Inequalities in educational outcomes in Ethiopia:
An exploration of gender and regional differences
based on the national examinations in grades 10 and 12.

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Doctoral dissertation submitted for the degree of PhD

CEMO: Centre for Educational Measurement

Faculty of Educational Sciences

University of Oslo

2021

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Series of dissertations submitted to the
Faculty of Educational Sciences, University of Oslo
No. 342

ISSN 1501-8962

Cover: Hanne Baadsgaard Utigard.
Print production: Reprosentralen, University of Oslo.

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Dissertation Summary

This dissertation provides a thorough discussion of the results from three different empirical studies on inequalities in educational outcomes and equity policy in Ethiopia. Specifically, the studies focus on gender and regional disparities and on how policy measures and educational opportunity impact gender equity in school attainment, enrolment and access in Ethiopia. The analysed data encompassed two full student cohorts participating in the national examination at the end of secondary and preparatory education in Ethiopia.

In gender-region analyses, large regional differences were found. In academic achievement, the central regions outperformed all other regions. Nevertheless, not all the emerging regions were underachievers compared to the more established regions. A large gender gap in general and STEM academic achievement was found even in the central regions, with girls underachieving when compared to boys. However, this gender gap in achievement was less pronounced in the emerging regions. Furthermore, although female students were highly underrepresented at school in the emerging regions, the gender gap in enrolment or eligibility demonstrated more comparable rates in the emerging regions than in the more developed regions. Current affirmative action was not found to have worsened the observed gender inequalities in absolute enrolment numbers by ensuring that similar enrolment rates were achieved within each group for transition to a preparatory programme and, to a lesser extent, to university.

Taken together, the clear regional and gender differences are indicators that Ethiopia is changing and developing at different speeds across the regions and population groups, implying that policymakers should remain attentive to regional and group differences and find smart strategies to deal with these discrepancies. Education for all, in the literal sense, might be one fruitful way forward.

Sammendrag av avhandling

Denne avhandlingen er basert på en grundig omtale av resultater fra tre forskjellige empiriske studier om ulikheter i utdanningsresultater samt likhetspolitikk i Etiopia. Studiene fokuserer spesielt på forskjeller mellom kjønn og regioner, og på hvordan politiske tiltak og utdanningsmuligheter påvirker likestillingen i skoleprestasjoner, -deltagelse og -tilgang i Etiopia. Data fra to fulle studentkohorter som deltok i avsluttende nasjonale eksamener i videregående skole og ved forberedende utdanning i Etiopia, ble analysert.

Analyser av kjønn og regioner viste store regionale forskjeller. Sentrale regioner utkonkurrerte alle andre regioner mht. akademiske prestasjoner. Likevel underpresterte ikke de fremvoksende regionene sammenlignet med mer etablerte regioner. Det ble funnet store kjønnsforskjeller i akademiske prestasjoner både generelt og for STEM, selv for de sentrale regionene, med jenter som underpresterte sammenlignet med gutter. Kjønnsforskjellene i prestasjoner var mindre uttalt i de fremvoksende regionene. Selv om kvinnelige studenter var svært underrepresenterte i skolen i de fremvoksende regionene, viste kjønnsgapet i innmelding eller kvalifisering mer sammenlignbare ratioer i disse regionene enn i de mer utviklede regionene. Nåværende positive særbehandling forverret ikke de observerte kjønnsulikhetene i absolutt antall innmeldte ved å sikre at innenfor hver gruppe ble det oppnådd liknende innmelding til overgang til et forberedende program og, i noen mindre grad, til universitetet.

Sammenlagt er de klare regionale forskjellene og kjønnsforskjellene indikatorer på at Etiopia endrer seg og utvikler seg i ulik hastighet på tvers av regionene og befolkningsgruppene. Dette innebærer at politiske beslutningstakere må være oppmerksomme på regionale forskjeller og gruppeforskjeller for å finne gode strategier for å håndtere disse ulikhetene. Utdanning for alle, i bokstavelig forstand, kan være en fruktbar vei videre.

ማጠቃለያ (summary)

በዚህ የ ፫ኛ ዲግሪ ጥናታዊ ጽሑፍ፤ በኢትዮጵያ የተማሪዎች የትምህርት ተሳትፎና ውጤት እንዲሁም የፍትሃዊነት ፖሊሲ (equity policy) ላይ በማተኮር የተከናወኑ ሶስት የተለያዩ ጥናቶች የተካተቱ ሲኾን የጥናቶቹ ውጤትና ትንታኔ በዝርዝር ቀርቧል፡፡ጥናቶቹ በዋናነት በሴቶችና ወንዶች እንዲሁም በክልሎች መኻል ስለሚንጸባረቀው የትምህርት ተሳትፎና ውጤት ልዩነት ላይ አተኩረዋል። በተጨማሪም የማኅበራዊና ኢኮኖሚአዊ ደረጃን እንዲሁም የፖሊሲ ርምጃዎች የነበራቸውን አዎንታዊ አስተዋጽዎ በመገምገም ለተሻለ ውጤት የሚያበቁ አማራጭ የፖሊሲ ማሻሻያ ሓሳቦችን ለማቅረብ ተሞክሮባቸዋል።

የጥናቶቹ ዐቢይ የመረጃ ምንጭ የኢትዮጵያ ሀገር አቀፍ የትምህርት ምዘናና ፈተናዎች ኤጀንሲ ሲኾን ፤፡ በኢትዮጵያ ትምህርት ሥርዓት የኹለተኛ ደረጃና እና የመሰናዶ ትምህርት ላይ የነበሩ ተማሪዎች በናሙናው ተካትተዋል። በናሙናው የ ፬ (4) ተከታታይ ዓመታት (ከ፳፻፬ - ፳፻፯ /2004-2007 ዓ.ም ወይንም እ.አ.አ ከ2012-2015) መረጃዎች የተካተቱ ሲኾን በጥቅሉ ስምንት መቶ ሺህ የ፲(10)ኛ ክፍል ተማሪዎች እና ኹለት መቶ አስራ አንድ ሺህ(211,000) የመሰናዶ ተማሪዎች መረጃ በጥናቱ ተካትቷል። የመረጃው ስብጥር የተማሪዎችን ጾታ፣የፈተና ውጤት፣ክልልና የትምህርት ቤት "ኮድ" በዋናነት ይዟል። ሌሎች ተጨማሪ መረጃዎችም ከኢትዮጵያ ማዕከላዊ ስታትስቲክስ የሕዝብ መረጃ ማዕከል እና ከዓለም አቀፍ የሰው ሀብት ልማት ሪፖርት(HDR) ተካትተዋል።

በጥናቱ ግኝቶች መሠረት በኹሉም የትምህርት ደረጃ በአማካኝ ልኬት መሠረት የተማሪዎች የፈተና ውጤት (achievement)) ከ፶ እጅ (50%)በታች ከመሆኑም ባሻገር የጾታና ክልል ትንታኔ እንዳመለከትው ቀላል የማይባል የትምህርት ተሳትፎ (enrolment) እና የፈተና ውጤት (academic achievement) ልዩነት በሴቶችና ወንዶች እንዲኹም በክልሎች መኻል ታይቷል። በትምህርት ውጤትና ተሳትፎ፣ ማዕከላዊ አስተዳድር ክልሎች (አዲስ አበባ እና ድሬዳዋ) ከሌሎቹ ክልሎች የተሻሉ ኾነው የተገኙ ሲሆን፤ አዳጊ ክልሎች ከሌሎች ክልሎች ጋር ሲነጻጸሩ ተቀራራቢና ብሎም የተሻለ (ለምሳሌ አፋርና ሶማሌ) የፈተና ውጤት አሳይተዋል፡፡

በተጨማሪም የጾታ ትንታኔው እንደሚያሳየው አዲስ አበባን ጨምሮ በአብዛኛው ክልሎች በሴቶች እና ወንዶች መኻል የጎላ የትምህርት ውጤት ልዩነት(በአማካኝ የወንዶች ውጤት ከሴቶች ይበልጣል።) እና የትምህርት ተሳትፎ ልዩነት ታይቷል። ነገር ግን በአዳጊ ክልሎች የጾታ ተሳትፎ (enrolment) ልዩነት እጅግ ከፍ ያለ ቢኾንም (የሴት ተማሪዎች በቍጥር አንስተኛ መኾን) የፈተና የትንተና ውጤት እንዳመለከተው በሴቶችና ወንዶች መኻል የጎላ የትምህርት ውጤት (Academic Achievement) ልዩነት የለም። ይህ የሴቶችና ወንዶች ተቀራራቢ የፈተና ውጤት፤ የጎላ ተሳትፎ ልዩነት ባልታየበት አዲስ አበባ ክልል እንኳ አልታየም። በአጠቃላይ በማደግ ላይ ባሉ ክልሎች ሴት ተማሪዎች በትምህርት ገበታ ላይ ቍጥራቸው በጣም ዝቅተኛ ቢኾንም በትምህርት ውጤት ወይም የተሳትፎ ብቍነት ላይ

ያለው ጾታዊ ልዩነት በበለጸጉ ክልሎች ውስጥ ከሚገኙት በተሻለ ተመጣጣኝ እንደኾነ አሳይቷል፡፡ በሳይንስ ትምህርት ፈተናና ተሳትፎ ላይ የተደረግው የጥናት ውጤት እንዳመለከተው፤ በአማካኝ ልኬት ዝቅተኛ የትምህርት ውጤት የታየ ሲሆን የሴቶች ተሳተፎ በሀገር ደረጃ እንዲሁም በኹሉም ክልሎች አነስተኛ ኾኖ ተገኝቷል።በአዲስ አበባ የመሰናዶ ትምህርት፤በማኅበራዊ ሳይንስ መርሐ ግብር የሴቶች ተሳትፎ ከወንዶች ልቆ ታይቷል።

ሌላው የጥናት ውጤት እንዳመለከተው አሁን ያለው የትምህርት ፍትሐዊነት ማሻሻያ እርምጃ (affirmative action) በመሰናዶና በከፍተኛ ትምህርት ተሳትፎ በክልሎችና በጾታ መኻል ያለውን ልዩነት ለማሻሻል አዎንታዊ አስተዋጽዎ እንዳለው አመላክቷል፡፡ነገር ግን የተሳትፎ እድል ከመክፈት ባለፈ በማሻሻያ እርምጃው የተጠቀሙ ተማሪዎች ውጤታማነታቸው ለማረጋገጥ የሚያስችል ስልት አልተዘጋጀም። ሌላው የዚህ ጥናት ትንተና እንደሚያሳየው በእድሉ መጠቀም የቻ ሉና መሥፈርቱን ያሟሉ ተማሪዎች ትምህርቱን ካጠናቀቁ የመሰናዶ ተማሪዎች ጋር ሲነጻጸሩ ሰፊ ልዩነት አሳይተዋል.። ከዚህ በመነሣት ኹለት መላምት መሰንዘር ይቻላል፡- የመጀመሪያው በማሻሻያ ርምጃው የተጠቀሙ ተማሪዎች በተለያየ ምክንያት አቋርጠው ሊኾን መቻሉ ሲኾን ኹለተኛው እድሉ ቢኖራቸውም ከመጀመሪያው በተለያዩ ምክንያቶች ለመጠቀም አለመቻላቸው ይኾናል። የኹለተኛው መላምት የመኾን አጋጣሚ የጠበበ ሲኾን፤የመጀመሪያው ግን የመከሰት አጋጣሚው ሰፊ ነው። ይህም በሌሎች ጥናት ግኝቶች እንደታየው የዕድሉ ተጠቃሚዎች በልዩ ድጋፍ ካልታገዙ የማቋረጥ አጋጣሚያቸው ሰፊ ሊኾን መቻሉ ተስተውሏል።

በጥቅሉ ሲታይ፤ ግልጽ የኾነ የክልል እና የጾታ ልዩነት መታየቱ በፍጥነት እየጨመረ ካለው የሕዝብ ቍጥር ጋር ተያየዘ ልዩነቱ እየሰፋ ስለሚኼድ በልዩ ኹኔታ አፋጣኝየመፍትሔ ፖሊሲ አግጣጫ መዘርጋት ያሰፈልጋል። ለሦስት አስርት ዓመታት ጥቅም ላይ የዋለው የፍትሐዊነት ማሻሻያ ፖሊሲን(affirmative policy) በመገምገምና በማሻሻል ለትምህርት ተሳትፎ እኵልነት የሚደረገውን ጥረት ከማገዝ አንጻር ጉልህ ሚና ስልሚኖረው ፖሊሲ አውጪዎች ከምሁራንና ከሚመለከታቸው የባለድርሻ አካላት ጋር የውይይት መድረክ መፍጠር ይገባቸዋል።

Outline of the Dissertation

The dissertation is an article-based thesis consisting of three studies discussed in a general introduction, research context, major research questions, methodological consideration and a more general conclusion at the end. The dissertation tackles the core question of the impact of regional gender disparities on educational outcomes through a lens that acknowledges the vast differences in context between males and females across regions in Ethiopia (see Figure 1). The general introduction serves the purpose of bringing to light the key issues underlying the three empirical studies: equity-equality dilemma, educational opportunity, affirmative policy and gender inequality in education. For a quick preview of the setup of the individual studies, see Table 1. The general discussion allows a follow-up on some commonalities in what may have been learned so far from the three studies and permits a prediction of further research directions, policy recommendations and challenges.

Overview of the Studies

Study1 Tesema, M.T. & Braeken, J. (2018). Regional inequalities and gender differences in academic achievement as a function of educational opportunities: Evidence from Ethiopia. *International Journal of Educational Development, 60*, 51-59.

Study2 Tesema, M.T. & Braeken, J. (Submitted). Mapping student enrolment and admission eligibility for higher education in Ethiopia: Affirmative action as equity instrument?

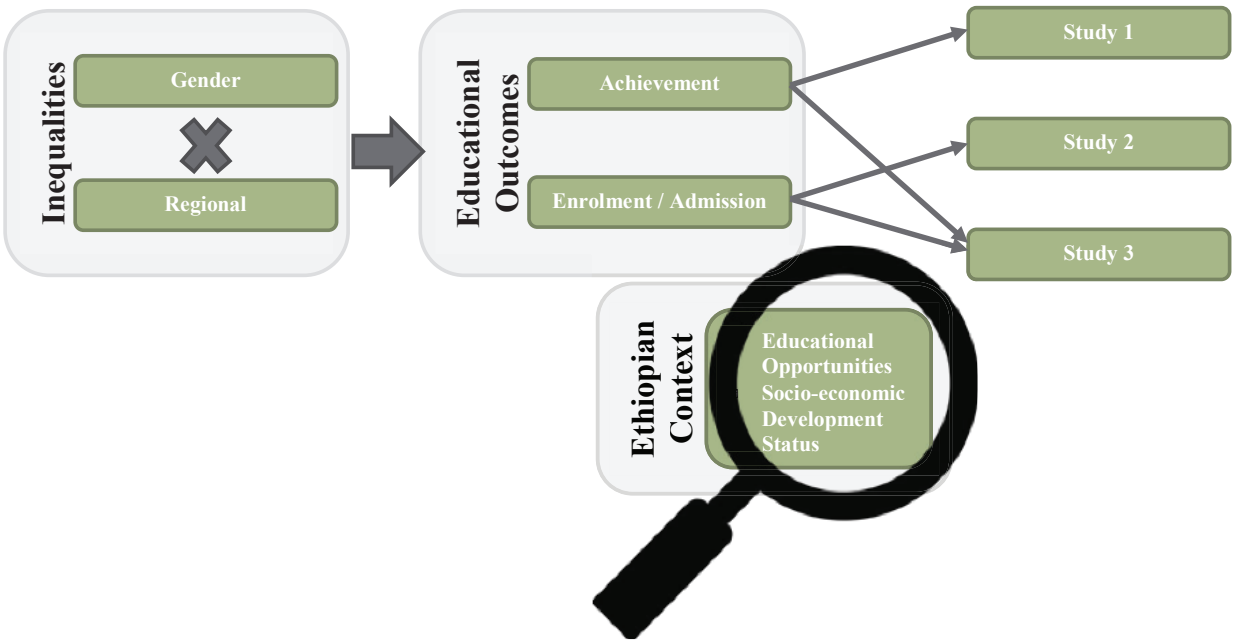
Study3 Tesema, M.T. & Braeken, J. (Submitted). Gender disparities in STEM enrolment and achievement: The role of regional socio-economic development in Ethiopia.

Table 1.

An overview of objectives, sample and method of analysis for the three studies.

	Aim	Population/sample Data collection Education level	Analysis Method
Study 1	To provide empirical evidence by exploring gender and regional differences in academic achievement as a function of educational opportunity (EO) in Ethiopia	*n* = 211706 students participating in preparatory programme Standardized National Exam Registry data Preparatory programme (G11-12)	Achievement: Region*Gender EO*Gender Quantitative: Multilevel Regression
Study 2	To explore gender equity in enrolment and admission status from high school through preparatory to university by region, and To evaluate the impact of affirmative action on gender equity in enrolment and admission to higher education in Ethiopia	2 high school cohorts each *n* = 800000 2 preparatory cohorts each n = 200000 Standardized National Exam Registry data	Enrolment & Eligibility: Region*Gender | Affirmative action Quantitative: Logistic Regression
Study 3	To explore the gender and regional differences in educational outcomes in STEM subjects through a socio-economic-status lens as measured by regional development index in Ethiopia	High school (G9-10) Preparatory programme (G11-12) University	STEM achievement & enrolment: Region*Gender Quantitative: T-test, Logistic regression

Figure 1. Schematic overview of the three empirical studies.



Acknowledgements

Undertaking this PhD has been a unique experience for me and it would not have been possible to do without the support and guidance that I received from many people.

First and foremost I am extremely grateful to my supervisors, **Prof. Johan Braeken** for his invaluable advice, continuous support, and patience. Your guidance encouraged me in all the time of research and writing of this thesis. Your insightful feedback pushed me to sharpen my thinking and brought my work to a higher level. It would have been unthinkable to bring my thesis to its current state without your support.

My gratitude extends to **Prof. Sigrid Blömeke** for her treasured support and helpful feedback at various stages of my work including mid-way evaluation and final revision which was really influential in shaping my dissertation. I am also very grateful to **Prof. Ronny Scherer** for willing to participate and provide insightful comments and suggestions for the final evaluation of my PhD project. I would like to offer my special thanks to **Prof. Rolf Vegar, Prof. Teklu Abate** and **Prof. Ides Nicaise** for their constructive and valuable comments on my thesis. Many thanks to **Prof. Jan Eric Gustafson** who provided me an opportunity to join CEMO team and supported me in planning my project, and serving as co-supervisor for a while.

I also wish to thank each member of dissertation committee: **Prof. Elaine Unterhalter, Prof. Girma Berhanu** and **Prof. Fengshu Liu** for their insightful comments, questions and suggestions which immensely improved the quality of the dissertation.

I would like to express my sincere gratitude to Norwegian Government for providing me with the opportunity to participate in quota scheme scholarship programme which was crucial for sponsoring my PhD programme at the University of Oslo. Additionally, I gratefully acknowledge

the funding received from CEMO (Centre for Educational Measurement, UiO) at the faculty of education towards my PhD.

My deep appreciation goes out to personnel at Ethiopian National Educational Assessment and Examination agency, especially to Dr Zerihun Duresa for graciously providing access to big data on secondary and preparatory education students in Ethiopia.

I thank the cheerful, caring and helpful Anne-Catherine and my fellow CEMO mates for the stimulating work environment, wonderful social activities, and all the fun I have had during all the years at CEMO.

Special thanks to my family: my mother (Tebeyen), sister (Dr Yeayne) and brothers (Dr Agegnehu, Maru, Abebe, Fasika, Addis) for supporting me throughout the journey.

Finally, to my wife, Mery: your love and understanding helped me through this long journey to make the completion of this dissertation real. Without you believing in me, I never would have made it.

Melaku Tesfa Tesema

November, 2021

GENERAL INTRODUCTION

1 General Introduction

With increasing growth in the global population, ‘equal educational opportunities for all’ has been a universal declaration for decades, with an intention to promote equality in educational participation and achievement among different groups (UNESCO, 2000). In connection with this movement, different countries across the world are striving to tackle inequalities by designing relevant strategies and policies (Salmi, 2018; UNESCO, 2016).

Despite efforts to achieve the Education For All (EFA) goals, places in the world remain where the issues of equitable access and achievement in education are still major concerns (UNESCO, 2015). According to the latest UNESCO global report, while it is estimated that around 258 million children, adolescents and youth are out of school, the projection for 2030 indicates that only six out of ten youth will complete secondary education (UNESCO, 2019b). In terms of academic proficiency, the report noted that more than 50% of children and adolescents of primary and lower secondary school age do not achieve minimum proficiency levels in reading and mathematics. In terms of gender equity, only half of the countries had achieved gender parity in participation to lower secondary education and only one-fourth of the countries in upper secondary education (UNESCO, 2019a).

A complicating factor is that education data are often incomplete so that the most marginalized population groups remain mainly invisible in statistics at both the national and global levels (UNESCO, 2015). The consequence of not knowing about the existence of disparities in educational outcomes might even worsen the provision of educational opportunities for marginalized groups. Therefore, there is a need for accurate, current and comparable data on education for a better prediction of reaching the UN's sustainable development goal 4, which is 'quality education for all by 2030' (UNESCO, 2019b). These data are needed to identify the possible issues of disparities, locate them, and ultimately track them over time to see whether policy-making and educational interventions may have succeeded.

Despite the efforts to implement different equity instruments for widening opportunities (Salmi & D'Addio, 2020), inequity in education participation and achievement remains a major challenge in many places, with the highest records in developing countries. This implies that there needs to be a mechanism to assess the impact of these equity policies on education, especially when proper data are available.

