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# **A MORAL OBLIGATION, AN ECONOMIC PRIORITY: THE URGENCY OF ENROLLING OUT OF SCHOOL CHILDREN**

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**HIGH LEVEL STRATEGIC MEETING  
TO ACCELERATE EFFORTS TO REACH  
OUT OF SCHOOL CHILDREN**

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## FOREWORD

It is easy and very appropriate to be outraged that more than 60 million children are denied their right to a quality education. There is ample evidence that the world has fallen very short in relation to its commitments to children's education. And, the current global economic climate with its effects of austerity, increasing unemployment, and financial instability makes it easier to look for ways to economize, to "tighten the belt", to cut costs. Unfortunately, this is also often interpreted as a reason to decrease investments. Thus, not meeting the moral obligation is somehow perceived as "understandable" due to economic exigencies.

The reality is, however, that this is exactly the time to invest in education—starting with those 61 million deprived of the opportunity to reach their potential because they cannot complete even a primary education.

This paper, a cooperative effort between Educate A Child and Results for Development Institute provides ample and significant evidence as to why investments in education are beneficial to the nation and its economy as well as to the individual. It does this in two ways. First, it presents evidence of the multiple benefits of education in several areas—economic, social, political, psychosocial and environmental and summarizes how these benefits have been measured. Second by using data from selected countries, it uses two different approaches to measure the cost, in terms of economic growth, of not providing primary education to children in these countries. This cost varies according to country—but it is unacceptably high.

There is no single answer, but it is very clear from the data that providing a quality primary education to all children has significant economic and other effects that are beneficial for nations and our global system. Investment in education is an engine that drives growth and development—especially when times are difficult. This paper demonstrates that there is every reason for us to rise to the challenge and meet the moral imperative of enabling children to fulfill their right to a quality education. Now.

This publication, the first technical document from Educate A Child, is shared to help enhance the understanding of the importance of investing in those marginalized children who are not in school and to catalyze debate and action that will result in this critical investment.

**Mary Joy Pigozzi, PhD**  
*Director, Educate A Child*

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## EXECUTIVE SUMMARY

Educate A Child (EAC)'s mission to support the Education for All initiative and Millennium Development Goal for education is more pressing and relevant than ever. Although significant progress toward achieving universal primary education has been made over the past decade, out-of-school children (OOSC) remain a pervasive global problem. According to UNESCO estimates, there are at least 61 million OOSC in the world (UIS 2012).

To underscore the importance of reducing the global number of out-of-school children, this paper summarizes the research on the multi-faceted benefits of primary education and estimates the economic costs of large out-of-school child populations. Part I of the paper reviews the literature on the benefits of primary education, covering the vast range of positive economic, social, political, psychosocial, and environmental impacts for individuals and society that are associated with primary education attainment. The evidence in Part I highlights the importance of primary education in breaking the intergenerational transmission of poverty and building dynamic, prosperous societies.

The second half of the paper uses two economic methods to estimate the cost of OOSC in six countries where OOSC are still prevalent (Bangladesh, Cote d'Ivoire, Democratic Republic of Congo, India, Mali, and Yemen). The six countries were selected to provide geographic variety and on the basis of data availability. Bangladesh, Cote d'Ivoire, and India are EAC countries where EAC is operational, and the Democratic Republic of Congo (DRC) and Yemen are both EAC priorities. The first estimation approach uses labor market data to estimate the total earnings that will be forfeited in the near future due to undereducated workers (today's population of out-of-school children). The second approach consists of a macroeconomic model that estimates the income gap that has resulted from large past populations of out-of-school children.

Part II reveals that for many countries with high OOSC prevalence, the economic benefit associated with achieving universal primary education exceeds multiple years of economic growth. There are significant economic incentives to educate current OOSC populations (up to 7% of gross domestic product) and even larger potential gains from providing remedial education to the OOSC of past generations. Taken together, the findings of this report should provide impetus for efforts to reach out-of-school children and ensure that all citizens have access to primary education and the opportunity to reach their full economic and social potential.

## ACRONYMS

**DRC:** Democratic Republic of Congo

**EAC:** Educate A Child

**EFA:** Education For All

**GDP:** Gross Domestic Product

**GMR:** Education For All Global Monitoring Report

**HDI:** Human Development Index

**MDG:** Millennium Development Goals

**OOSC:** Out-of-School Children

**UIS:** UNESCO Institute for Statistics

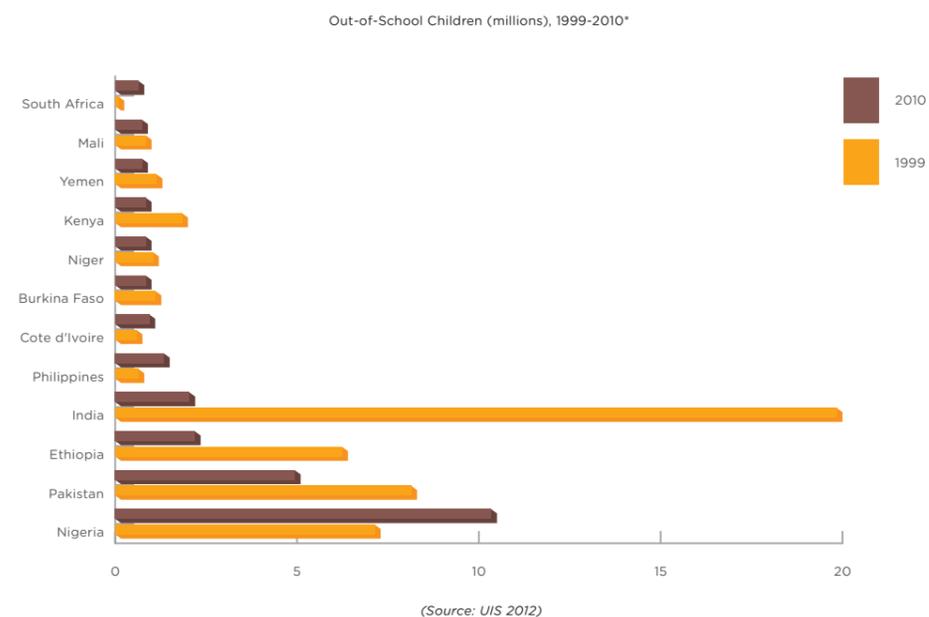
**UN:** United Nations

## INTRODUCTION

Primary education is a core component of development strategies, and one that the international community has embraced consensually. Coordinated, global efforts to achieve universal primary education began in the 1960s. The Education for All (EFA) movement gave those efforts renewed vigor starting in 1990, and further reinforcement came ten years later at the international conference on education in Dakar, Senegal. Goal 2 of the EFA agenda is: “Ensuring that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to, and complete, free and compulsory primary education of good quality.” Similarly, Goal 2 of the Millennium Development Goals (MDG) is to “ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.”

Despite these initiatives, over 61 million children of primary school age were expected to never enroll in school, start school late, or had already dropped out in 2010 (UIS 2012). These are the world’s out-of-school children (OOSC). Nearly half of them were expected never to enroll in school, while the rest either had already dropped out or expected to enroll late. Significant progress in achieving universal primary education has been made over the past decade, as the global number of OOSC dropped by 44%, from 108 million. However, much of those gains were achieved between 1999 and 2004, and progress in reducing OOSC has stagnated in recent years (GMR 2012).

Figure 1: Progress in Reducing the Number of OOSC in High Burden Countries has been Uneven



\* Data are for closest years to 1999 and 2010 with available data (1999, 2000, or 2001 and 2008, 2009, or 2010 depending on the country).

Considerable regional variation underlies the aggregate trend in OOSC. Although the global absolute number of OOSC has fallen since 1999, the number of OOSC has increased in many countries. Twelve countries alone, eight of which are in Sub-Saharan Africa, account for half of the world’s OOSC population (Figure 1). With significant progress being made in South and West Asia, a growing concentration of OOSC are in Sub-Saharan Africa, which is home to over half of OOSC. In Sub-Saharan Africa, the number of OOSC rose from 29 million in 2008 to 31 million in 2010. Over one-sixth of all OOSC are in Nigeria (GMR 2012), where the rate of OOSC has actually increased since 2001. In some countries, the lack of progress in reducing OOSC can be attributed to disruption from armed conflict (e.g. the Democratic Republic of Congo), ethnic discrimination (e.g. the Kurds in Iran) and natural disasters (e.g. floods in Pakistan).

There is also notable concentration of out-of-school children within demographic groups. Data shows a sizable gender gap in global enrollment (53% of OOSC were female in 2010), and that gap is even more pronounced in certain countries (61% of OOSC in Mozambique are female). The income gap is on average even larger than the gender gap in primary education attendance. Children from the poorest families are overwhelmingly overrepresented in OOSC populations across countries, because the private costs of attending school are more prohibitive to the poor. In Mali, for example, 75 out of 100 children from the richest quintile of households enter school, compared with 26 out of 100 from the poorest households (Delprato 2012). Recent household surveys (2005-2009) from eight countries show that school fees are a common deterrent to enrollment (GMR 2012). Many countries, including Kenya, Mozambique, and Ethiopia, have taken steps to address this by abolishing school fees, and have observed an increase in enrollment (World Bank 2009). However, other financial obstacles remain. On top of school fees, books, supplies, clothing, transportation costs, and private tutoring are all expenses that richer families are better equipped to defray.

Furthermore, attending school imposes an opportunity cost that is most burdensome to the poorest families. They are faced with a decision between putting their children to work and enrolling them in school. The direct and indirect costs of schooling are more likely to induce families at the lower end of the income distribution to substitute child education for child work, whether at home or in the labor market. Even in countries where access to education is equal, children from richer families are more likely to stay in the system and complete primary education (GMR 2012). Schemes that lower barriers to enrollment, reduce dropout and promote attendance (such as conditional cash transfers) have high social rates of return, because they allow individuals and societies to access the benefits of primary education.

In summary, OOSC are a significant and persistent phenomenon, and they are concentrated geographically (Africa and South Asia) and demographically (females and children in poverty). Due to their exclusion from school, OOSC forgo the benefits of primary education, which are discussed in Part I of this paper. In Part II, it is shown using two economic cost estimation approaches that the sheer number and high prevalence of OOSC in certain countries represents a major economic failure – an underinvestment in human capital that could result in an income gap of as much as 7% of GDP.

## PART I: THE BENEFITS OF PRIMARY EDUCATION IN DEVELOPING COUNTRIES

While an established body of research affirms that primary education has wide-ranging benefits at both the macro and micro levels, the recent stagnation in out-of-school reduction makes this a critical time to reflect on how primary education affects individuals, their families, and their communities, and to reenergize global efforts to reach out-of-school youth. Part I presents a concise and comprehensive snapshot of recent research on the benefits associated with primary education. Although this summary is organized thematically, it is important to note that most of these themes are interconnected, since education affects all aspects of one’s life and, through externalities, communities at large.

### PRIMARY EDUCATION, A BASIC HUMAN RIGHT FOR ALL

Education is a basic human right for all, as stated in Article 26 of the 1948 Universal Declaration of Human Rights: “Everyone has the right to education.” The Declaration propounds that basic education should be free and compulsory. Increasing access to education is consequently one of the necessary preconditions to realizing this right, and in the wake of the Declaration, the UNESCO Education for All initiative and other major international human rights treaties and global education conferences (e.g., Jomtien in 1990, Dakar in 2000, Jakarta in 2005) have advocated for the universal right to education. Along the same lines, the United Nations has developed legal instruments for signatory country obligations to protect and uphold the right to education for all (UNESCO and UNICEF, 2007).

Education is an intrinsic, inalienable, and indivisible human right in and of itself, thus implying that primary education does not require an instrumental value to be mandated. However, education is also a vehicle for achieving other human rights, as well as human and economic development for individuals and their communities (see Table 1). Possessing basic knowledge, having access to the necessary resources and enabling contexts, and being involved in the community are all basic capabilities for human development (UNESCO, 2003). Evidence on the positive economic returns associated with primary education (discussed later in this section) “adds further impetus to the human-rights rationale for expanded support” for basic education (Mertaugh, Jimenez, and Patrinos, 2009).

Table 1: Conceptual Framework Highlighting Education as a Universal and Indivisible Human Right

The right of access to education	Education throughout all stages of childhood and beyond Availability and accessibility of education Equality of opportunity
The right to quality education	A broad, relevant, and inclusive education Rights-based learning and assessment Child-friendly, safe, and health environments
The right to respect in the learning environment	Respect for identify Respect for participation rights Respect for integrity

(Source: UNESCO and UNICEF, 2007)

### ECONOMIC BENEFITS OF PRIMARY EDUCATION

A rich body of research has explored the effects of education on the economy. One of the most heavily explored themes is the private (for the individuals being educated) and social (for the communities those individuals live in) economic returns to education, and how those returns vary geographically, intertemporally, demographically, and by education level. These studies use varied theoretical and statistical approaches to compare the costs and benefits associated with investing in education (Mertaugh, Jimenez, and Patrinos, 2009).

According to human capital development theory, investing in education is a means for increasing an individual’s productivity. This is in turn linked to access to better jobs, potentially leading to higher earnings as well as opportunities for social mobility (Patrinos, 2007). In contrast, signaling theory proposes there is a positive correlation between years of education and earnings only because the level of education completed operates as a signal of an individual’s inherent abilities, productivity, or motivation for prospective employers. Thus, schooling completion is not necessarily indicative of productivity gained from education (Riddell, 2006). Spaul (2012) notes that in developing contexts, human capital theory is more suitable to the analysis of primary school education than the signaling theory approach, because elementary reading and numeracy skills are fundamental precursors to individual productivity.

#### Effects of Primary Education at the Macro Level

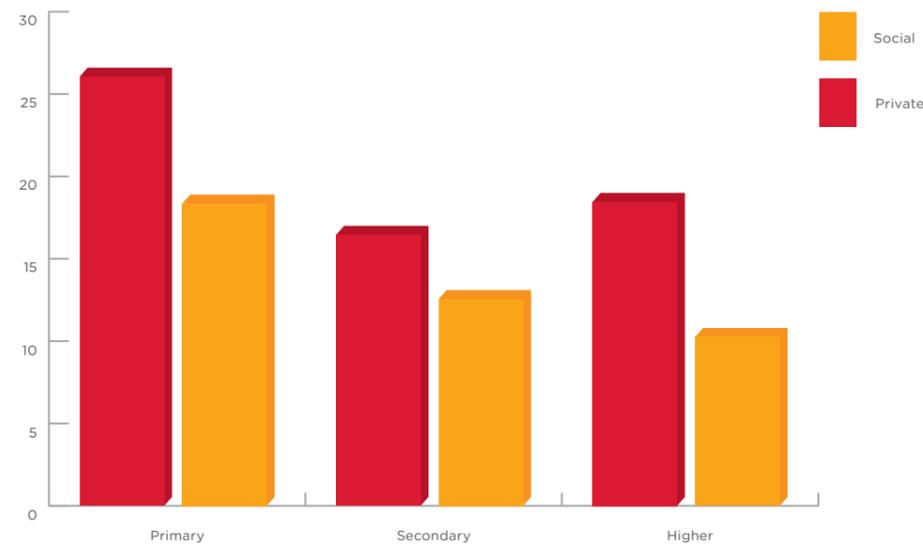
While a number of studies examine the effect of education levels on countries’ economic growth, results vary and there is no conclusive evidence that primary education has a macroeconomic impact on growth. Some studies do find a significant effect of primary education on macro-level growth, but with large time lags (McMahon, 1999). A large-scale study spanning 100 countries between 1960 and 1995 reveals that while there is a positive, significant correlation between the number of secondary school years completed by males and economic growth, the number of years of primary school is not found to be significantly associated with growth (Barro, 1999). Empirical evidence also shows that the macro effect of education varies based on a country’s level of development. For example, some earlier studies note that returns were the largest for the primary level in low-income countries, such as Mingat’s study (1996) spanning 1960 to 1985. In these cases, primary education has even higher returns due to its role as a gateway to higher education and the economic benefits associated with secondary and tertiary schooling (Patrinos and Psacharopoulos, 2011).

