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Banati, Prerna

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Unequal Educational Trajectories:  
The Case of Ethiopia

Ilze Plavgo

Introduction

Obtaining education is widely acknowledged to constitute one of the main starting conditions for later opportunities over the life course, regarded as a quintessential means to improve productivity, promote a healthy lifestyle, empower and increase civic participation, raise individual capabilities, and reduce intergenerational transmission of poverty (Buchmann and Hannum, 2001; Hanushek and Woessmann, 2008; Sen, 1999). Considerable progress has been made in terms of increasing enrolment rates at a primary and secondary school level all over the world, especially after the World Education Forum in Dakar in 2000 in which the international community committed to achieving Education for All by 2015 (UNESCO, 2017a), and the Millennium Development Summit of 2000 in which the world’s leaders committed to meeting the Millennium Development Goals (MDGs), among which was universalization of primary school enrolments and gender parity (UN, 2015). The steepest progress in pupil's enrolments has taken place in sub-Saharan Africa, where primary school enrolment rates between 1990 and 2015 on average increased from 52% to 80% (UN, 2015). One of the most notable increases was observed in Ethiopia, the case study of this chapter, where net primary school enrolments grew from 19% in 1994 to 85% in 2015, and net secondary school enrolments increased from 11% in 1999 to 31% in 2015 (World Bank, 2019).
Despite this progress, recent evidence shows that getting children into school has not translated into knowledge acquisition. According to UNESCO, the latest estimated share of children not achieving minimum proficiency levels in reading and mathematics by the time of primary school completion age in sub-Saharan Africa was about 85% on average (UNESCO UIS, 2017: 7; UNESCO, 2017a). It is becoming more and more evident that children’s learning outcomes depend not only on school availability but also on school quality and home environments where learning and decision making about children’s educational trajectories take place. Educational outcomes can be highly stratified by family background due to differences in living conditions in early childhood and parental resources during school age. This type of stratification – conventionally called inequality of educational opportunity – can be either equalized or further exacerbated depending on the educational systems and policies in place.

The most recent step towards stronger international commitment to address the issues of quality and inequality in education was the agreement of the Sustainable Development Goal 4 (SDG 4) in 2015. The main contribution of SDG 4 which sets it apart from all previous international commitments is its emphasis on learning quality and equity at all levels of education (United Nations Sustainable Development, 2015). To identify appropriate interventions for reducing inequalities in learning opportunities, it is important to identify the sources and timing of disparities in educational trajectories. This chapter studies inequality of educational opportunities in low-income contexts, analysing to what extent and at what transition points children’s educational opportunities become socially stratified. Firstly, it looks at the extent to which children’s cognitive development and educational trajectories differ by the family’s socioeconomic status (SES) and whether disparities vary across the different educational levels. Secondly, it studies whether transition to higher levels of education is sensitive to children’s initial cognitive endowments, and whether this varies by parental SES. The case of Ethiopia was selected since it has witnessed one of the highest levels of educational expansion in the world after extensive school reforms in 1994, while inequalities in primary and secondary school progression persist. Ethiopia’s child population is the second largest in Africa after Nigeria, and the ninth largest in the world (World Bank, 2019). Enabling equal educational opportunities in this part of the world will be a prerequisite to achieving the global SDG 4.

This chapter contributes to existing literature in two substantive ways. First, it uses a direct assessment of cognitive abilities measured early in childhood prior to the time when educational decisions were made,
allowing study of the relationship between initial endowments and later educational transitions. The longitudinal design of this study minimizes the risk of endogeneity and reverse causality since it is possible to control for the order of events. Second, it tests whether differences in initial cognitive abilities are reinforced or compensated by families’ educational investment decisions across three transition points of the educational cycle: transition to upper primary, secondary and higher education. Unlike cross-sectional data, the longitudinal design of this survey allows us to observe the same individuals’ living conditions, cognitive development and school progression from early childhood to late adolescence, enabling educational trajectories to be studied without imposing any assumptions about the sequence of events.

The data used come from the Young Lives long-term longitudinal study, which followed the lives of two birth cohorts born around 1994 and 2001 in four countries, including 3,000 children in Ethiopia. Household and child-level surveys were carried out in five rounds every three to four years between 2002 and 2016. Findings point at two main sources of inequality of educational opportunity. Firstly, children from disadvantaged socioeconomic backgrounds tend to develop lower cognitive abilities early in childhood, already before formal schooling begins. Evidence also suggests that parents and schools reinforce this initial inequality since children with lower cognitive abilities are less likely to transit to higher levels of education. Secondly, also when comparing children with the same levels of initial cognitive abilities, poorer children tend to have lower chances to make transitions to higher levels of education compared to their more privileged peers, with increasing gaps at each educational transition.