The main objective of this dissertation, therefore, is to provide empirical evidence based on a thorough discussion and review of the results of three different studies on inequalities\inequity in educational outcomes and equity policy in Ethiopia and, furthermore, based on representative large-scale national data. In particular, the studies focus on gender and regional disparities and how policy measures and educational opportunities impact gender equity in school attainment, enrolment and access to preparatory and higher education in Ethiopia.

In addition to the limited number of studies that focus on educational inequalities in high school and beyond in Ethiopia, the motivation to focus on these levels of education relies on the

fact that these are crucial stages during which students make important life decisions and take further steps that determine their futures.

In addition, large, nationally representative education data are accessible at these stages due to a standardized national examination at the end of each education level in Ethiopia, making a more thorough comparative study feasible. The hope is that the work in this dissertation can be a steppingstone to help shape policies and make policies more inclusive for the diverse needs and conditions of student populations in Ethiopia.

1.1 Equity and equality in Education: conceptual framework

In education research, (in)equity and (in)equality are widely used terms that partly overlap in meaning, although they are not the same. Because they share some conceptual similarity, the terms are frequently used interchangeably. One of the purposes of this section is to clarify the basic conceptual differences and similarities, and determine how we can apply the terms in research.

Like any normative concepts, the words 'equity and\or equality' tend to have different meanings depending on the different contexts or disciplines\fields. For example, equity can be viewed as a question of distribution in field of economics. While lawyers, in relation to legal systems, tend to think of equity in terms of fair judgement, educators consider equity in terms opportunity to pursue an education. A similar approach works for equality as it is used in multiple contexts. We may, for example, say 'equality of opportunity' or equality of outcome. The term cannot be delimited to one context as it may refer to equalities in economic benefits, resources, inequality in quality of life or ability, equality of rights, choices or capabilities (A. Sen, 1995). Furthermore, there is common trait for all the different views about equity and/or equality in that

the interpretation primarily relies on principles of fairness and justice (Espinoza, 2008; Rawls, 1999; A. Sen, 1995).

Although the efforts to understand the concepts of equity and\or equality has been highlighted earlier (Sen, 1982; Rawls, 1999; Sen, 1995), the debate has continued among scholars (Aguado-Odina et al., 2017; Castelli et al., 2012; Espinoza, 2008; Field et al., 2007b; OECD, 2018; Salmi & Bassett, 2014; Subrahmanian, 2005; Takeuchi et al., 2018b; Unterhalter, 2009; Unterhalter & Robinson, 2020; Zamojska, 2016) Frønes et al., 2020) in relation to fundamental issues such as rights, fairness and social justice.

We start the discussion from some of the earlier central theories of justice and fairness that are linked with the present debate on the conceptual understanding of equity and equality. In particular, we present the original contribution of pioneer philosophers such as **Amartya Sen** and **John Rawls** in laying the foundation for understanding social theories on equity and \ or equality.

While some are of the opinion that improving equality of opportunity through the creation of equal access to social services is enough, others argue that equity needs to be defined in terms of outcomes or based on the impact it may have on peoples' way of life. For example, Sen argues that everyone in a fair social system has equal rights, opportunities, respect, and the chance to fulfil their potential according to their abilities and passions (Sen, 1995; Sen , 2000). Whatever the argument is, the approach to equity is based on the assumption that it entails addressing any form of injustice among the most disadvantaged societies (Rawls, 1999). The following section summarizes, among the different social justice theories, Rawls's theory of justice and Sen's Capability approach frameworks relating to equity and or equality.

The theory of justice as fairness was introduced by John Rawls in an effort to shift the idea of distribution to greater society instead of individuals (Rawls, 1999). In his advocacy for

the principle of 'equality' and 'difference', Rawls argues that while individuals are entitled to have the maximum liberties, inequalities are tolerable as long as they benefit the most disadvantaged. Liberties, for example, include the right to vote, freedom of speech, freedom of personal property and freedom from arbitrary arrest (Rawls, 1999). It is clear that Rawls's conception about inequalities coincides fundamentally with the concept of equity since the main concern here is to deal with inherent disadvantages in terms of opportunity and social mobility. Thus, the contemporary equity paradigm seems to relate to Rawls's principle of difference in formulating fair equality of opportunity approach. While the difference principle advocates for inequalities in outcome, given equality of opportunities, Rawls claims that inequalities at birth and natural endowments are undeserved; as a result, they require compensation (Rawls, 1999). However there are more 'undeserved' inequalities in addition to those Rawls stated here and these include, but are not limited to, inequalities due to location, gender, and ethnicity. With respect to the social equity paradigm in the context of education, for example, it implies that a greater priority must be given to the most disadvantaged group of society to provide access to basic and quality education.

Amartya Sen

While Rawls's idea of justice emphasizes the approach to alleviating inequity by targeting the most disadvantaged, Sen's Idea of Justice and the capability approach also targets the specific and individualized needs of the disadvantaged groups (A. Sen, 1995). One of the reasons Sen constructed his capability theory is to address the shortcoming in the idea of Rawls's equalities. For example, with his concept of capability, Sen argues that it is an extended form of Rawls's 'social Goods' principle in which people should be able to have different choices in order to achieve their life goal (Sen, 2000), taking human diversity (in terms of needs, preference, ability)

into consideration. Sen's main criticism starts with Rawls's idea of equality in terms of primary goods where Rawls assumed that fair distribution of goods alleviates the problem of inequity. However, Sen disagrees with this assumption and argues that although people are provided with primary resources, chances are very slight that they will have the same capacity to change resources into actual well-being (Sen, 2000).

The assumption of human diversity dictates that not everyone has the same interest, ability or need, which implies that they will not be able to achieve the same status merely because they are provided with equal primary resources. Therefore this concern with diversity led Sen to claim that people's capabilities are crucial to achieving their goal with the resources they have. If, for example, two individuals having a goal of achieving a good life have same resource, they may not be able to achieve the goal equally as they may have different abilities to use the resources. Thus, as these capacities differ from person to person, legal recognition alone is not sufficient to help them achieve what they aspire to achieve. This implies that institutions need to consider individual and group specificity to make sure that they have the required conditions.

Both Rawls's theories of justice and Sen's capability approach are assumed to consider the many dimensions of outcomes where equality matters (Rawls, 1999; Sen, 2000). In other words, the ideas do not apply to only one aspect of equality, but are applied in multiple aspects including economic benefits, resources, quality of life or ability or capability. The capability paradigm has an interpretation for the context of education where many dimensions, such as school resources, teaching, learning achievement, co-exist. According to Rawls's theory of justice (Rawls, 1999), equality in opportunity can be maintained by providing equitable schooling to every child in disadvantaged areas, while Sen's capability approach posits that providing access to school alone is not sufficient as schooling may not necessarily be learning (Sen, 2000). Therefore it is essential to understand that the students have different learning style and way of

using schooling opportunity (school resources, teachers, and teaching) to get to their desired learning achievements which apparently require identifying their learning needs. Therefore, policy initiatives targeting equity are also required to focus on achieving, or at least on reduced inequalities with a similar approach. In other words, equity actions in education need to target the valued aspiration of disadvantaged groups and individuals, and enhancing the capabilities required to achieve those aspirations.

Apart from Sen and Rawls's great contributions, contemporary studies have also made efforts to expand the ideas of equality and/or equity in relation to justice and fairness. The following section is devoted to providing another argument and discussion on the theoretical understanding of equity and/or equality in general and also in education in particular.

While equality refers to sameness in treatment which is linked the idea of equal opportunity (Zamojska, 2016), equity as a concept is described as being equal in quantity and quality with the condition that people's circumstances and needs are taken into consideration (Espinoza (2007). It is clear that the latter is more related to the issue of justice and fairness. The main intention of equality, on the other hand, is to provide the same social service to all, and its implementation seems to result in more justice and equal access to, for example, schooling. This means there is reason to question fairness in 'equality' whenever it implies treating everyone equally, disregarding the existing differences and that not everyone begins at the same starting point. As a result equity is getting more attention and emerged as a better alternative to address social justice or fairness in the field of education (Field.et.al, 2007). This argument rooted in Rawls's idea of equality principle (Rawls, 1999) which places an emphasis on the social, economic, and political causes of an inequality, and strives for remedies that consider the context and circumstances of disparities in outcomes. On the other hand , 'equal opportunity' which is associated with the concept of equality (Takeuchi et al., 2018a; Zamojska, 2016), benefits all

students equally irrespective of their circumstances, but in an equitable system priority is given to aiding the disadvantaged groups through consideration of personal and socio-economic circumstances such as gender, ethnicity or family background.

In a similar argument, '*Equality of opportunity'* and '*Avoidance of absolute deprivation'* are the two basic principles in defining equity under the framework of equality of human rights and development (World Bank, 2006). While the first principle is related to the many dimensions of outcomes resulting from efforts and talent, but not from predetermined circumstances (such as gender, background, place of birth, family status), the latter is about eradicating poverty and recognizes the ideas that societies may have a role protecting their neediest members despite the principle of equal opportunity (Rawls, 1999).

Furthermore, focusing on equity as compatible with fairness and social justice, Takeuchi and colleagues discussed the way equity can shape our understanding of available opportunities and suggested an example of a programme that helps to improve equity in some situations (Takeuchi et al., 2018b). They propose that 'Comradeship' which develops through breaking boundaries between groups of societies, is the foundation for equity, allowing historical marginalized members to share a similar starting line with more advantaged groups of people. In a similar approach, Unterhalter's idea of 'equity from below', which we discuss next, considers aspects of 'personal heterogeneity both in circumstances and in conceptions of a good life' Unterhalter (2009). In this regard, Sen's capability approach also asserts the need to accept human diversity in many aspects (Sen, 2000).

Equity: capability approach

In a discussion about equity in relation to the 'capability approach', Unterhalter has identified different ways of thinking about equity in education and indicated how this might be useful to

address disparity in capabilities in education (Unterhalter, 2009). The author made three distinctions about the way we could understand equity from different perspectives on the basis of a historical interpretation of its meaning: 'Equity from above', 'Equity from Below' and 'Equity from Middle' (Unterhalter, 2009). The author argues that all the three forms of equity are important in order to expand capabilities in education and to assess equality whenever there is diversity of needs. In the sense of capability, she argues that equity as a process of making fair and impartial is linked to Sen's capability approach which argues that the metric of interpersonal comparison needs to take human diversity as a central issue (Unterhalter, 2007,2020; Sen, 1995).

According to Unterhalter, equity from below involves a valuable dialogue and discussion about the expansion of a capability set across many different points of view. It can be a discussion between groups to build shared values and address inequalities. Specifically it involves some sort of negotiation not on the basis of majority rule, nor the intensity of one person's view with regard to another, but rather a process of reasonableness (Unterhalter, 2009). This argument corresponds to the ideal principle attached to 'equal opportunity framework' of world development report which stressed that it is through open debates that the society under consideration should be able to decide on optimizing equality, ensuring fairness and protect against deprivation (World Bank, 2006). It also coincides with Rawls's framework that asserts the significance of equal opportunity and cooperative arrangements that benefit the more and the less advantaged members of society Rawls, 1999).

However, Unterhalter emphasizes that this equity cannot be sustained without the introduction of regulations and laws, which are associated with the 'equity from above' concept. Equity from above can be assessed, for example, through exploring policy documents that are in place to expand capability in relation to education (e.g. curriculum, teacher training, school

structure, etc) (Moskal & North, 2017). Therefore, whenever 'equity from above' is maintained, students from low socio-economic families will not be denied access to education or fail to progress due to lack of resource (Rawls, 1999). Furthermore, Unterhalter discusses what she calls 'equity in the middle' which is associated with the flows of ideas, skill, material resources, and time that substantively expand the capability set. In general, as all the three forms of equity are interconnected and co-dependent, it is important to bring them together to get the desired outcomes in relation to 'equalizing capabilities in education' (Unterhalter, 2009,).

Dimensions of equity and\ or equality

There are multiple dimensions for which equity and equality matter and equality in one dimension does not necessarily indicate equality in another dimension (Sen, 1995). In other words, equality of opportunity cannot be an indication of equality in success or achievement, because the former doesn't guarantee the latter. For example, providing equal educational opportunity (e.g. access to higher education) for all students from different socio-economic backgrounds does not guarantee that all students succeed equally.

In an attempt to explain the dimensions of equity, Salmi & Bassett (2014) suggested that 'Equity in what?' and 'Equity for whom?' are the two questions that we should ask in order to understand dimensions of equity. While the first is related to opportunity or access, the latter indicates the targets groups that are considered disadvantaged. Eventually, though, it is usually common to see in literature that equity and access are somehow interpreted as similar constructs, equity is not only getting access; it is also having equal opportunity to choose, to progress, to graduate or get a job. Sen's capability approach strongly supports this argument as it is primarily based on individual need and potential (A. Sen, 1995). Three main dimensions of equity, according to Salmi and Bassett (2014), are identified: equity of access, equity of results and equity of outcomes. Equity of access linked to offering equal opportunities to enrol in a certain

programme of study, for example. It can be a secondary school or higher education training programme. This does not seem to differ from equality as it deals with offering equality of access. By equity of results, the authors refer to opportunities to advance in the system and successfully graduate from a programme with the basic skills necessary to compete in a society, whereas equity of outcomes is related to the opportunity and capacity to secure places in labour market.

The second dimensions of equity apply to issues in relation to target groups identified as beneficiaries. Salmi & Bassett (2014) identified the following groups, for example, as equity targets recognized in many countries:

• Lower-income group

• Minorities in relation to ethnic, linguistic, religious, cultural, age or residence location

• Women and

• People with disabilities

Other studies also discuss dimensions of equity in terms of fairness and inclusivity (Field et al., 2007b; OECD, 2018). As fairness dictates that personal or socio-economic circumstances, such as gender or family background, should not be obstacles to educational success (Rawls, 1999), inclusivity infers that all students have equal access, or reach at least a minimum level of skills (Field et al., 2007b). However, this does not necessarily mean that every student gets an equal level of educational attainment but rather that the differences in students' educational outcomes are independent of their socio-economic backgrounds and social circumstances, over which they no longer have control (OECD, 2018). Therefore when equity is considered, it should be based on understanding of the bigger aspects of socio-economic, demographic as well as political context where inequities are being introduced, magnified or addressed (Unterhalter, 2005, 2008; Unterhalter & Robinson, 2020). Therefore unlike equality, equity needs to involve treating

people based on their needs to achieve equality and promote both justice and fairness, while the former (equality) disregards differences and assume same starting position for all (Espinoza, 2008, see).

In relation to fairness, authors such as Rawls (1999) has forwarded principles of fair equality of opportunity and the notion of distributional justice (Rawls, 1999). The idea has been crucial and played a key role in guiding fair policy formulation (Laing, Mazzoli Smith, and Todd 2016). This policy approach is concerned with both the principles for the fair distribution of education goods, rights and duties and also with beliefs about what makes for fair distribution. The other understanding of fairness implicit to the notion of 'closing the gap' is the meritocratic principle, there often being an assumption that fairness is synonymous with a meritocratic education system (Bamfield and Horton 2010; Brighouse, Howe, and Tooley 2010). This principle acknowledges that there will be educational differences in outcome, but these are justified if processes are fair and that there is equality of opportunity. The other argument focuses on equality of outcome, to be achieved through positive discrimination trying to secure similar outcomes for different student groups in society, in recognition of the fact that background inequalities skew equality of opportunity.

1.1.1 Measuring equity and equality

As discussed earlier inequity and inequality are widely recognized as challenges for education systems and societies more broadly, but the terms vary in their conceptualization and usage which makes measuring them more complex. Equality can be assessed quantitatively by, for example, looking at how many people from a certain group have access to highly demanded goods compared to other groups. However we can assess equity both in quantitative and qualitative ways, that includes a moral judgement, in addition to quantity, of a certain level of distribution of opportunities(Frønes et al., 2020; Unterhalter, 2009, 2016).This makes it difficult

to assess equity due to subjective differences in how we evaluate quality and extent of inequalities. Parity is one example of measure of equity that used to refer to numeric indicator. For example, gender parity is commonly used as a concept to describe a statistical measure that provides a numerical value, such as female-to-male or girl-to-boy ratios for indicators such as education enrolment (Subrahmanian, 2005). Gender parity is, therefore, a useful indicator for assessing gender imbalance in specific areas of indicators and set goals to minimize disparities. Apart from theoretical understanding ,equity is also treated along the line of excellence and quality (Branden et al., 2011; OECD, 2016). This makes it more practical and measurable in education and it continues to be considered a priority for post-2015 'Education for All' agenda (UNESCO, 2015). Along this line, gender equality was also one of the main agenda for post - 2015 education, but there is debate about dealing with the complexity of measuring this gender inequality/equality (Aikman & Unterhalter, 2013; Unterhalter, 2008, 2015, 2016; Unterhalter & Robinson, 2020).

The main argument about gender (in)equality is that how we define it in schooling entails more than a description of the numbers of girls and boys enrolled in and progressing through stages of instruction (Aikman & Unterhalter, 2013; Unterhalter, 2015, 2016; Unterhalter & Robinson, 2020). Although inequality is usually seen as a line of differences in terms of participation or achievement (e.g. school, employment, income) between groups, it might be understood even in broader sense. For instance, inequality can be understood from capability perspective, as limits or constraints on the opportunities an individual or a group may have to choose and realise the actions, attributes and relationships of wellbeing they have reason to value (Aikman & Unterhalter, 2013; Unterhalter, 2008, 2015; Unterhalter & Robinson, 2020). From similar point of view ,equality in general or gender equality in particular is understood as expanding opportunities in a sense that freedom, agency, valued outcomes are maintained to the

optimum without penalties associated with gender (Aikman & Unterhalter, 2005, 2013; Unterhalter, 2008, 2010, 2016; Sen, 1999; Nussbaum, 2011; Unterhalter & Robinson, 2020)

Further, the ideas of how equity and equality could be treated and measured in relation to different features of the educational process such as availability of resources, access, survival, output and outcome has been pointed out in (Espinoza, 2008; OECD, 2018; Takeuchi et al., 2018b). On (in)equality, Espinoza pointed that the dimensions are associated with three goals: (1) 'equality of opportunity'; (2) 'equality for all'; and (3) 'equality on average across social groups'. And in relation to the equity dimension, three goals are recognized: (1) 'equity for equal needs'; (2) 'equity for equal potential'; and (3) 'equity for equal achievement' (Aikman & Unterhalter, 2013; Espinoza, 2008; OECD, 2018; Takeuchi et al., 2018b; Unterhalter, 2010). It is also noted that those goals of equity and equality are pertinent to different stages of the educational process, including resources, access and outcomes (see Table 2 below).

Moreover, it is apparent that equity can be achieved via an equitable education system that allows individuals to take full advantage of education and schooling, regardless of their backgrounds (Faubert, 2012; Field et al., 2007a; Frønes et al., 2020). Whenever equity is achieved, it is more likely that 'the meaningful redistribution of resources and opportunities and the transformation of conditions under which disadvantaged groups make choices' will be realised (Rawls, 1999; Subrahmanian, 2005; Unterhalter, 2009). In this way, institutional barriers and historical disadvantages can be tackled to achieve equality. Depending on the context of a country, different equity strategies are implemented to address inequalities in educational participation and success (Salmi, 2018). Affirmative action for admission, financial assistance, and mass expansion, are some of the approaches that have been used as equity instruments in many countries, and Ethiopia in particular has been implementing for quite some time for higher education admission (FDRE, 1994; Molla, 2018).

Table 2.

The difference between equity and equality (adapted from Espinoza, 2008).

	Equity	Equality
Meaning	Equity is the virtue of just and impartial	Equality is a state where each and every individual is granted the same rights and responsibilities, irrespective of their individual differences
What is it?	Means	End
Distribution	Fair	Even
Recognises	Differences and attempts to counter unequal individual opportunities	Sameness and treats everyone as equal
Ensures	People have what they need Those with equal needs gain equal level of educational attainment	Providing everyone the same thing Eliminate any legal, political, social, cultural or economic constraint that might prevent any student from obtaining good scores in test performances
	Ensure that students with equal potential realize equal educational attainment	Ensure that all students obtain the same level of educational attainment
	Access to all educational levels no matter if individuals utilize that opportunity or not	Access at the individual and group level on the basis of need

So far we have covered discussion of different conceptual understanding about equity and equality from the literature starting from earlier works of Rawls and Sen. It is evident that Rawls and Sen, among others, laid foundation in introducing the conceptual understanding of equity and \or equality paradigm in terms of justice and fairness, and other authors also involved in expanding and clarifying the ideas in different contexts. We also showed that the variety of approaches that are useful to bring conceptual clarity about how we can use the terms in research and education are rooted in the theories of justice and fairness. However, while most of the studies discussed here are placed under Rawls's principles of justice in explaining equity and equality concepts, Sen's capability approach was also discussed in few more articles such as in (Aikman & Unterhalter, 2013; Espinoza, 2008; Unterhalter, 2009, 2010, 2016; Unterhalter & Robinson, 2020).

Despite some overlaps in the description of fundamental principles, several different ways are identified on how the concepts can be understood. The First is related to equal opportunity which is necessarily a matter of justice (or compensatory justice) and right (Kodelja, 2016;. Here, equality of opportunity is to be understood as nothing other than an equal right of everyone to prove themselves, to make use of their talents, overcoming their weakness. It can be regarded as the right to succeed as far as we can and as far as we deserve (Kodelja, 2016). Equality of opportunity is not a matter of luck but it is a matter of justice in the form of compensation to redress a past wrong. One of the well-known ways to correct such injustices is the implementation of so-called policies of positive discrimination or affirmative action. Equality of opportunity is therefore not a matter of luck but a matter of compensatory justice, which establishes equality in such a way as to eliminate inequalities caused by fortunate or unfortunate coincidences (Kodelja, 2016). Based on these considerations, we can see that equality of

opportunity is opportunities in the sense of an equal probability of the specific result being achieved.

