

Why public investment in pre-school education is needed to boost cognitive and school outcomes for the poorest children

Early childhood care and education is on the policy agenda in Ethiopia. Few Ethiopian children attend pre-school, and those who do are typically in urban areas and are not the poorest children. This gap is important since the poorest children are those who stand to benefit most from ECCE. This study draws on statistical analysis of the impact of ECCE, written to inform the policy environment. The brief highlights the benefits of investing in quality, publicly funded ECCE programmes for children living in poverty.



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The early childhood years set the foundations for life. Ensuring that young children have positive experiences, that their rights are guaranteed and that their needs for health, stimulation and support are met is crucial to their well-being and development. In a context where family and community structures are constantly changing and countries are going through rapid social and economic changes, early childhood programmes complement the roles that parents and other caregivers play in raising children during the early years. Early childhood care and education (ECCE) programmes not only benefit children and families, they also have the potential to reduce social inequality, and benefit communities and societies at large.

The contributions of ECCE to the healthy development and future well-being of children who are particularly economically and socially disadvantaged have become a vital public issue in Ethiopia, with implications for government, families, business, and NGOs.

Key Findings

- Well-conceived, good-quality early childhood education enhances children's readiness for schooling, and has a positive and permanent influence on later schooling achievements.
- Young Lives data support the finding that early education programmes have the potential to improve cognitive development and academic success.
- Children who have experienced pre-school tend to have better test scores, and are more likely to be in formal school than other children. Young Lives data indicate that 18% of the children who attended pre-school were reported to perform excellently in primary school as compared to 10% of the children who had not.
- Children who have attended pre-school achieve better results. Our data show that 8-year-old children who have attended pre-school scored 43.7% higher in vocabulary tests and 51.1% higher in the cognitive test.
- Attending pre-school education improves early entry and enrolment in formal primary education and the grade completed; children who attended pre-school tend to have completed a higher grade than those who did not.
- To encourage better learning, it is therefore both more efficient and more equitable to invest in education very early; correcting failure later may not reduce the inequalities that result from unequal access to pre-school education.



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With this in mind, in 2010 the Ethiopian government developed a national ECCE policy framework recognising the significance of children's early experiences for their later development. The policy has five key priorities: creating a coherent government structure which will assist in institutionalising ECCE and in coordinating and streamlining ECCE services; increasing access to and equity in ECCE service provision; improving quality of ECCE services; enhancing nationwide advocacy on the importance of ECCE; and establishing enhanced child protection mechanisms.

In addition, the ECCE policy has four basic pillars for the delivery of early childhood services: parental education; health and early stimulation programme from pre-natal up to 3 years; pre-schools/kindergartens from 4 to 6 years; and community-based non-formal school readiness programmes. The framework acknowledges the need to increase awareness of the importance of a good start in life and a strong foundation for later learning, which are often achieved through pre-school programmes

However, there is extremely limited government and donor funding available for the plans in the framework, and the implementation of ECCE risks placing a significant burden on an already overstretched primary education system.

In the light of the critical importance of public investment in ECCE in Ethiopia, this policy brief presents findings from research conducted by Young Lives on the cognitive and other educational implications of pre-school attendance in urban areas. Cognitive development outcomes were measured using the Peabody Picture Vocabulary Test (PPVT) and Cognitive Development Assessment – Quantity (CDA-Q) Test. The former is a test of vocabulary recognition that has been widely used as a general measure of cognitive achievement, while the latter is commonly used to assess cognitive development in young children.