The chapter proceeds with a section reviewing key theories and existing empirical findings on how disparities in educational outcomes develop in childhood. It then proceeds with a section outlining the context of Ethiopia, a description of the data and the research strategy, a findings section and a conclusion discussing the findings and their policy implications.

**Theories and evidence on the mechanisms behind inequality of educational opportunity**

Social stratification researchers have put forth several explanations as to why educational trajectories tend to differ by parental socioeconomic status. Following Boudon (1974), family conditions determine children’s educational outcomes through two main pathways: indirectly by having an effect on children’s cognitive abilities and scholastic
performance, and directly by the decisions and choices made about educational transitions net of children’s cognitive endowments and grades. These two pathways are called the primary and secondary effects of social origin, respectively. Primary effects indicate the extent to which a family’s SES affects individuals’ educational transitions through cognitive abilities or acquired performance. They operate through the transmission of genetic traits and through family influences and daily interactions, with parents transmitting sociocultural and educational resources that are crucial for cognitive and non-cognitive development (Blossfeld and von Maurice, 2011; Hackman et al, 2010). Disparities by SES in cognitive abilities are developed in early childhood due to differences in living conditions and cognitive stimulus, and tend to accumulate and reinforce with age (Carneiro and Heckman, 2005; Heckman, 2006; Rose et al, 2016: 17–19).

Secondary effects or choice effects are the SES gaps in educational outcomes that persist after holding cognitive abilities and previous performance constant. These effects stem from the assumption that parental SES affects the level of sensitivity to costs associated with educational investments (Ress and Azzolini, 2014). Disparities in educational choices are especially prominent at each of the educational transition points when families need to make decisions about their children’s continuation to higher levels of education and about the school tracks and school types. Disparities in choices are driven by differences in economic and social resources as well as the motivation to avoid downward social mobility under the assumption that parents want their children to reach at least the same level of socioeconomic status as their own (Breen and Goldthorpe, 1997; Erikson and Jonsson, 1996). Figure 2.1 presents a simplified causal mechanism describing these pathways.

**Figure 2.1: Causal mechanism describing primary and secondary effects of social origin**

Source: Author’s adaptation from Erikson et al (2005: Fig 2a, p 9732)
A growing base of evidence investigating parental investment behaviour in human capital concludes that parents tend to reinforce initial educational differences by investing more educational human capital in the more able children, thus intensifying inequality in educational opportunities (Ayalew, 2005; Behrman et al, 1994). As an example, Bacolod and Ranjan (2008) study how household wealth and child endowments jointly affect family decisions regarding children’s schooling and work in Philippines, and find that high-ability children are more likely to be in school relative to low-ability children. Similarly, Dendir (2014) studies the relationship between children’s cognitive abilities and parental decisions regarding school enrolment and work in Ethiopia and finds evidence of reinforcing parental investment as higher-ability children are more likely to be enrolled in school. These studies, however, do not assess if this relationship varies at different educational transition points, and do not study inequalities by parental socioeconomic status.

The secondary effects of social origin suggest that the observed reinforcing association does not apply to the same extent to families of all socioeconomic backgrounds. While less advantaged families are likely to condition educational investment decisions on their assessment of a child’s cognitive and scholastic abilities, educational trajectories of children from more advantaged families are less dependent on prior endowments (Boudon, 1998; Breen and Goldthorpe, 1997; Goldthorpe, 1996). Previous research in a number of industrialized countries shows that lower grades are less consequential for students from more advantaged socioeconomic origins as they disproportionately move to higher levels of education also in the case of lower grades and other negative prior conditions (Bernardi, 2014; Blossfeld et al, 2016; Torche, 2016). This concept is referred to as the compensatory advantage of social origin. Not much is known, however, about whether this mechanism is generalizable to other regions in the world where educational systems are currently expanding and where variation in school quality is greater.

Based on the described theories and previous empirical findings, the following hypotheses are put forth for the case study of Ethiopia: H1 The level of early cognitive endowments varies by parental SES and is associated with later educational transition decisions; H2 Disparities in educational transitions by level of cognitive abilities accumulate and reinforce with age; and H3 For higher-SES families, decisions regarding educational transitions are less dependent on children’s initial cognitive abilities compared to low-SES families.
Context of Ethiopia

In the 1990s, the government of Ethiopia placed education at the centre of its development policy, and has had a good record in expanding access to formal education ever since. The current education system is based on the 1994 Education and Training Policy and follows a format of eight years of primary school, two years of general secondary education, and two years of preparatory secondary education. Primary school officially starts at age seven, and is divided into two cycles of primary education lasting for four years each. The focus of the first cycle of primary school (Grades 1–4) is on basic literacy and numeracy and automatic promotion is common, while the second cycle (Grades 5–8) provides general education and access to it depends on a pupil’s grades during the first cycle. The medium of instruction at the primary school level is generally a local language (20 in total) up until Grade 4 or 6 depending on the region. In parallel, Amharic and English are taught as subjects since Amharic is the language of communication at a country level, while English is a medium of instruction for secondary and tertiary education. Since 1994, primary and secondary public schools have no tuition fees, while higher levels of education are based on cost-sharing of lodging and fees. The government also invests in expanding tertiary education, increasing the number of public universities from 8 in 2008 to 31 in 2013. Public investment in education is relatively high compared to other countries in the region, amounting to about 20% of total government spending in the 2000s and nearly 4% as a share of GDP (Woldehanna and Araya, 2016).