This assumption is based on the fact that equality of opportunity creates a fair start for all individuals to compete in the playing field, be it for an education or a job. However, it is possible that people may start at the same point, but still display differences in outcome due to personal effort, or hard work. Besides, there are outcomes that people are expected to match or be at equal level with, for example school achievement or graduation from university. However, discussing equality in terms outcome might lead to the expectation that everyone should achieve the same, which is obviously erroneous. This is one of the issues related to meritocracy that is discussed in the literature.

Equality of starting points is often associated with equal accessibility, although there is an important difference between the two with equal access being derived from the principle that everyone is equal before the law. Therefore the primary assumption is that it is conceived as equal access to all public services on the basis of individual merit, one's abilities and virtues – and not on the basis of birth and inherited privileges (Kodelja, 2016). In this case, we can see that equal opportunities were understood as equality of access that requires a form of access (the right procedures, modalities), the same starting point as well as material conditions and circumstances. While equality of access to something for all on the basis of merit is one thing, ensuring a level playing field thereby providing everyone with equal initial opportunities is another. The former requires a form of access while the latter presupposes the prohibition of discrimination and redresses historical injustice. In this way, inequality becomes a means of achieving equality, as it is a corrective to prior inequality (Kodelja, 2016).

The other important point that we identified in the discussion is equity in terms of capability which mainly refers to the system of structures that define the progress for individuals

with different needs. At the end we discussed that the idea of equity (equity of outcomes) being related to outcome measures resulting from educational practices or policy actions (e.g. equity in enrolment, achievement related to excellence (OECD, 2016)).

The studies in this dissertation have employed some of the conceptual ideas discussed here. In study 1 and study 3 we employ the ideas of inequality of opportunity and the concept that is related to equity of outcome. In both papers, one of the main focuses was gender equity in achievement intersecting with socio-economic status (SES) (regional) and geographic location. In addition enrolment in STEM programmes and the university admission rate were also studied as a function of educational opportunity which was measured by SES. Moreover, we use a descriptive analysis of intersectionality approach (Unterhalter, 2012; Unterhalter & Robinson, 2020). The main focus of study 2 was equity in school enrolment, inclusions and equity policy impacts for higher education, and we argue that equity policy would be expected to minimize gender inequality. In sum, this study utilizes the theories of equity of treatment for participation (e.g. affirmative action policy) and equity of outcomes in which the paper explores equity in enrolment and admission rate to higher education. Therefore, in our study, equity of outcomes was examined using students' (group) achievement exam scores, enrolment number (ratios) and admission rate.

1.2 Educational Opportunities and Educational outcomes

It has been a while since the notion that there should be equality of opportunity in education for everyone was claimed in international conventions regarding Human Rights. For instance article 26 of the United Nations Universal Declaration of Human Rights (UN, 1948) proclaims that 'everyone has the right to education', that 'education shall be free, at least in the elementary or fundamental stages' and that 'education shall be directed to the full development of

the human personality. The convention intends to establish a system in which fair and equal access to a good quality education is in place and people achieve success in education according to their efforts and ability, without any form of discrimination. Furthermore, until recently, the basic problems related to the provision of education is that of reaching marginalized groups that are disadvantaged in one or more ways and underrepresented in social services, including education. Consequently, creating equal educational opportunities is considered as a way to tackle inequalities among these groups, as they can be translated into equality in educational participation and success (UNESCO, 2015).

However, does equality of opportunity guarantee (or are same as) equality of educational outcomes? To answer this question, it is first better to see the dimensions and definitions of equality of opportunities and discuss theoretical arguments and empirical evidence pertaining to the connection between equality of opportunity and educational outcomes.

According to Coleman (1967, p. 6), equality of opportunity has meant several things that include primarily: (1) Providing a free education up to a given level which constituted the principal entry point to the labour force. (2) Providing a common curriculum for all children, regardless of background. (3) Partly by design and partly because of low population density, providing that children from diverse backgrounds attend the same school. (4) Providing equality within a given locality, since local taxes provided the source of support for schools. Despite the overlap between some of the ideas, these definitions touch several important issues that are critically essential to deal with educational disadvantages. It then follows that the concept is described by others as ‘access’, ‘participation’, and ‘result’ (Brookover & Lezotte, 1981), but it received criticism due to its focus only on one aspect of equality concept. In a sense this calls for expanding the meaning of equality; it cannot be limited to having access to education, methods used in education or results of the education process (Campbell and Klein, 1982). It is instead an

approach that gives individuals the opportunity to develop their talents and ability at optimum level in a system where institutions have an instrumental role in bringing out individual interests and talents (Cantürk & Aksu, 2015; Genç & Eryaman, 2006)

1.2.1 Equality of opportunity vs Equality of outcome

Equality of oopportunity can be regarded as answer to the question 'Equality of what?' in terms of education, employment, health care and other important public goods. These opportunities differ from one other in that they represent a 'relationship between particular subjects, particular obstacles and particular objectives' (Westen, 1990). However, since opportunity is not a guarantee that the individual will achieve the goal, provided she chooses to pursue it, an opportunity is not the same as a guarantee (Kodelja, 2016), because it does not imply 'the absence of all obstacles between a given subject and a given objective' (Westen, 1997, pp.24). Therefore, it follows that equality of opportunity is not and cannot be the same as equality of outcomes. This does not necessarily mean, however, that they don't affect each other, and it is likely that inequality of opportunity will likely result in inequality of outcome. The question that remains is whether equality of opportunity implies both equality of starting point and equality of outcomes. In the following section we look studies that focus on the understanding that educational opportunity (as indicated by SES) is linked to educational outcome (e.g., attainment, enrolment, achievement)

Inequalities in literacy and school enrolment cannot be attributed solely to the availability of adequate schools, because family or socio-economic status that is critical in determining the child's opportunity, can influence school participation and achievement (Burney & Irfan, 1991; Erikson, 2020; Palardy, 2013). Educational opportunity has been found to be an important factor in determining students' academic success (Aikens & Barbarin, 2008), and a broad range of resources has been found that are positively related to student outcomes with effect sizes large

enough to suggest that moderate increases in resource allocation may be associated with significant increases in achievement (Greenwald et al., 1996). In particular, factors such as parental social class, education and earnings have been shown to have independent effects on children educational attainment, in addition to the effects of other factors (Bukodi et al., 2015; Bukodi & Goldthorpe, 2013; Erikson, 2016). This, in fact, implies that the total effect of several background factors tends to be greater than the effect of any single factor.

Moreover, the Global Education Monitoring Report issued by UNESCO points out that economic inequality could be the main factor creating more inequality in educational outcomes, making it difficult to achieve the 'education for all goal' any time soon, and this challenge could be due to the fact that a large variation in economic developments between countries is translated into differences in the provision of educational opportunity (UNESCO, 2015). The report added that while educational opportunity is meant to describe the availability of adequate resources and facilities for teaching and learning processes, the quality of educational opportunity is higher in rich countries than in poor countries. Similarly, within any single country, there may be regional disparities in terms of socio-economic development. For example, in Ethiopia, emerging regions like Somali or Afar are considered regions with poor socio-economic conditions, including limited infrastructure and school facilities (FDRE, 1994). Also, there are unfavourable cultural practices and lifestyles (pastoral and nomadic life), coupled with a lack of awareness about the values of education. Such situations lead to differences in the provision of school facilities, which means that students' educational opportunities are dependent on the region where they live; students from better economic regions will have better opportunities, and vice versa.

In our studies, educational opportunity was defined broadly in terms of both opportunity at starting point (SES), and opportunity of outcome (Enrolment, achievement). It is assumed that better economic regions are characterized as having better and more equitable educational

opportunity than less developed regions. Evidence is sought to ascertain whether regional disparities in educational opportunity are related to differences in academic achievement, enrolment and gender equity.

1.3 Gender and education

Girls' schooling and gender equity has been a global agenda item for quite some time with important political and analytical discussions on the issues of indicators for gender equality (Unterhalter, 2011, 2010,2014). Prior studies on gender inequalities in education have documented two types of evidence, particularly regarding enrolment and attainment disparity. While a number of studies indicate that women have surpassed men in educational attainment in most Western societies (Buchmann et al., 2008; Buchmann & DiPrete, 2006; OECD, 2012), education in developing countries is characterized by gender imbalance favouring boys in schooling achievement (Afzal et al., 2013; Akinbi & Akinbi, 2015; Grant & Behrman, 2010). Women and girls' disadvantages in education persist in developing countries despite all the efforts to avoid them, resulting in abundant attention to the issue in research.

Studies in the literature have also widely discussed the multitude effects of educating girls. For instance, women who are educated are healthier, participate more in the formal labour market, earn more income, have fewer children, and provide better health care and education to their children compared to women with little or no education (Klugman et al. 2014). The benefits of education are thus passed on to generations and to communities at large, and whenever girls have greater educational and economic opportunities, they are more likely to pursue those opportunities to achieve their goals and meet their needs. According to the Education for Sustainable Development (ESD 2030) programme agenda, gender equality is considered a human right and a requisite for achieving broader social, political and economic development goals

(UNESCO, 2016 ;Unterhalter, 2014, 2015). However there are multiple barriers attached to structural, social, and financial aspects that prevent girls' enrolment, educational attainment and completion of both primary and secondary schools.

One piece the evidence published by UNESCO indicates that out of 161 countries, 60 percent have achieved gender parity in enrolment at the primary school level, compared to only 38 percent of countries at the secondary level (UNESCO, 2016). The data also reveals that the gender imbalance is worse in low-income countries for which only 20% have reached gender parity at primary level and 10% at secondary level (ibid). With respect to socioeconomic status, there are also indications about the role of family income on children's participation in education. For instance, UNESCO's prediction indicates that across sub-Saharan Africa, boys from high income families are expected to reach the target by 2021, but girls from poor families may not reach the target until 2086; the gender gap is still eight years for rich families, in favour of boys (UNESCO, 2014).

There are several other factors that hinder millions of girls around the world from accessing and completing their education. Among these are social norms that are cultural theories about gender role and include social expectations and prescriptions attached to the informal rules, beliefs, and attitudes in a society (McCleary-Sills et al., 2015;Unterhalter, 2014,2015,2017). An analysis of data from different countries about gender role indicates that on average a quarter of men and an equal share of women believe that it is not ok for women to delay getting married because of education or career aspiration (Klugman, 2014). In some places, such norms are institutional or reflected in the formal structure. For example, worldwide, there are several nations with at least one law against women and girls' rights, and many more countries have more than five such laws, while still others have more than ten laws that are biased (Klugman, 2014). Depending on the cultural practice, these norms about gender role vary greatly across

countries, with potential negative impact on girls' education and attainment, sexism in school curricula, violence in school, early child bearing, and marriage (Ellsberg et al., 2015;Unterhalter,2015)

According to UNESCO's report, one out of three girls is married before her 18th birthday in developing countries (UNESCO, 2013), despite considerable differences across countries and in-country regions; for example, the lowest rate (2%) in Algeria and highest (75%) in Niger (Raj & Boehmer, 2013). Despite the effort to introduce counter enforcements in many countries to deal with these adverse norms such as early marriage, the resulting effects do not appear promising as there might be countervailing norms or widespread exceptions (McCleary-Sills et al., 2015). Others argue that customary or religious law might play a major role in making exceptions for minimum age for marriage, allowing parents to make decisions concerning their daughters and causing them to wed before the age of 18 (Vogelstein, 2013).

Moreover, other studies provide empirical evidence indicating the connection between early marriage and education attainment, which happen to be strong for girls (UNFPA - UNICEF, 2021). This relationship implies that it is very challenging for girls in developing countries to remain in school once they get married. Evidence is documented in our studies (see study 2, and study 3) that there is gender imbalance in secondary and preparatory school enrolments in Ethiopia, especially in regions with predominantly rural areas. This might be linked to the fact that more girls in rural areas are victims of early marriage and are unable to make it to secondary and preparatory level. In Ethiopia, according to United Nations Population Fund (UN, 2019), 19.1% of girls aged between 15 and 19 are married, despite the efforts to introduce laws against the practice of early marriage (Jo Boyden, 2013)

Another problem of gender and education is related to STEM (Science, technology, engineering and Mathematics) education which has been a global concern due to the under-

representation of women in the field. A recent global report on the status of the gender gap in STEM education indicates that female students represent only 35% of higher education STEM fields (UNESCO, 2017). From a socio-economic perspective, STEM jobs are considered to be high-earning job careers and a small gender gap would lead to more employment opportunities for women. In terms of STEM academic performance multiple studies – particularly in developed countries – have documented that the gender gap is not significant (Else-Quest et al., 2010) although the number of girls pursuing STEM studies is smaller than the number of boys (Jiang et al., 2018; Stoet & Geary, 2018). The enrolment trend with respect to socio-economic circumstances is that there is a higher probability to enrol in STEM and correspondingly smaller gender gaps for less gender-equal and less economically developed countries (Jiang et al., 2018; Stoet & Geary, 2018).

When it comes to students' choice, multiple contributing factors are documented in the literature, including gender stereotypes (Makarova et al., 2019; D. I. Miller et al., 2015; Nosek et al., 2009), social belongingness and perceived competency (Tellhed et al., 2017; Vinni-Laakso et al., 2019), a lack of female role models (Quimby & Santis, 2006) and family-friendly flexibility in the STEM fields (Weisgram & Diekman, 2017). Other researchers suggest that domain-specific values and competence beliefs may mediate gender differences in achievement behaviours and course choices (Eccles et al., 1993; Simpkins et al., 2006), such that increasing differences in self-concept and value cannot be disregarded (Chang, 2008)

More recently, studies have found gender equality paradoxes in STEM education. These studies provide evidence indicating that gender differences in educational achievement are strong in wealthier and gender-equal countries, and weaker in less gender-equal nations (Stoet & Geary, 2018). It was speculated that social-economic pressure could be the driving force for students in less gender-equal nations. Considering the fact that STEM fields are sources of high income, the

assumption is that students from poorer countries would prefer to join the field as a means to resolve economic pressure, while students in wealthier nations have socio-economic security and less pressure to strive for high income careers such as STEM. Study 3 was designed to further explore this hypothesis by considering the different regional states of Ethiopia with regard to intersectionality, diverse socio-economic development and the provision of educational opportunities.

1.3.1 Gender equality and intersectionality approach

So far we have discussed the issues of gender inequality in terms of education attainment, and enrolment. However, there are other social aspects of inequality that overlap with education, such as poverty, socio-economic, rights, wellbeing, employment. While the formal approach to gender equality focuses on bringing women and men to a similar level in education, for instance, the intersectional approach (Unterhalter & Robinson, 2020) to gender inclusion goes beyond that to understand the structures that shape the conditions of women's lives and the general forms of inequality (Aikman & Unterhalter, 2005; Unterhalter, 2010, 2016). Here, the emphasis of inclusion is on high-quality education, human rights, equal opportunities and social justice (Aikman & Unterhalter, 2013; Armstrong et al., 2011; Unterhalter, 2015; Unterhalter & Robinson, 2020). By focusing on only one identity marker such as gender, researchers and practitioners might miss the bigger picture as students might be excluded/discriminated against on multiple levels. For example, a female from a poor family, in a rural area in an emerging region may be disadvantaged on multiple levels. Therefore, the use of a single-axis framework does not do justice, and the intersectional approach is crucial to address inequity.

Furthermore, focusing on only one factor of difference in explaining the educational success or failure of certain student groups simplifies the complexity of situation which needs to be scrutinized with great caution. Assuming that an education system exists in a vacuum, and is

not influenced by society and the processes that happen within the society, is also misleading (Unterhalter & Robinson, 2020).

Such considerations make it necessary to re-centre discourse about equitable education to the intersection not only of different identity markers related to the students themselves but also of the system and wider society (Armstrong, and Spandagou 2011; Crenshaw 1989, 1991; Hancock 2007;Unterhalter & Robinson, 2020). This in turn may result in acquiring a better understanding of the multifaceted nature of gender inequality.

The idea of the intersectionality approach is also conducive to addressing educational inclusion in a way that deals with all the systemic and historical processes linked with inequality and to striving to change such processes (Unterhalter & Robinson, 2020). This implies that the practice of systemic discrimination, be it in the context of education or not, has a historical basis that may result in inequality in education and needs to be addressed. Although this approach recognizes that resources are important, what is more essential is an understanding of how gender and education are associated in the shaping of inequality, how the institutional arrangements that establish these injustices work, and the ways by which to redress such systemic practices (Unterhalter & Robinson, 2020).

Moreover, educational inclusion, from the perspective of institutionalizing gender equality, is expected to place more emphasis on several issues. For instance, it requires attention to how the education system articulates economic injustice, the distribution of income and wealth, health and political injustice (Unterhalter & Robinson, 2020). For example, efforts to improve access to basic education have been successful in enrolling girls and boys in primary education for all irrespective of the socio-economic status of the children. However there is a visible gender gap in access to secondary and higher education and only a small proportion of children from the lower social class are able to access and complete these levels where girls are the main victims

(Evans et al., 2021; UNESCO, 2015, 2019a). Through intersectional analysis we may be able to question whether the policies of universal provision of secondary education are in place so that education is more readily accessible to economic and socially disadvantaged groups, and to assess interventions for targeting the problems (Unterhalter & Robinson, 2020). For instance, a strong monitoring system for assessing the effectiveness of pursuing universal declaration in terms of education and poverty reduction goals is an example that can help control progress and provide evidence. Affirmative action is one policy action in place that can help to redress and compensate systemic and historic disadvantages or discrimination, reducing inequalities in access to secondary and higher education. However there must also be mechanisms for assessing the impact of such policy action on universal provision of secondary education.

1.3.2 Debates about measuring gender equality in education

As inequality, in the context of education, is strongly attached to disparity in educational outcomes, including school access, retention and progression and learning, equity concerns about inputs and are defined as a reassessment and redistribution of resources (human, institutional, and financial) with the goal of reducing or eliminating systematic inequality in outcomes. In this sense, equity is a path to achieving equality while inequity, at the same time, implies a failure of a programme, policy, or intervention to provide every child with an equal opportunity to obtain a quality education. Along the line of measuring inequality and equity, it has been acknowledged that there are main factors that complicate the process in education. For example, inequality can be examined with reference to a wide range of indicators with respect to, for instance, access or learning (UNESCO, 2018). Different inequality measures can be used to see how an educational indicator is distributed in the population, each with advantages and disadvantages. Similarly, these different measures can lead to different conclusions about the degree of inequality and change over time. Therefore it is critical that policymakers need to know how an indicator varies

by individual characteristics, such as wealth, but it is often difficult to compare these characteristics across countries (UNESCO, 2018; Unterhalter, 2013, 2016; Stoet & Gear, 2019)

In measuring gender equality in education, parity has been one of the most common methods which can be used to communicate easily to a larger audience. However, the adoption of the parity index to monitor gender aspects of SDG target helps to extend its use beyond enrolment ratios to all education indicators, including learning outcomes (UNESCO, 2018). While this is positive, the index addresses only one of several domains in gender equality in education. To improve monitoring of gender equality in education, efforts need to focus on collecting more comprehensive data on gender aspects of curricula, textbooks, assessments and teacher education; and closer links are needed between those working on gender equality indicators in education and more broadly (Unterhalter, 2020, 2016, 2013, 2015; UNESCO, 2018; Stoet & Gear, 2019).

Although parity is widely used as existing international and national measures for reporting on gender in formal schooling, it is as argued that a broader approach is required to capture the multifaceted nature of gender equality. Parity generates some useful insights about the distribution and use of resources; hence, it is an important measure. However, there is an argument that as a measurement technique, it tells us very little about the institutions that help reproduce gender inequalities within and beyond education, failing to give us a sense of the dimensions of gender equality, and the processes and investments in schooling that will develop, support and sustain this (Unterhalter, 2015). However, it is not clear whether all these dimensions mentioned here are quantitatively or qualitatively measurable. This complicates the argument about how changes in these processes can be evaluated and tracked using quantitative and qualitative information and a range of strategies for measurement (Unterhalter, 2015, 2016, 2020; Stoet & Gear, 2019). As a measure of disparity, quantitatively, gender parity is used in several

studies and international organizations such as PISA data, UNESCO, and the World Bank. However, the widespread use of this measure needs to be supported by the ideas from the scholarly discussion about the complex connection between gender, equality and education (Dejaeghere, 2015; G. Sen & Mukherjee, 2014; Stoet & Geary, 2019; Unterhalter, 2015, 2016; Unterhalter & Robinson, 2020). This indicates that since gender equality is a very broad concept, researchers are required to identify and differentiate it from gender disparities in school achievement, participation, or attainment. Gender parity can be applied in a specific research topic such as studying disparities in schooling, but it does not capture the other dimensions of inequalities. In general, gender equality in education is related to wellbeing, agency, aspects of embodiment and lack of violence, knowledge and criticality, public good, social relationships and context (Unterhalter, 2020, 2016). Hence, it is essential that researchers understood the complexity. Parity measure has been utilized in this dissertation to study gender disparities in enrolment and attainments, but macro level regional socio-economic status was also taken as an indicator of other social aspects such as wellbeing, public good, social relationship etc.. However, limitations of our studies are clear: not all aspects of dimensions mentioned in (Unterhalter, 2015, 2016; Unterhalter & Robinson, 2020) are well addressed. Therefore, it is recommended that needed parity measures be combined with measures of other inequality dimensions in order to provide substantial evidence for policy action.

1.4 Affirmative action

1.4.1 Affirmative action: definition

Affirmative action is among the most contentious and contested policy issues (Oh et al., 2010; Pojman, 1998), and it does not lend itself to a uniquely acceptable definition. The discussion about affirmative action revolves around gender, ethnicity, race and minorities that

generally tend to initiate controversies in some countries (Crosby et al. 2006; Holzer and Neumark, 2008; Leslie et al., 2014 ; Sowell, 2004). The debate starts from the assumption that affirmative action has the same meaning as equal opportunity (Crosby et al. 2006). Affirmative action is a form of policy measure that calls for action to insure that equality of opportunity exists (Crosby et al., 2003), acknowledging past discrimination on the basis of certain factors, such as gender, race, ethnicity (Harris, 2009; Leslie et al., 2014; Sowell, 2004). The concept is used not only to refer to policies or behaviour in different spheres, including employment, education, and government contracting; the action may cover many different activities, including recruitment, training, hiring, promotion, while being operative at a number of different levels and in a number of different ways, including public vs. private, federal versus state versus local, and involuntary versus voluntary (Holzer & Neumark, 2000; C. Miller, 2017; Sowell, 2004).