There is some ambiguity on whether the benefits of education are greater for the individual or society. In a study of farming output in Ethiopia, Weir (1999) provides evidence that the social benefits of schooling are larger than private benefits. Across 14 villages, completing an average of one extra year of school in the village was found to have a larger effect on farm productivity than increasing household educational attainment by an average of one year. On the other hand, a number of studies note that the macroeconomic returns are lower than those for individuals, in part because of education being supported financially through public investments (Boissiere, 2004). This may be because macro-level rates of returns are generally calculated based on earnings and do not account for the benefits associated with positive social externalities, such as improved equity, public health, and security, which are difficult to quantify (Colclough, Kingdon, and Patrinos, 2009). If externalities were included in calculations to quantify the true benefit of education, some analysts estimate that the social returns would double the private returns, with primary education producing more externalities than secondary and tertiary education (Jimenez and Patrinos, 2008).

### Effects of Primary Education at the Micro Level

For developing countries between the 1960s and the 1990s, the economic benefits (and returns) of education for individuals are generally found to be high, with returns to the primary level the highest (see Figure 2). Primary and secondary education also have an equalizing effect, as they were found to reduce income dispersion (Keller, 2010). However primary education enrollment rates alone were not sufficient to decrease inequalities in income distribution, unless accompanied by increases in education quality.

Figure 2: Returns to Investment in Education Level



(Source: Psacharopoulos and Patrinos, 2004)

Earlier studies found that each additional year in school is associated with a 10 to 30 percent increase in hourly wages (Psacharopoulos, 1994). The private returns to primary education were found higher for males (at about 20 percent versus 13 percent for females), while females had higher returns to secondary schooling (Psacharopoulos and Patrinos, 2004; The World Bank, 2008). One study also showed that in India, a country with high absolute numbers of OOSC, primary education had a strong causal effect on the growth of individual incomes between 1966 and 1996 (Self and Grabowski, 2004).

Recent studies show that the pattern of economic private returns to education has evolved over the past two decades. Since the 1990s in developing countries, economic returns for individuals have increased for the secondary and tertiary levels, whereas returns to the primary level have been slightly lower, or have increased at a slower pace (Psacharopoulos and Patrinos, 2004; Verspoor, 2008). In a meta-analysis, Colclough et al. (2009) summarize the findings of 18 studies on wage workers from 26 countries in Africa, Asia, and South America in the 1990s and 2000s, which find that the overall return to one extra year of education actually increases with the level of education. In other words, the higher the education level completed, the higher the economic benefit for an individual.

This phenomenon emerged simultaneously with the overall increase in schooling levels in developing countries. Aromolaran (2006) reached the same conclusion for Nigeria, another country with a serious OOSC problem, where the private returns to schooling have been small for both males and females at the primary level (2 to 3 percent) and the secondary level (4 percent) since the 2000s, but are substantial at the tertiary education level, at around 10 to 15 percent. In addition, Mertaugh et al (2009) cite the examples of Argentina, Mexico, and Thailand, where workers who only completed primary education have been more vulnerable during periods of economic crisis, in particular to job loss and falling wages, compared to workers with a secondary or tertiary-level education.

Studies provide different possible explanations for the decline in private returns to primary education (UN Millennium Project, 2005; Colclough et al., 2009). First, the increase in primary school enrollment and completion has made the pool of primary-educated workers larger, driving the wages down for workers in that category. On the demand side, the technology-driven demand for more specialized skills on the labor market has increased, and primary education does not provide for these skills. Second, this change could be related to diminished quality of skills delivery in primary schools. In India, for example, completing five years of primary education was found to not guarantee the acquisition of basic literacy and numeracy skills for a high proportion of students. This could be linked to a reduction in per student public expenditures (due to increased primary school enrollment), or perhaps to the increase in enrollment of pupils with parents with no education, for whom “informal home-based learning is therefore more constrained” (Colclough, Kingdon, and Patrinos, 2009).

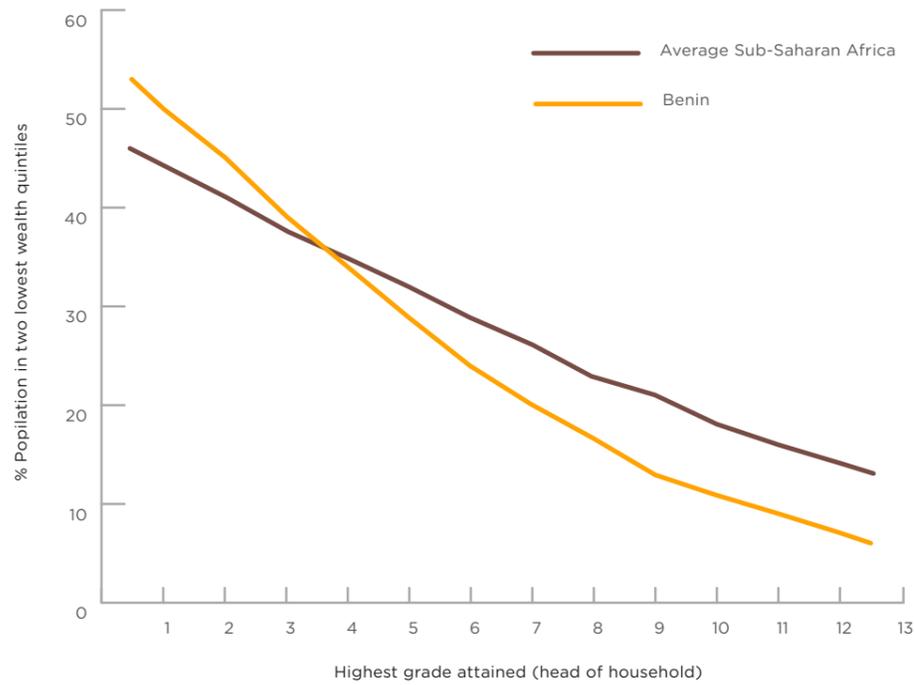
A few important remarks should qualify the findings above. First, despite the modest recent decline in private returns to basic education, and although variations exist across and within countries, the average benefits of primary education for individuals remain high (Mertaugh et al., 2009). This is especially the case in Africa and South America (Michaelowa, 2000; Psacharopoulos and Patrinos, 2004). Second, the effects of recent global initiatives aimed at improving education quality, not only on learning outcomes but on individual earnings, will take time to manifest. Consequently, longer periods of time are needed to obtain meaningful data and to show the relationship between an individual’s schooling and his or her labor market experience.

Third, these studies generally examine private economic returns to education using wage-based employment data. Wage workers, however, do not make up the majority of the typical workforce in many developing countries, especially low-income countries where high absolute or relative numbers of OOSC can be found. Across 23 countries in Sub-Saharan Africa, nearly 90 percent of those employed worked in the informal sector in the early 2000s, with 72 percent of that 90 percent engaged in farming. Research establishes that education increases farming output by imparting general skills and by inspiring pro-innovation attitudinal change, which encourages the adoption of technical innovations. Mertaugh, Jimenez, and Patrinos (2009) find that increases in the average level of primary schooling has a positive effect on farming output in Uganda, India, and the Philippines, while Fox et al. (2012) find that acquisition of primary education facilitated mobility to higher productivity sectors and enabled more efficient use of households’ labor resources in Mozambique.

**Primary Education's Role in Breaking the Cycle of Poverty and Facilitating Equity**

Education attainment and risk of poverty are intrinsically related. In Sub-Saharan Africa, Majgaard and Mingat (2012) established that the risk of being poor declined from 46 percent for individuals with no education to 28 percent for those who completed six years of education.

Figure 3: Relationship between Educational Attainment and the Risk of Poverty, Benin 2001, and Sub-Saharan Africa Average



(Source: Majgaard and Mingat, 2012)

(Source: Majgaard and Mingat, 2012)

Enabling access to and success in primary education contributes to breaking the intergenerational transmission of poverty. Bird and Higgins (2011) describe it as the private and public transfer of deficits in household assets and resources from one generation to another. This transmission is a complex, systemic process involving household and extra-household factors (see Table 2) along the entire lifecycle, and successfully breaking the cycle therefore necessitates a holistic approach and multi-sectoral interventions. This is in part why primary education enrollment has extensively been targeted through global initiatives in the past decades (UNESCO and UNICEF, 2011).

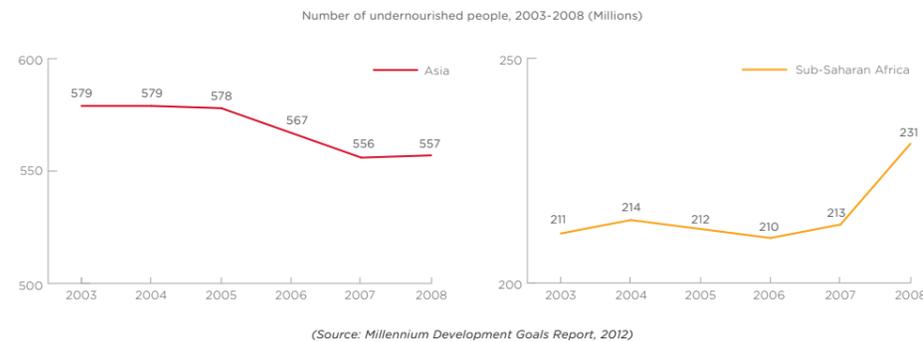
Table 2: Household and Extra-household Level Factors that Influence the Intergenerational Transmission of Poverty

Household Factors	Extra-household Factors
Household characteristics	Discrimination (caste, religion, ethnicity)
Parental income	Cultural norms and psychological factors
Access to productive assets	Poor governance
Education and skills acquisition	Social capital and networks
Health and nutrition	Macroeconomic shocks
Quality of parenting, nurturing, and socialization	Conflict
Early exposure to violence	
Intra-household discrimination against females	
Child-lead households	
Early childbearing	
Child labor	

Adapted from Bird and Higgins, 2011

Investing in primary education justifiably remains a core component of poverty-reducing development strategies. Bird and Higgins (2011) note that when individuals become educated, they acquire human capital, which allows individuals to derive benefits from other assets and enable them to exit poverty. Acquisition of education also somewhat insulates individuals from being as vulnerable to economic shock, crisis, or conflict. Figure 4, for example, shows that countries in Sub-Saharan Africa (where levels of completed education are broadly lower) were hit harder than Asian countries by food and financial crises, and the numbers of undernourished individuals subsequently surged.

Figure 4: Sub-Saharan Countries were Hit the Hardest by the Food and Financial Crises



(Source: Millennium Development Goals Report, 2012)

Acquisition of primary education facilitates resilience and the maximization of other assets throughout one's life and beyond to the next generation. Because educated mothers are more likely to provide good care and send their children to school, females play a central role in breaking the cycle of poverty and inequalities (UNICEF 2007). As such, education policies and programs aimed at increasing female access to quality education generally have a tremendous effect on poverty reduction across generations. Persistently large proportions of out-of-school girls result in persistently high youth and adult illiteracy. This represents colossal missed growth potential and family welfare loss, given that women's work is closely integrated with household production systems, and that women's income is more likely to benefit the family through the provision of children's food, clothing, health services, and education.

Women's central role in the rural and informal economy has been evidenced repeatedly. In the mid-1990s in Sub-Saharan Africa, women performed 90 percent of work related to processing food crops, providing water and fuel-wood for households; 80 percent of work related to food storage and transport from farm to village; 90 percent of hoeing and weeding; and 60 percent of harvesting and marketing (Blackden and Bhanu, 1999). Education for a girl from a young age compounds over time and helps her pass the benefits to her progeny, positively affecting opportunities for the next generation. Indeed, children accessing primary education not only increase their own human capital – leading to better earnings, better health, increased resilience, etc. – but also tend to transmit the value of education to their children. Conversely, girls who do not attend school (most likely those from poor families) transmit low human capital, and her children are likely to be uneducated and have low earnings as well.

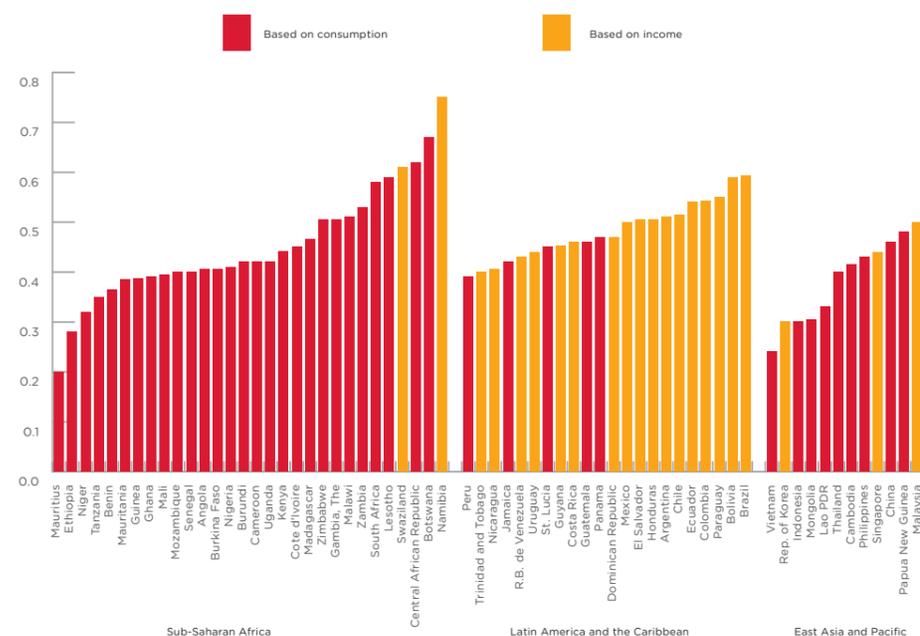
At the macro level, education, poverty reduction, and economic growth are all interconnected (World Bank Independent Evaluation Group website; UN Millennium Project, 2005). In past decades, countries whose economies have grown the fastest have also achieved the most poverty reduction. Conversely, countries that had slow economic growth experienced the greatest escalation of poverty. As Boissiere (2004) notes, these interlinkages should be supported through policies for human capacity development related to education, health, social protection, and decision-making:

“[E]conomic growth is all the more powerful in reducing poverty when coupled with good policies for human capital development, which promotes more equal income distribution. ... [A] virtuous circle can be established in which policies such as promoting high-quality basic education contributes to growth and reduced inequality, which in turn stimulates more growth allowing for more education.”