The central objective of the government’s educational reform efforts that started in 1994 was to increase access to schooling, especially at a lower primary school level. This objective is largely achieved since most primary school age children attend the first cycle of primary education. School fee abolition was one of the main reforms aiming at increasing enrolment. Transition to upper primary and secondary school level, by contrast, is lower and is socially and regionally stratified despite school fee abolition. Disparities in school attendance and completion persist, especially by location, parental education, household wealth, family composition and birth order, among other factors (Mani et al, 2013; Woldehanna et al, 2008). A growing base of evidence shows that educational expansion was not accompanied with a sufficient increase of investments in school infrastructure and teachers, thus leading to deteriorating teaching quality due to increasingly overcrowded classrooms, lack of teachers and school resources, and in some cases a shift from full-time to part-time schooling (Bhalotra et al, 2015;
Riddell, 2003; Tomasevski, 2006; World Bank and UNICEF, 2009). In 2008, the government started implementing the General Education Quality Improvement Programme, designed to improve teaching quality at all public primary and secondary schools, and to support transition to tertiary education (Woldehanna and Araya, 2016). The government of Ethiopia has also ratified the Sustainable Development Goals, among which SDG 4 aims to eliminate gender disparities and to ensure more equitable access to all levels of education and vocational training (UNESCO, 2017b; United Nations Sustainable Development, 2015). It is therefore timely to assess what guides family decision making regarding educational investments, and to what extent children’s chances to transit from lower to higher levels of education are socially stratified.

Data, variables and research strategy

This study uses data from the Young Lives longitudinal survey obtained from the UK Data Archive (Boyden, 2018). The Young Lives study followed the lives of two birth cohorts in five survey rounds between 2002 and 2016 in four low- and middle-income countries including Ethiopia. The average age of the older birth cohort (1,000 children) during the five survey rounds was 7, 12, 15, 19 and 22 years, respectively, while the average age of the younger cohort (1,999 children) was 1, 5, 8, 12 and 15. Extensive child-, household- and community-level questionnaires were performed to gather data on children’s living conditions, family composition, cognitive development, mathematics skills, reading skills and school history, allowing children’s educational trajectories to be tracked from early childhood to late adolescence. The Young Lives Ethiopia sampling was based on sentinel site surveillance, purposefully selecting 20 sites to meet the study objectives. Households were randomly selected in each site. The selected sites are located in five administrative regions: Addis Ababa, Amhara, Oromia, Southern Nations, Nationalities and Peoples’ Region (SNNP) and Tigray, and provide a balanced representation of Ethiopia’s geographical and cultural diversity (Young Lives, 2018).

Sample

The analysis is based on two birth cohort samples. The younger cohort sample – children born around 2001 and followed from age 1 until age 15 – is used to study educational trajectories during primary school. The older cohort sample – children born around 1994 and followed
The younger cohort children were followed for five rounds from around age 1 until age 15 between 2002 (Round 1) and 2016 (Round 5). Out of a total of 1,999 observations surveyed in Round 1, most of the children were followed up until Round 5. The attrition rate of this longitudinal survey for the younger cohort is low (9.4% between Rounds 1 and 5), so the risk of a bias in the results due to attrition is unlikely. The final sample of the younger cohort children with non-missing data on all the variables of interest is 1,744 observations, which is 87.4% of the initial younger cohort sample.\(^1\)

The older cohort children were followed from around age 8 (Round 1) until age 22 (Round 5). To study the transition to secondary education, information collected in the first four rounds is used since attrition up until the fourth round is relatively low (9%). The final sample with non-missing data on all the variables of interest is 870 observations, which is 91% of the initial sample of the older cohort. To study transition to tertiary education, information collected in Round 5 is used to capture the sampled individuals in early adulthood. Attrition for the older cohort in Round 5 is considerably higher as only 86% of the older cohort individuals surveyed in Round 4 were followed in Round 5 when they reached around age 22. As a result, the final sample with non-missing data for the analysis of transition to tertiary education is 752, which is 75% of the original older cohort sample. Attrition of 25% is high and can lead to a bias in the results. Further analyses showed that the adolescents who were more likely not to be followed in the last round on average had higher household wealth.\(^2\)

Thus, the findings of the third outcome variable measuring disparities in transition to vocational and tertiary education are conservative and should be interpreted with caution since they are based on a sub-sample of adolescents that excludes the more advantaged groups.