While the majority of the definitions found in the academic literature are related in one or more ways to the idea stated above (Kang & Banaji, 2006), the American Psychological Association (1996) described the idea of affirmative action as the ‘voluntary and mandatory efforts undertaken by governments; private employers; and schools to combat discrimination and to promote equal opportunity in education and employment for all’ (APA, 1996, p.2). This is in line with the perspective that the action aims to eliminate discrimination against women and ethnic minorities, and to redress the effects of past discrimination (Kravitz, 1997) . On the basis of organizational perspectives, affirmative action takes a form so that resources are devoted to making sure that people are not discriminated against based on their gender or their ethnic group (Crosby et al., 2006).

In this dissertation, specifically in study 2, we follow the ideas of scholars who have defined it broadly as a policy initiative meant to deal with all forms of discrimination that prevent disadvantaged from being recognized, as well as from obtaining the necessities that enhance

equality of life in society. We believe that this definition is broad and covers what we intend to discuss in our study, especially our focus on an affirmative action policy for admission to preparatory and higher education in Ethiopia to enhance equality, especially that of women, students from emerging regions. It must be noted that the definition of the concept not only evokes controversy, but is also designed and implemented in a way that continues to generate serious discussions among proponents and opponents (Gu et al. 2014; Seldon, 2006). We will discuss such controversies later in the next sections.

1.4.2 Affirmative Action as Equity Strategy

One of the strategies used in different countries to address inequality in education is affirmative action, which is a policy action designed in several forms (Salmi, 2018; Sowell, 2004). In particular, affirmative action in education includes measures that attempt to increase the participation of particular groups when they are regarded as underrepresented (Sowell, 1990, 2004). There are different types of affirmative measures under the umbrella term 'affirmative action', such as 'preferential treatment' (Haque, 2003) for members of targeted groups; the tie-break policy (McCrudden, 2015) in which individuals from underrepresented groups are preferred when equally qualified; quotas (Htun, 2004); reservations (Amarnath Mohanty, 2007) and positive actions (European Commission, 2009) for unlawful discrimination.|

In addition, there are other indirect measures that focus on increasing the participation of underrepresented groups in higher education. These measures include government assistance, which often provides financial support for specific areas in which target groups are over-represented so that they are highly rewarded by the measure (McCrudden, 2015). This type of measure has been used, for instance, in university admissions, where places are provided for the top 10% of the class in each high school so that a significant number of students from the target

group will be eligible to gain admission to university (McCrudden, 2015). Such measures are found to be effective when the level of segregation is high (Gaibie, 2014). Other measures involve the provision of more grants by the government to prioritize educational areas designated as target areas, and also for low -performance schools.

The controversial 'tie-break' policy gives priority to the targeted groups and disregards other groups with similar status or qualification, and this practice makes 'tie-break' one of the most debatable measures of affirmative policy. Apart from being common in many places, this approach has been deemed a justified measure in the USA and Europe to deal with gender discrimination (Hodapp, Trelogan, & Mazurana, 2002). Preferential treatment is a type of affirmative action that is also controversial, given that this approach provides preferential treatment to members of the target group, irrespective of qualification (Sowell, 1990). However, a 'tie-break' preference grants an advantage to members of the underrepresented group who are equally qualified for a particular position, or equally deserving of particular benefit (Selanec & Senden, 2013). In both cases, the debate lies in the fact that well qualified or better qualified candidates could be disqualified in favour of a member of the target group. Therefore, these measures lead to two different situations, as noted by McCrudden (2015). The first is an advantage for a candidate from the target group, despite the presence of better-qualified candidates, or the introduction of quotas in favour of the underrepresented groups. The implementation process of affirmative action in the Ethiopian admission system is similar to the 'tie-break' system that gives priority to individuals from disadvantaged groups when they qualify for the threshold, disregarding students from other groups with similar achievements.

1.4.3 Justifications for affirmative action

The main reasons for introducing affirmative action in many countries are inequality in education and employment and of the need for diversity related to the contexts of gender, caste,

ethnicity or race (Sowell, 2004). One of the most widely used justifications for affirmative action is that affirmative action is a tool used to redress historical injuries and is often seen as compensation for past discrimination (McCrudden, 2015; Sowell, 2004). The second argument is that affirmative action can be used to redistribute resources to minorities or underrepresented groups so that their situation in society, as well as quality of life, is improved in the process of enhancing distributive justice (Edwards, 1995). The other argument is based on diversity perspectives, with the intention to justify affirmative action on the basis of achieving a desirable composition of groups in programmes, universities or businesses (McCrudden, 2015), as diversity is found to be effective in improving educational experiences (Konan et al., 2010), and students' perceptions about the world are influenced by how they are exposed to a wider range of perspectives.

Another important issue regarding affirmative action is, if it is a temporary measure, how to evaluate its impact and effectiveness on the implementation process. It is clear that to evaluate whether a programme is effective or works well, one would need to ascertain the goals it is supposed to achieve and the extent to which they are successful. Therefore, the impact of affirmative action can be evaluated based on the expectation that affirmative action will improve the situation of underrepresented groups so that, in the end, everyone will have equal opportunity and success without causing fears among any other groups or without undermining others' self-confidence and making them feel alienated from the social system (Crosby, 1994). Apart from this advantage, as mentioned earlier, affirmative action is mainly used to eradicate past and current discrimination and establish a fair system for everyone, whether rural, urban, low SES, male or female. Among the bigger questions in this thesis is the focus on highlighting enrolment patterns in high school preparatory programmes and evaluating the impact of affirmative action

programmes on gender and regional equity in preparatory programme enrolment and university admissions in Ethiopia, based on national data.

1.4.4 Target groups for affirmative action

An important part of the implementation process for affirmative action is deciding which group is to be the beneficiary (Sowell, 1990). Although beneficiaries differ from country to country due to differences in social contexts and circumstances, the most common target groups are women (McCrudden, 2015). However, it is also common in some countries to see that the measure is used to benefit other groups that are deemed disadvantaged, such as racial minorities, ethnic minorities in the USA or as a part of majority groups in South Africa and Malaysia or castes in India (Sowell, 2004). However, not all target groups qualify for affirmative action, as there are limits on the number of employment positions as well as access to educational opportunity (McCrudden, 2015). As a result, specific criteria are often used to select the most disadvantaged groups that are anticipated to benefit from the programme. For example, the most common strategies include introducing pre-determined quotas for candidates from targeted groups; providing a lower admission threshold for target groups during admission to educational programmes; and providing financial and academic support targeting disadvantaged groups (Sowell, 1990).

While affirmative action is used to deal with inequality in opportunities, the controversy begins when the condition of one group is perceived as being undermined by the action taken to benefit the target groups (Ratuva, 2013), leading people to claim that affirmative action policies are a form of 'reverse discrimination' and that the measures are perceived by people outside the target group as 'unfair' by nature. One argument is that if affirmative action is designed to redress past discrimination, it needs not to be based on the same criteria (e.g. sex, race) that were used to discriminate in the past (Faúndez, 1994). Moreover, it has also been stated that one of the reasons

for negative reactions to ethnicity- and gender-based affirmative action was that they could be perceived as both over- and under-inclusive because many economically disadvantaged individuals are not minorities and many minorities are not economically disadvantaged (Malos, 1996). Instead, it has been suggested that a system of affirmative action based on other characteristics, such as economic wellbeing or status, are more appropriate in the interest of fairness (Malos, 2000).

1.4.5 Affirmative action in Ethiopia

The long-standing problem of access to education has been well recognized in Ethiopia, including problems of gender equality or regional and urban/rural disparities (FDRE, 2016; MoE, 2002b). Among the different equity strategies, affirmative action has been introduced as part of the current education and training policy in 1994, soon after the current regime came to power (FDRE, 1994). It has been more than three decades since affirmative action was introduced in the Ethiopian Constitution. Its introduction was based on the premise that affirmative action could accelerate the equality of the disadvantaged and those subjected to historical injustice. To make it easy for immediate application, the provisions of affirmative action in the Constitution have required affirmative action to be incorporated in policies and laws that would allow implementation in specific instances (FDRE, 2015). With respect to the national policy context, greater attention has been paid to stressing the importance of affirmative measures and women's rights to equality in employment and education (FDRE, 1993).

Forms of affirmative action in Ethiopia are found in two instances, that is, affirmative action for employment and affirmative action for education (Darasa & Prakasa, 2015). In the former, special measures are provided for target groups, such as women, people with disabilities, and people from a minority ethnic background (usually native citizens of emerging regions) during employment (Ethiopia, 1995). The main approach is that when they compete for a position

and are equally qualified, they are entitled to additional support by virtue of belonging to the target group, and are hired because of this support.

The second form of affirmative action is used for education; special measures are applied to target groups when they compete to enrol in competitive education programmes (FDRE, 1994). For example, lower admission cut scores are available for women, people with disabilities or emerging region students when they are admitted to preparatory or university education (FDRE, 2015). This policy approach is 'preferential treatment' by nature, since it gives priority to female candidates in general, and emerging-region male students disregarding other groups with similar status or qualification (MoE, 2017). According to the placement guideline (MoE, 2017), the implementation process is that, on the basis of the number of places available in universities throughout the country, separate admission cut scores are announced for targeted groups. The cut scores are decided so that a significant proportion of pupils will have access to university by being part of an underrepresented group. The final admission cut scores for both affirmative and non-affirmative groups is approved by the federal Ministry of Council before it is released to the public. However, the admission cut scores are different for STEM and non-STEM study programmes at universities.

2 Research Context: Educational Policy development and Challenges in Ethiopia

Ethiopia, located in the Horn of Africa (see Figure 3), is one of the most populous nations and has a multilingual, multicultural composition of people and comprises more than 80 languages (Harold & Mehretu, 2019). Ethiopia's population continues to grow and is estimated to reach 172 million by 2050 (Lakew & Bekele, 2015). Since the introduction of the education-for-all movement and as one of several low-income countries in Africa, Ethiopia has been facing enormous challenges as it tries to create a more inclusive and efficient education system and, at the same time, cope with rapid population growth (Molla, 2018). This section includes an overview and historical development of education policy in Ethiopia with an emphasis on challenges of equity and inequalities in educational opportunities.

Location of Ethiopia in Africa

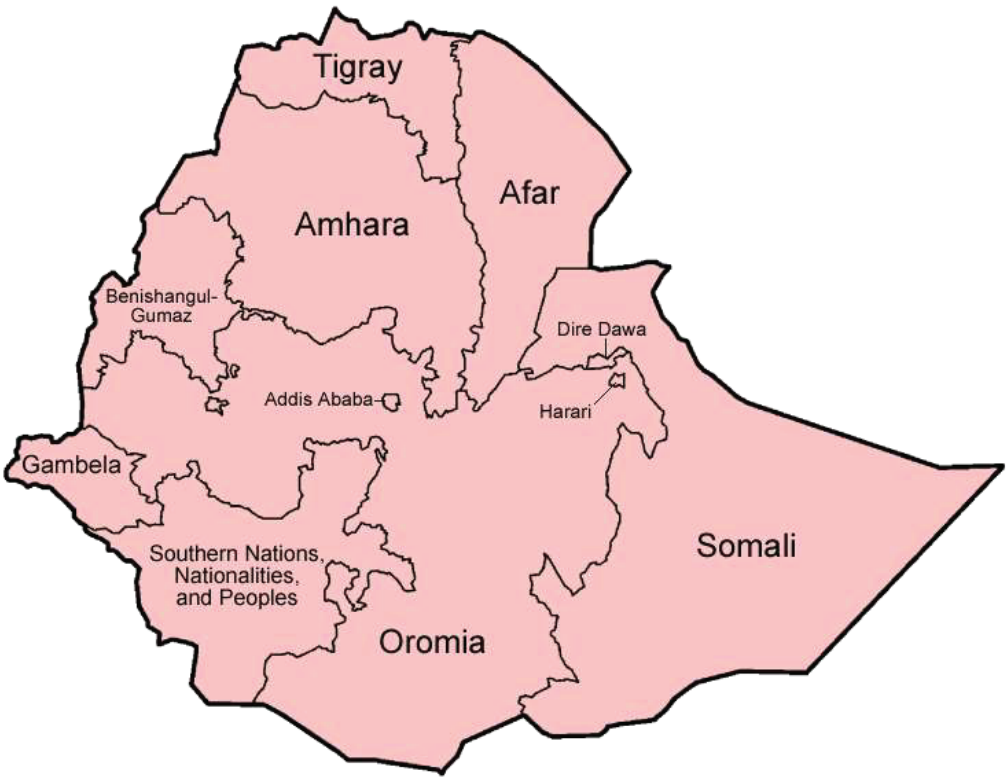


Figure 3. Regional states of Ethiopia

Source: wikipedia

Education in Ethiopia has a very long history dating back to the early fourth century – designed, planned and provided by the Ethiopian Orthodox Church (Wagaw & Thomas, 1990). Beginning then, Christianity was the state religion and remained so for a very long time, and church education was the only form of education until so-called Western education was introduced in 1908, during the reign of Emperor Menelik II of Ethiopia (Wagaw & Thomas, 1990). The church education system was primarily religion-focused, but language studies, philosophy, art, literature and arithmetic were and are still part of it (Teshome, 1979). The system is structured with different levels of education starting from basic language literacy to higher level doctrine of Ethiopian Orthodox Church. Although the main intention is to prepare priests and clergy to serve the church, to the educational system is attributed with having developed a unique writing script (ge'ez letters) and the Ethiopian calendar, which is different from other systems. This made Ethiopia the only country in Africa with its own calendar and writing system.

Church education also aimed not only at training priests but also civil servants such as judges, governors, scribes, treasurers, and general administrators (Teshome, 1979). In fact, Ethiopia, as a county possesses a very long year of practice of indigenous education attached to the Orthodox Church (Girma, 1958), but westerntertiary education was initiated for the first time only in the late 20th century with the establishment of Addis Ababa University College in 1950 (Negash, 2006). Furthermore, until recently the church education has continued to serve in place of pre-primary education (in particular, rural areas where formal early education structure is not established) where children (regardless of their religion) develop language skills (e.g. reading, writing,) and basic numeracy skills that are important to progress in primary education.

The opening of the first formal school in 1908 was a result of growing genuine interest, mainly for Emperor Menelik II, to make use of any opportunities and create a school system so

that people would have more opportunities to take advantage of a new form of education that compromised between tradition and innovation (Zewde, 2002). Later, in this period, more schools (up to hundred) were opened both in the capital and the provinces, and some of them were opened by non-governmental bodies such as foreign communities and missionaries (Bender, 1976). The primary objective of the schools was to provide students with necessary language skills so as to enable the country to make and maintain good connection with other countries. As a result, the school curriculum contains mainly foreign language teaching and some courses in religion, mathematics, calligraphy and law (Bender, 1976). Even though efforts were made to develop the education system in this period, formal policy structure for Western education was not very well established until 1950 (Negash, 1996). In the following section, a brief discussion of the development and reform process is presented focusing on the time before and after 1991. This is because the current education policy is largely part of a new reform introduced in 1994 following a new government system in 1991, although some changes have been introduced recently, and comparing reform developments with previous systems helps to have a contextual and historical evolution of educational policy-making in Ethiopia. It then concludes with recommendations for current and future efforts to improve education policy developments and reform in Ethiopia.

2.1 Policy development process (pre-1991)

This chapter covers the policy development process during the imperial regime and socialist regime between 1930 and 1975 in Ethiopia. In fact, efforts were made prior to 1930 to develop the education system, but progress was limited in terms of establishing a structured government system responsible for managing the process centrally (Zewde, 2002).

The status of education was very much enhanced during Haile Selassie's regime starting in 1935 with his inspiration to modernize the country by expanding Western education (Pankhurst, 1974). Although enrolment inequity was one of the problems, the government's priority measure was to produce more teachers and personnel for the state workforce (Negash, 1996). This leads to the preparation of a curriculum that could support immediate needs of human resources for the government system. Yet the main challenge was that the curriculum was not adapted to the local context as the teaching staffs were primarily foreign (Negash, 1996). It is, however, possible to see that as the education is in the early stages of development, the primary agenda was to establish a relevant education system with proper resources, and it seems that inequity/inequality was not a primary issue as it is now.

The education structure during this era had been changed a few times so as to align it to the social needs as relevance was the other main agenda item along with equity and inequality. For instance, a 6-6-4 structure comprising six years of primary education, six years of lower secondary and four years of upper secondary education system was used for some time before it was changed to 6-2-4. With regard to the assessment system, the introduction of the national examination was a big step and was used to evaluate students' achievement level at the end of primary education (grade 6) and junior education (grade 8). A national test at the end of senior secondary school was also used to determine students' achievement at grade 12, and later it became Ethiopian School leaving certificate examination (ECLCE), which has been in use until now, but with a different name (university entrance exam: UEE) since 2003.

Efforts were also made to address problems related to the lack of local teachers and personnel. The government had not only an interest in recruiting more nationals qualified and experienced in the process of policy development, but it also initiated a comprehensive study

tasking various Ethiopians with identifying the problems of the education sector (Tamiru & Lasser, 2012). The study is called 'education Sector review' (Tefera, 1996).

Inequalities in educational opportunity was one of the many problems identified in the study, and it was subsequently recommended that ''equal access to education for all parts of the country' is one of the objectives of education (Tefera, 1996). The problem of inequity, as reported in the study, is associated with the fact that most schools were urban-centred and the system was male- dominated. It is also important to note that in an attempt to take gender equity as an important issue, the first girls' school was opened during this period (Negash, 1996). However, although there is no quantifiable record in the literature indicating efforts to address regional disparities in enrolment, more schools were established in several places across the country (Negash, 2006). The school enrolment rate for girls was 32% in primary and 29% in secondary education in 1975 (Negash, 1996) which can be taken as a big achievement given the time, but it indicates gender inequity for general enrolment. The general enrolment was 655,550 for primary and 134,900 for secondary education for that year (USAID, 1992), with data including enrolments from all regions.

Education Sector Review (Tefera, 1996)– designed to assess the education sector – was the first official document that raised several policy-related issues, but there was little chance to use the recommendations for policy change as Emperor Haile Selassie's regime was already overthrown by military coup soon after the review was completed. Since the new regime had a political ideology that is different from the feudal system, the education policy development process was somewhat affected by the new Marxist/Leninist (socialist) political ideology and followed a different approach.

As mentioned earlier, after the monarchy system ended in 1974, a new government system with a different political ideology took over the system and started changing the education

policy and began using it actively as a tool to disseminate its ideology (Negash, 1996). However during this period, education was also taken as a means for development and provided free of charge for the masses (Teshome, 1996). In terms of education quality, some scholars argue that this regime inherited an education system that is of good quality but reached only a small number of people (Negash, 2006). This implies that it was not quality but rather educational access that was the primary concern during that period. However, for secondary education, this regime inherited a system that was able to graduate more secondary school students than the country's economic capacity to provide employment and further educational opportunity (Negash, 2006).

Among other achievements, this period achieved a reduction in adult illiteracy rate from 90% to 24%, which was outstanding in the history of Ethiopian education (Tefera, 1996). Expansion of primary education was also witnessed during this period, for instance, increasing the number of schools from 2754 in 1974 to 8260 by 1986, which tripled the enrolment for primary education (Tefera, 1996). However, the figure did not indicate the status of equity and it was, in fact, challenging to make access to education equitable across the different regions due to lack of funding (Tamiru & Lasser, 2012). Studies on enrolment equity also indicated that regional disparities in school participations were significant, with the highest participation rate in the southern regions while the other regions lagged behind (Shibeshi, 1989).

The quality of the education was also hammered due to rapid expansion which resulted in scarcity of resources including quality teachers and school facilities (Negash, 1996). This, as a result, leads to the launching of a project called ‘The Evaluative Research of the General education system in Ethiopia’, which primarily aimed to assess the education development process and provide recommendations for the way forward (Tefera,1996). Although the recommendations from the study were quite relevant and timely, the scarcity of resources (mainly funds) made it difficult to implement the recommendations (ibid). Despite the limitations, the

education development process prior to and during this period recorded a significant expansion of the school system, building an important foundation for post–1991 efforts towards more equitable access to education and current achievement.

2.2 Policy development process (post - 1991)

After 17 years of civil war, following the overthrow of the socialist government, a new party called the Ethiopian People's Revolutionary Democratic Front (EPRDF) came to power in 1991. Soon after a transitional government was established, a new structural reform took place, including the introduction of a new constitution that established a new form of ethnic-based regionalization which divides the country along ethnic lines. Although it was stated that the intention is to create a decentralized administrative system by giving full autonomy to regional states, it is still debatable whether ethnic-based regionalization is, in fact, the right federal system for Ethiopia (Shewadeg, 2019). This came with the fear that such an arrangement might lead the country into a fragile state due to ethnic conflicts which had already caused the deaths and displacement of hundreds of thousands of civilians in several parts the country (Berhanu, 2020; International Organization for Migration, 2019).

Moreover, the new federal system of governance virtually dismantled the earlier administrative systems that were structured based on geographic location. The political structure of the new arrangement is established based on ethnic lines and language with 11 administrative regions (see Figure 3), as if there are only 11 ethnic groups or language in the country. A new region has been recently introduced (in 2020) raising the number of regional states to 12, but a map of the new region is not yet available in public sources)

A decentralized organizational structure was established for the education system giving every issue to the regions disregarding the absence of administrative capacity for some districts to

stand as an autonomous region. An important step is that every region was authorized to use local languages in primary schools up to grade 6 and later up to grade 8 (Negash, 2006) which is a pedagogically vital action. Although the regional governments are responsible for implementing and monitoring the education programme, the federal government is mainly responsible for managing teacher education, examination and curriculum development and also for facilitating multi-year development programmes such as the Education Sector Development Program (ESDP) that sets performance targets and reform agendas for the entire system (MoE, 2015). Through the establishment of education and training policy, the structure of the education system was designed to cover all educational levels from kindergarten to university, formal as well as non-formal learning with the aim of making education a tool for rapid development (FDRE, 1994)).