1. Early childhood is a crucial time to invest in interventions that improve children's welfare

- Recent studies have found that investing in better-quality early childhood programmes can positively impact children, their families, taxpayers, and the government. Research on human development emphasises that young children have specific needs, and the extent to which these needs are satisfied affects their development into youth and adults. From this perspective, participation in early childhood programmes is beneficial because it leads to improved outcomes, including better nutrition, health and education, in both the short and long term. Moreover, from an economic point of view, investment in early childhood programmes offers a high pay-off in human capital (including learning and better nutrition) and therefore there is a strong case for public intervention.
- The early years of life are critical for the acquisition of concepts, skills and attitudes that lay the foundation for lifelong learning. Recent research in the field of health, psychology and cognition has found that cognitive and non-cognitive stimulation in early life are critical for long-term development.
- Evidence from neurobiology and other brain research fields has shown that a negative experience or the absence of appropriate stimulation is more likely to have serious and sustained effects on a young child than on an older child (Malmberg et al. 2010). So participation in comprehensive, good-quality ECCE programmes can significantly alter the developmental trajectory of a child.
- Quality pre-schooling provides a foundation for later learning. Investing in well-conceived, good-quality early childhood education helps to meet the diverse needs of young children during the crucial early years of life, enhances their readiness for schooling, and has a positive and permanent influence on later schooling achievements (Carneiro and Heckman 2003). Early childhood education not only affects the cognitive development of young children, but also a number of non-cognitive skills such as motivation, self-discipline and socialisation.
- Investment in education is likely to be better at the early stage of development than later years because young children's cognitive ability and behaviour are more malleable compared to adults. It is therefore both efficient and more equitable to invest in education very early; intervening later to improve learning is likely to be less successful, and since the poorest children are likely to be further behind, may be inequitable and inefficient. This is not only because early childhood education facilitates later learning, but also because school performance and learning can produce large returns, especially for disadvantaged children.

2. Pre-school education in Ethiopia is slowly spreading but still scarce

- Early childhood education in Ethiopia is still predominantly provided by the private-sector NGOs and religious institutions (Woldehanna 2011; and Woldehanna and Gebremedhin 2012). Apart from promoting ECCE, and providing technical support and quality monitoring, the government currently plays a limited role in providing pre-school education.
- The enrolment rate for pre-school education has remained very low, especially in rural areas of the country. For instance, in 2008/9, out of the estimated 7.3 million children of the appropriate age group (4-6 years) only about 4.2% were reported to have access to pre-school education (see Table 1). This means that most children are enrolled in primary education without having experienced any pre-school programme.

Table 1. Gross enrolment rate in pre-school education in Ethiopia, 2000–11, by gender (%)

Year	Boys	Girls	Total
2000/1	2.0	2.0	2.0
2001/2	2.1	2	2.1
2002/3	2.0	2.0	2.0
2003/4	2.2	2.1	2.2
2004/5	2.4	2.3	2.3
2005/6	2.8	2.6	2.7
2006/7	3.2	3.1	3.1
2007/8	3.9	3.9	3.9
2008/9	4.2	4.2	4.2
2009/10	4.8	4.7	4.8
2010/11	5.3	5.2	5.2

Source: Woldehanna and Gebremedhin (2012)

- Though the pre-school enrolment rate is very small, it has been growing since 2003/4. However, the regional as well as urban-rural disparities are still significant, clearly indicating the lack of expansion of early childhood education programmes in rural areas. Pre-school education in Ethiopia is dominated by fee-charging nursery schools and kindergartens which are mainly accessed by children of middle-class parents living in urban and semi-urban areas. As a result, enrolment is limited to urban areas and richer children.
- Ethiopia's education system faces numerous constraints. One of the major obstacles is that the rapid expansion of the education system, particularly primary and above, has left a considerable financial gap between available funds and the anticipated cost of investments needed to improve and maintain quality. This also has the effect of limiting the availability of resources which are critical

to support quality pre-school education. Yet a growing body of evidence clearly demonstrates that investment in early childhood education yields big pay-offs and greatly improves subsequent psychosocial development as well as academic performance.

Types of ECCE providers

- **Government pre-schools** are mostly in urban areas but include a small number of reception classes attached to primary schools in both rural and urban areas. Teachers are paid from student fees and community contributions.
- **Private schools are fee-paying.** They are usually replicas of primary schools, with uniforms, academic lessons and sometimes instruction in English.
- **Public schools** are partly funded by government and partly by student fees. Facilities and the quality of service provision are more like private schools than government schools.
- **Community schools** are run by non-governmental providers. They include **NGO schools** which charge low or no fees if they are targeting poor communities. **Formal faith-based schools** charge lower fees than private schools. Christian schools combine teaching of a secular curriculum with some religious instruction, while *madrassas* only offer religious education. Informal faith-based schools, where children are taught by a single religious instructor, charge very low fees.