**Variables**

**School transitions**

The outcome variables of interest are school transitions throughout the educational cycle in Ethiopia. The first outcome variable is transition to the secondary cycle of primary education, which starts at Grade 5. A total of 81% of all children of the younger cohort had reached this level of education or higher by age 15. The second outcome analysed is transition to secondary education, which starts at Grade 9. A total
of 59% of all children of the older cohort had reached this level of education or higher by age 19. The third outcome variable is transition to higher education (post-secondary, vocational or university). A total of 30% of all children of the more restricted older cohort surveyed in Round 5 had achieved this level by age 22.

Socioeconomic status

The socioeconomic status of a child’s family is measured by household wealth at a time when the child was of primary school age. The wealth index is a composite measure of the household’s economic status comprising housing quality, service quality and asset ownership. For the purposes of this study, the sample is divided into three equal groups by household wealth representing three levels of family’s SES: lowest, middle and highest.

As a robustness check, SES is also measured in absolute terms by parental educational attainment representing the educational capital of the child’s family. It is measured by the highest level of education achieved by parents or caretakers, selecting the highest educational level of the two. Children are divided into three categories by the highest level of parental education achieved: no formal education, incomplete primary and complete primary education or higher. The share of children with parents with no education, incomplete primary and complete primary education or higher is 45%, 26% and 28% respectively for the older cohort and 44%, 25% and 31% for the younger cohort.

Cognitive abilities

The main mediating variable is the level of a child’s cognitive ability in early childhood measured by the Peabody Picture Vocabulary Test (PPVT). The PPVT is a measure of receptive vocabulary achievement which was first carried out at around age 5 for the younger cohort and at age 12 for the older cohort. The task of the test was to select the picture that best represents the meaning of a word presented orally by the examiner. Tests were untimed, did not require reading on the part of the respondents, were performed individually at home and generally took about 25 minutes. Scores were computed by subtracting the number of errors from the ceiling item. Previous reliability and validity tests of the PPVT of the Young Lives surveys in Ethiopia show that tests perform well in capturing the variation in ability among children in the study sample (Cueto et al, 2009; Cueto and León, 2012). The PPVT z-score distribution by socioeconomic status is provided in Figure 2.2.
Figure 2.2: Distribution of cognitive ability test scores by socioeconomic status

Note: Younger cohort’s mean age 5; older cohort’s mean age 12
Table 2.1 lists descriptive statistics of individual and household variables in their original metrics for three samples which are used to study three educational outcomes measured at age 15, 19 and 22, respectively. Time-varying child and household characteristics are measured with a lag of seven years to capture children’s and their families’ circumstances when children were of school age. Children’s cognitive abilities are measured with a lag of seven to ten years to capture their abilities in early childhood before educational decisions were made. In each of the three samples, about a half were female, the majority resided in rural areas and had parents with no or incomplete primary school.

**Research strategy**

A multivariate logistic regression model is used to estimate the effect of initial cognitive abilities and parental socioeconomic status on school transitions. To estimate whether families with a different socioeconomic status compensate or reinforce early disadvantage, an interaction term is introduced in the model to see if the effect of initial cognitive abilities on subsequent educational outcomes varies by family’s SES. The model takes the following form:

\[
E_{it} = \beta_0 + \beta_1 \text{Ability}_{i,t-2} + \beta_2 \text{SES}_{i,t-1} + \beta_3 \text{Ability}_{i,t-2} \times \text{SES}_{i,t-1} + \gamma X'_{i,t-1} + \epsilon_{it}
\]

(1)

where \( E_{it} \) is the educational status of individual \( i \), expressed as a binary variable equal to 1 if the child made a transition to a given level of education by time \( t \) and 0 otherwise; \( \text{Ability}_{i,t-2} \) is the child’s cognitive ability in early childhood measured by a PPVT test score with a time lag of seven to ten years corresponding to the time before the educational level analysed; \( \text{SES}_{i,t-1} \) indicates the socioeconomic status of the child’s family measured with a time lag of seven years corresponding to school age one level below the educational level analysed; \( X'_{i,t-1} \) is a vector containing a set of child- and household-level covariates during school age to cancel out compositional differences that potentially affect children’s educational status (age in months, gender, number of children in household by age group, region, ethnicity, area of residence, child’s health status relative to peers and caretaker’s age). Parameters \( \beta_1 \) and \( \beta_2 \) measure whether children’s transition to higher levels of education is statistically directly associated with their cognitive abilities in early childhood and their family’s
## Table 2.1: Summary statistics: educational outcomes and individual variables