2.2.1 Structures of education system

The formal structure of the pos-1992 education system(4-4-2-2) as stated in the education policy indicates eight years of primary education which is divided into first cycle (1–4) and second cycle (5–8)programmes and two years of general secondary education(9–10) followed by 2 years of senior secondary(later became Preparatory/ 11–12) education (FDRE, 1994). TVET and higher education were also in the list of priority areas. The system was designed with the assumption that a general education fulfils the basic educational needs and includes all aspects of learning and prepares the student for pursuing subsequent specialized education (FDRE, 1994), while vocational education prepares the student to engage in junior, medium, vocational and higher-level education and vocational skills (MoE, 2015).

As mentioned earlier, primary education, which used to be for duration of 6 years, has been modified to last for two more years (i.e. 8 years total), while general secondary education extends up to 10th grade. Generally the education system covers pre-school education, primary

education, lower secondary education, technical-vocational education; preparatory education and university education (see Figure 4). As indicated earlier the structure of the education school system is 4+4+2+2. . However, a new education structure (6+2+4) has been proposed, which would change it back to the old system. This newly developed education road map, which is planned to be implemented soon (MoE, 2018) has proposed introduction of a national regional exam at the end of grade 6 instead of grade 8 and also cancellation of the grade 10 national exam. The proposed structure consists of 8 years of primary education (divided into two cycles) and four years of high school (9-12).

2.2.2 Pre/-Primary Education

Although the 1994 education policy document indicted that the pre-primary education is one of the priority areas (FDRE, 1994), the sector got attention late in 2010 after national strategic documents were prepared for early childhood education (FDRE, 2015). For instance the government has drafted strategic operational plan and guidelines for early childhood care and education (ECCE) (Ministry of Education, 2010b), and national policy framework for early childhood care and education (Ministry of Education, 2010a) to inform the implementation of ECCE. ECCE is a form of kindergarten, which is often considered as a prerequisite for admission to primary school. Due to very limited access, few children are able to attend kindergarten before they start first grade in primary education in Ethiopia. The kindergartens, which are mostly available in urban-dominated areas, are usually organised by private school owners, religious organizations, and other non-governmental organizations (MoE, 2016). For the year 2016, the national gross enrolment rate for pre-primary education was 45.7%, with the highest enrolment rates in Addis Ababa(93%) and Tigray(88%) while only 4.5 percent of the children in Afar region and 14 percent of the children in Somali region are enrolled in pre-primary programme (MoE, 2017; UNICEF, 2019). This indicates that regional inequity is major problem in addition to limited national enrolment.

While there is still a sizeable number of overaged children in Ethiopian primary schools, most students start free primary education at the age of seven. Promotion between grade levels is based on continual assessment during the first phase, while term-end examinations are introduced in the final year (FDRE, 1994). Although the majority of public primary schools do not have formal and strict entry requirements for grade 1, private schools usually have entry requirements and selection mechanisms that include interviews or examinations (Begna, 2017). As indicated in policy document, upon completing primary education (at the end of grade eight), students sit for a

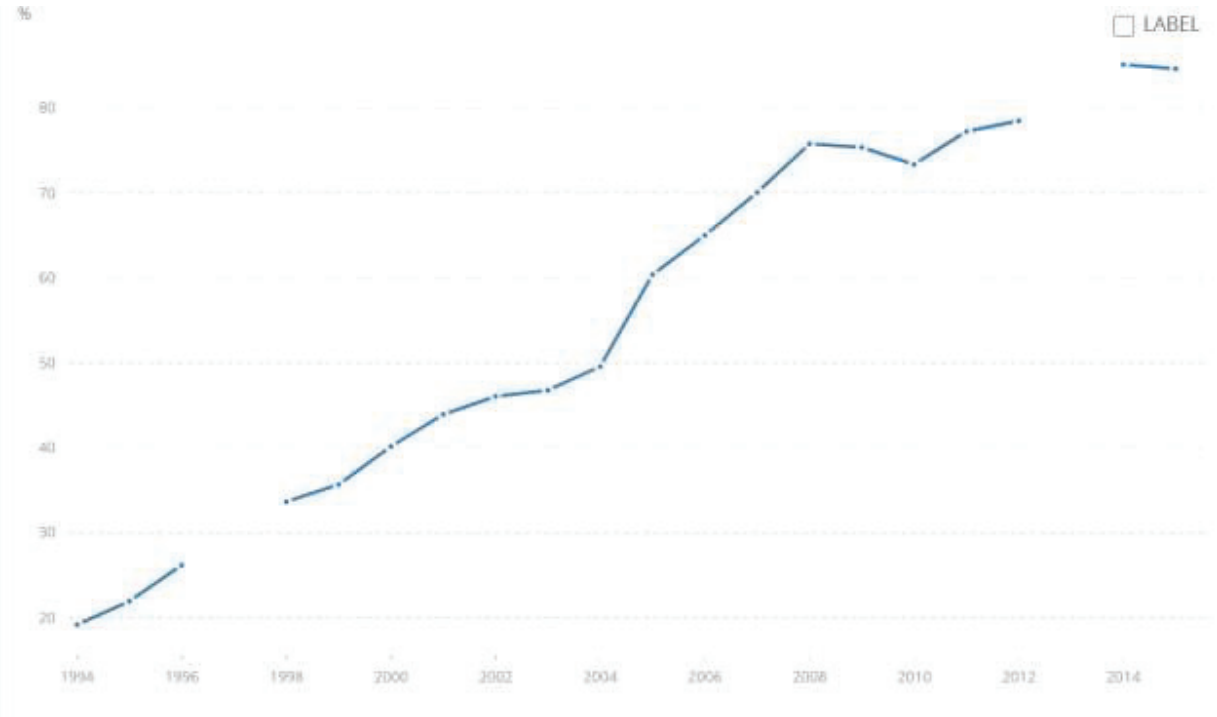
region-wide external examination and, if successful, are awarded a Primary School Leaving Certificate (PSLC), which is a prerequisite for admission into secondary school at grade 8. Students who fail the exams need to repeat grade eight before they can retake the test. Note that administration of a grade 6 regional examination is planned in the new education policy amendment (MoE, 2018).

With regard to school fees, primary education is freely accessible at public schools, but private schools, which are relatively better in terms of qualities of teachers and school facilities, often demand school fees. Most of these private primary schools are located in Addis Ababa, and they cover only 7% of primary schools in the country (Begna, 2017).

Although there is a core standard national school curriculum for primary education, there is some variation in terms of the language of instruction, as some of the regions have their own regional language. Subjects offered at the primary education level give a broad range of knowledge and skills; the areas include aesthetics, languages, mathematics, natural sciences and social sciences. More specifically, the Amharic language (mother tongue), English, mathematics, environmental science, art and physical education are taught in the first stages (grades 1 to 4) of primary education, and civics and ethical education, physical education, visual arts and music, Amharic, English, mathematics, and integrated science are offered in grades 5 and 6, while civics and ethical education, Amharic (mother tongue), visual arts and music, physical education, English, mathematics, social studies, biology, chemistry and physics are taught in grades 7 and 8. Typically, students attend school for 5 days per week for 4 hours each day and 39 weeks per year. In these weeks, 34 will be used for classroom activities and the remaining will be used for tests, giving feedback on test results, and so on. On each day, the four hours are divided into 6 periods (lessons) of 40 minutes each.

Enrolment: As the data from World Bank indicates (see figure 4), enrolment of students for primary education has shown a significant increase since 1994. The net enrolment rate of primary education for female has increased from 16 percent in 1994 to 81 percent in 2015 growing at a rate of 9.4% (UNESCO, 2020). Similarly the enrolment of male students has been improved since 1994, according to UNESCO's report. It shows an increment from 26 % in 1994 to 88% in 2015 (UNESCO, 2020). Compared to the female students, males have been favoured throughout the years which indicate the prevalence of gender inequity in enrolment at primary education.

Figure 5.Primary school enrolment (net %) rate (1994 – 2015)



Source: UNESCO Institute for Statistics (2020)

2.2.3 Secondary Education: High School

Upon completing primary education (at the end of grade eight), students sit for a region-wide external examination and, if successful, are awarded a Primary School Leaving Certificate

(PSLC), which is a prerequisite for admission into secondary school at grade 9 (FDRE, 1994). As stated in Education and training policy (FDRE, 1994), the goals of the first cycle of secondary education, which includes grades 9 and 10, are to (1) provide general education that will enable students to identify their needs, interests and potential so they can choose their preferred field of study; (2) enable students to continue further education and training; and (3) prepare students for the world of work. Secondary education is tuition-free, and the school curriculum covers several school subjects (see Table 3).

Table 3.

School subjects in secondary (9-10) education

Subjects	Language: Mother tongue	Mathematics	Chemistry	Geography
	English	Information Technology	Physics	History
	Amharic as 2nd language	Physical Education	Biology	
	Geez	Civics		

Except for the language subjects (mother tongue, Amharic, and Geez), the language of instruction for secondary school is English. *Geez* is an old language that uses its own alphabet and has been spoken in ancient Ethiopia before it became only a liturgical language in the Ethiopian Orthodox Church. Amharic and Tigrigna are extended languages based on the Geez alphabet. Although Geez is not a main part of the national curriculum, a Geez national examination is prepared for those who want to take the test at the end of grade 10.

At the end of the cycle, students must sit for the nationwide EGSLCE, a multiple-choice test administered by the National Educational Assessment and Examination Agency. The exam usually includes several test subjects, graded on an A-F scale. In order to qualify for progression

into preparatory education, students must score high enough to reach the admission threshold set by the Ethiopian Ministry of Education. Depending on their grade average, students who pass can continue in the university-preparatory track or enrol in vocational programmes or teacher training institutes.

Enrolment: As indicated in UNESCO's data, there was a sharp decline in enrolment at secondary education just before the introduction of a new education policy. However, it continues to improve from 12% in 1999 to 37.5% in 2012. Enrolment data for gender indicates a similar pattern. Female students' gross enrolment rate has increased from 10 % in 1999 to 36% in 2012, but dropped to 34 in 2015. For males, it shows an increment from 15 in 1999 to 39% in 2012, but dropped to 35 in 2015. Despite promising improvements, the changes are in favour of male students indicating that there are more male students than females in secondary schools in Ethiopia.

Figure 6.Secondary school gross enrolment (%) rate (1985 – 2015)

Source: UNESCO Institute for Statistics (2020)

2.2.4 Preparatory Programme

The goals of the second cycle (grades 11 and 12) of secondary education are to choose subjects or areas of training, prepare for higher education and prepare students for the world of work and, the programme is open to all holders of the Ethiopian general school leaving certificate examination with sufficiently high grades (FDRE, 1994; MoE, 2002b). Students can choose between a natural Science stream and a social Science stream with both streams having a common core curriculum as illustrated in Table 4 (MoE, 2002b).

At the end of grade 12, students sit for the nationwide Ethiopian University Entrance Examination, which tests their knowledge of seven subjects, including mathematics, English, civics, general academic aptitude, and three stream-related specialization subjects (MoE, 2002b). The students are expected to score high enough in order to get admission into a university (FDRE, 1994) and, the exam performance is graded on a numerical 0–100 point scale, with a total possible score of 700 in the combined seven test subjects. Cut-off scores for university admission are set every year, depending on the number of available seats in Ethiopian higher education.

2.2.5 Technical and Vocational Education training (TVET)

The majority of Ethiopian students who could not enter university preparatory education continue their studies after grade 10 by enrolling in TVET programmes, of which there is a great variety, offered by both public and private providers. These programmes range from informal short-term training courses to formal certificate programmes of up to three years in different programme areas, such as agriculture, natural resources, tourism, health and construction technology. (Mengistu, 2012). The main objective of TVET is to produce a lower and middle-level, competent, motivated, adaptable and innovative workforce.

Table 4.

School subjects for preparatory education

Stream	Subjects	Common subjects	Language
Natural Science	Physics Chemistry Biology Technical Drawing	English Civics Physical education Mathematics ICT	Mother Tongue Amharic
Social Science	Geography History Economics General business		

Depending on the levels, there are different admission requirements for TVET, and a sufficient score on the grade 10 national examination is one requirements, but the students that were unable to reach the preparatory programme admission threshold will also have an opportunity to join in one of the TVET levels (Krishnan & Shaorshadze, 2013). Admission to TVET is also possible for students who completed the preparatory programme but were unable to achieve a sufficient score to enter university. In addition, the highest level of TVET (Level-5) also accepts university graduates. In general, there are five different levels of TVET programmes with increasing requirements, but there is also a level called the extension programme (TVET Extension), which accepts applicants with no formal education or those that dropped out after primary education (Krishnan & Shaorshadze, 2013).

2.2.6 Higher Education

Current Ethiopian higher education is characterised by a massive expansion to meet the need for sustainable development to produce the necessary human capital. Until 2014, the higher education system has established 33 universities (MoE, 2014b), and with additional 11 universities planed as part of the growth and transformation plan 2 (GTP II) (FDRE, 2016), making the total number of universities 44 in 2019. Its policy formulation and practice are based on a combination of the long history of Ethiopian traditional education (church education), western countries' influence, and current global opportunities (Molla, 2018). However, the progress to expansion has many challenges and limitations in terms of the quality of education and the creation of equal opportunities for students from different backgrounds (MoE, 2018).

The undergraduate programme for a bachelor's degree ranges from four years for arts, science and education, five years for pharmacy, engineering, architecture and law and six years for medical and veterinary programmes (FDRE, 1994). The next level of university offers master's level degrees which last for two years after the bachelor's degree and admission to programme requires at least a bachelor's degree, and a final paper is mandatory to graduate. The third higher education degree is a PhD, which requires three to five years of study after the master's degree. The PhD admission requirement is generally a relevant master's degree, and it is expected to present a dissertation demonstrating attainment of skills, knowledge of their specialty and an ability to conduct research independently (FDRE, 1994).

University admission. Ethiopia has a centralised admissions system in which undergraduate admissions criteria are set by the federal Ministry of EFA for higher education institutes, both public and private (MoE, 2017). This admission is generally based on the university entrance exam and, due to the scarcity of university seats, it is highly selective. The Ministry of Education sets minimum score requirements and quotas for different programmes,

based on the number of available seats. Admission is also based on 70:30 programme allocations, in which 70% of seats are reserved for STEM fields and 30% for the humanities and social sciences (Kahsay, 2012). Females, emerging region students, and students with disabilities are granted preferential admission via lower score requirements (FDRE, 2009). For example, for 2015 admission, female students only need a score of 320 to qualify for admission into social science programmes—a threshold lowered even further for women from pastoral communities and other special needs regions, which required an average of only 300. That said, these measures have had limited impact on diversifying Ethiopia's student population, which continues to be dominated mostly by male affluent students from urban areas (only 35% of undergraduate students and 24% percent of graduate students were female in 2015) (UNESCO, 2017).

2.2.7 Assessment and Examination System

One of the most common forms of assessment is the National Learning Assessment (NLA), which is primarily organised by the National Educational Assessment and Examination Agency (NEAEA) of the Ethiopian Ministry of Education. NLA is supported by curriculum experts, teachers and consultants, and financially by development partners (e.g. USAID). NLA is conducted every four years for grades 4, 8, 10 and 12, and the primary purpose is to identify gaps in learning achievement and variation among groups by gender, and also to highlight factors affecting learning outcomes. In addition to NLA, formal regional assessments take place in grade 8, followed by national examinations in grades 10 and 12. At each of these levels, students will be assessed annually, and performance will be used to guide the transition to the next level of education (FDRE, 1994, see Figure 4). Apart from administering a range of national assessments, it was stated in the education sector development programme V (ESDP V) that Ethiopia needs to take steps to participate in regional and international assessments of educational performance with the intention to gather information about the performance of Ethiopian students compared to

their peers around the world (FDRE, 2015). This action can be helpful as it might lead to curricular adjustment, which will be determined based on evidence from high-performing countries or from those showing rapid progress in a short time.

The grading system in Ethiopia varies depending on the level of education, and both letter grades and raw scores or percentages are used (Trines, 2018), and the grades are provided to students on their certificate. For a comparative purpose, Table 5 provides grading practices in the assessment system and grade descriptions for secondary school and preparatory programmes in Ethiopia, in contrast to the USA system. At the university level, the grading system corresponds to the letter grade system used in the USA.

Table 5. *Grading system for high school and preparatory education* (Loo, 2018; Trines, 2018)

Secondary school (9-10)				**Preparatory programme (11-12)**		
Letter grade	**Scale**	**Meaning**	**US grade**	**Scale**	**Description**	**US Grade**
A(4)	90-100	Excellent	A	75 -100	Excellent	A
B(3)	80-89	Very good	B	63 -74	Very good	B
C(2)	60-79	Satisfactory	C	50- 62	Good	C
D(1)	50-59	Average	D	25- 49	Satisfactory	D
E(fail)	0.0 - 49	Fail	F	00 -25	Fail	F

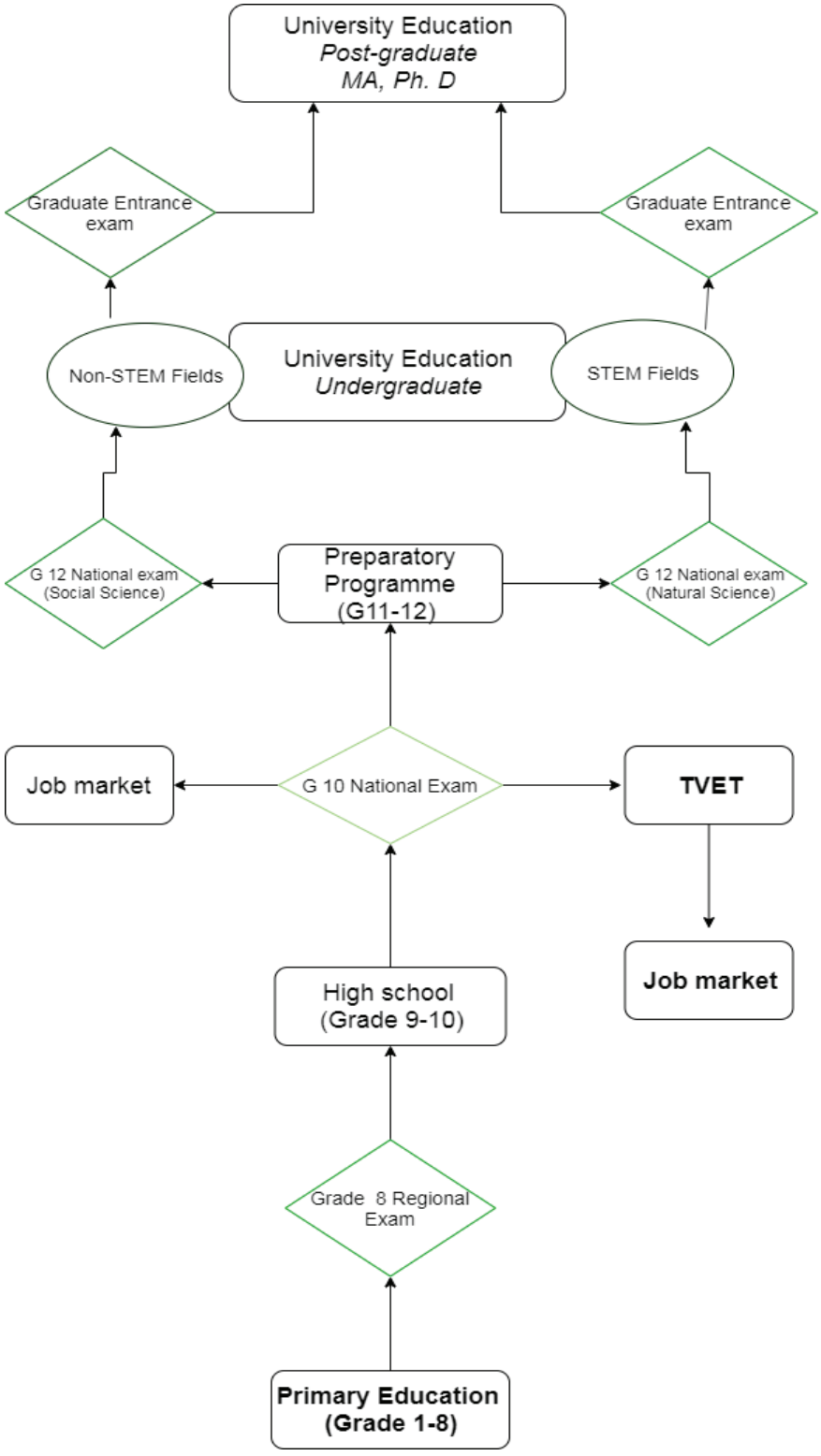


Figure 4. The different levels and national examinations in the Ethiopian education system.

2.2.8 Educational equity: Strategies

Together with the development of education training policy, the government also adopted, in 1997, the Education Sector Development Program (ESDP), which has been used as a guiding strategic document up to the present time (MoE, 2015). The Education and Training Policy has been the inspiration for the Education Sector Development Program (ESDP). The recent ESDP is ESDP V, the fifth medium term plan prepared for the year 2016–2020 to serve as the central strategy document for educational development in Ethiopia (MoE, 2015). During the policy development process, the main problems in education were identified as relevance, access and equity. The following objectives are stated as priorities in the policy documents (MoE, 2015):

The priorities of the education and training programme and ESDP documents are:

- Provide equal opportunities and participation for all, with special attention to disadvantaged groups
- Deliver quality education that meets the diverse learning needs of all children, youth and adults
- Develop competent citizens who contribute to social, economic, political and cultural development through creation and transfer of knowledge and technology
- Promote effective leadership, management and governance at all levels in order to achieve educational goals by mobilizing and using resources efficiently
- Assist children, youth and adults to share common values and experiences and to embrace diversity

The first strategic document, ESDP I, was formulated as part of a twenty-year education sector indicative plan which targets the goal of achieving universal primary education by 2015 and was

prepared in collaboration with regional governments and members of the donor community (MoE,2015).