Equity appears to be closely linked to education and poverty reduction as well. A World Bank report (2005) defines equity in terms of equal opportunity (such that economic, sociocultural, and political prospects are based on the efforts or talents of the individual, regardless of circumstances of birth) and avoidance of absolute deprivation (such that societies consider mediation for individuals in the most dire poverty circumstances). Research shows that inequity in access to education contributes to other inequities in individual well-being, and is also closely related to an individual's ability to think and affect the world around them. Since this capacity may be acquired through education, access to and completion of quality primary education is crucial.

Consequently, the improvement of equity needs to be more strategically and cohesively embedded in education policies in order to achieve greater social justice for individuals as well as facilitate development processes. However, as noted earlier, access to schooling “is only a small part of the problem. Greater access needs to be complemented by supply-side policies (to raise quality) and demand-side policies (to correct for the possibility that parents may underinvest in the education of their children for various reasons)” (The World Bank, 2005). Since Sub-Saharan Africa has the highest levels of inequality across regions (see Figure 5), investment in primary education appears all the more necessary to alleviate inequities.

Figure 5: Sub-Saharan Africa has the World's Highest Levels of Inequality (Based on Income and Expenditure Gini Coefficients)



(Source: The World Bank, 2005)

In addition to socioeconomic equity, it is important to note another dimension of equity – gender equity. According to cultural norms in many developing countries, the traditional sphere of influence of women is home production (e.g. childcare and agriculture). This isolates women from outside markets where socioeconomic status is determined. Gender inequities are also apparent in education systems, yet tremendous improvements are evident, according to various education indicators (UNESCO 2012). Progress has been made toward gender parity, but regions with large OOSC populations still lag behind (UNESCO 2012). Girls now enroll at a higher pace than boys at all education levels, and they have higher retention and completion rates as well, but gender disparities in years of schooling remain significant in South Asia and Sub-Saharan Africa (World Bank, 2005).

### Primary Education: A Necessary Step on the Education Continuum

Primary schooling is not intended to be the end of a student's education. Rather, it opens doors to the post-primary levels, which are associated with higher economic returns. "The measured returns to basic education understate the full returns to basic education because they do not include the role of basic education in raising the earnings of individuals who go on to secondary and higher education after completing basic education." (Mertaugh, Jimenez, and Patrinos, 2009) Hence, primary education is a necessary step to reach higher levels along the education continuum (UNESCO and UNICEF, 2011). Early childhood education has also been recently explored as an essential link on this continuum (The World Bank, 2007).

The levels of education are all interrelated, so investing resources in one benefits the others, in terms of both access and quality (Michaelowa, 2007). For example, imparting primary school pupils with strong cognitive skills contributes to their successful transition to the secondary school level. Likewise, devoting resources to secondary education complements the goal

of universal primary education, since increased availability and quality of instruction at the secondary level may encourage families to ensure their children complete primary school (Deininger, 2003).

To summarize, there is strong and multi-dimensional evidence on the economic benefits of primary education. At the micro level, primary education (mostly through skills acquisition) is shown to have a strong, positive, causal effect on an individual's earnings and productivity. It also enables individuals to access higher-level employment and break the intergenerational cycle of poverty. While evidence on the macroeconomic returns to years of schooling is less conclusive, skills are found to be associated with macro-level growth. It is also important to note that the difficulty in identifying and quantifying the externalities associated with education means that there may be further, unmeasured economic benefits associated with primary education.

## SOCIAL BENEFITS OF PRIMARY EDUCATION

The social benefits of primary education, although "generally not thought of as economic ones ... may serve as background for social stability that would allow economic benefits to bear fruit." (Boissiere, 2004).

### Education, an Instrument for Social Reproduction and Social Change

Since education is a product of society, it represents what societies believe in and how they do things. Education is therefore a powerful cultural instrument that enables societies to either reproduce their values or embrace change (UN Millennium Project, 2005; UNESCO, 2005). Primary education constitutes the first building block in transmitting a society's intrinsic values to children, so that its culture may be preserved. Primary education can also help transform values, outlooks, or behaviors, promoting positive changes within a society. Critical thinking and self-reflection are two important skills that drive these cultural mechanisms.

Consequently, systemic decisions regarding what primary curricula will encompass (learning contents), how knowledge and skills will be transmitted (pedagogy and teaching methods), and who will receive this education (beneficiaries, location, availability), are all part of the social reproduction process. These decisions may lead to the perpetuation of social stratification, or alternatively contribute to a "new social equilibrium." (UN Millennium Project, 2005)

### The Effect of Primary Education on the Next Generation's Education

A mother's education level plays a key role in predicting her children's school attainment. A UN Millennium Project report (2005) summarizing findings from Egypt, Ghana, India, Kenya, Malaysia, Mexico, Pakistan, and Peru found this effect to be even stronger for daughters and significantly larger than the effect of a father's educational attainment. For example in Peru, mothers' educational levels were found to increase daughters' school enrollment by as much as 40 percent more than fathers' educational levels.

The UN Millennium Project report (2005) explains that maternal education may impact their children's enrollment through several mechanisms. First, since education is related to one's earning capacity, labor force participation, and ability to manage economic resources, mothers with a primary education may better provide the resources necessary to send their children to school. Second, mothers with a primary education may be able to provide a more intellectually stimulating home environment, for example through helping their children with homework or engaging in thought-provoking discussions. Third, mothers with a primary education who value the instruction they received can better communicate the importance of education to their children. For instance, in Latin America, children of employed mothers were

more likely to enroll in school and complete higher levels of education than those whose mothers did not work. On average, a mothers' participation in the labor market was found to prolong their child's schooling by two to three years.

#### Primary Education and Crime

As summarized by Soares (2004), the economic theory of crime posits that criminals respond to economic incentives similarly to how law-abiding workers respond to income, urbanization, and institutional development. He tests the relationship between crime rates and development using data from a cross-country study of thefts, burglaries, and contact crimes. The apparent positive correlation between crime and development that previous studies reported comes from the fact that more developed countries tend to have better crime-reporting systems. Using new data, the study finds that gross primary school enrollment rates are negatively correlated with thefts and contact crimes, while economic growth is negatively related to thefts only. The other variables in his model - income, urbanization, police presence, and religion - do not have statistically significant effects on crime. This leaves primary education as a strong determinant of lawfulness.

#### Primary Education and Social Cohesion

Research has explored the relationship between education and social cohesion. Social cohesion, which brings together a nation's diverse groups under one unifying banner despite their differences, is also "seen in the manner in which an individual is accepted in the same or diverse group. Individuals' perception about their participation and level of acceptance in the group [thus] influences their sense of belonging and therefore attitude as members of the group." (Tabane and Human-Vogel, 2010). The connection was studied for South Africa, a country where the ideal of developing a non-racial and equitable school environment is clearly stated in the constitution. Participants in a focus group indicated that schools help create a sense of belonging by fostering respect and equal treatment, thus contributing to a more cohesive society. Heyneman (2003) suggests that educational systems could potentially contribute to social cohesion by teaching the rules supporting a given sociocultural structure, enabling children to form social connections, providing equal opportunities to children, and combining the interests of many under one umbrella.

## HEALTH BENEFITS OF PRIMARY EDUCATION

The effect of primary education on health has been explored in great detail for over forty years. There is considerable evidence that the two are positively and significantly associated, across time and countries. This linkage is especially important to girls' education, since eventually girls become the primary caregivers of their household. There is strong evidence that education improves health literacy and health outcomes, but the following section focuses on causality flowing from education to health.

#### Primary Education and Reproductive Behaviors

High fertility is a particularly acute problem in high-burden countries with large absolute numbers or proportions of out-of-school children (see Table 3). In Sub-Saharan and Middle Africa, fertility levels have not declined much in the past 25 years compared to the rest of the world. The total fertility rates in African countries between 2000 and 2005 ranged from a high of seven births per woman in Niger to a low of three in South Africa (Bongaarts, 2010). High fertility rates have a negative impact on health outcomes, such as maternal mortality and infant mortality. There is wide agreement that slower population growth opens the window to lower dependency ratios, higher saving rates, and increased labor force participation among women. To summarize, high fertility rates have a heavy economic cost and social cost as well.

Research generally shows a strong negative correlation between educational attainment and fertility rates, as well as a strong positive correlation between educational attainment and intervals between births, even after various other socioeconomic and behavioral factors are controlled for (UNESCO, 2006). At the macro level, each additional year of schooling for girls reduces national fertility rates by 5 to 10 percent. At the micro level, a woman's fertility rate is reduced by nearly one birth when she gains four extra years of education. In Sub-Saharan Africa, according to Demographic and Health Survey data, a woman with no education has her first child at 18 and on average 3.2 children by the age of 30, while a woman who has completed secondary education has her first child at age 20 and 2.2 children by 30 (Majgaard and Mingat (2012). Brazilian and Peruvian women with no education have about six children, while those with a secondary education have about three (UN Millennium Project, 2005).

Table 3: Total Fertility Rates in Countries with High Absolute Numbers or Proportions of Out-of-School Children

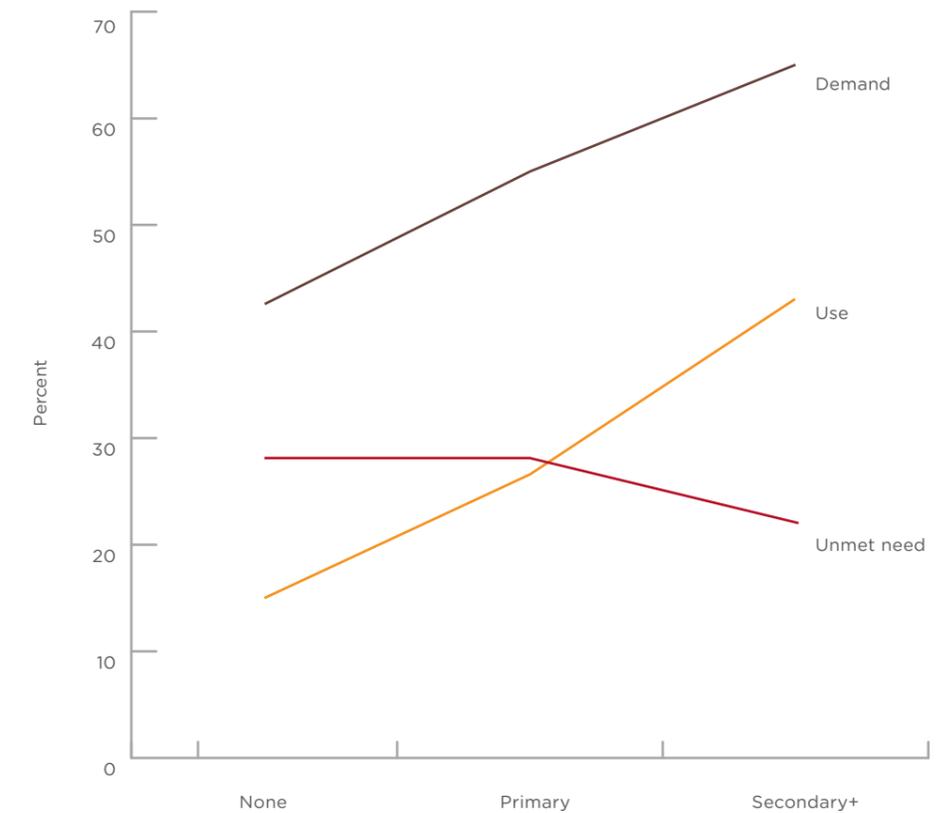
	In 2000 (number of births/woman)	In 2011 (number of births/woman)	Difference
Burkina Faso	6.3	5.8	-0.5
Cote D'Ivoire	5.2	4.3	-0.9
Democratic Republic of Congo	6.9	5.7	-1.2
Ethiopia	6.1	4.0	-2.1
India	3.1	2.6	-0.5
Kenya	5	4.7	-0.3
Mali	6.8	6.2	-0.6
Niger	7.5	7.0	-0.5
Nigeria	5.9	5.5	-0.4
Pakistan	4.5	3.4 (in 2010)	-1.1
Philippines	3.8	3.1	-0.7
Yemen	6.5	5.1	-1.4

(Source: The World Bank, <http://data.worldbank.org/indicator>)

**Note:** Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.

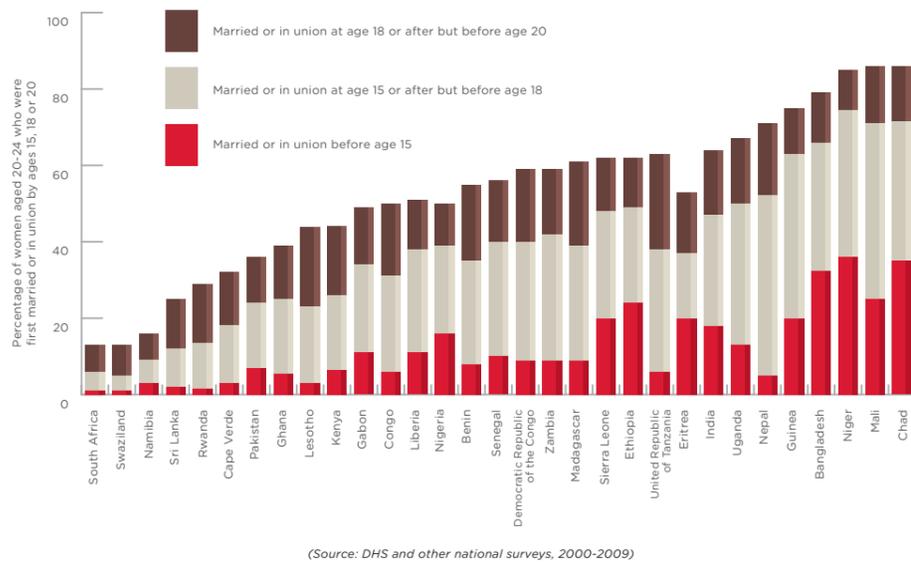
The mechanisms through which education and fertility are linked have been widely researched. Education affects “infant mortality and child health, spouse choice, marriage age, female employment outside the home, and the costs of educating children,” (UNESCO, 2006) as well as desired family size, contraceptive use, and demand for contraception; characteristics which are all associated with lower fertility rates. Educated women in Sub-Saharan Africa tend to use contraceptive methods more, as shown in Figure 6. 28 percent of women with no education versus 55 percent for women with upper secondary education use contraception.