<table>
<thead>
<tr>
<th></th>
<th>Younger cohort</th>
<th>Older cohort</th>
<th>Older cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age 15</td>
<td>Age 19</td>
<td>Age 22</td>
</tr>
<tr>
<td></td>
<td>(Round 1–5)</td>
<td>(Round 1–4)</td>
<td>(Round 1–5)</td>
</tr>
<tr>
<td></td>
<td>Mean (sd)</td>
<td>Mean (sd)</td>
<td>Mean (sd)</td>
</tr>
<tr>
<td><strong>Educational transition:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper primary</td>
<td>0.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>0.59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational and tertiary</td>
<td></td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td><strong>Socioeconomic status (SES):</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wealth index a</td>
<td>0.35 (0.19)</td>
<td>0.32 (0.19)</td>
<td>0.37 (0.18)</td>
</tr>
<tr>
<td>Parental education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0.44</td>
<td>0.45</td>
<td>0.45</td>
</tr>
<tr>
<td>Incomplete primary</td>
<td>0.25</td>
<td>0.26</td>
<td>0.28</td>
</tr>
<tr>
<td>Complete primary/ higher</td>
<td>0.31</td>
<td>0.28</td>
<td>0.28</td>
</tr>
<tr>
<td><strong>Ability:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPVT score at around age 5</td>
<td>21.0 (11.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPVT score at around age 12</td>
<td>75.7 (26.3)</td>
<td>74.9 (26.1)</td>
<td></td>
</tr>
<tr>
<td><strong>Other characteristics:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender: female</td>
<td>0.47</td>
<td>0.47</td>
<td>0.47</td>
</tr>
<tr>
<td>Age in months</td>
<td>181.0 (3.7)</td>
<td>228.7 (3.9)</td>
<td>264.3 (3.8)</td>
</tr>
<tr>
<td>Caretaker’s age a</td>
<td>36.2 (9.0)</td>
<td>39.4 (9.7)</td>
<td>42.2 (9.5)</td>
</tr>
<tr>
<td>Number of children in household a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 0–5</td>
<td>0.95 (0.83)</td>
<td>0.64 (0.76)</td>
<td>0.57 (0.71)</td>
</tr>
<tr>
<td>Age 6–12</td>
<td>0.81 (0.75)</td>
<td>1.07 (0.84)</td>
<td>1.19 (1.00)</td>
</tr>
<tr>
<td>Age 13–17</td>
<td>0.86 (0.88)</td>
<td>0.94 (0.83)</td>
<td>0.58 (0.67)</td>
</tr>
<tr>
<td>Child’s health relative to peers a b</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same</td>
<td>0.39</td>
<td>0.49</td>
<td>0.49</td>
</tr>
<tr>
<td>Better</td>
<td>0.49</td>
<td>0.44</td>
<td>0.43</td>
</tr>
<tr>
<td>Worse</td>
<td>0.12</td>
<td>0.08</td>
<td>0.08</td>
</tr>
</tbody>
</table>
socioeconomic status during school age, respectively; Parameter $\beta_3$ is the coefficient of interest estimating whether the effect of initial cognitive abilities on later educational transitions varies by family’s SES. Parameter $\beta_1$ is expected to be positive (that is, a positive effect of higher initial cognitive abilities on later educational transitions). Parameter $\beta_2$ is expected to be negative in the case of a compensatory advantage (that is, low initial cognitive abilities are less consequential for higher-SES families), zero if the association between initial abilities and later school transitions does not differ by SES, and positive in case of a reinforcing effect of SES (that is, high cognitive abilities are more consequential for higher-SES families). Variables measuring the child’s age in months and caretaker’s age in years are centred, and the PPVT test score is standardized to have a mean of 0 and a standard deviation of 1 for easier interpretation of the regression results. All standard errors are clustered at sentinel site level, amounting to 21 clusters. The estimated coefficients are expressed as marginal probabilities to transit to a given level of education by time $t$.

Table 2.1: Summary statistics: educational outcomes and individual variables (continued)

<table>
<thead>
<tr>
<th>Area of residence: rural</th>
<th>Younger cohort</th>
<th>Older cohort</th>
<th>Older cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tigray</td>
<td>0.21</td>
<td>0.21</td>
<td>0.20</td>
</tr>
<tr>
<td>Amhara</td>
<td>0.20</td>
<td>0.20</td>
<td>0.21</td>
</tr>
<tr>
<td>Oromiya</td>
<td>0.20</td>
<td>0.21</td>
<td>0.22</td>
</tr>
<tr>
<td>SNNP</td>
<td>0.25</td>
<td>0.23</td>
<td>0.23</td>
</tr>
<tr>
<td>Addis Ababa</td>
<td>0.14</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td>Region *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tigray</td>
<td>0.21</td>
<td>0.21</td>
<td>0.20</td>
</tr>
<tr>
<td>Amhara</td>
<td>0.20</td>
<td>0.20</td>
<td>0.21</td>
</tr>
<tr>
<td>Oromiya</td>
<td>0.20</td>
<td>0.21</td>
<td>0.22</td>
</tr>
<tr>
<td>SNNP</td>
<td>0.25</td>
<td>0.23</td>
<td>0.23</td>
</tr>
<tr>
<td>Addis Ababa</td>
<td>0.14</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td>Child’s ethnic group:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amhara</td>
<td>0.29</td>
<td>0.29</td>
<td>0.30</td>
</tr>
<tr>
<td>Gurage</td>
<td>0.08</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Oromo</td>
<td>0.21</td>
<td>0.21</td>
<td>0.20</td>
</tr>
<tr>
<td>Tigray</td>
<td>0.23</td>
<td>0.23</td>
<td>0.22</td>
</tr>
<tr>
<td>Other</td>
<td>0.20</td>
<td>0.20</td>
<td>0.21</td>
</tr>
<tr>
<td>Observations</td>
<td>1,744</td>
<td>870</td>
<td>752</td>
</tr>
</tbody>
</table>