3. Pre-school attendance enhances subsequent cognitive and school outcomes

- Table 2 (see overleaf) gives background statistics on enrolment and test scores for different groups of urban children dependent on whether or not they had attended pre-school. It is important to note that since it is the poorest children who are likely to have least access to pre-school, these descriptive differences may also reflect other disadvantages, rather than simply demonstrating the 'value-added' effect of pre-school. The findings show there is a correlation between attending pre-school and the chances of being enrolled in primary school at age 8: only 78% of children who didn't go to pre-school were in primary school at age 8, compared with 94% of those who had been to pre-school.

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Table 2. Comparison of primary school enrolment by pre-school attendance

Variable	Urban children	
	N.	%
No pre-school (in R2)	321	43.09
Of which enrolled in formal school (in R3)	250	77.9
Pre-school (in R2)	424	56.91
Of which enrolled in formal school (in R3)	400	94.34

Source: Woldehanna, T. (2011)

- When the relative performance in school between children who had attended pre-school and those who had not is compared, those who experienced pre-school typically did better in test scores and were more likely to be enrolled in formal school. The gain in PPVT test scores (Table 3) between the ages of 5 and 8 years is also greatest for those who had experienced pre-school.

Table 3. Urban children's cognitive development and grade progression at the ages of 5 and 8 years by pre-school attendance

	Non-pre-school	Pre-school	Total
Raw PPVT score in Round 2	21.84	30.47	26.79
Raw score of PPVT in Round 3	81.22	126.29	106.87
Grade completed at the age of 8 or in Round 3	0.78	1.04	0.92

Source: Woldehanna and Gebremedhin (2012)

- Children who attend pre-school were also reported by their teachers to be performing better in primary school; some 18% were reported to be performing excellently in school as compared to only 10% of the children who had not attended pre-school.
- In general, the performance of children in primary education who had attended pre-school was higher than those who had not; these are not causal figures, but indicate that children with experience of pre-school also do better in later academic performance.

Table 4. Primary school performance of urban children by pre-school attendance (%)

Performance in school	Non-attendees	Attendees	Total
Excellent	9.52	17.63	12.06
Good	49.95	50.81	50.22
Reasonably good	33.33	27.61	31.54
Poor	6.98	3.71	5.96
Very bad	0.21	0.23	0.22

Source: Woldehanna and Gebremedhin (2012)

- Since more advantaged children are more likely than less advantaged children to attend pre-school, the descriptive results above may be affected by underlying differences in who gets access to pre-school. To account for these differences the research also compared the experience of a beneficiary group (received pre-school) and a control group (matched using propensity score matching techniques). By creating a control group, this technique allows evaluating the additional impact of pre-school for the treated group.
- Table 5 suggests that 5-year-old children who attended pre-school scored 31.2 per cent higher in the PPVT and 23.1 per cent higher in the CDA-Q test than those who did not attend pre-school. When the children reached the age of 8, compared to the non-attendees, pre-school attendees scored 36.1 per cent higher in the PPVT and 59.2 per cent in the CDA-Q test, indicating that gain from pre-school increased as the children grew older.