Figure 6: Demand for and use of Contraception by Level of Education (Average of 30 Countries in Sub-Saharan Africa)



Lastly, age at first marriage, which is linked to education level, is also associated with lower fertility rates. In Africa, women with seven or more years of schooling tend to marry about five years later than women with no education. Figure 7 shows that in countries with high rates of OOSC, such as Mali, India, and Ethiopia, early marriage (by age 20) is common practice for at least 50 percent of women.

Figure 7: Marriage by Age of First Union in Selected Countries with Available Disaggregated Data



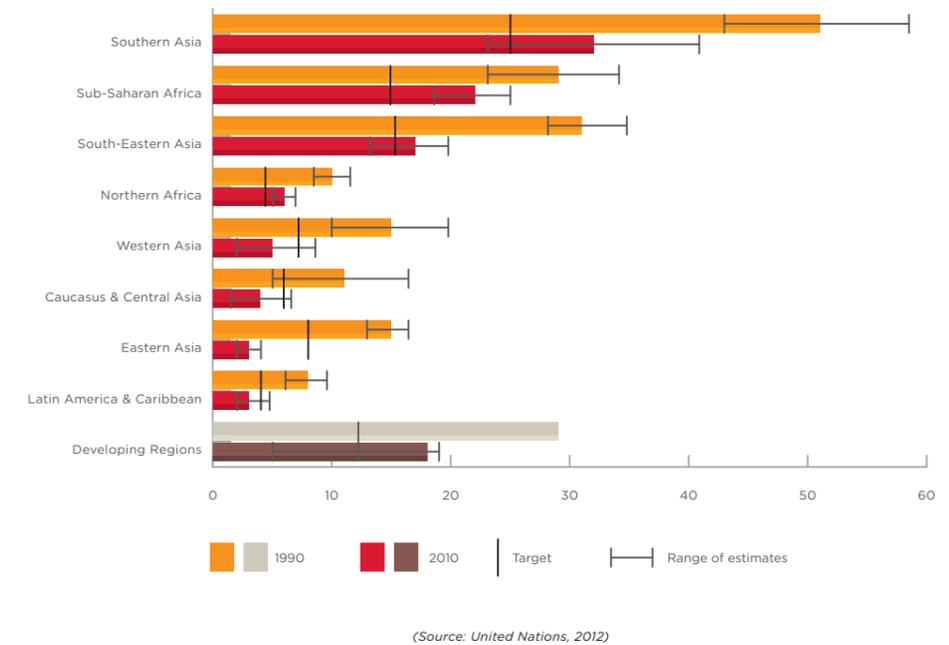
(UNICEF, 2001)

There are intergenerational links between primary education and family size as well. Research demonstrates that children from large families complete fewer years of school than their counterparts from smaller families. This can usually be attributed to the dilution of resources among multiple children, or the necessity to have children contribute to family income. In turn, limited education has an adverse effect on a child's ability to escape poverty, since his or her skills will not match those demanded by the labor market. The individual is less likely to escape from poverty and thus likely to have more children, perpetuating the cycle.

**Primary Education and Nutrition**

Proper nutrition is a vital requisite for any individual to function. Malnourished or undernourished children, who tend to be underweight, are more prone to sickness and impaired physical and cognitive development. Without an adequate diet, in terms of both quality and quantity, children may not have the necessary strength to learn in school. Malnutrition leads to sickness, which leads to school absenteeism and poor learning outcomes. Unfortunately, malnutrition is rooted in poverty across and within developing countries: children living in poor households are three times more likely to have stunted growth (United Nations, 2012). Rural areas are also more affected: children who live in rural areas are twice as likely to have stunted growth (United Nations, 2012).

Figure 8: Proportion of Children under 5 who are Moderately or Severely Underweight



(Source: United Nations, 2012)

Progress remains slow and is not uniformly shared among countries. Malnutrition remains a rampant problem in Sub-Saharan Africa and South Asia in particular. These two regions have the highest percentage of undernourished individuals, at 27 percent and 22 percent, respectively (UNESCO, 2012). The problem is particularly acute for children, as shown in Figure 8. Given the rapid population growth and slow nutrition progress in Sub-Saharan Africa, the number of stunted children actually increased in the region from 38 to 55 million between 1990 and 2010 (UNESCO, 2012). In 2010, 16 out of 24 Sub-Saharan countries had more than 40% of children with stunted growth. The region's share of global stunting also increased from 15 to 32 percent in that timeframe. That proportion is projected reach 42 percent by 2020. Similarly in India, despite remarkable levels of growth in the past decades, stunted growth remains high due to poor maternal nutrition, low birth weight, high levels of poverty, and low levels of maternal education. The impact of severe malnutrition is irreversible - Save the Children (2012) calls it a "life sentence for children."

Evidence from research conducted in past decades shows that women's education is strongly and significantly associated with decline in malnutrition, although the precise mechanisms linking education and nutrition are yet to be fully understood (Abuya, Ciera, and Kimani-Murage, 2012). A study of slums in Kenya shows that a mother's level of education is robustly associated with declines in children's malnutrition. In Brazil, the expansion of primary schooling, accompanied by improvements in maternal and child health services, was credited with decline in child malnutrition as well as inequity (UNESCO, 2012).

### Primary Education and Health

In the past decades, under-five childhood mortality declined by 35 percent between 1990 and 2010, from 97 to 63 deaths per 1,000 births (United Nations, 2012). However, in countries with large numbers or proportions of OOSC, the under-five mortality rates tend to remain high, as shown in Table 4.

Table 4: Under-five Mortality Rates in Selected Countries with High Numbers or Proportions of Out-of-School Children

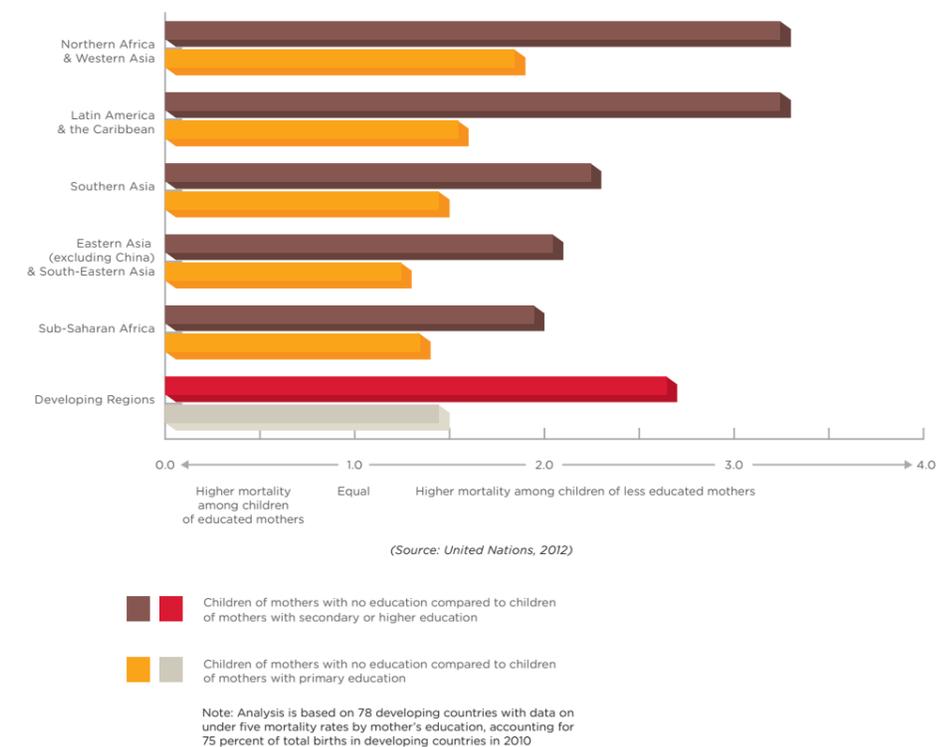
	2000 (per 1,000 live births)	2011 (per 1,000 live births)	Percentage Point Change
Burkina Faso	182	146	-36
Cote D'Ivoire	139	115	-24
Democratic Republic of Congo	181	168	-13
Ethiopia	139	77	-62
India	88	61	-27
Kenya	113	73	-40
Mali	214	176	-38
Niger	216	125	-91
Nigeria	188	124	-64
Pakistan	95	72	-23
Philippines	39	25	-14
Yemen	99	77	-22

(Source: The World Bank, <http://data.worldbank.org/indicator>)

In these countries the decline in childhood mortality actually accelerated in the decade spanning from 2000 to 2010 (2.5 percent per year, compared to 1.9 percent per year in the 1990s) (UNESCO, 2012). UNESCO (2012) suggests that half of that decline was due to increased education levels among women of reproductive age. Three regions, however, have had slower rates of decline than the others: Oceania, Sub-Saharan Africa, and South Asia. Slower declines in the latter two were associated with the low average educational attainment of women in these regions (UNESCO, 2012). Sub-Saharan Africa had the highest rate of neonatal mortality, at 35 deaths per 1,000 live births in 2010, as well as the highest rate of under-five mortality, at 121 per 1,000. The region also now has a larger share of child deaths: in 1970, 19 percent of the 16.6 million children world-wide dying before the age five lived in Sub-Saharan Africa, while the corresponding figure in 2010 was 49 percent of the 6.6 million children (UNICEF, 2012). In these two regions, children from poor households or rural areas are now even more likely to die by age five. However, disparities were also noted across countries within the region. For example, Niger, Malawi, Sierra Leone, and Liberia successfully managed to decrease their child mortality rates by 100 deaths in that timeframe.

The effect of women's education on health is particularly strong, and has been explored in detail. Mothers' education is strongly and significantly associated with their children's chances of survival before age five, as shown in Figure 9. Education is also positively linked with the likelihood of receiving prenatal health services in Sub-Saharan Africa, which improve newborns' health prospects (Majgaarden and Mingat, 2012). Children whose mothers completed secondary education or higher have the highest rate of survival, and those whose mothers completed primary education tend to survive more than those whose mothers lack formal education. On average, a 10 percentage-point increase in girls' primary enrollment is expected to decrease infant mortality before age one by about 4 deaths per 1,000 births (UNICEF, 1999).

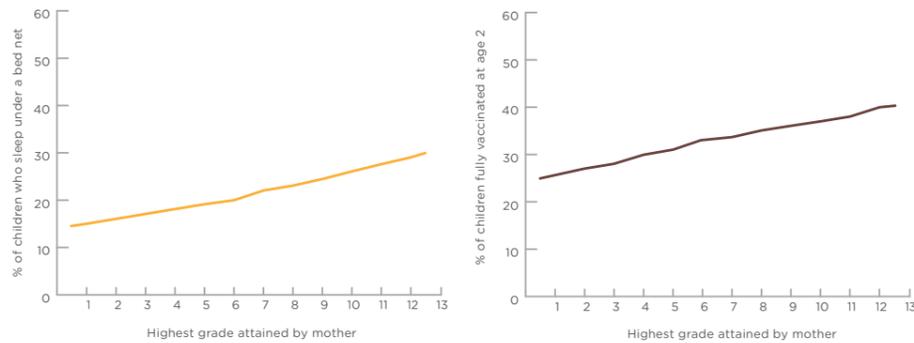
Figure 9: Comparison of Under-five Mortality Rates by Mother's Education Level (2000-2010)



(Source: wUnited Nations, 2012)

Mothers' educational attainment is also connected to proxies of childhood health and development in Sub-Saharan Africa, such as the likelihood of sleeping under a bed net and being fully vaccinated by age two (see Figure 10). In addition, educated mothers tend to use health services more often (UN Millennium Project, 2005).

Figure 10: Relationship between Mothers' Educational Attainment and Two Proxies of Child Health in Sub-Saharan Africa



(Source: Majgaard and Mingat, 2012)

Sub-Saharan Africa and South Asia accounted for 85 percent of the 287,000 maternal deaths world-wide in 2010, with shares of 56 percent and 29 percent, respectively (United Nations, 2012). During her lifetime, a woman in Sub-Saharan Africa has a 1 in 31 chance of dying as a result of pregnancy, a statistic seven times higher than for South Asia, 15 times higher than Latin America, 19 times higher than East Asia, and 139 times higher than for developed countries (2008 data). Many of these pregnancy or delivery-related injuries and deaths could be avoided if pregnant women received care from health professionals during their pregnancy, as well as during and after delivery (UNICEF, 2012). Access to such services however, is tightly linked to three factors: availability of services, ability to pay these services, and knowledge that such services exist and are beneficial. Consequently, education and equity are closely associated with a mother's survival. Not surprisingly, evidence shows that women in Sub-Saharan Africa and South Asia, the regions with the lowest rates of primary school attainment, are those least likely to receive care with the recommended frequency during their pregnancy, and to have their birth attended by a skilled midwife or doctor (United Nations, 2012).

Education and maternal survival are thus directly related. Women with six or more years of education are more likely to seek prenatal care, assisted childbirth, and postnatal care, which are beneficial to the mother and her newborn child (UNICEF, 1999; UNAIDS/UNFPA/UNIFEM, 2004; UN Millennium Project, 2005; World Bank Independent Evaluation Group website). Mother's education is also linked to other pregnancy measures that contribute to reducing maternal mortality in Sub-Saharan Africa, such as being vaccinated against tetanus and receiving vitamin A supplements.

While the overall growth of the HIV/AIDS pandemic has somewhat stabilized due to preventative efforts, the problem remains acute in Sub-Saharan Africa, which has the largest share of HIV cases (UNESCO, 2012). In 2009, 15 of the 17 million of children who had lost a parent to AIDS lived in Sub-Saharan Africa. Women are also particularly at risk, and while 60 percent of HIV-infected individuals are female in developing countries on the whole, the corresponding rate is 70 percent in Sub-Saharan Africa (UNESCO, 2012). A UN Millennium Project report (2005) noted that while women remain the principal victims of HIV/AIDS in developing countries, primary education enables them to better protect themselves and their families. The report indicates that among children between 15 and 24 years old, those who had completed primary education were less than half as likely to contract HIV as those who had not. This is due to an understanding of HIV/AIDS-related information, decision-making and critical thinking skills, and an increased assertiveness with respect to their own reproductive and sexual rights.

Primary education has both a direct and indirect effect on families' health, including infant mortality, child mortality, and maternal mortality. On the whole, more educated individuals tend to be healthier and have healthier behaviors (Feinstein et al., 2006). The mechanisms by which education affects health are varied and complementary (Riddell, 2006). At school, individuals may receive health-related information, change their perceptions in adopting behaviors that are beneficial to health, or acquire basic literacy skills that enable them to better acquire and understand health knowledge. As a result, educated females are more receptive to using modern medical treatments and medicines. In addition, they are more likely to have higher incomes, providing them with the necessary means to better care for their families.