Note: Variables in their original metrics. * Observed with a seven-year lag. $^b$ Child’s assessment of own health relative to other children of the same age.
Findings

The key questions that this section seeks to answer relate to the SDG 4 target of equal access to all levels of education and vocational training for all people irrespective of their gender, social origin and other characteristics. As educational systems become more meritocratic, it is generally expected that educational outcomes become less dependent on families’ socioeconomic status and more dependent on children’s cognitive endowments. To separate between the two, a longitudinal survey design is needed to distinguish between diverging educational trajectories due to initial endowments and due to family resources and choices net of initial endowments. The longitudinal design of the Young Lives survey allows educational trajectories of the same children to be observed over a period of 15 years and provides measures of early circumstances with a sufficient time lag before decisions regarding educational transitions are made. This design makes it possible to study the timing of divergence of children’s educational trajectories and to analyse the pathways through which inequality in educational opportunities occurs. First, we look at the extent to which initial cognitive endowments vary by a family’s SES. Second, we study the extent to which abilities determine transition to higher levels of education. Third, we analyse whether children with the same initial cognitive endowments have diverging educational transitions depending on their family’s SES. In correspondence with the SDG 4 target of equal access to all levels of education (UNESCO, 2017b), the educational trajectories studied in this section are transitions to upper primary, secondary and tertiary education.

The role of socioeconomic status in determining cognitive abilities

The second target of SDG 4 emphasizes the importance of equitable early childhood development so that all girls and boys are equally ready for primary education. This target requires early interventions since cognitive development is socially stratified early in childhood, a long time before children enter primary school. Figure 2.2 shows the distribution of cognitive ability test scores by socioeconomic status for a selected sample of children in Ethiopia. Findings are in line with previous research and show that children from families with a higher SES on average already score substantially better in cognitive ability tests before entering primary school, and that these disparities tend to accumulate and intensify with age. Previous research shows that unequal access to pre-school facilities explains some but not all the
Figure 2.3: Transition rates to higher levels of education by level of initial cognitive abilities

Source: Author's own
differences in cognitive development by socioeconomic status. As an example, Woldehanna (2016) examines the effect of pre-school access on children’s cognitive performance in Ethiopia using the Young Lives data and finds that pre-school mediates about one third of the direct effect of a family’s socioeconomic background and geographic location. These findings point to a need for more public investments not only in formal pre-school education but also in levelling of household living conditions to meet the target of reaching equitable cognitive performance and levelling of school readiness before children enter the classrooms.

*The role of cognitive abilities in determining educational trajectories*

The findings presented in Figure 2.3 confirm the crucial role played by cognitive abilities in determining children’s educational trajectories. Low cognitive development during childhood is negatively associated with later educational transitions. On average, only 74% of children who scored poorly in the receptive vocabulary test measured before school age progressed to upper primary school, while as many as 90% of all children who scored highly made this transition. The gap in transition rates between lower- and higher-ability children increases progressively for secondary and higher levels of education. On average, only 40% of children who were among the bottom third of the distribution in the receptive vocabulary test measured at around age 12 made the transition to secondary school, while as many as 80% of high-ability children made this transition. Similarly, the proportion of adolescents and young adults who moved on to vocational or tertiary education was only 12% for low scorers versus 50% for high scorers based on cognitive tests measured at around age 12. Together, these findings underline that inequality in educational opportunities starts early with inequitable cognitive development in early childhood, and that the negative effect of low cognitive performance exacerbates at higher levels of educational transition points. Thus, the SDG 4 targets of equitable access to primary, secondary, vocational and tertiary education are unlikely to be reached before addressing the SDG target 4.2 of equitable access to quality early development, care and pre-primary education so that all children are equally ready for primary school.
The role of socioeconomic status in determining educational trajectories for children with the same initial cognitive abilities