Table 5. Impact of pre-school education on children's cognitive development at the age of 5 (Round 2) and 8 (Round 3)

Round 2 (at age 4.5 to 5.5)	%
PPVT score	31.2
CDA-Q test score	23.1
Round 3 (at age 7.5 to 8.5)	%
PPVT score	36.1
Enrolment rate in Round 3	11.8

Source: Woldehanna and Gebremedhin (2012)

- To check these results, analysis, not reported here, explored impact on later achievement using regression techniques. The results from these different methods are consistent with the results in table above, finding positive additional effects on PPVT and CDA-Q tests, associated with attending pre-school.
- Moreover, results from other similar estimations are in tune with the above findings. For instance, one estimation result indicated that PPVT scores are found to increase by a magnitude of as high as 44% because of pre-school attendance for the urban sample. CDA-Q scores, on the other hand, showed a 51% differential effect on the urban observations. At the age of 5 years, the differential effect of pre-school attendance was smaller, indicating an increased association between pre-school attendance and cognitive development as children got older, and hence higher returns from early investment at a later age.
- Furthermore, pre-school education had a strong impact on enrolment in primary school and grade completion at 8 years. The primary school enrolment rate for

children who had attended pre-school was 11.8% higher than that for those who had not. Also, the pre-school attendees were, on average, more than a fifth of a grade further on than the children who had not attended pre-school.

4. Public investments in early learning can produce long-term improvements in the development of disadvantaged children

- Skills formation is a life-cycle process where education at one stage is an input into the learning process of the next stage, implying that skills are self-reinforcing. Thus, an investment in education at one stage not only raises directly the skills attained at that stage, but also indirectly the productivity with which educational investment at the next stage will be transferred into even further skills.
- Evidence from various countries such as Bolivia, Argentina and Jamaica clearly indicates that publicly funded early childhood programmes have positive impacts on children's gross and fine motor skills, psychosocial skills and language acquisition (Hidalgo and Urzua 2010). Similar findings from East Africa showed that attending pre-primary school facilitates subsequent achievement in primary school and is also accompanied by low drop-out and repetition rates in each grade (Malberg et al. 2010).
- There are wider benefits to society from investment in young children. According to the human capital literature in the field of economics, there is a strong multiplier effect associated with investment in ECCE, whereby investments in the early years, particularly for disadvantaged children, can make investments in the later years more productive (Hidalgo and Urzua 2010).

5. Conclusions and Implications: Despite the potential of early childhood education to transform young lives, it remains inaccessible for many children

- Mounting evidence indicates that ECCE programmes generally do not reach the poorest and most disadvantaged children, the very ones who stand to gain the most in terms of health, nutrition and cognitive development.
- Though the provision of pre-primary education for children has recently shown some improvement in urban settings, it has remained scarce across rural areas and the service is still inaccessible for economically disadvantaged children. For example, with the private

sector currently the dominant provider of pre-schooling, the high fees that these private pre-schools expect in effect exclude children from economically disadvantaged households and rural areas.

- Early childhood education attendance is positively correlated with children's cognitive development. Pre-school attendance at the age of 3 has a strong positive effect on the cognitive development of children at the ages of 5 and 8 years, as measured by vocabulary and CDA-Q test scores.
- Pre-school attendance was also positively correlated with earlier entry in primary school and the grade completed at the age of 8. This shows that pre-school attendance prepares children for faster learning progression and so boosts the effectiveness of primary schooling.
- Early education programmes have substantial potential to improve the cognitive development, academic success, and lives of children in poverty. Therefore, there is a need to reconsider policy priorities and give due attention and resources to the equitable development and expansion of pre-school education.
- More investment in pre-school programmes in rural areas and impoverished localities would be one way of ensuring that the gap in pre-school enrolment between rural and urban and between rich and poor families does not open up.
- A national curriculum, with technical support and structures to ensure compliance across the range of providers, would offer a uniform starting point for all pupils.
- A strategy and funding to train ECCE teachers, to deploy them across rural and urban areas and to pay them enough to keep them in the system, would provide a skilled consistent cohort of specialist teachers.

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- *The Effects of Early Childhood Education Attendance on Cognitive Development: Evidence from Urban Ethiopia* by Tassew Woldehanna (Ethiopian Journal of Economics, 20(1): 113-64)
- *The Effects of Pre-school Attendance on the Cognitive Development of Urban Children at the Ages of 5 and 8 Years: Evidence from Ethiopia* by Tassew Woldehanna and Liyousew Gebremedhin (Young Lives Working Paper 89).

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