## POLITICAL BENEFITS OF PRIMARY EDUCATION

The empowering potential of education is associated with the increased and improved political participation and engagement of citizens, and therefore contributes to the quality of public policies and to democratization.

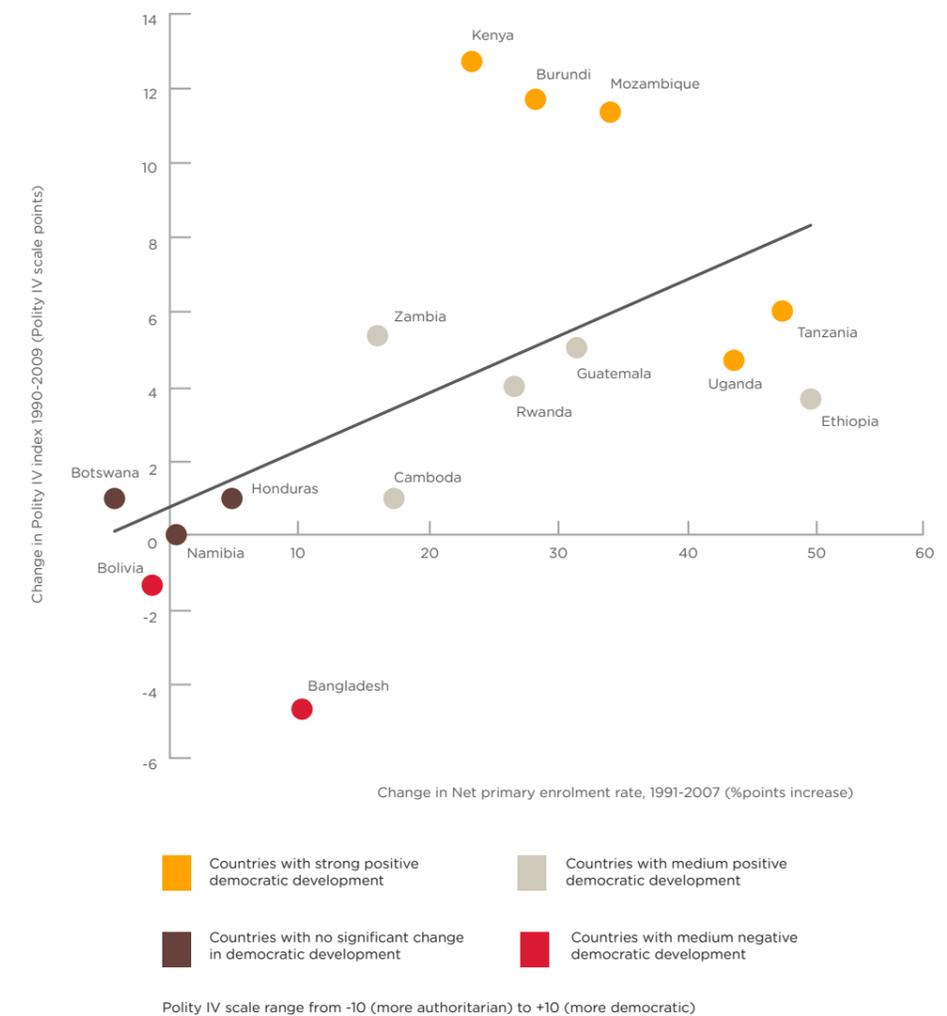
### Primary Education, Democracy, and Governance

Research shows that there is a positive, significant relationship between several primary education indicators and democracy-related measures such as democratization, representative forms of government, political rights, and civil liberties (Mertaugh, Jimenez, and Patrinos, 2009). Two theories provide candidate explanations for this relationship. According to modernization theory, mass education raises literacy rates, which in turn helps develop democratic political systems. According to the top-down institutional perspective, an individual's place and role in society is determined by their level of education, and tertiary education generates intellectual elites capable of advancing the democratic process. Following the modernization theory, investing in primary and secondary education is considered most valuable to democracy building, while the institutional perspective posits that investments in tertiary education are more beneficial (Drakner and Subrahmanyam, 2010).

Primary education enrollment rates, attainment rates, and skill levels are positively and significantly correlated with various measures of and support for democracy. (Drakner and Subrahmanyam, 2010). The two authors found that low income countries like Ethiopia, Tanzania, Uganda, and Mozambique, where large primary enrollment increases (over 20 percentage points) occurred, experienced concomitantly large advances in democratic development as illustrated in Figure 11. However, while other countries such as Namibia, Botswana, Bangladesh, or Bolivia also increased their primary enrollment rates considerably, this was not associated with democratization gains.

One limitation to these findings is that while correlation is established between education and democratization, causality is not. In addition, there was at least a 10-year time lag between the increase in enrollment rates and their effect on the democratization process. Furthermore, the authors recommend that increases in access to primary education be accompanied by efforts to improve the quality of the education provided, since education quality has an effect on education outcomes and consequently, on democratic development. Lastly, increases in primary enrollment rates had to be least 20 percent to reveal any clear association with the democratic development process.

Figure 11: Net Primary Enrollment versus Polity IV Index (1990-2009)



(Source: Drakner and Subrahmanyam, 2010)

Plotting the change over time with one of the democracy indexes (Polity IV) on one axis and increased in net primary enrollment on the other, a strong correlation for the sample countries appears.

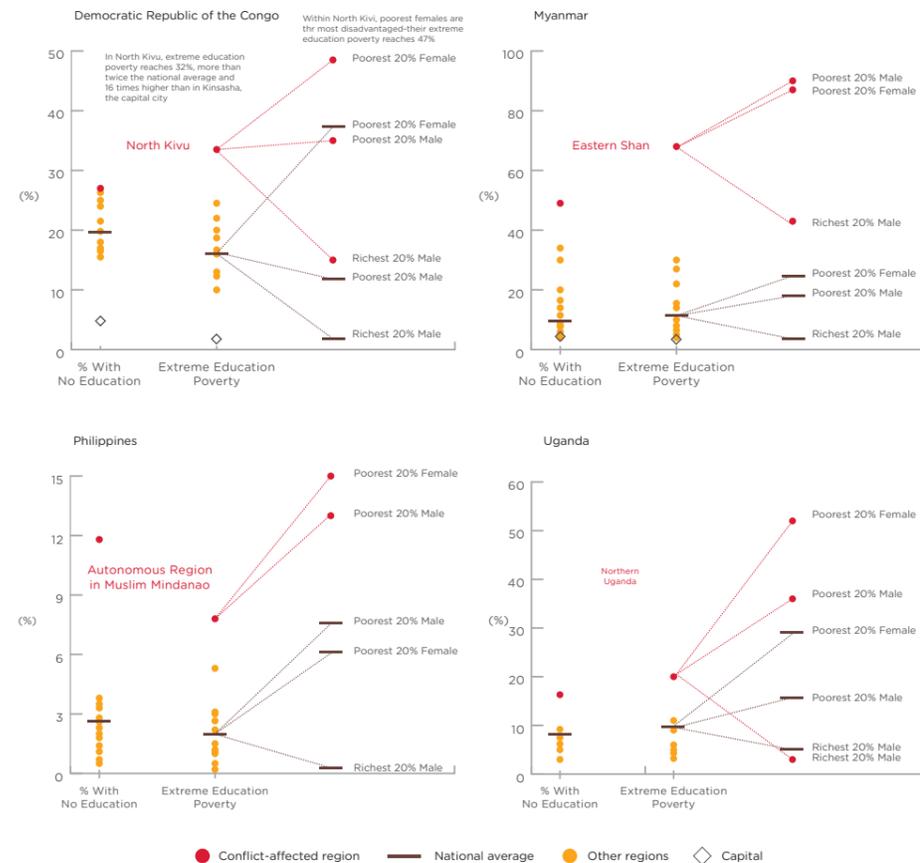
### Primary Education and Civic Engagement

Schooling at all levels of education has a positive effect on political participation, civic engagement, and voter participation. Educated individuals are more likely to vote, engage in political discussions, and be favorable to democratic efforts. However, some studies suggest that only primary school completion is associated with positive benefits with respect to civic engagement (Mertaugh, Jimenez, and Patrinos, 2009).

**Effects of Primary Education during Conflict, on Post-conflict Reconstruction, and on Peace Building and Social Cohesion**

Nearly 28 million children of primary school age in conflict-affected or fragile countries are currently out of school. While these conflict-afflicted or fragile countries comprise 18 percent of the world’s primary school age population, their proportion of OOSC is much larger, at 42 percent (UNESCO, 2011). Of the 34 countries least likely to reach the United Nation’s Millennium Development Goals, 22 have been affected by current or recent conflicts. Children living in these 22 countries face a compounded risk of being marginalized and to being subjected to severe poverty (see Figure 12).

Figure 12: Share of 7- to 16-year-olds with no Education and 17- to 22-year-olds with less than Two Years of Education in Selected Conflict-affected Regions and Other Regions, Latest Available Year



(Source: UNESCO, 2011)  
Notes: '% with no education' applies to the population aged 7 to 16. 'Extreme education poverty' is the share of the population aged 17 to 22 with less than two years of education. For the Democratic Republic of the Congo, data is for the second poorest and second richest quintiles.

(Source: UNESCO, 2011)

Notes: '% with no education' applies to the population aged 7 to 16. 'Extreme education poverty' is the share of the population aged 17 to 22 with less than two years of education. For the Democratic Republic of the Congo, data is for the second poorest and second richest quintiles.

In times of conflict, primary schools have tremendous short-term benefits and additional positive impacts for children. Schools can provide a safe haven and assistance in dealing with psychosocial trauma caused by conflicts as well as help students develop coping strategies. An example of related humanitarian initiatives is the temporary “School in a Box,” set up for displaced populations in Sierra Leone, Nepal, and Lebanon (UNICEF, 2011).

The benefits of primary education immediately following the end of a war are also significant. School-building and education infrastructure reconstruction projects, where facilities were destroyed, staff fled, and students had extended absence from school or suffer from post-conflict trauma, enable populations to feel that life is returning to normalcy. It also reaffirms the presence and legitimacy of the state, fostering populations’ confidence in the future (UNESCO and UNICEF, 2011). The World Bank (2005) uses evidence to emphasize that while post-conflict efforts generally focus on primary education, since it constitutes the basis of an entire system and affects large numbers of children, it is necessary to also systematically help the functioning of the pre-primary, secondary, and tertiary levels. The World Bank cautions that without taking a system-wide approach to education, post-conflict reconstruction might introduce or worsen existing disparities in the education system.

## PSYCHOSOCIAL BENEFITS OF PRIMARY EDUCATION

### Primary Education and Capabilities

Capabilities, functionings, education, and development are all interrelated concepts (Sen, 2005). According to Sen's work, functionings are an individual's actual 'beings and doings' and are defined as the states and activities that make up an individual (i.e. being healthy, being happy, and having a good job). Capabilities represent what an individual values in terms of functionings, and also what an individual has the freedom and ability to achieve. In a sense, capabilities signify an individual's opportunity and option to generate the valuable functionings outcomes. Capabilities are composed of different possible combinations of functionings. Nussbaum (2000) attempts to classify these basic human capabilities into the following 'being able to' categories: life; bodily health; bodily integrity; senses, imagination, and thought; emotions; affiliation; play; and control over one's environment. It is difficult, however, to elaborate a set list of capabilities associated with education (Sen, 2005). Even when the basic functionings acquired through school are similar, exogenous factors may have a differential effect on individuals' capability to capitalize on their functionings. Such exogenous factors include physical or mental differences, variations in the environment and the physical or social infrastructure (Sen, 2005). A process of public deliberation could best address what schooling should cover, based on a specific context's functionings needs and values.

Acquiring functionings through education also opens perceptual doors, where individuals become empowered to contemplate new options that would have never been conceivable had they received no education. Nussbaum (2000) discussed this option facet of the capabilities concept acquired through basic education: "For had Jayamma had more education, she would have had different options, and the skills [acquired in school] would not have been superfluous. She thinks them so because of habit, because she is not used to seeing any women of her class and generation go to school, and maybe also because it's human ... to adjust your sights to the kind of life you actually can have." In other words, education helps individuals to think of themselves as persons with "a plan of life to shape and choices to make" (Nussbaum, 2000).

Another important notion is that gaining functionings does not necessarily mean that the individual will actually automatically operationalize them. "The idea of 'capability' (i.e. the opportunity to achieve valuable combinations of human functionings — what a person is able to do or be) can be very helpful in understanding the opportunity aspect of freedom and human rights. ... The term freedom, in the form of capability, is used here to refer to the extent to which the person is free to choose particular levels of functionings (such as being well-nourished), and that is not the same thing as what the person actually decides to choose" (Sen, 2005). Hence, there is a nuanced difference between an individual possessing functionings and actually having the freedom to choose to use them or not. Nevertheless, the bottom-line of skills acquisition is an intrinsic, de-instrumentalized human right in itself, whatever the associated opportunity: "It seems perfectly legitimate to require primary and secondary education, given the role this plays in all the later choices of an adult life" (Nussbaum, 2000).

### Primary Education and Empowerment

Education is an instrument for empowerment, and can be seen as the mechanism through which an individual controls his or her own destiny and affects change in the community. Particularly for females, education facilitates acquisition of human capital which enables them to participate in more lucrative economic activities, gain critical thinking and communication skills, awareness, assertiveness, and ability to make choices. These in turn have the potential to increase females' control over bargaining power and decision-making influence within their family but also the larger group (UNAIDS/UNFPA/UNIFEM, 2004). Educated women tend to play a more active role in their communities, striving to enhance the well-being of the greater group, fostering solidarity, participating in public life, and deriving the greatest benefit from available services and existing opportunities or support structures. These gains are subsequently linked to positive effects on their children's well-being, cognitive ability, and own productivity as adults. This is again linked to the strong intergenerational virtuous cycle of educating girls and women described above.

However, two points qualify these statements. First, while primary education enables women with regard to empowerment, the effect of secondary education is stronger. Second, the socioeconomic context of the family and larger community has a great influence on how and to what extent females' empowerment may be instrumentalized to realize other benefits. Conditions include family structure, cultural background, level of economic development, employment opportunities and depth of the labor market, and degree of gender stratification. The impact of women's education in terms of empowerment tends to be maximized in contexts that are already relatively egalitarian. In gender-stratified contexts, for example, education alone is not sufficient for women to be autonomous, have access to resources, or participate fully in all aspects of public life. The UN Millennium Project (2005) reports that according to a meta-analysis on fertility spanning 59 studies around the world, the level of women's education associated with a 10 percent decline in the fertility rate varied with the degree of gender stratification.