The findings presented in this section show that inequitable early cognitive development is only one part of the explanation of the observed disparities in educational opportunities. Inequality in educational trajectories between children from lower- and higher-SES families persists also when children have the same level of initial cognitive abilities. In line with the compensatory advantage hypothesis, the more socioeconomically advantaged families are not sensitive to the level of children’s cognitive abilities when deciding about their transition to upper primary school. As can be seen from Figure 2.4, most children from high-SES families transit from lower to upper primary school regardless of children’s cognitive performance at age 5. For children from lower-SES families, by contrast, chances to reach upper primary school are substantially lower for those with low early cognitive abilities and increase progressively with higher cognitive performance levels. The estimates presented in Figure 2.4 are based on a sample of children born around 2001 in five regions in Ethiopia surveyed between 2002 at age 1 until 2016 when children were around age 15. The estimates are net of a wide range of individual and

Figure 2.4: Probability to transit to upper primary school

Note: N = 1744; SES = wealth. Logistic regression model with controls. Standard errors clustered by sentinel site.

Source: Young Lives Survey Rounds 1–5, younger cohort
Figure 2.5: Probability to transit to secondary school

![Probability to transit to secondary school](image_url)

Note: N = 770; SES = wealth. Logistic regression model with controls. Standard errors clustered by sentinel site.

Source: Young Lives Survey Rounds 1–4, older cohort

household characteristics measured at school entry age (for details see the methods and variables section).

Figure 2.5 shows the relationship between cognitive ability test scores at around age 12 and later transition to general secondary education for a selected sample in Ethiopia. The estimates presented in Figure 2.5 are based on a sample of children born around 1994 and surveyed between 2002 and 2013 up until age 19. Contrary to upper primary education, no compensatory advantage mechanism can be observed for high-SES children in case of low cognitive performance at the end of primary school age. Children’s probability to move up to secondary school increases with their level of cognitive abilities for both low- and high-SES families. Nevertheless, the SES gap in the probability to transit to secondary school is substantive and increases with the level of initial cognitive abilities. Among children who scored low on the cognitive ability test at around age 12, the probability to transit to secondary school for children from high-SES families is about 17 percentage points higher compared to children from low-SES families, but this difference is not statistically significant. For children with average and high cognitive ability test scores at around age 12, the gap in the probability to transit to secondary school between low- and high-SES families increases to 23 and 25 percentage points, respectively, and this
difference is statistically significant. Among children with average and high PPVT test scores, on average only 55% to 65% of those from low-SES families move on to secondary education, compared to 80% to 90% of children from high-SES families with the same cognitive performance at primary school age.

The third educational transition of interest is that of vocational and tertiary education measured for a sample of children born around 1994 surveyed between 2002 and 2016 up until the mean age of the surveyed individuals was 22. Cognitive abilities were measured at around age 12 while the latest educational status was measured at age 22. As mentioned in the methodology section, this sampled cohort experienced a relatively high attrition rate between survey years 2013 and 2016, with a higher proportion of young adults from high-SES families dropping out of the survey in the final round. Thus, the estimates for the higher-SES group for this educational transition may be downward biased considering that some of the individuals from high-SES families were not captured in the last survey round.

As can be seen from Figure 2.6, parental socioeconomic status and cognitive performance together reinforce inequality in accessing post-secondary education. Higher cognitive performance during primary school age is associated with a higher probability to move on to
tertiary education, but only for children from middle- and higher-SES families. Children from low-SES families, by contrast, have a substantially lower probability to transit to tertiary education, and their chances to make this transition remain low regardless of their cognitive endowments. These findings reveal not only substantial inequalities by parental socioeconomic status net of cognitive abilities, but also a loss of potential talent. Children from low-SES families, even those with the highest cognitive ability levels, have considerably lower chances to access vocational training and university compared to high-SES students. To put it in perspective, high-ability low-SES children have lower chances to transit to vocational and tertiary education than low-ability high-SES children. Therefore, equalizing early childhood development and improving the quality of primary and secondary education can be regarded as necessary but insufficient preconditions to reach the SDG target 4.3 of equal access to technical, vocational and tertiary education. As pointed out by UNESCO (2017b), the provision of tertiary education ought to be made progressively free to eliminate existing financial barriers. Besides financial barriers, social stratification research points at additional mechanisms behind inequality in accessing tertiary education, such as differences in perceived returns to education and differences in parents’ knowledge to navigate through the educational system (Boudon, 1998; Breen and Goldthorpe, 1997; Jackson, 2013), which also ought to be considered.