Based on the fact that educational opportunities were limited, it was expected that the new policy would bring significant changes in a short time. As a result, the strategic goal of the policy was: Provision of a fair, equitable quality education to all regions, giving special emphasis for rural areas as they cover 85% of population (FDRE, 1994; MoE, 2002b).

With regard to primary education, the intention was not only to raise the standards of education for the few but also to universalize it, expand secondary education in line with the number of primary school students and expand higher education in accordance with professional needs (FDRE, 1994). To deal with the issues of equity, provisions were made to support less developed regions and women, as they are regarded historically as disadvantaged groups (FDRE,1994). These compensatory measures were stated in the policy on Article 3.9.4-5 :

> Special financial assistance will be given to those who have been deprived of educational opportunities, and steps will be taken to raise the educational participation of the deprived regions. The government will give financial support to raise the participation of women in education.

The government has also claimed free education, particularly for primary education and secondary education (up to grade 10) (FDRE, 1994). Because of this, the majority of the people would not be prevented from getting a basic education due to lack of financial resources. However there is a fee for education beyond general education, although the policy states that students are only supposed to pay the cost after they have completed their education, either through a long-term payment plan or by providing service in return for a minimal salary (FDRE,

1994). In terms of assuring equity in educational opportunity, this funding arrangement is expected to have a positive impact as the government finances collected from cost sharing can be used to expand primary and secondary school, which helps to improve educational access for children of unprivileged groups.

Although Ethiopia did not fully achieve universal primary education by the year 2015, substantial increases in primary education enrolment had been reported since the policy was introduced in 1994 (Moussa & Omoeva, 2020, see Figure 5). However, the expansion of primary school education was not supported in parallel with resources such as teachers; as a result, this caused a sharp rise in the pupil-teacher ratio which was 64:1 in 2014 (Moussa & Omoeva, 2020). This may have been a major factor in the current decline in the quality of education in Ethiopia as the massive expansion enhanced access but at the same time sacrificed the quality of education.

Encouraging and supporting private investors to open schools and learning institutions was also considered an important strategy with the aim to improve access to education (FDRE, 1994). However since private schools are mainly opened in urban areas, they had a limited impact in terms of improving educational equity nationally, and they might even create inequality as they are affordable only for families of higher SES status.

2.2.8.1 Higher education and equity strategies

Similar to the situation in education in general, inequity in the pursuit of higher education has been considered as major concern that needed attention in Ethiopia (FDRE, 1994). As a result, mass expansion was considered a good strategy to address problems of inequality in educational opportunity, and it did result in provisions to accommodate a large number of students in HE institutes (MoE, 2002a). This action helped to increase the number of public and private

university study places so that people from disadvantaged regions would have an improved opportunity to enrol (Molla, 2014). Due to this effort, the gross enrolment rate of tertiary education has improved from 4 percent in 2008 to 8.13 percent in 2014 (MoE, 2015). Recently undergraduate enrolment reached nearly 800,000 students total in all programmes (Yallew, 2020).

However, as some scholars argue, there are unintended consequences of mass expansion (Liz Reisberg & Laura Rumbley, 2010; van Deuren et al., 2016) on the quality of education. This has been the case in Ethiopia as the quality of higher education has been deteriorating since the introduction of the mass expansion strategy, which usually is not coupled with sufficient supplemental resources (academic stuff, teaching resources). Some researchers even suggested that the government might need to slow down expansion and focus on qualitative concerns such as quality of education and equity issues (Waweru & Abate, 2013, Semela, 2011). However, this is somehow challenging as the government is expected to prepare places for the large student population now completing secondary education; this group is increasing every year due to rapid increase in primary school enrolment.

Inequality in educational participation between the different regions is also an issue that arose along with the concern for equitable access. As mentioned earlier, expansion is considered a means to deal with inequity among the different federal states/regions of Ethiopia. As a result, equitable distribution of universities among the different regions was suggested as a tool to help achieve this goal (FDRE, 2009). However, this was shown to have little impact on the target group. Given that university admissions are processed centrally and that every student has equal opportunity to choose, opening universities in emerging regions has overall positive impact on enrolment in general, but has no special advantages for students living in an emerging region.

Therefore, this approach is weak approach to equity and has little impact despite its motives being more of political than educational.

Another important equity strategy designed for higher education in Ethiopia is affirmative action, which targets groups that are underrepresented in higher education for different reasons (FDRE, 1994). It has constitutional support and has been in use for nearly three decades in Ethiopia. Affirmative action is also the most widely used measure to address inequity in different countries (Altbach et al., 2010; Clancy & Goastellec, 2007; Santiago, 2008). The implementation process, its impact on equity and drawbacks in Ethiopia are discussed in a different section in this chapter.

All in all, higher education in Ethiopia is characterized by greater expansion but limited representation of students from marginalized/emerging regions, women, and students from low socio-economic status is a problem that persists (Molla & Gale, 2015). Even though girls are benefited due to widened access to higher education in Ethiopia, the country places 136th in terms of gender parity index rank in tertiary education globally (World Economic Forum, 2017). Therefore, to critically address the issue, the focus should be on intervention targeting the beneficiary groups rather than relying on mass expansion that benefits everyone equally (but not equitably). Affirmative action can be one example that needs to be strengthened, in the case of Ethiopia, to achieve the desired outcomes.

3 Major Research questions

The following are major guiding research questions addressed in the three studies

1. Does inequality in educational opportunity explain regional and gender disparities in educational achievement in Ethiopia?

2. Does affirmative policy have a significant impact on equity in enrolment and transition to higher education (including preparatory) in Ethiopia?
3. Does inequality in educational opportunity explain regional and gender disparities in STEM enrolment, achievement and transition to higher education?

4 Relevance of the study

Apart from several studies regarding gender equity in educational access and achievement globally (Alon & Gelbgiser, 2011; Psaki et al., 2018; Stoet & Geary, 2015, 2018), efforts to explore the situation in developing countries has faced challenges due to the lack of adequate data and data management systems (UNESCO, 2015). As a result, evidence from developing countries is scarce in the literature. Our studies contribute towards closing this gap by relying on nationally representative large-scale data to provide reliable comparative evidence from a developing country.

Moreover, the diverse contextual differences, including socio-economic disparities among different nations, might create a concern about the validity of findings in studies that target specific geographic regions, such as Western countries, more predominantly. The studies covered in this dissertation contribute by providing empirical evidence from Ethiopia, a key representative of developing countries and the biggest nation in the Horn of Africa. The studies also contribute by providing recommendations and suggestions that are essential in shaping national policy strategies and amendments related to educational equity in Ethiopia.

Furthermore, it is expected that the primary objectives of an education system are to equip pupils with knowledge that helps them take part in social, economic and political life, and also to provide a pathway to valuable credentials, irrespective of the pupils' social and economic

backgrounds (Labaree, 1997). Therefore, the studies provide a strong basis upon which to assess the performance of the Ethiopian national education system regarding these dimensions, given that the studies are based on nationally representative educational data. Particular areas that will be assessed include the degree to which the education system helps individuals develop capabilities necessary for successful socio-economic integration (indicated by educational achievement) and the extent to which it provides equitable opportunities for social advancement (indicated by educational equity).

5 Methodological Considerations

Comparative studies in education require representative datasets, along with measurement instruments that can be administrated in a standardized fashion and lead to outcomes that allow for a fair and transparent comparative analysis. Here, we benefited from the presence of standardized national examinations organised by the Ethiopian National Examination and Assessment Agency at different levels of the Ethiopian educational system, which provided unique datasets to work with.

The same examination is administered nationally throughout all the regions at the same time. Furthermore, each region is required to use the same national educational curriculum and the same language of instruction (English), starting in upper secondary school. This situation provides a stronger standardized context for a quasi-experimental study using these exam data. Comparisons were made between gender groups across regions that would be typical cases in international comparative studies in education, where the educational system and language of instruction might vary substantially between participating regions and countries.

Furthermore, for each cohort, the sample size in our study was close to the student population size, making it close to a census and helping with the representativeness of the sample.

The datasets include, for two cohorts, all students participating in the national examination at the end of secondary and preparatory education in Ethiopia. School enrolment is mandatory in order to be eligible for the examinations, which are considered essential. Students understand the high stakes, because they see the examination as an opportunity to continue their education beyond upper secondary school to a university career and subsequently better job opportunities. Thus, given this context, exam enrolment is a suitable proxy for school enrolment.

5.1 Importance of using national assessment data for education research

Standardized national examinations offer clear advantages not only for comparative research but also for quality assurance and policy-making, although standardization is challenging. Each examination is an organizational challenge, requiring a huge investment in human and financial capital and other resources. Unfortunately, the newly introduced education policy road map proposes that the currently administered national examination at the end of grade 10 will no longer be given; this change implies that the transition from grade 10 to a preparatory programme will now be based on students' performance on unstandardized, teacher-made exams. As a result, there will be huge deviations in terms of exam practices between schools, teachers, and regions. Hence, this reform will make it difficult to conduct similar comparative research at this level in the future. Therefore, it is important to stress that having the national examination (instead of, or in addition to, teacher-made exams) generates multiple advantages in terms of transparency, standardization, and comparability to properly evaluate the quality of the Ethiopian education system.

Studies of large scale-scale assessment data tend to promise representability of the results, statistical power and have the ability to reveal even minor effects (Ertl et al., 2020). This representability can help the studies to be more informative and provide stronger evidence for

policymaking than traditional educational studies that often rely on convenience samples (Wagemaker, 2014).

The other importance of studying on large scale national assessment data is the long term perspective since they have been repeated across several cycles or years and show a longitudinal panel design. Such patterns allow to easily asses how changes in educational policy may impact on students' education outcomes (Schleicher, 2019). The longitudinal approach also enables researchers to identify background variables, shading light on how an individual's characteristics affect educational trajectories (Blossfeld & Rossbach, 2019). Besides representativity and the longitudinal perspective, large scale assessment data provide standardized procedures, instruments, item pools, and exam booklets (OECD, 2013), and this standardization ensures a data that allow comparative studies between regions as well as different cohorts. Moreover, the availability of large sample with national assessment data provides a statistical power for analyses that allows detection of even small effects which helps to reveal effects that would have been overlooked in traditional educational studies that depends on small sample size. However, statistical power decreases when analyses go beyond the individual level and focus on class, school, or national realms (Ertl et al., 2020).

5.2 Systematic review

In addition to the main studies, a Systematic review was designed to provide an exhaustive summary of current evidence relevant to the major research questions in relation to equity, equality and gender in education. The review process was based on PRISMA protocol which is useful tool to follow and report the procedures. Two big data bases: ERIC, the largest education research database and web of science were used as sources to search for relevant articles. There were four stages to the process of the systematic review. The first stage was

identifying the key words used for the searching process which were equity, inequality, education and gender. A combination of these words, specified in title and abstract, were used in both databases which resulted in total 404 articles. In order to identify and exclude any duplicates, the researcher used the Mendeley software which is suitable reference manager.

Secondly, some eligibility and inclusion criteria were also specified before screening. Journal articles with empirical data or articles addressing theoretical understanding of the concepts specified under key terms were chosen. In order to avoid confusion and difficulty in translating, searching was only focusing on articles published in English. Regarding time line for year of publication, a ten-year period was chosen (between 2010 and 2021), a sufficient period to observe the related research and publication trends. Exceptions were for some articles written by pioneer authors with original contribution to the theories of equity and inequality.

Thirdly, the first screening, after duplicates removed, was made based on reading each abstract. At this stage, 325 articles were screened and 81 articles were extracted for further review. The main focus is identifying articles on theories of equity and equality in education. The next stage was finalizing the suitable articles based on full text review. Thus, 34 articles were deemed useful and suitable.

Finally, based on the final articles, a review is written on four broad issues identified through the process, namely (I) the concept of equity and inequality in education (II) (in) equality of opportunity and outcome in education and (III*)* Gender inequality in education.

5.3 Data limitations.

The initial idea of tracking individual students throughout the educational system ended up infeasible due to the lack of a unique identifier variable in the different data sources. Attempts were made to create an approximate linkage of individual grade 10 student records to individual grade 12 students in both cohorts, based on the available background information, but the results were not satisfactory. The one-to-many matches were simply too numerous.

Another limitation with respect to educational opportunity is that we could only rely on data at the aggregate region-level, as student-level data on socio-economic status, parental education and other indicators were not available. As a result, we used a proxy measure to indicate educational opportunities based on a governmental classification of regions in terms of socio-economic development status, which describes the provision of educational opportunities. Even though this aggregate-level data disregards differences at an individual level within a region, an analysis of the region-level indicator still provides important information and signals regarding regional and gender disparities in educational outcomes.

5.4 Methodological limitations and future research

Part of our study's main focus was on gender inequalities in relation to other forms of social division such as location and socio-economic status. This is a type of descriptive analysis of intersectionality, drawing on intra-categorical social division (Unterhalter, 2012; Unterhalter & Robinson, 2020). This approach is useful as it is linked to the UN sustainable development goals (SDG) and the analysis has documented important findings on intersectional inequalities in Ethiopian education and helped to develop suggestions to shape policies and practices pertaining to inclusion. Moreover, although this approach does not provide insight into the causes of these inequalities, our analysis is expanded through evaluating policy impacts, and discusses how and

in what form inclusion policies and practices should be designed to substantially change these inequality patterns in Ethiopia. However areas that are contested around race, ethnicity, and disability are scarcely touched in our analysis given that the data is hardly available and some do not exist in our research context. Although addressing such elements of intersectionality is useful, they are often treated in fragmented initiatives (Unterhalter, 2005; Unterhalter & Robinson, 2020).

Moreover, this descriptive approach to intersectionality on its own does not consider the structural causes of inequalities and exclusions. However the analysis in this study considered other dimensions of inequality (e.g. regional human development or poverty index) allowing us to understand the intersectionality of gender and regional socio-economic status, though it is macro level analysis. Therefore, we recommend that future research should draw on and use as many sources as it can document descriptive intersectionality within education systems and the interventions that aim to address these as an important mapping exercise. One example is Unterhalter & Robinson's (2020) suggestion on intersectional analysis which speaks in favour of applying three forms of intersectionality approaches; descriptive intersectionality, institutional and normative intersectionality and discursive intersectionality. Institutional forms of intersectional approach suggest that analysis needs to look more closely at how the intersections of institutions produce inequality and how forms of inclusion can be monitored to sustain gender equality in education (Unterhalter & Robinson, 2020; Unterhalter, 2012). Although this dissertation documents some of the intersectional inequalities associated with gender inequalities in education, a more qualitative approach using additional historical, sociological and political economic analyses would have added more to help understand why there are different patterns of difference within groups of girls and boys or within and between regions.

STUDY 1

Tesema, M.T. & Braeken, J. (2018). Regional inequalities and gender differences in academic achievement as a function of educational opportunities: Evidence from Ethiopia. *International Journal of Educational Development, 60*, 51-59.

6 Study 1

Abstract

This study investigated regional and gender differences in academic achievement in Ethiopia and examined whether these differences can be explained in terms of unequal educational opportunities (EO). Educational opportunity was operationalized in a broad sense based on a regional differentiation in terms of socio-economic and school environment factors. The study results are based on a multilevel analysis of census data (N = 211706) for the 2015 national standardized exam of grade 12 students. Whereas the Central (high EO) regions outperformed the other regions (Cohen's d =.85) as expected, there were some inconsistencies in the comparison between Established (mid EO) regions and Emerging (low EO) regions. Coincidentally, the two Emerging regions that were unexpectedly performing at the level of the Established regions were also the two regions in which there was no evidence for a gender gap in achievement. For other regions, including the Central regions, evidence for a gender gap sometimes as large as the regional gap was identified, with boys having on average higher scores than girls (Cohen's d = [.22,.87], with an average of.50). Plausible explanations and further policy recommendations are discussed.

Key words: Educational opportunity, regional inequalities, gender, academic achievement

Introduction

Ethiopia has been focusing on improving students learning outcomes and educational opportunities at all levels of the education sector. However, many challenges still remain. For instance, lack of access to education and unequal educational opportunities continue to be an obstacle, especially for females and students in emerging regions (e.g., the Somali and Gambela regions in Ethiopia)(World Bank, 2005). Beside sociocultural barriers to participation (especially for girls in rural areas), inequalities in access to quality education are widespread, as less-resourced schools are generally located in rural areas and in the emerging regions. During recent years, together with an increase in the number of teachers and schools, access to all levels of the education system has increased at a rapid rate; yet, the situation still remains a concern for emerging regions (EFA, 2015).

The post-2015 education and development agenda stressed that the driving forces of education and development frameworks should be `elimination of poverty and eradication of inequalities` within and between countries, generating universal and equitable access to quality education (Sayed et al., 2013). As part of the universal education declaration, Ethiopia has the responsibility to address the issues of inequalities of educational opportunities to different groups, including emerging regions and women.

Since the education system is seen as a means to enhance overall nation-building and achieve the national goal of eradicating poverty, it is essential that the education system actually offers equal opportunities and quality educational experiences that promote learning achievement. The Ethiopian government has been expressing interest to create better educational opportunities, with the expectation that doing so will enhance learning outcomes. In collaboration with the World Bank, the General Education Quality Improvement Programme (GEQIP) has been

designed and implemented, with the aim of facilitating improvements in the quality of schooling nationally, focusing on equity and learning outcomes through investment in key inputs such as textbooks and infrastructure (MOE, 2008). Equity has also been addressed through mainstreaming of a number of cross cutting issues, such as gender, special education needs, and paying special attention to the four most under-served emerging regions (MOE, 2008).

The role of educational opportunities in regard to academic achievement has been documented in many studies (Audrey-marie, Joseph, & Elizabeth 2012; Chandra, Catherine, Kathryn, Lindsey, & Kenneth, 2010; Coleman et al., 1966; Eide & Showalter, 1998; Ferguson, Bovaird, & Mueller, 2007; Guyton & Oakes, 1995; Herman & Klein, 1996; Lacour & Tissington, 2011; Rolleston, James, & Aurino, 2014; Woessmann, 2004). However, many of those earlier studies focused on the 'opportunities to learn' concept, which forms part of a larger concept of curricular alignment. Furthermore, variation in achievement is still a global concern, and very limited studies have been conducted in the context of developing countries (UNESCO, 2004). Since lack of equal educational opportunities is a major concern in developing nations, studies in such countries can provide vital contributions to the existing scientific evidence in the literature which in turn can be used to inform local and international policy. This study explores whether inequalities in educational opportunities across different regions and groups in Ethiopia are reflected by inequalities in school achievement.

Educational opportunity in this context refers to the extent to which students have equitable access to basic facilities that make up quality schools (Coleman et al., 1966; Rogers, 2010), and also the extent to which students encounter social and cultural barriers to proper schooling. It is a broad construct covering students' access to qualified teachers, safe and clean school environment, textbooks and learning materials, and school-home-social conditions (Coleman 1967; Coleman et al., 1966; Stevens, 1996).

Structure of Ethiopian Education System

The current education structure of the country was designed with the purpose of expanding the education sector, improving quality and ensuring that educational content is harmonized with the country's development objectives. In line with the federal system, each of the regional states has their own regional educational bureaus (National Regional States Education Bureaus). These Bureaus are responsible for the administration and management of general education, technical and vocational education and also teacher-training programmes and institutions, while the federal Ministry of Education is responsible for higher education. The basic role of the Ministry of Education is to formulate policy and guidelines that are implemented by the different regional Bureaus or units. The general formal education structure includes pre-school education, primary and secondary education, technical-vocational education and higher education.

The primary education covers 8 years (age groups 6 to 14) and is divided into two 4-year cycles (grade 1 through grade 4; and grade 5 through 8). At the end of grade 4, students take the first national examination and must achieve a score of at least 50 percent in order to continue to grade 5. At the end of grade 8, students take the national Primary School Certificate examination. The next structure is 2 years of general secondary education (grade 9-10). At the end of this general secondary education (grade 10), students take the Ethiopian General Secondary Education Certificate / 10th Grade National Examination. This exam is administered nationally by the Ethiopian National Assessment and Examination agency. After having successfully completed this exam, students can either follow vocational training or attend the two general upper grades (the so-called preparatory programme). The preparatory secondary education also consists of a 2-year period since 2001 (grades 11 and 12) and is regarded as preparation for higher education. At the end of this phase, students can sit for the nationally administered

university entrance examination and obtain a university admission certificate. The current study was conducted using national examination results of students at the end of this preparatory programme in grade 12.

Although the country has one general education policy, each regional state has a mandate to amend the components so as to fit to the local context. All regional education bureaus are expected to prepare their students for the national examination and have responsibility (in collaboration with the Ministry of education) to facilitate the administration of the examinations each year. The national examinations have high stakes attached to them and are used for selection, placement and certification.

Educational Opportunity: Disparities between Regions

It is certainly reasonable to assume that educational opportunity depends on the resourcefulness of a region or an institution and that poorly resourced schools necessarily provide less learning opportunities to their students. In order for students to achieve, they must have appropriate learning opportunities. Whenever different regions within a country have major economic differences, it is very likely that students from economically less developed regions are more disadvantageous. Several studies in different places have looked into differences in socio-economic development level of regions as sources of variation in students' academic achievement (Checchi & Peragine, 2005; Edgerton, Peter, & Roberts, 2008; Elmore & Fuhrman, 1995; Ferrão, 2014; Mok, Wong, & Zhang, 2009; Qian & Smyth, 2008; Sibiano & Agasisti, 2013; Straková, Tomášek, & Willms, 2006; Tomul, 2009; Ukiwo, 2007) and the contribution of policy related practices to student learning outcomes in different regions (Ning et al., 2016). Few studies considered variations in educational opportunity created due to differences in socio economic developments of regions. This study explores differences in students' academic achievement as related to regional educational opportunity in Ethiopia.