### Primary Education and Self-concept

Basic education helps improve students' perception of self, also called self-concept, which encompasses self-esteem (own perception of self-worth) and self-confidence (own perception of abilities). This may in turn lead to positive individual behavioral change and to other social, health, and political benefits. Self-esteem contributes to an individuals' resilience and also allows other non-cognitive skills, such as coping and problem-solving, to develop fully.

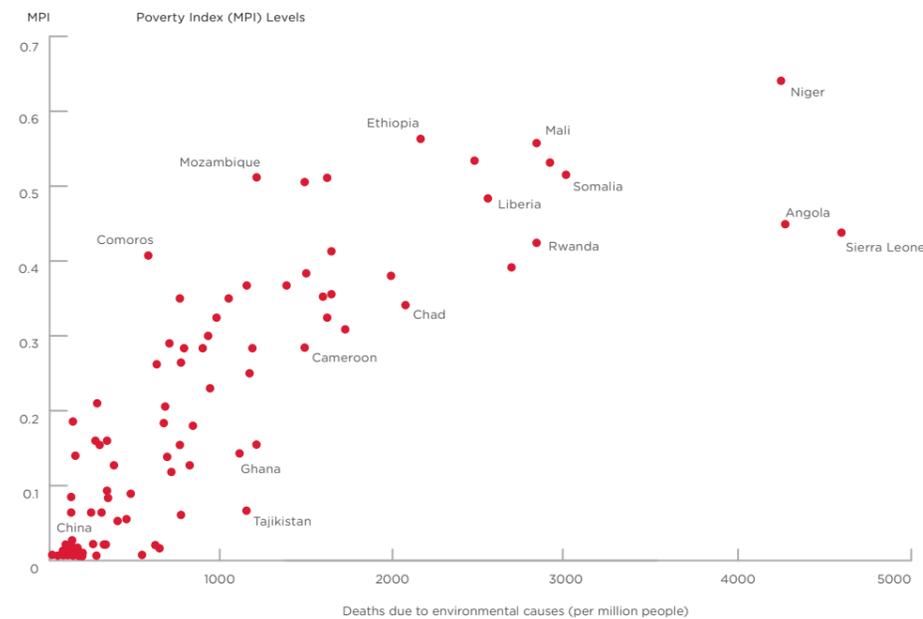
The act of going to school in itself does not guarantee improved self-confidence or self-esteem. Grade repetitions, low test scores, moral harassment, neglect, or physical threats may negatively affect the way students see themselves, discouraging them from staying in school. A study showed that in Jamaica, boys who were continually being told they were lazy and inattentive ended up having low self-esteem and performed poorly (USAID, 2008). Two of the strategies showed to help improve pupils' self-esteem are to adopt inclusive school discipline policies to create a safe environment for learning, and to implement positive learner-centered strategies to give tailored, constructive feedback. In Chile in the late 1990s, the Ministry of Education started a program to improve the quality of primary schools in disadvantaged regions. About 1,200 schools and 200,000 students were involved. One of the program's core features was to offer focused assistance to low-achieving students to enable them to improve their grades. As a result, children's' grades, self-esteem, self-confidence, and social competence greatly improved (UNICEF, 2000).

## ENVIRONMENTAL BENEFITS OF PRIMARY EDUCATION

### Primary Education, Disaster Preparedness, and Adaptability to Climate Change

Climate change tends to increase individuals' vulnerability to extreme weather events. The poor are also most vulnerable to environmental challenges, as depicted in Figure 13. Six out of the 10 countries with the highest rates of death due to environmental causes are among the 10 countries with the highest multidimensional poverty index: Niger, Angola, Sierra Leone, Mali, Somalia, and Rwanda.

Figure 13: Deaths Attributable to Environmental Risks are Associated with High Multidimensional Poverty Index (MPI) Levels



(Source: UNDP 2011)

Notes: MPI=Multidimensional Poverty Index, composed of measures in health, education, and standard of living. This figure excludes very high HDI countries. Survey years vary by country.

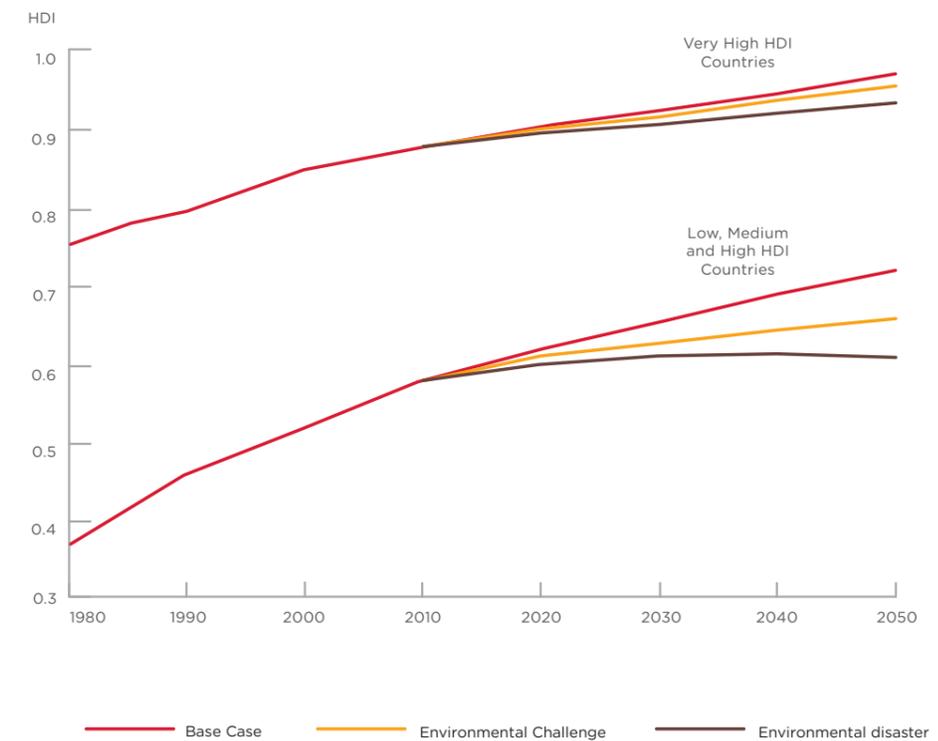
(Source: UNDP 2011)

MPI=Multidimensional Poverty Index, composed of measures of health, education, and income.

In addition, adverse environmental conditions have an important effect on long-term human development, as illustrated in the scenarios predicted in Figure 14. The projected global Human Development Index (HDI) for 2050 decreases by about 8 percent under the “environmental challenge” scenario compared with a base scenario. The predicted decline is even larger (a 12 percent decrease) for Sub-Saharan Africa and South Asia. The “environmental challenge” scenario projects increased multilevel environmental challenges at the household level (indoor solid fuel use), local level (water and sanitation), urban regional levels (outdoor air pollution), and global level (agricultural production). Under the “environmental disaster” scenario on the other hand, which uses the same dimensions but with higher challenge levels, decreases in human development would be even more pronounced. Under those two hypothetical scenarios, exacerbated environmental challenges would trigger increased inequalities across countries.

Although this is a relatively new field of study, research establishes a link between education and reduced vulnerability to climate shocks. This could be due to better disaster preparedness through safe construction practices, or better ability to gauge potential climate risks. Muttarak and Pothisin (2012) mention a recent, cross-country analysis spanning from 1980 to 2010, which finds that countries with higher proportions of women with a secondary education registered fewer fatalities due to natural disasters. They also cite the cases of Rio de Janeiro and San Salvador, where households living in low-risk areas tend to have higher levels of education compared with those who lived in high-risk areas. In their multilevel analysis of disaster preparedness following earthquakes in Thailand, the authors find that the chances of being better prepared increased with education, after controlling for other characteristics.

Figure 14: Scenarios Projecting Impacts of Environmental Risks on Human Development



(Source: UNDP, 2011).

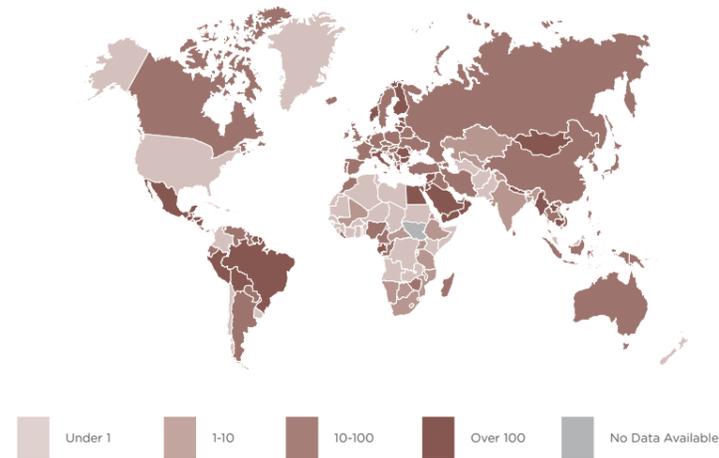
Blankespoor et al. (2010) also confirm the relationship between education and disaster preparedness. They find that resilience to weather-related disasters such as floods and droughts is linked to female education. Specifically, between 1960 and 2003, countries that had high levels of female education had lower mortality due to extreme weather compared to countries with similar income and weather conditions.

### Primary Education and Sustainable Development

Education is the primary vehicle for societal change. Hence, the United Nations Decade for Sustainable Development (2005-14) has supported the promotion of quality education that is sensitive to present and future environmental and ecological needs, rooted in local socioeconomic and cultural systems: “Education is widely seen as one, large ray of hope for the global sustainability vision.” (UNESCO, 2006).

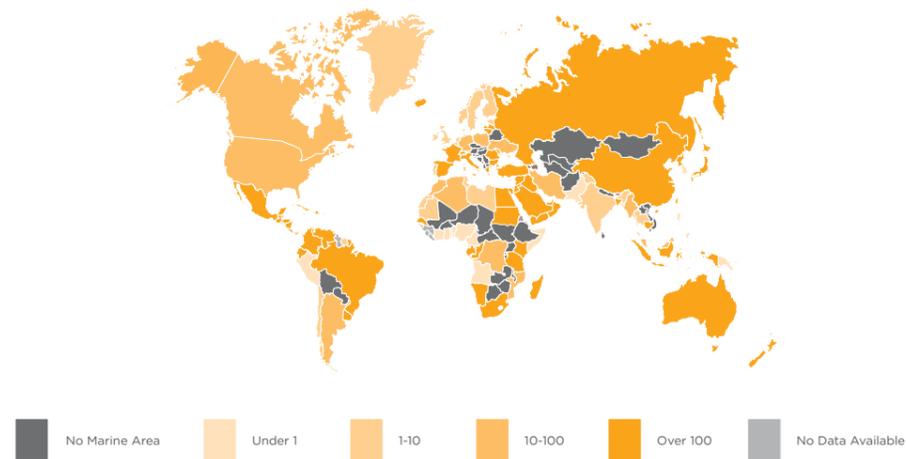
Figure 15: Biodiversity in the World, 1990-2000

Growth in terrestrial areas protected, 1990-2010 (Percentage)



(Source: Millennium Development Goals Report, 2012)

Growth in marine protected area (up to 12 nautical miles from land), 1990-2010 (Percentage)



(Source: Millennium Development Goals Report, 2012)

(Source: Millennium Development Goals Report, 2012)

Education for sustainable development requires a multipronged approach that reconciles economic growth, social development, and environmental protection. It is not simply incorporating environmental studies into curricula. According to the 2009 Bonn Declaration, education for sustainable development helps societies to address different yet interrelated priorities and issues such as water, energy, climate change, disaster and risk reduction, loss of biodiversity, food crises, health risks, social vulnerability, and insecurity. An emerging focus in developing countries is the protection of biodiversity. As illustrated in Figure 15, efforts are nascent and need to be advanced, especially in Sub-Saharan Africa and South India.

One of the pillars of education for sustainable development is improving access to quality basic education, since it establishes not only the foundation to environmental stewardship but also transmits the skills, values, perspectives, and knowledge essential to understand and apply the fundamental concepts of sustainability. Providing pupils with the necessary knowledge on disasters and climate change also enhances their resilience and reduces their vulnerability to natural shocks. The education systems in some regions of the world indeed show awareness of the need for sustainable development education, such as the Pacific region. Papua New Guinea has developed a primary schools environmental education curriculum, while Kiribati has an environmental science for primary schools curriculum (UNESCO, 2006). All levels (primary, secondary, and tertiary) and types (formal, non-formal) of education, however, have a role to play in education for sustainable development, especially tertiary education institutions through their role as technical and research centers of higher knowledge.

## CONCLUSION

Primary education is as much an inalienable human right as it is a powerful instrument with the potential to generate benefits for individuals and their families, the communities in which they live, and entire nations. Education affects virtually every aspect of one's life, as well as the lives of the next generations. Some of the benefits of primary education are immediate, while others accrue over time. Indeed, the evidence on social returns, which encompass the private returns as well as positive externalities such as democratization and public health, though difficult to quantify, justifies national and international investments in primary education.

Education being systemic by nature, the benefits of primary education are largely conditional on context - that of the individual himself or herself, family, community, and country as a whole. The questions of access and success, tightly linked to education benefits, are therefore not only a matter of expanding school quality and availability, but are related to the ability of the system to project itself in the future and mitigate external socioeconomic factors that are responsible for children not being in school or not achieving the necessary education outcomes.

Part I of this paper has provided a comprehensive overview of the economic, social, health, political, psychosocial, and environmental benefits of primary education. Part II provides an analysis of the other side of the same coin - the costs associated with failure to provide universal primary education in countries that still have significant out-of-school child populations.

## PART II: THE ECONOMIC COSTS OF OUT-OF-SCHOOL CHILDREN

The following sections estimate the economic cost of out-of-school children in a sample of six countries, with an understanding based on Part I that the economic impact accounts for only a portion of the total costs associated with out-of-school children. Two approaches are employed to give an indication of the magnitude of the cost (expressed as a percentage of GDP) that countries have lost, or will lose, due to their large populations of undereducated citizens. The approaches provide two different angles for conceptualizing the cost of out-of-school children.

The first approach uses a microeconomic method, aggregating the estimated productivity gaps of individuals who do not complete primary education. Based on wage premium data and out-of-school prevalence rates, it provides an estimate of how much higher GDP will be in roughly a decade if all of today's OOSC are given primary education before they enter the workforce. The second approach uses a macroeconomic method, based on global average returns to years of schooling, to estimate how much higher GDP would be today if the prevalence of OOSC had been reduced significantly in the past, such that the example country's current workforce had (on average) completed primary education. Together, the two approaches show that there are significant economic incentives (equivalent to multiple years of GDP growth) to educate OOSC populations and to provide remedial education to the OOSC of past generations.