Conclusions

The SDG 4 aims to ensure equitable access to all levels of education starting from pre-school to vocational training and tertiary education (UNESCO, 2017b). In order to reach these goals, it is important to understand the mechanisms behind inequality in educational opportunities and the timing when children’s educational trajectories begin to diverge. In this chapter, the Young Lives Ethiopia longitudinal survey data were used to understand the timing and sources of divergence in children’s educational trajectories in low-income contexts. Following Boudon (1998), it was hypothesized that inequitable educational transitions by parental socioeconomic status are produced through two main pathways: disparities in cognitive performance developed during childhood, and differences in parental educational decisions net of children’s cognitive abilities. Due to the longitudinal design of the data, it was possible to distinguish between
the effect of children’s early endowments measured in childhood and later parental educational investments.

In line with previous findings, the analysis showed that the SES gap in cognitive performance develops early in life when children are still in their home environment. Children from low-SES families on average score lower in cognitive ability tests compared to high-SES families, and this disparity increases with age. The findings also support the SDG 4.2 and confirm that early cognitive development is crucial for future chances to transit to higher levels of education. As an example, as many as 80% of the children scoring highly in cognitive tests at primary school age move on to secondary school, compared to only 40% from the bottom third of the ability distribution.

Initial educational inequalities tend to be reinforced by parental educational investments in children with higher abilities. The findings show one notable exception: that of transition to upper primary school for high-SES families. While low-SES families are sensitive to their children’s cognitive performance, children from more advantaged families have a persistently high probability to transit to upper primary school regardless of their level of cognitive ability. The implication of this finding is that more advantaged families compensate their offspring’s early disadvantage in case of low cognitive ability prior to school age.

Children from higher-SES families have considerably greater chances to move on to secondary education. Contrary to the primary school level, all types of families are sensitive to their children’s cognitive performance at this level. These findings imply that in Ethiopia, families with relatively higher socioeconomic resources also evaluate their children’s success probabilities before investing in secondary and post-secondary education. Early (dis)advantage also determines later educational transitions for more advantaged families as they do not compensate for low cognitive performance at later transition points. It should however be noted that children from high-SES families tend to score significantly higher on early cognitive ability tests and very few of them show low cognitive performance by the end of primary school. Thus, inequity in educational opportunities is reproduced early in childhood and reinforced with each educational transition. These findings show that the SDG 4 targets of equitable access to all levels of education are unlikely to be reached before addressing the SDG target 4.2 of reaching equitable cognitive performance through quality early development, care and pre-primary education so that all children are equally ready for primary school.
Inequality of educational opportunities is most striking at the post-secondary level. Children from low socioeconomic backgrounds face significant barriers to accessing post-secondary education. Children from low-SES families have equally low chances to access vocational education and university regardless of their initial cognitive ability level. This points at a loss of talent since those children who initially score highly in cognitive tests are substantially less likely to move on to higher education. This finding has direct policy implications as it shows that high-ability poorer children can keep up with their more advantaged peers and progress through primary school, but they are blocked at higher transition points. Thus, any policy aiming to equalize children’s educational opportunities should aim not only at improving early childhood development and cognitive abilities through investments in children’s living conditions, health and nutrition prior to school age, but also reduce the barriers faced by low-SES families in accessing post-secondary education.

For the purposes of this study, it was important that cognitive abilities are measured as early as possible to avoid the estimates being confounded by prior parental investments and school effects. In the longitudinal survey used, the first time the PPVT receptive vocabulary test was performed was in Round 2 when the younger cohort was age 5, thus fulfilling the study requirements for the analysis of transition to upper primary school level. The older cohort, by contrast, was around 12 years old when the PPVT test was performed. Thus, one of the main limitations of this longitudinal design is that for the analysis of transition to secondary and tertiary education, the PPVT test was measured only at the end of primary school age. The estimates concerning transition to secondary and tertiary education may therefore be confounded with prior family decisions based on children’s early endowments not captured in this survey, and may incorporate both family and school effects. For future research seeking to analyse the timing and sources of inequality in educational trajectories from early childhood through all levels of education, it is important to capture individual endowments as early as possible before the school starting age.

Notes
1 Two-sample t-tests were carried out to compare the initial and the excluded sample. Results show that differences in means are not statistically significant in most variables of interest, with a few exceptions. Among children who dropped out due to attrition or missing information, there were proportionally slightly more girls and more children living in households with a female household head.
2 Two-sample t-tests were performed to identify differences between adolescents of the older cohort who were surveyed until Round 4 (age 19) but not followed in
Round 5 (age 22), totalling 13.5% of the older cohort sample. Those not followed in Round 5 on average came from households with a higher wealth index, scored higher on cognitive ability tests, and had higher transition rates to upper primary and secondary education. There were no statistically significant differences on other characteristics such as gender and parental education.

Findings are largely similar regardless of the SES variable used and are available from the author upon request.

The same analysis was performed by gender. The estimates show no statistically significant differences between boys and girls regarding the association between initial cognitive endowments and later educational transitions. Results can be obtained from the author upon request.

Only children who attended upper primary school or higher are considered here so the estimates are not affected by children who never attended school.

References