The Ethiopian Federation consists of eleven states (nine national regional states and two administrative states, see Figure 1), and the Constitution maintains that the States have equal rights and powers, although they differ in size (Habib, 2011). The regional structure reflects the country's decentralized political system and the government's commitment to address regional imbalances. An overview of some regional educational and socio-economic characteristics is given in Table 1. Based on these characteristics and regional status labelled by the government; the 11 regions were classified into 3 categories: **Central, Established** and **Emerging** regions. The division can be interpreted in terms of regional ranks and based on the extent to which students have access to proper (quality) education. It is expected that the differences in educational opportunity across regions are related to differences in academic achievement of students.

Figure 1. Regional states of Ethiopia.

Source: United Nations Office for the Coordination of Humanitarian Affairs (OCHA).

The nine regions are divided into two categories based on the overall economic and development status (i.e., Emerging and non-emerging or Established). The Emerging regions (Afa, Somali, Gambela and BGumuz) are less developed and have difficulties in providing adequate educational opportunities. Furthermore, they are also characterized by frequent drought and poverty (UNDP, 2015). In those regions, girls' education is still less valued, because they are forced to marry and work at home at an early age, as a result of which girls' school participation is low (MOE, 2014/15). This is reflected in a low gender parity index of about.7 (GPI: ratio of girls to boys in school), meaning that for about every 10 boys only 7 girls participate at school, with the Gambela region having a noticeably low GPI of barely one third. In the general, although the school sizes are smaller, the average number of students per teacher (student-teacher

ratio) is higher in these regions, and there is a shortage of textbooks (textbook-student ratio), implying a potentially more isolated and heavier workload for teachers in the Emerging regions. Together these indicators are consistent with low expectations for educational opportunities in these Emerging regions.

In contrast to Emerging regions, Established regions (Tigray, Amhara, Oromia, Southern nation nationalities and people (SNNP), and Harari) constitute both urban and rural areas. They are relatively well-developed regions (compared to the Emerging regions), and the students have better opportunities, such as qualified teachers and better resourced schools (especially schools in urban areas), and some of these regions have improved gender parity in school participation. This puts Established regions in a better position than Emerging regions when having to provide educational opportunities to their students.

The two Central chartered cities or regions (Addis Ababa and Dire Dawa) are administered centrally by the federal government. Addis Ababa, the capital city, consists of 9 independent sub-cities with an urban population. Dire Dawa is the other chartered city in the eastern region and is an industrial centre and home to several markets. Both regions have several high-quality schools (i.e., well-resourced and with well-trained, experienced teachers) and large numbers of private schools as compared to the other regions. Therefore Central regions are taken as the most developed regions and capable of providing better educational opportunity than both Emerging and Established regions.

Consistent with this overall picture, the official poverty index report (UNDP, 2015) also indicates that the poverty incidence is highest in Emerging regions and lowest in the two Central regions, with one exception to the rule, the Established region Harari with the lowest poverty incidence (Poverty index= 11.1, see Table 1).

Table 1.

Overview of Regional characteristics in Ethiopia

		Region	Gender Parity Index	% Private Schools	School Size	Student Teacher ratio	Textbook Student Ratio	Poverty index
Centra -	1	Addis Ababa	1.07	37	204	20.0	10.6	28.0
	2	Dire Dawa	.84	40	124	20.5	11.0	28.0
Established	3	Tigray	.99	6	168	29.6	12.2	31.8
	4	Amhara	.88	1	202	23.0	13.7	30.5
	5	Oromia	.81	5	129	25.8	16.3	28.7
	6	SNNP	.84	7	151	23.0	11.0	29.6
	7	Harari	.91	8	224	17.0	10.8	11.1
Emerging	8	Afar	.70	2	99	50.8	5.1	36.1
	9	Somali	.63	3	96	44.0	2.2	32.8
	10	BGumuz	.78	0	79	28.4	11.7	29.9
	11	Gambela	.33	0	172	30.4	3.9	32.0

Note. Source (MOE, 2014/15; UNDP, 2015)
Region: names of 11 regions and educational opportunity-based classification
Gender parity index: school participation ratio of number of male students to female students per region
%private schools: percentage of private schools in each region
School size: average number of students per school in each region
Student teacher ratio: average number of students per teacher in each region
Textbook student ratio: average number of textbooks per student in each region
Poverty index: income-based poverty incidence in each region

Gender and Educational Opportunities

As in many other societies, women and girls constitute one of the particularly vulnerable groups in Ethiopia. It has been observed for many years that women and girls are victims of discrimination in the economic, social and political life of the community. 'Education and women' was considered as the most urgent priority in attaining the EFA objectives by ensuring access to and improving the quality of education for girls and women. However, focusing on gender equality in education as a separate policy area had little impact, although girls and women generally benefited from the expansion of education provision within countries that strived to reach all citizens, regardless of gender (Unterhalter, 2007).

Gender disparity was still evident in access, enrolment and literacy figures, especially, in sub-Saharan Africa, including Ethiopia. There are many factors that are deemed to contribute to girls' weak school participation: for instance household chores, distance to school, early marriage, less parental interest to invest in daughters or an unsafe school environment (Aikman & Unterhalter, 2006). Parents may send their daughters to school, but they still expect them to fulfil traditional duties, such as household chores, rather than making sure they do their homework or arrive at school on time for class. The problem is even more severe in rural areas, where schools are not well equipped. For instance, it is very common to see schools lacking proper water supplies and separate toilets for girls and boys, and this is, in fact, one of the reasons for girls to leave secondary school or miss classes (Hagos, 2014; Tsegaye, Tamiru, Kitaba, & Getachew, 2011).

Although the education system has shown a systematic increase in enrolment at almost all levels over the past decades, there is still reason for concern, since boys still have greater school enrolment than girls; especially, in secondary education. The National Educational Statistical

Abstract indicates that for every 100 boys enrolled in secondary education, there are approximately only 77 girls (MOE, 2012). The dropout rate is also high for females; especially, during the transition from primary to secondary education. A national survey confirmed that significant gender differences were observed regarding literacy and educational background (UNFPA, 2010). The annual literacy statistics of 2012 confirmed that 82% of Ethiopian women aged 15 and above are illiterate, compared to 58% of men (MOE, 2012). A national survey of women aged between 15 and 49 year revealed that 75% of urban and 31% of rural women had ever been to school (Erulkar, Ferede, Ambelu & Girma, 2010).

Several international agencies and collaborating partners have been supporting the initiatives to improve girls' participation in developing countries, although the information regarding the impact of such initiatives remains scarce (UNESCO, 2004; Unterhalter, 2007). Given that these efforts are still continuing to create equal opportunities of quality education for girls and boys, it is inevitable to see if this learning opportunity contributes to minimise the gender gap in students' academic outcome. It is clear that achieving equal opportunity for gender requires not only equal chance of participation but also a minimizing of the gap in academic outcomes. Based on the existing census data on students' academic achievement, this study explores gender differences in academic achievement across regions that differ in socio economic development.

Research Hypotheses

The description of the Ethiopian context makes it clear that large regional differences exist, including large regional differences in educational opportunity, which can be expected to translate into clear regional differences in educational achievement. Therefore, the following hypothesis was formulated:

H1. Regional differences in academic achievement

are related to differences in EO.

More specifically, we expect that (i) the Central regions – having the most EO – outperform all other regions and that (ii) the emerging regions – lacking EO – are underperforming compared to all other regions.

The fact that boys and girls have unequal educational opportunities implies that they not only will have differences in access to education but also differences in educational achievement outcomes. Hence another hypothesis was formulated.

H2. Gender differences in academic achievement

are related to regional differences in EO

This study provides a differential perspective on academic achievement in one of the biggest educational systems in a developing country and explores the theoretically expected regional differences and gender gap as a function of regional educational opportunity using Ethiopian national census data on the grade 12 national standardized examination of 2015. Large quantitative studies that are shedding light on educational systems that are in continuous development, as is the case in Ethiopia, are currently missing in the literature.

Method

Sample

Census data from the National Assessment and Examination Agency (NAEA) in Ethiopia were available for this study. In the academic year 2015, the NAEA assessed 211706 grade 12 students (44% female: 94106 female, male=117600; average age 19 with 95% CI [17, 23]) from 1372 schools covering all eleven regional states throughout the country.

Measures

Academic achievement. The outcome variable of this study was student academic achievement defined as students' performance in the grade 12 national examination as measured by the average test score on the exam scaled from 0 to 100. The national examinations consist of seven subjects for each of the two different study streams: natural science (English, Math-1, Aptitude, Civics, Physics, Chemistry, and Biology) and social science (English, Math-2, Aptitude, Civics, Economics, Geography, and History). The examination provides an overall assessment of students' acquired subject matter skills, knowledge and understanding. Each subject is covered by a standardized exam consisting of 45 to 60 multiple choice items with scores expressed on a scale from 0 to 100.

Educational Opportunity. Because learning processes and factors related to learning are often complex (Banicky, 2000), educational opportunity (EO) is a difficult to measure construct. Winfield and Woodard (1994) suggested that a minimum measures of EO should include information about the resources, school conditions, curriculum, and instruction to which students have access. We operationalised EO equally broad in this study by relying on a classification of regions in terms of their regional educational opportunities as linked to a governmental category system. This proxy measure for educational opportunity is mainly based on economic and school

related factors and defines three ordered categories: The Central regions (that include the two chartered big cities), the Established regions, and the Emerging regions (see also Table 1).

Statistical Analysis

We used a multilevel analysis strategy (Luke, 2004; Snijders & Bosker, 2011) to properly account for the nested data structure (i.e., students within schools) when addressing the research questions. Analyses were performed in the open-source statistical software R, using the package lme4 (Bates, Mächler, Bolker, & Walker, 2015) for the estimation of linear mixed-effects models.

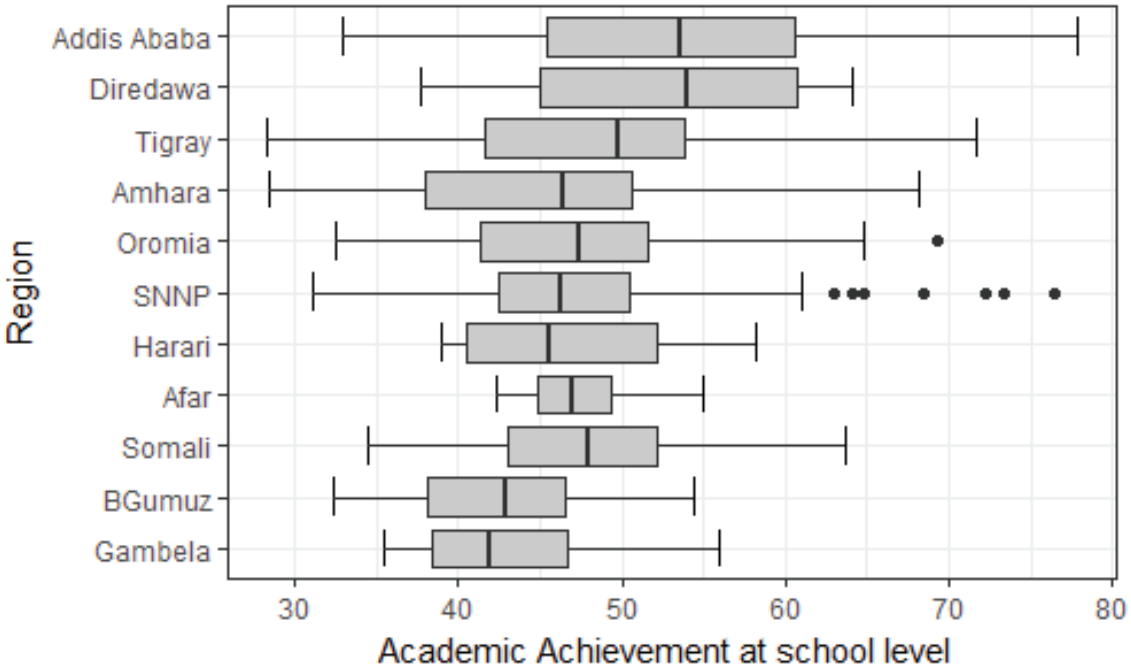
Results

Descriptive statistics

In order to provide an overall picture of the nature of the outcome measure in this study and as a first descriptive step in the analysis, we set up an unconditional null model for academic achievement by allowing the average exam score to vary across schools (i.e., a so-called random intercept model). The variance for the random intercept at the school-level amounted to 62 with the residual within-school variance at the student-level being 58. As such 52% of the total variance in average exam score could be attributed to school-level differences and the remaining 48% could be attributed to individual differences. The relatively high percentage due to school differences is in line with the general impression that school qualities and characteristics can differ widely within Ethiopia. Figure 2 illustrates the distribution of the best linear unbiased prediction (BLUP) for the random intercept for academic achievement at the school level for the 1371 schools that participated in the study across the 11 regions. The range for the school level academic achievement was wide in most regions, and, for instance, Addis Ababa and Dira Dawa have 50% of their average school average score between 40 and 60. The null model further indicated that the expected exam score for an average Ethiopian grade 12 student in an average school is estimated to be 47.15 (0.22) with a within-school standard deviation of 7.6. Note that

the general threshold for entry to higher education in Ethiopia was set by the government to be 45 points on this particular 2015 examination. This corresponds roughly to the 39% percentile in our population achievement score distribution.

Figure 2. The distribution of the best linear unbiased prediction (BLUP) for the random intercept for academic achievement at the school level



H1. Regional differences in academic achievement as a function of educational opportunity

In the next analysis step, the regional unit that a school belongs to was added to the null model as a categorical fixed-effect school-level predictor to investigate regional differences in academic

achievement. Model comparison by a likelihood ratio test shows that this regional model outperforms the unconditional null model ($\chi^2(10) = 119$, $p < .001$), supporting the existence of regional differences in academic achievement in Ethiopia. The difference in average exam score between students of different regions can amount to over 10 points (i.e., Addis Ababa vs B Gumuz: $\beta = 10.47$ (1.55), $p < .001$) (see also Table 2), with region explaining about 8% of the between-school variance. The standardized regional difference effect sizes as measured by Cohen's *d* varied from hardly different $d = .01$ to largely different $d = 1.37$, with an average of $d = .50$ across all pairwise regional comparisons. This indicates that a potential clustering of regions in terms of average academic achievement might exist.

In order to test one of our core research hypotheses that regional differences in academic achievement in Ethiopia are a function of differential educational opportunities, the regional unit categorical predictor with 11 levels was substituted by a categorical EO predictor, coding for the three levels of regional educational opportunities (Central, Established and Emerging).

Table 2.

Average exam score according to the Regional model compared to the average exam score according to the Educational Opportunity model for the 11 regions in Ethiopia

		Average Exam Score			
Region	**N**	**Regional Model (R)**		**Educational Opportunity Model (EO)**	**Δ(R,EO)**
Addis Ababa	25879	53.02		52.97	0.06
Dire Dawa	1367	52.31		52.97	-0.65
Tigray	18000	48.42		46.52	1.89
Amhara	56041	45.02		46.52	-1.51
Oromia	55876	47.02		46.52	0.49
SNNP	37104	46.56		46.52	0.03
Harari	897	47.12		46.52	0.60
Afar	1583	*47.23*	**	46.19	1.04
Somali	9499	*47.76*	**	46.19	1.56
B Gumuz	2532	42.54		46.19	-3.65
Gambela	2927	*42.63*		46.19	-3.57

Note. The regional model is the better fitting model.

Δ(R, EO): Difference in prediction between the Regional model and the Educational Opportunity model.

**.Afar and Somali regions showed better performance than expected; higher than the other two Emerging regions, and at equal footing of Established regions.

As expected, the Central regions (i.e. better EO regions) largely outperformed the other two regional EO categories (Established and Emerging) with about six points on average which comes down to a Cohen's *d* standardized difference of about.8 (*d* =.84, β = 6.43 (.70), *p* <.001; *d* =.89, β = 6.78 (.90), *p* <.001). Yet unexpectedly, the model indicated that there was no evidence for the Established regions systematically outperforming the Emerging (less EO) regions (β =.35 (.66), *p* =.589). In fact, model comparison showed that this regional educational opportunity model was untenable as it does not perform on an equal footing with the regional model ($\chi^2(8)$ =

34, p <.001). To be able to better interpret the model's failure, the average predicted regional exam score under the EO model was compared to the corresponding average predicted regional exam score under the regional model (see Table 2). Although the Emerging regions (least EO) were expected to be the lowest performers in terms of academic achievement, the performance of the Afar and Somali regions was, with an average regional exam score of about 47, equivalent to that of Established regions. The other two emerging regions, Gambela and Gumuz, with a score of about 42, did underperform ($d \approx 0.66$) compared to the Established regions (see Table 2). Hence, the Emerging regions fall apart in two groups, a group performing as expected, and a group performing better than expected according to EO expectations.

Gender differences in academic achievement

In order to study gender differences in academic achievement, gender was added to the null model as a categorical person-level predictor with a random slope across schools. Model comparison indicated that the gender model outperformed the null model ($\chi^2(3) = 25403$, p <.001), with gender explaining 12% of the within-school variation in academic achievement. In an average school, a female scores on average about 44 points ($\beta_0 = 44.65$ (.23), p <.001) and a male student scores on average about 4 points higher ($\beta_{Gender} = 4.29$ (.08), p <.001) than a female student. This average gender gap in favour of males is highly variable across schools (Between-school variance (β_{Gender}) = 5.60) with some schools hardly showing a gender gap, whereas in other schools this could go up to 9 points (95% CI [-.34, 8.94]). The average score for females was more variable across schools (SD = 8.27) than for males (SD = 7.74), and higher average scores for females were related to a smaller gender gap (r = -.36) in schools.

H2. Gender differences in academic achievement as a function of regional EO

In the next analysis step, the regional unit that a school belongs to was added to the gender model as a categorical fixed-effect school-level predictor, first as a main effect and then also including an interaction effect between region and gender to allow for regional differences in gender gap in academic achievement. Model comparison indicated that the gender × region interaction model showed better fit to the data than the (gender, region) main effects model (χ^2 (10) = 390, p <.001), and the gender model (χ^2 (20) = 521, p <.001). The gender × region interaction model explained 48% of the total variation in exam scores compared to 40.5% for the null model. Although the size of the gender gap in academic achievement at school varied across regions, with an average of about 3.6 points in favour of male students (Δ = 3.58 (.17), p <.001), there was supporting evidence for an average gender gap in all regions and always in favour of male students (see Table 3), with the exception of the Afar and Somali region (Δ =.77 (.67), p =.254 & Δ = -.02 (.30), p =.934). Exactly these two regions were the two Emerging regions that surfaced in the earlier analysis as performing better than expected according to their educational opportunities classification.

Table 3.

Average exam score for male and female students, and the corresponding gender gap in exam scores for the 11 regions in Ethiopia

Region	**Male**	*N*	**Female**	*N*	**Δ(M,F)**	*p*
Average	48.93	117600	45.30	94106	3.63	<.001
Addis Ababa	55.09	14701	51.42	11178	3.67	<.001
Dire Dawa	55.33	717	49.48	650	5.85	<.001
Tigray	50.77	9077	45.92	8923	4.86	<.001
Amhara	47.97	30359	41.76	25682	6.20	<.001
Oromia	48.74	32590	44.10	23286	4.64	<.001
SNNP	48.14	21034	44.30	16070	3.85	<.001
Harari	50.36	497	44.66	400	5.70	<.001
Afar	47.46	1067	46.70	516	0.76	.263
Somali	47.77	7138	47.78	2361	-0.01	.975
BGumuz	43.60	1520	40.76	1013	2.84	<.001
Gambela	42.99	2423	41.42	504	1.57	.017

Note. Δ(M,F): The difference in average exam score between male and female students.

Discussion

This study explored the theoretically expected regional differences and gender gap in academic achievement as a function of regional educational opportunity using Ethiopian national census data on the grade 12 national standardized examination of 2015.

Although the Ethiopian government has been implementing quality improvement programmes (see e.g., the General Quality Education Program, GEQIP) to enlarge the educational opportunities across the country to, our finding indicates that the average academic achievement score in the majority of regions is significantly and much lower ($d \approx -.85$) than that in the Central regions that also happen to provide the better educational opportunities to their students.

This finding supports the claim that educational opportunity has an impact on students' academic outcomes (Chandra et al., 2010; Coleman et al., 1966; Eide & Showalter, 1998; Ferguson et al., 2007; Guiton & Oakes, 1995; Linda, 2001; Reeves, 2012). This also implies that efforts made by the government and different NGOs in order to achieve universal declarations in education (e.g., EFA goals) need to focus on minimalizing differences in the provision of educational opportunity among regions. Given that the Central regions are the major economic regions, this finding could also imply that working on minimizing economic inequalities between regions might help close the gap in academic achievement. This result of regional differences is similar to the evidence documented in previous studies in different countries on regional differences in academic achievement (Checchi & Peragine, 2005; Edgerton et al., 2008; Elmore & Fuhrman, 1995; Ferrão, 2014; Mok et al., 2009; Qian & Smyth, 2008; Sibiano & Agasisti, 2013; Straková et al., 2006; Tomul, 2009; Ukiwo, 2007).

Yet, our first hypothesis was only partially supported as we did not find a consistent difference between Established and Emerging (lowest EO) regions. Contrary to our expectations,

not all Emerging regions performed badly. Two of the Emerging regions, Afar and Somali, have displayed exceptionally good performance, at equal footing of the Established regions. This might imply that local emphasis, operationalization, and commitment in implementing the different governmental ordered quality and equity enhancing programmes might have made a difference. Further research should try to identify best practices and positive contextual factors in these specific regions and share those practices across other low performing regions.