### MICROECONOMIC COST ESTIMATION

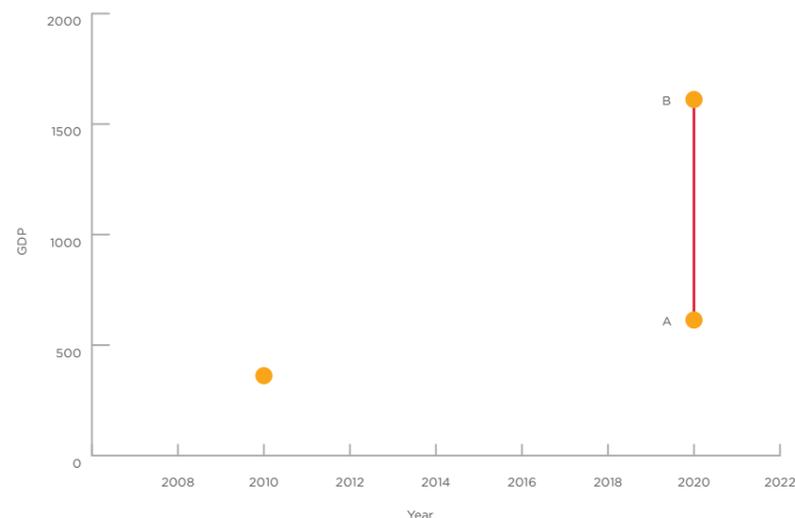
Evidence on the returns to education suggests that in recent decades, the income gains from primary school completion have fallen relative to the returns of higher education (Colclough et al 2009). There are even some studies that show no apparent returns to primary education (Kingdon et al. 2008). Labor economists ascribe this trend to demand- and supply-side developments. These include skill-biased technological change, which has raised the demand for skilled workers at the expense of unskilled and semi-skilled workers, and the rising proportion of the global working population that has completed primary education. There is also concern that progress toward universal primary education has strained educational infrastructure in less developed countries, to the detriment of quality of schooling and, as a result, the productivity gains associated with primary education.

There are three reasons why the downward trend in relative returns to primary education does not undermine the importance of investing in primary school and reducing the number of out-of-school children. First, basic education is recognized as a human right. Second, primary education is a prerequisite for higher levels of education, so the cost of OOSC is proportional to the returns to all levels of education. Finally, the majority of economic studies focus on the effect of primary education on the wages of workers employed in the formal sector, but this constitutes only one aspect of returns to education. As discussed in Part I, primary education has a wide range of non-market benefits (social, political, psychosocial, environmental, and health) that studies typically do not capture.

With these arguments in mind, this section constructs estimates of the economic cost of large OOSC populations. Given that OOSC is a phenomenon heavily concentrated in select countries (see Figure 1), returns to education vary widely by country, and data is missing for potentially key countries (e.g. China), estimating a global cost of OOSC is neither illustrative nor tractable. Instead, the country-level costs of OOSC are estimated for a sample of six countries, selected to provide geographic variety and on the basis of data availability: Cote d'Ivoire, Democratic Republic of Congo, India, Mali, Pakistan, and Yemen.

Cost estimation in this section investigates the question: *If all of today's children expected not to complete primary school actually do complete basic education, how much higher will GDP in the six countries be when that cohort of children enters the labor market in ten years, relative to a counterfactual in which those OOSC never complete primary education? (Figure 22).*

Figure 22: The Economic Cost of Out-of-School Children



The cost of OOSC can be thought of as the difference in GDP between two hypothetical, forward-looking scenarios: one in which current OOSC trends persist (point A) and one in which today's OOSC that are not currently expected to complete primary education do receive basic education before entering the labor market in the next decade (point B).

**The cost of OOSC can be thought of as the difference in GDP between two hypothetical, forward-looking scenarios: one in which current OOSC trends persist (point A) and one in which today's OOSC that are not currently expected to complete primary education do receive basic education before entering the labor market in the next decade (point B).**

The first step in the analysis is to quantify the direct cost of OOSC - lost labor productivity. The pure economic impact of primary education is the effect of schooling on wages. There is a vast literature, discussed in Part I, that measures the returns to education in terms of wage premia - the wage differential between those who complete a given level of education and those who do not (Psacharopoulos and Patrinos 2004). Wage premia estimates provide a measure for the direct private benefit of education completion.

As discussed in Colclough et al (2009), labor market returns to education vary substantially by country and level of education. Unfortunately, countries with significant OOSC populations are the ones for which wage premia are least likely to be available for recent years. They are also the countries that tend to have large informal sectors, so wage premium estimates have limited relevance. The majority of primary education wage premium studies have not been updated in light of recent evidence that the primary education wage premium has been falling relative to premia associated with higher levels of education. Many recent studies focus on higher education, taking primary education as a human right with benefits that no longer require empirical validation.

Thus, even estimation of the direct productivity cost of OOSC is not straightforward. Due to these data limitations and methodological issues, assumptions must be made to quantify the direct economic cost of OOSC. To overcome the lack of information on the returns to education outside of the formal labor market, it is assumed that the wage premia estimated in studies on the returns to education are representative of the economic benefits that would accrue to all population groups. For example, the 15% wage premium used for Cote d'Ivoire (Schultz 2004) was estimated using survey data of males age 25-34 employed in wage labor. The analysis underlying Table 6 assumes that the 15% wage premium for primary education applies to all members of the population in Cote d'Ivoire, even those working in the informal sector or the household. This is not an unreasonable assumption, given the sparse but growing evidence on education returns in the informal sector (De Brauw and Rozelle 2006 for rural China, Nguetse Tegoum 2009 for Cameroon, Arbex et al. 2010 for Brazil, and Yamasaki 2012 for South Africa) and on the effect of education on childcare (Part I).

To calculate the direct cost of OOSC (Equation 1), the per capita economic benefits (measured by wage premia) from primary education must be multiplied by the prevalence of primary school non-completion in the school-aged population. However, raw OOSC numbers alone do not reveal how many school-aged children in a cohort will eventually complete primary education under the status quo scenario. Country-level data produced and provided for this study by UIS (2013) break OOSC down into the three categories for the most recent year with available data (e.g. based on 2006/2007 Demographic and Health Survey for Pakistan). Those figures are used to derive the percentage of children projected to not complete primary school. The analysis assumes that all late-starters eventually complete primary school, and that no drop-outs or those unlikely to start will ever complete primary school. Thus the final column of Table 1, percentage of non-completing OOSC, is the overall percentage of OOSC minus the percentage that is likely to start late. These simplifying assumptions belie the complex behavior of OOSC (many of whom enter and leave school multiple times due to idiosyncratic factors like family illness), but they make the analysis possible in the absence of more detailed data on OOSC.

**Equation 1:** Direct GDP loss from forgone primary education = [% non-completing OOSC] x [Wage premium to primary education]

The percentage of school-aged children that is predicted to not complete primary education (the last column of Table 5) is then multiplied by the wage premium (the second column of Table 6) to produce estimates in Table 6. The last column of Table 6 can be interpreted as the direct economic cost (lost productivity as measured by wages) incurred by today's OOSC that will not complete primary education in each of the six countries when those OOSC reach working age. It can also be visualized as the vertical red gap between points A and B in Figure 22.

Table 5: Breakdown of OOSC Populations based on UIS Analysis of Household Surveys, 2013

	Number of OOSC (thousands)	School-aged Children in 2010 (thousands, GMR 2012)	% OOSC	% Drop-outs	% Likely to start late	% Unlikely to Ever Start	% Non-completing OOSC
Cote D'Ivoire* (6-11, UIS 2009)	1,161	3,074	38%	8%	9%	21%	29%
DRC (6-11, EPDC 2010)	3,022	11,285	26%	6%	14%	6%	12%
India** (6-10, EPDC 2006)	23,400	123,619	19%	3%	7%	9%	12%
India** (6-10, UIS 2008)	2,278	123,619	2%	0.3%	0.7%	0.9%	1.2%
Mali (7-12, UIS 2011)	850	2,510	34%	1%	1%	32%	33%
Pakistan (5-9, UIS 2010)	5,125	19,755	26%	2%	16%	8%	10%
Yemen (6-11, UIS 2010)	857	3,926	22%	4%	10%	7%	11%

\* The breakdown for Cote d'Ivoire is generated using regional figures for sub-Saharan Africa. Calculation based on UIS (2012).

\*\*Two estimates are provided for India due to the large discrepancy between UIS and EPDC data. Note that the school-age population and number of OOSC are a few years apart, and so % OOSC for India is less precisely estimated than for the other five countries.

Table 6: The Direct Economic Costs of Out-of-School Children

	% Non-completing OOSC	Wage Premium to Primary Education	Direct Cost as a % of GDP
Cote d'Ivoire (6-11, UIS 2009)	29%	15%	4.3%
D.R. of Congo (6-11, EPDC 2010)	12%	9%	1.1%
India* (6-10, EPDC 2006)	12%	3%	0.3%
India* (6-10, UIS 2008)	1.2%	3%	0.0%
Mali (7-12, UIS 2011)	33%	9%	2.9%
Pakistan (5-9, UIS 2010)	10%	8%	0.8%
Yemen (6-11, UIS 2010)	11%	10%	1.1%

\*Two estimates are provided for India due to the large discrepancy between UIS and EPDC data.

The second step of the analysis is designed to account for the value of primary education as a gateway to higher education (Equation 2). Table 7 estimates the additional increase in aggregate income that OOSC would be expected to generate if they complete primary education, due to the access they gain to secondary education. This is calculated by multiplying the wage premium to secondary education by the rate of continuation from primary to secondary school (GMR 2012) and the rate of secondary school completion. Because data is unavailable for secondary school completion rates, it is conservatively assumed that 50% of students that transition from primary to secondary education complete secondary school. That assumption is based on the lowest rates of primary school completion observed in developing countries. The probability-weighted loss from forgone secondary education is then added to the direct cost of missing primary education to generate the last column of Table 7.

**Equation 2:** Probability-weighted GDP loss from forgone secondary education = [% non-completing OOSC] x [Wage premium to secondary education] x [rate of continuation from primary to secondary school] x [rate of secondary school completion]

Table 7: The Economic Cost of OOSC, Accounting for Forgone Benefits of Attending Secondary School.

	Wage Premium to Secondary Education	Rate of continuation to secondary school	Probability-weighted GDP loss from forgone secondary education	Direct GDP loss + Probability-weighted GDP loss from forgone secondary education
Cote d'Ivoire (6-11, UIS 2009)	39%	46%	2.54%	<b>6.8%</b>
DRC (6-11, EPDC 2010)	22%	80%	0.84%	<b>1.9%</b>
India* (6-10, EPDC 2006)	21%	81%	0.98%	<b>1.3%</b>
India* (6-10, UIS 2008)	21%	81%	0.1%	<b>0.1%</b>
Mali (7-12, UIS 2011)	22%	73%	2.61%	<b>5.5%</b>
Pakistan (5-9, UIS 2010)	14%	74%	0.5%	<b>1.3%</b>
Yemen** (6-11, UIS 2010)	41%	73%*	1.70%	<b>2.8%</b>

Sources for Wage Premia: Colclough (2009), Psacharopoulos and Patrinos (2004)

\*Two estimates are provided for India due to the large discrepancy between UIS and EPDC data.

\*\*Continuation to secondary school data was unavailable for Yemen. Mali's rate of continuation was used, since Yemen and Mali have similar gross enrollment rates in secondary school.

Table 7 shows that, taking purely economic gains into account, countries with large OOSC populations will forgo significant benefits when today's OOSC enter the labor market in ten years. Indeed, for all countries except India and Pakistan, the projected economic gap due to OOSC is greater than the value of multiple years of average GDP growth. In the case of Mali, the projected cost of OOSC is worth three years of average GDP growth (Mali's historical average growth rate is 1.82%, according to the World Bank). For Yemen, the projected cost of OOSC is worth four years of average GDP growth.

Indirect costs are difficult to quantify, but the discussion in Part I of the health, social, political, psychosocial, and environmental benefits associated with primary education revealed that they are large. To generate an estimate of the total cost (market and non-market costs combined) of OOSC requires calculation of the forgone non-market benefits of primary education. There are also significant behavioral impacts of education that might take years or decades to manifest. For example, education has been shown to accelerate demographic transition in developing countries (as discussed in Section I). By lowering dependency rates, increasing investment and raising female labor force participation rates, educating OOSC can have large economic impacts aside from direct productivity gains. Since OOSC forgo all of these benefits, the economic cost estimated in Table 7 likely provides a lower bound for the total cost of OOSC. Moreover, as discussed in Part I, there are additional significant benefits associated with female primary education. Since females are overrepresented in OOSC populations, the calculations above further understate the total costs of OOSC populations.

This section has provided an indication of the magnitude of the economic cost of today's OOSC in six high-burden countries. In the next section, macroeconomic analysis is employed to account for the costs imposed by large past populations of OOSC and historic underinvestment in primary education.

### MACROECONOMIC COST ESTIMATION

The microeconomic approach to cost estimation requires precise quantification of the various microeconomic effects of education, many of which are difficult to express in terms of income. For that reason, the previous estimation exercise focused on labor productivity gains. While a macroeconomic cost estimation approach is less specific on where income gains are derived from, it has the potential to provide a more comprehensive estimate of the cost of OOSC. Based on available data and established methodology, this section allows exploration of a different question: *How much higher would GDP be today if a country had achieved universal primary school completion for the entire working population?* Unlike the microeconomic analysis of the preceding section, the macroeconomic approach, based on recent work by Barro and Lee (2010) and Patrinos and Psacharopoulos (2011), takes into account the economic cost of individuals who did not complete primary education in previous generations, rather than just the current cohort of OOSC.

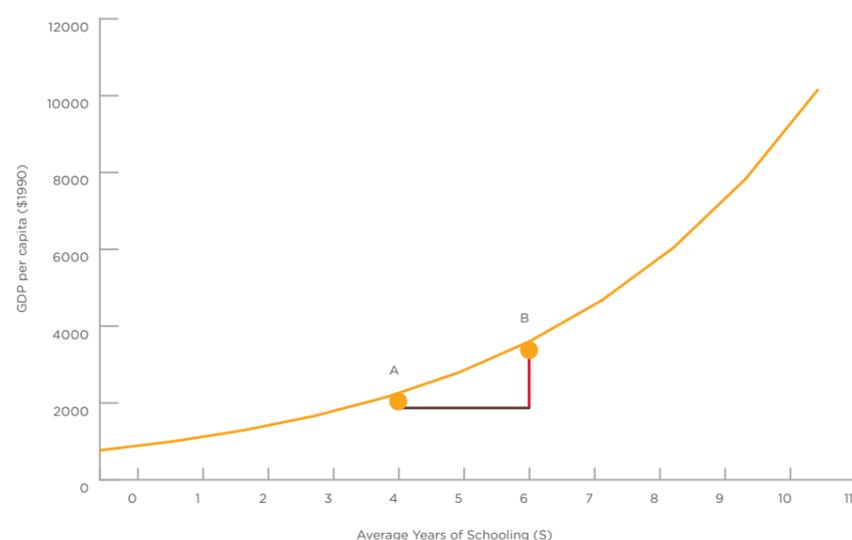
OOSC prevalence rates would be ideal for estimating the lost output that results from large populations of uneducated individuals. Unfortunately, OOSC numbers cannot be directly factored into macroeconomic analysis because data is not available in long enough time series to conduct rigorous analysis with OOSC as an explanatory variable. This is unfortunate, given this paper's proximate interest in out-of-school children. However, a suitable alternative is available for 1950-2000 in the Barro-Lee international dataset: Average Years of Schooling (S).