The better-than-expected performance of some Emerging regions will also have implications for selection and admission to higher education. Connected to the regional label 'Emerging' is an affirmative educational policy that positively discriminates students from Emerging regions by lowering their required score on the exam to be admitted to university. Hence, from a policy perspective, one can wonder whether the current labelling of regions needs to be revised and affirmative policy actions reconsidered.

At the same time it is worth mentioning that the Established region Amhara performed unexpectedly poor (i.e., compared to the Afar and Somali $d \approx -0.29$ Emerging regions). Given that the national examination is a high-stakes exam and used as an admission criterion for higher education, it easy to understand the negative impact that poor exam performance will have on students in this particular region when it comes to fairness of selection. And similarly, given that the national examination is used as a measure of effectiveness of the educational system, observing an Established region which is underperforming, compared to Emerging regions, might imply that there is a serious issue in the policy practice and the setting of the education system in that particular region.

Nevertheless, the other two emerging regions (Gambela and Gumuz) performed poorly, supporting our hypothesis. The fact that these regions are more rural dominated and less economic, compared to Central and Established regions, leads to claims that there is less

opportunity to basic school facilities and resources, which can be linked to weak performance on academic achievement. The government and other stakeholders working in the education sector should pay attention to creating better educational opportunities for rural areas where school facilities and resources are rarely available.

Although efforts have been made to address gender equity and minimise obstacles that hinder girls' school participation, a significant and large gender gap in academic achievement has been found in favour of boys in almost all regions, including those regions with the better educational opportunities. This finding might indicate that cultural practices still affect girls' educational opportunity and this gender gap in academic achievement can be considered as an important indicator of the need for extra effort to create positive atmosphere that promote girls active school participation and improve academic achievement in all regions.

Yet, there might also be hope. The multilevel analyses indicated that in high performing schools, the gender gap tends to be smaller. Hence, although girls face many social-cultural challenges, interventions aimed at minimizing the gender gap at school level might have significant effect on girls' school achievement. Furthermore, the only two exceptions to the large regional gender gap in achievement are exactly the two Emerging regions, Afar and Somali that are already observed to be performing better than expected. Although these regions are labelled as emerging by the government as a result of weak socio-economic development levels, it is surprising and also promising to observe them performing even better than the Established regions and also showing no gender gap in academic achievement. An obvious explanation in terms of a selection effect, 'only the bright girls go to school' might be less likely given that a gender gap is still apparent in the other two Emerging regions where school participations of girls is at equal levels or even lower than in Afar and Somali (see Gender Parity Index in Table 1).

Both the regional and gender differences have been cross-validated in the 2014 census cohort of students and also show to be robust when the overall average exam score is replaced by an average score based on only the common courses between the natural and social sciences stream. Together with the representative census data, this provides good evidential strength to the study results. The data analysis of the study was based on only region level information regarding educational opportunity. The large between-school differences in each region stress the need for further research looking into additional educational opportunity predictors at the school level. Yet this data might be less easily obtainable at an equally representative and large scale. In any case, if we would like to move beyond the current exploratory mapping, further research needs to delve into more detailed and informative educational opportunity measures to better understand the potential causes behind the observed regional differences and gender gap.

Conclusions

In conclusion, we believe that the study's findings contribute to clarifying to what extent educational opportunities affect academic performance of students in different regions of Ethiopia. Given the large between-school differences in all regions, school level interventions might promise to be an effective route to improve educational opportunities and learning outcomes.

Furthermore, the findings might prompt educational stakeholders and government initiatives in Ethiopia to review the equality and quality improvement programmes designed to address educational opportunities. The results also inform policy makers to emphasise the importance of continuing efforts to reduce gender and regional inequalities in shaping the educational outcomes of Ethiopian students, even in the more Established and Central regions of the country.

We encourage further research, small and large scale, and preferably even longitudinal if possible, on the educational systems in developing countries and the link between educational opportunities and academic achievement.

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GENERAL DISCUSSION

Tesema, M.T. (2020). Inequalities in educational outcomes in Ethiopia: an exploration of gender and regional differences based on the national examinations in grade 10 and 12.

9 General Discussion

Although there is well documented evidence regarding gender equity in educational access and achievement globally, efforts to explore the situation in developing countries faced challenges due to lack of adequate data, making the evidence from developing countries scarce in the literature. Three studies were designed to explore the situation in Ethiopia, relying on representative large-scale educational data from standardized national exams in grades 10 and 12. In this section, we discuss some commonalities in what we have learned so far from the three studies and sketch out further research directions, policy recommendations and challenges.

9.1 Commonalities in what we have learned so far from the three studies

Regional differences & gender gap. Given that the same education system is implemented in every region, performance differences among regions could be linked to contextual factors such as school and teacher quality and the provision of adequate teaching resources, which are usually directly related with the socio-economic development of a region. Simply put, the more developed regions have higher quality schools, with better teachers providing quality education. Yet, contrary to what was expected, some of the emerging regions

were performing as high on some educational outcomes as the more developed central and established regions.

Regarding the gender gap, female students in emerging regions were achieving at comparable levels to male students in both general (Tesema & Braeken, 2018) and STEM-specific academic studies (Study 3). However, this comparability was not the case in the central and established regions in Ethiopia, where females were significantly underachieving both overall and in STEM subjects (the exception was Addis Ababa at the secondary school level, but not at the preparatory programme level: females underperforming). These regional differences in the absence/presence of the gender gap can explain the limited but mixed findings in the literature based on small-sample studies (e.g., (Eshetu, 2015); Tekola et al., 2019). Furthermore, STEM enrolment or eligibility demonstrated more comparable rates in the emerging regions than in the more developed regions.

The better-than-expected performance in some of the emerging regions may imply that the quality of educational opportunity might not be as poor as we assumed on the basis of the government's classification of regional states in terms of socio-economic status. In fact, this better performance may be linked to the government's heavy investments to support these regions in terms of provision of educational inputs and other social services that thus may have a positive impact and help to improve students' academic outcomes. One example is the opening of a new unit at the federal Ministry of Education, called the Department of Special Support and Inclusive Education, which provides special support for emerging-region students and for the implementation of the General Education Quality Improvement Program (GEQIP). GEQIP is a strategic policy project introduced in collaboration with donors; it began in 2008, with a budget of $50 million from the World Bank for Phase 1 and $80 million for Phase 2 to improve the quality of education in the country (World Bank, 2008). The main objectives of Phase 1 (2009-

2013) were to improve teaching and learning conditions in primary and secondary education and improve management, planning and budget capacity of the Ministry of Education and the Regional Education Bureaus (World Bank, 2008). In Phase 2, which lasted for 4 years after Phase 1, the main objectives were to (i) improve learning outcomes, (ii) improve completion rates in grades 5 and 8 and (iii) improve the Gross Enrolment Rate (GER) in the first and second cycles of secondary education (World Bank, 2008).

On the one hand, the small gender gap in emerging regions might imply a selection effect; however, on the other hand, difficulties in gathering information may affect the accuracy of the data. Given the admission criteria in terms of national exam scores, it is reasonable to assume that the gender gap in achievement is translated into a gender gap in actual enrolment numbers for later educational levels. Therefore, for the emerging regions, the girls that reach higher levels of education might be those who have defeated all the odds to deal with social, economic and cultural obstacles and perform academically as well as boys, who do not usually experience (to the same extent) these socio-cultural barriers to their schooling.

Whether these results are due to a selection effect or are simply a result of the government's special support for the emerging regions is a question of debate. In any case, it was evident from Study 2 that in most of the regions, there are fewer females than males in the educational system at grade 10 and also at grade 12, and the situation is worst in the emerging regions. A study conducted by the World Bank in 2012 indicated that although gender disparity in access persists, there was progress towards gender balance in primary education (Joshi & Verspoor, 2012). For instance, they reported that the gender parity index for first cycle (1–4) primary school was 0.90 while it is 0.86 for second cycle (5–8), .80 for secondary school, but only .57 for the preparatory programme. Our studies documented that gender imparity is not a consistent finding across regions and, hence, national figures might not be fully informative.

Whereas there is improved gender parity in central regions, the situation for some emerging regions such as Somali or even more established regions such as Afar is especially poor. It is essential that government initiatives focus on supporting more girls throughout upper secondary school and beyond, especially for the most affected regions. A good start for achieving this objective would be to try and level out both the observed achievements and the enrolment differences between female and male students within each region.

Taken together, the clear regional and gender differences are indicators that Ethiopia is changing and developing at different rates across the regions, implying that policymakers should remain attentive to regional and group differences and find smart strategies to deal with these discrepancies. Education for all, in the literal sense, might be a fruitful way forward.

Affirmative action. With regard to the impact of affirmative action on enrolment and admission, we observed that the current affirmative action was, at most, redressing the observed gender inequalities in absolute enrolment numbers by ensuring that within each group, similar enrolment rates were achieved for transition to a preparatory programme and, to a lesser extent, to university. As pointed out in the discussion section for study 2, current affirmative action improves, at most, admission eligibility for target groups but does not equalise enrolment numbers, especially when there is no support mechanism to keep the target group on track on the way to completion. This limitation is due to the fact that affirmative action in the Ethiopian admission system does not amount to much more than merely setting a lower threshold for target groups. Hence, even with the specific lower admission thresholds in emerging regions, female students will still end up being highly underrepresented in the preparatory programme and at university. The problem becomes more severe when we go up through the levels of education, reflecting the impact and carryover effect of earlier achievement gaps and dropouts. Regardless of whether it is in STEM or other domains, this under-representation of females can be translated

into disparities in job qualifications, which in turn lead to income inequalities between women and men.

Although the limitations of the current affirmative action policy are most visible in the emerging regions, there is one region in which this policy might be overshooting the target. In Addis Ababa, the enrolment inequality has been redressed and currently more female than male students have been made eligible to enrol in university studies. Yet, within the STEM domain, female students are still underrepresented. When contrasted to the situation in the emerging regions, one could argue that the situation in Addis Ababa resembles the composition and features more commonly seen in Western educational systems. Future affirmative action policies (see, further, the future challenges subsection) should be more attuned to the differences in an educational and socio-economic context and will require an update of the current crude classification system that may also be too historically and ethnic-geographically rooted.

9.2 Further research needed

Apart from looking at secondary and higher education, future research should investigate the gender disparity in academic achievement and enrolment at earlier levels of education in Ethiopia, taking regional SES differences into consideration.

As mentioned earlier in the general introduction of this dissertation, a measure of regional level socio-economic status might not be the most detailed indicator, because this kind of aggregate measure considers all schools and all students within a region as having the same educational opportunities and resources, which might not always be the case. This means that within a region, schools and students differ in socio-economic status or resources because, among other factors, there are many more urban areas and many more rural areas in each of the regions.

Therefore, in order to gain a more detailed perspective and insight on the issues at hand, it is crucial to have individual level data about SES and school level data on educational opportunities.

Currently, this type of data is unavailable in the system; therefore, we suggest considering the addition of variables that measure educational opportunity and socio-economic status to the national educational register data for both schools and individual students. As soon as socio-economic data become available at the individual student level, it will be important to investigate the association between socio-economic factors and students' academic achievement and educational enrolment at this more detailed level of analysis than the current coarser regional divide. Assuming that the register data and educational data management system in Ethiopia are further improved and made more accessible, the connection of student data across different levels of education – hopefully starting earlier than secondary school – will allow for stronger longitudinal studies that can shed further light on regional differences and the developments involving the gender gap across the Ethiopian educational system.

In addition to differences in socio-economic status, regional states in Ethiopia differ in terms of multiple and inter-linked socio-cultural practices that affect young girls' choices and participation in education. Such practices include, among others, early marriage, early pregnancy, unequal distribution of domestic responsibilities, limited mobility, limited decision-making power over social relationships and inequitable care practices at home (Jones et al., 2014). Given these disparities in gender-related cultural practices among the different regions in Ethiopia, future studies should consider approaches to incorporate cultural factors as potential determinants of individual differences in educational outcomes between girls and boys. However, because of the political sensitivity of this subject, one should tread lightly when putting these issues under the spotlight.

9.3 Future challenges for the educational system in Ethiopia

Based on survey data from 'young lives' initiatives (J. Boyden et al., 2016), Woldehanna & Araya (2016) estimate that only 14.1 per cent of the students were able to join institutions of higher learning with 5 percent attending university level. Hence, higher education is not for everyone in Ethiopia. In order to compete with the rapidly changing global movement in terms of technology and adequate human resources, it is essential for Ethiopia to improve the situation of infrastructure and policy concerning education. For instance, the lack of a well-established educational management system is one needed improvement, including, for example, the absence of a systematic and digitalised data organization coupled with limited infrastructure and human capacity to manage the data. Without an adequate data management system, it will be difficult to conduct well designed empirical research that is essential for providing insight into developmental progress, identifying problems and finding the way forward to allow for evidence-based policy-making.

As mentioned in the general introduction in the discussion on methodological challenges, the lack of a unique identifier that can be used to link all the student data across different levels of education is one large deficiency in the system, posing problems for research and policy development in Ethiopia. In addition, the lack of data about students' socio-economic status, together with other students' school-related variables is also another challenge that needs to be addressed in the future. Given the huge population differences between and within regions in Ethiopia, the availability of such a data source for researchers would facilitate more fine-grained and informative studies on educational inequalities and equity, which in turn can be used to inform policy-making.

Affirmative action. Given that a new draft education policy road map was announced recently, it is essential for the Ethiopian affirmative action admissions system to be reviewed. Molla (2018) discussed gender equity instruments in Ethiopian higher education (HE). He indicated in his discussion that the persistence of disparities in HE is partly due to lack of substantive equity instruments that focus on 'compensatory, differential distribution of opportunity until a level playing field is realized to achieve equality' (pp. 160). Based on a thorough policy document analysis study, it was suggested that equity policies need to be adjusted to the needs and interests of the targets groups (Molla, 2018). With regard to affirmative action policy, Molla's argument beyond affirmative action, posits that transformative equity instruments should be in place to help the beneficiaries succeed in the participation and completion of their studies. In line with this argument, our findings have also led us to recommend a need to have a holistic approach for affirmative action that supports target groups struggling to compete with non-affirmative group in their education.

Thus, one of the key recommendations inspired by this dissertation regarding affirmative action is to design and implement a comprehensive affirmative action strategy for female and emerging-region students that focus on equal outcomes, rather than merely on equal opportunities. The strategies need to be clear and transparent when implemented and evaluated for impacts. The current affirmative action that is restricted to lowering the admission threshold scores should be expanded to a more holistic approach so that it will be useful not only to admit more underrepresented students but also keep them within the system by providing, among other aids, special courses and mentoring to facilitate students' success in both the preparatory programme and university. This kind of support can be provided through establishing a responsible body or unit at each preparatory programme/university whose main duty is to follow the progress of those students admitted by affirmative action, provide further support and collect their academic

records for research and monitoring purposes. A separate unit can also be established at the Ministry of Education to steer and maintain efficient monitoring and evaluation of the impact of the current affirmative policy and actions.

With regard to selection criteria, an affirmative action based on geographic region and gender might not be too effective to reach out to the actual disadvantaged groups. This approach may not be promising if it ignores the presence of both disadvantaged and advantaged people within any type of larger grouping of people. For instance, within a region, there are big cities where students can receive better schooling, but at the same time there are also more rural and economically poor areas where schools are in poor condition. The same argument can be used for gender-based affirmative action that ignores the presence of girls who are not disadvantaged, may come from wealthier families, or might attend high-quality private schools in contrast to the girls who are disadvantaged and who may come from poor families or attended poor public schools. During the last few decades, Ethiopia has changed significantly; many educational institutions have been established, the economy has developed, and school systems have been improved, but the current affirmative action does not take these changes into consideration. In countries like France and Israel, SES-based affirmative action has been used and was found to be quite effective. Therefore, instead of using the bigger entity 'region' linked to ethnicity and geographic location, there may be a need for a new, modern and better-targeted affirmative action that considers the socio-economic circumstances of individual students and their school contexts in order to reach out reliably to the actual disadvantaged groups. Although gender inequality is a big problem in Ethiopia, not all girls are in a similar situation or in need of affirmative action. Similar to what has been applied to girls in emerging regions, a special type of affirmative admission threshold (lower than the general females' threshold) can be introduced for girls coming from rural and low socio-economic areas and poor schools in established regions. Affirmative action always has the

risk of stigmatizing beneficiaries or antagonizing non-beneficiaries but, when implemented effectively, this policy action should be to the benefit of the whole country.

Exam quality. The overall performance on the national exams across the regions indicates that, on average, grade-12 students in Ethiopia perform poorly: a score of 46 % correct (out of 100), even with the best performing region, Addis Ababa, only scoring 48 % and the lowest performing region, BGumuz, having an average score as low as 36 %. This low scoring indicates that the majority of the students are unable to answer most of the questions on the examinations. Similar trends were observed when looking at specific subjects such as science and mathematics, for both grades 10 and 12.

Given that both grade-10 and grade-12 examinations are standardized and nationwide, they can be used as a measure of the overall quality of the pre-university education system in Ethiopia. Below-average results are obviously not very promising and entail the risk of having a more negative impact on the quality of higher education by delivering potentially huge numbers of unprepared students to apply for higher education. The expansion of higher education is a priority under the current government, and one might ask whether the focus should instead first be on raising the level of pre-university education in Ethiopia.

However, this type of argumentation might not be acceptable if the main reason behind the low achievement is believed to be the disproportionate difficulty of the exams. Even though the items for both grade-10 and grade-12 examinations are prepared by test experts, it is essential that item analysis be a core component of the test construction process before the test is given. This analysis can help to evaluate and maintain fairness and relevance of the exams, a quality control step that seems to be lacking in the current assessment system. Thus, whether it is the lack of quality of education or the exams being too difficult, this low average achievement on the

national exams should in any case trigger a dialogue about the importance of evaluating the quality of the exams along with judging the quality of the educational system.

Malpractice. Due to its high-stakes nature, the national examination process in Ethiopia has been undermined by cheating and malpractice scandals on a regular basis. These scandals can affect the results to a greater or lesser extent, but always entail the risk of unwarranted score inflation. Very recently, in 2018, the results of specific subjects on the grade 12 national examinations were cancelled by the NAEA, indicating that some kind of malpractice was detected. Even though there is typically no information disclosed by the agency about the records of malpractice by region, the issue does trigger the question, 'Given that all emerging regions are provided with equal support from the Ministry of Education, why do only two of these regions excel in performance on the national examinations?'. Knowledge of the incidence and distribution of malpractice can guide countermeasures to secure the system and procedures for administration and scoring of the national exams, but it is also important to further contextualize observed regional differences in exam scores.

Pastoral nomads. In some of the regions – predominantly the emerging regions – peoples' pastoral or nomadic lifestyle might create a significant challenge in bringing more students to school and helping them complete their education, all the way up to university. The government has introduced an alternative basic education system in collaboration with donors making mobile schools operable. Teachers for these mobile schools are recruited from the local students in early grades, even before the preparatory programme level. Although this policy measure ensures that this population group receives at least a basic education, it does put a stop to further education for those recruited into these teaching positions. Furthermore, due to cultural pressure and the related household burden, it will be mostly the female students who will take the teaching positions to have extra income and job security instead of taking the long-term perspective and proceeding to

the preparatory programme and on to university. Resolving this cultural and societal puzzle will not be an easy task, nor does it have a straight forward solution.

Implications for comparative research. It is clear that our research had important implications for comparative education research. It suggested that in searching for the reasons that students in some geographic settlement/ arrangement score higher on tests than in others, it is crucial to provide a socio-political/administrative justification for comparing students across such entities. Regional comparisons in terms of policy action and implementation in countries like Ethiopia (federal states) make theoretical sense, as regional administrative units have major juridical responsibility for delivering education. Our research also suggested that there are important benefits of intra-regional comparisons. The first is that there is less concern with differences in educational systems since a single policy arrangement applies to all states, although there are disparities in other aspects such as teacher labour markets, financing arrangements, and socio-economic development and culture. Intra-region comparisons can therefore focus more on educational management issues, since this still tend to vary considerably among regional units in federal systems (Khavenson, 2019). Methodologically, it is therefore easier to identify effective educational policies and practices when the contextual variations in which those policies and practices applied are greatly reduced

9.4 Epilogue

The complexity of the problems of educational access and achievement remains in Ethiopia. As a third world country, Ethiopia is a nation of great diversity in a social, cultural and economic context with low capability in providing a strong school system to oppose the constraining force of the rural family and to encourage families to bring the children to school. Consequently, the educational resources are ordinarily most unequally distributed between rich and poor areas,

cities or regions. AS educational opportunity depends largely on the opportunity provided by the family and the immediate surrounding area, city or region, the tangible educational resources, textbooks, teachers, classrooms, libraries, are in short supply. Inevitably inequalities in these input facilities generate differences in educational outcomes, making the very idea of equal education opportunity problematic. Education policy and strategies are designed and supposed to address these problems although economic growth is also crucial. Because the economy is not undergoing rapid change, most children (especially in rural areas) might follow in their parents' footsteps and choose the parents' occupation, so that formal schooling may be less relevant to their futures. If, however, the economy is in rapid change (which subsequently minimizes regional economic disparity), equality of education opportunity is indeed meaningful and consists primarily of ensuring that each child gets access to meaningful schooling.

Keeping in mind the challenges of a truly vast student population in a growing country as well as issues surrounding political controversies, the lack of a consensus among political parties, frequent ethnic conflicts and corruption, the current positive progress in the country's educational development needs to be strengthened with a strong policy approach and political stability that could bring fundamental change and improvement to the country in general, including its education system.

Given the new vibe, with the current prime minister, called a 'reformist' because of his actions and accomplishments within a very short time in government – acknowledged internationally by being awarded the Nobel Peace Prize in 2019 – there seems a better window of opportunity for the education system as well, at least to detach it from politics and make provisions for proper management by all the education stakeholders, provided peace and political stability remain in place.

10 References

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