In fact, Average Years of Schooling has one clear advantage: unlike OOSC numbers, it provides an indication of whether the typical citizen completes primary school. Azariadis and Drazen (1990) posit that there is a threshold of human capital accumulation past which economic growth effects take hold, creating a discontinuity in returns to years of education. This is why accounting for typical patterns of primary school completion, rather than just raw out-of-school numbers, is critical. Average years of schooling is not a perfect proxy for OOSC, but it is a key outcome of education policy, and is thus suggestive of how higher investment at the primary level can be expected to bolster output at the national level. Assuming that significantly

reducing large OOSC populations would coincide with raising the national average years of schooling to primary education completion ( $S =$  six years), the cost of out-of-school children can be approximated using macroeconomic estimation of the education-output relationship.

The technique for macroeconomic modeling of the relationship between education levels and income levels is derived from the labor economics literature, in which an individual worker's wages is dependent on his or her education attainment and other individual characteristics (Mincer 1974). Extending Mincerian equations to the aggregate level, macroeconomic modeling uses cross-country or time-series data (regional, national, or international) to estimate the income gains associated with the accumulation of human capital. Those gains can alternatively be considered the cost of underinvesting in human capital (i.e. having a large OOSC population). Psacharopoulos and Patrinos' (2011) estimation of a global Mincerian equation is presented graphically in Figure 23. For more details on this type of regression, refer to Annex 2.

Figure 23: The Education-output Relationship, as Estimated by Psacharopoulos and Patrinos (2011)



$$\ln Y_i = 6.645 + 0.258S_i$$

$\ln Y_i$  is natural log of per capita output in country  $i$ .  
 $S_i$  is the mean years of schooling of the working age population in country  $i$ .

Using data from over 100 countries from 1950-2010, Psacharopoulos and Patrinos fit the curve displayed above. In the graph above, the red line segment represents the cost of OOSC in a country where the average citizen completes only four years of schooling.

Using the type of Mincerian equation graphed in Figure 23, the cost of OOSC can be estimated as the difference between two hypothetical, backward-looking scenarios. In the first scenario, education policy followed the status quo (so that  $S$  is at its 2010 average, e.g. Point A in Figure 23). In the second scenario, a stronger push had been made to achieve universal primary education, so that today's average citizen has completed primary education ( $S$  rises to 6 years for 2010, e.g. Point B). Referring back to Figure 23, the cost of OOSC can be thought of as the vertical red distance between points A and B.

While Psacharopoulos and Patrinos' specification provides a useful starting point for conceptualizing the cost of OOSC in the macroeconomic context, their estimation technique has shortcomings (discussed in full detail in Annex 2). A more rigorous estimation of the education-output relationship is provided by Barro and Lee (2010). Barro and Lee estimate a more sophisticated model of the education-output relationship, using multivariable regression, panel effects, and instrumental variable estimation in order to resolve issues of omitted variable bias and endogeneity. By controlling for other possible influences on GDP, all of these additional econometric techniques bring the estimation closer to isolating a causal effect of education attainment on national income. Table 8 shows the macro-estimated costs of OOSC (based on Barro and Lee's estimation of the education-output relationship) for the same six countries analyzed in the microeconomic estimation exercise. The equation used to generate these estimates can be found in Annex 2.

Table 8: Macroeconomic Estimates of the Cost of Large OOSC Populations, 2010.

Country	Mean Years of Schooling (2010)	Estimated Income Loss per Capita
Cote D'Ivoire	4.50	22.2%
D.R. of Congo	3.47	43.3%
India	5.10	12.3%
Mali	2.03	83.8%
Pakistan	5.59	5.3%
Yemen	3.69	38.4%

As acknowledged previously, average years of schooling is an imperfect proxy for OOSC. It does not account for skewness in the distribution of educational attainment - reaching an average of six years of schooling does not necessarily imply achievement of universal primary education. The world mean is now 8.1 years of schooling (10.6 in advanced economies) but there are still 61 million OOSC. Still, mean years of schooling is the best available proxy for education policy change, and this analytical exercise is suggestive of the relationship between out-of-school children and income per capita. It suggests, on average, the increase in aggregate annual output a country could expect today if education policy and other external (possibly uncontrollable) influences had progressed such that primary education completion was the average outcome for citizens. The average citizen attaining six years of schooling can be thought of as a representation of a country reaching a level of educational development such that OOSC are no longer a pervasive phenomenon.

Bearing in mind these methodological imperfections and that cost calculations are based on the cross-country average relationship between income and education, Table 8 shows that countries with the large populations of OOSC face very high costs in terms of forgone GDP - from 5% for Pakistan to 84% for Mali. Even countries with large populations and lower rates of OOSC (e.g. India, which has made significant progress over the past decade in reducing OOSC according to UIS, with school life expectancy rising from 7.2 in 1999 to 12.4 in 2010) have much to gain from making a further push to reduce OOSC and provide remedial education to the OOSC of past generations. Compared to the microeconomic cost analysis, macroeconomic estimation shows that the cost of OOSC is even greater when the lack of education in the entire workforce (not just those currently of primary

school age) is considered, and highlights the significant potential gains from remedial schooling programs.

The results in Table 8 reveal that underinvestment in primary education associated with large output gaps, especially in the poorest countries, like the Democratic Republic of Congo and Mali. Based on their own regression results and the findings of Barro and Lee, Psacharopoulos and Patrinos (2011) conservatively estimate the global income loss from not providing every individual with one extra year of schooling is 7-10% of GDP per capita. This discussion and country-specific extension of their analysis shows that for countries with high rates of OOSC, where one extra year of schooling could be the difference between primary education completion and dropping out, the income loss attributable to OOSC is much higher.

#### Conclusion

This study has provided a survey of the literature on the wide-ranging benefits of primary education and a suggestive analysis of the economic cost of out-of-school children. The latter was conducted using two approaches. The first approach aggregates the forecasted foregone income of today's OOSC populations in six countries, predicting how much will be lost as a percentage of GDP in the future due to their lack of primary education. The second method predicts where countries would be today if they had invested more heavily in primary education, such that the average working-age citizen received full primary education.

Together, the two approaches show that there are significant economic incentives to educate OOSC populations and to provide remedial education to the OOSC of past generations. On top of the economic benefits, there are a range of non-market benefits that were not accounted for in the quantitative analysis but were discussed fully in Part I. Given the large and numerous benefits associated with primary education, programs that increase access to education and provide remedial schooling for OOSC are critical interventions to promote economic and social development. Until universal primary education is achieved in countries where progress has stalled, out-of-school children will continue to represent an unconscionable underinvestment in human capital and a costly barrier preventing nations from reaching their full economic and social potential.

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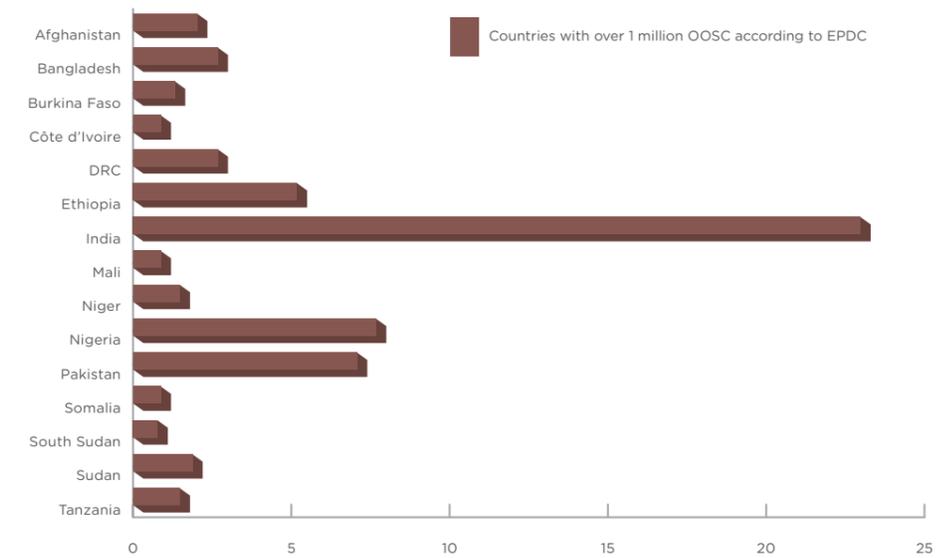
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## ANNEX 1: EPDC DATA

Estimates produced by FHI 360's Education Policy Data Centre (EPDC) are based on household surveys and population censuses, whereas UIS estimates are based on school administrative surveys and population censuses. This leads to very different OOSC estimates for some countries, and also different availability. EPDC collects data for a number of countries with large OOSC populations that are currently not published by UIS due to data issues or lack of reported data. The graph below shows all South Asian and Sub-Saharan African countries with over one million OOSC according to EPDC data (year of survey varies by country).

Figure 24: OOSC in Millions According to Household Surveys Analyzed by EPDC.



EPDC data is for the 2006 school year for Cote d'Ivoire, India, Mali, Niger, Pakistan, Somalia; 2008 for Nigeria, Sudan, South Sudan; 2010 for Burkina Faso, DRC, Tanzania; 2011 for Afghanistan, Bangladesh, Ethiopia, Uganda.

Although this study relies mostly on UIS data, it is important to note the availability of the EPDC's alternative OOSC data, which diverge from UIS estimates for a number of countries. Since they draw from different sources, EPDC and UIS data can be taken together to provide a more complete picture of the global OOSC problem.

## ANNEX 2: ECONOMETRICS

This annex goes into greater detail about the econometric specifications underlying Equation 3.

A generic Mincerian equation is shown below (Equation 3):

$$\ln(Y_i) = f(S_i, Z_i)$$

**Equation 3:** The natural logarithm of income of country  $i$  (in macroeconomic studies) or individual  $i$  (in microeconomic studies) is a function  $f$  of average years of schooling ( $S_i$ ) and a vector of other explanatory variables,  $Z_i$ . In a microeconomic study, this could include the individual's experience or gender. In a macroeconomic study,  $Z$  could include policy or demographic variables.

Using average years of schooling data for the working age population (age fifteen and older) from the Barro-Lee dataset, Psacharopoulos and Patrinos estimate the following Mincerian equation to describe the relationship between income and education from 1950-2010:

$$\ln Y_i = 6.645 + 0.258S_i,$$

**Equation 4:**  $S_i$  is mean years of schooling in country  $i$  and  $\ln Y_i$  is the natural logarithm of per capita income (GDP) in country  $i$ .

Psacharopoulos and Patrinos use a single variable regression – they do not condition their results on other characteristics of the countries in their sample. This is equivalent to excluding the vector  $Z$  in Equation 1. According to their estimates, each additional year of schooling is associated with a 26% increase in per capita income. This is consistent with a number of studies, such as Kruger and Lindahl (2001), who estimate a rate of return to schooling between 18% and 30%, and Heckman and Klenow (1997), who find that an additional year of schooling in a country is associated with a 30% higher per capita GDP.

Due to the exclusion of the vast number of non-educational factors that could potentially impact GDP, Equation 4 should not be interpreted as a causal relationship between education attainment and income. In addition to omitted variable bias, Equation 4 has other methodological issues. As shown in the microeconomic analysis section, the empirical evidence is that the returns to education differ substantially among countries and time periods. In estimating an average relationship across countries and over time, Equation 4 masks considerable variation in the economic cost of OOSC. Unfortunately, the Barro-Lee dataset only provides education attainment figures at five-year intervals, so there is not enough data to generate meaningful country-level Mincerian equations (only thirteen observations are available per country). There is also the possibility that Equation 4 is a product of spurious regression: except in Africa (where income and education attainment stagnated between 1980 and 2000), both income and mean years of schooling have been trending strongly upward worldwide since 1950, and regressing income on schooling could thus estimate an artificially strong relationship.

In Barro and Lee (2010) the relationship between years of schooling and output is estimated using the natural log of GDP per worker (individuals age 15-64) as the independent variable (Equation 5). This is manipulated algebraically below so that the independent variable is the natural log of GDP per capita instead.

$$\ln(Y_i/w_i) = 0.121S_i + 0.544\ln(K_i/w_i),$$

$$\ln(Y_i/n_i) = \ln(w_i/n_i) + 0.121S_i + 0.544\ln(K_i/w_i)$$

**Equation 5:** Fixed-effects estimation with instrumental variable for schooling (parental education).

$\ln$  represents the natural logarithm operator.

$Y_i$  is the output in country  $i$ .

$S_i$  is instrumented average years of schooling in country  $i$ .

$K_i$  is the per capita physical capital stock in country  $i$ .

$w_i$  is the working age population (15-64) in country  $i$ .

$n_i$  is the total population in country  $i$ .

Barro and Lee's specification has a number of advantages over that of Psacharopoulos and Patrinos. Barro and Lee add physical capital stock (a function of national investment and depreciation) as an explanatory variable. They also use the instrument variable estimation technique to resolve the potentially biasing effects of the endogeneity of human capital accumulation (causality between income and schooling is likely to go in both directions). They use parental income (proxied by national average years of schooling lagged by ten years) as an instrument for  $S$ , and use fixed-effects estimation, which allows for country-specific tendencies in income trajectories. They also estimate region-specific effects, but these are found to be insignificant for regions with large out-of-school populations. By controlling for other possible influences on GDP, all of these additional econometric techniques bring the estimation closer to isolating a causal effect of education attainment on national income.

The coefficient on mean years of schooling ( $S_i$ ) is 47% of Psacharopoulos and Patrinos' estimate of 0.26. This suggests that, by not controlling for the effect of physical capital on output, Psacharopoulos and Patrinos overestimate the effect of education on output by a factor of over 2. Table 9 compares cost estimation based on the two models of the education-output relationship (Equations 4 and 5). Due to the advantages of Barro and Lee's specification, estimates in the body of this paper are based on their model.

Table 9: Comparison of Psacharopoulos and Patrinos (2011) and Barro and Lee (2010) estimates

Country	Mean Years of Schooling	Income loss per capita (Psacharopoulos and Patrinos 2011)	Income loss per capita (Barro and Lee 2010)
Cote D'Ivoire	4.50	47.2%	22.2%
D.R. of Congo	3.47	92.0%	43.3%
India	5.10	26.1%	12.3%
Mali	2.03	178.3%	83.8%
Pakistan	5.59	11.2%	5.3%
Yemen	3.69	81.7%	38.4%

