

# 1 Introduction

In a multilingual society with historically favored and dominant local or international language, it is not clear whether the introduction of mother tongue instruction (MTI) leads to beneficial outcomes in economic development. Learning in one's mother tongue can potentially enhance labor market outcomes if it improves human capital accumulation. Yet, the link between MTI and success in the labor market is not theoretically certain, nor empirically well-established, largely because the relationship depends on unobserved factors that could spur it in contradictory ways.

While education is the key channel through which MTI could impact job market outcomes, it is not evident what the educational effects of MTI are, since the mediating factors “can either facilitate and optimize access to the content of the curriculum or block learning, preventing both access and equity” (Heugh et al, 2007). Different linguistic theories identify several variables that work in complex ways to influence the association between MTI and educational outcomes. Whereas sociolinguistic views highlight the relevance of relationships “between language and power” and the presence of significant variations in how “linguistic communities make use of and manage the linguistic rights and resources at their disposal”; applied-linguistic theories focus on the significance of “heterogeneity of experiences in language teaching methodologies, design of language teaching programmes, and availability of textbooks and other learning materials” (Heugh et al, 2007). These views imply that the impact of choice of language of instruction on human capital development varies according to the social context in which it is implemented.

A growing number of empirical studies have documented that mother tongue instruction in early schools leads to better learning outcomes (see, for instance, Walter and Chuo, 2012; Taylor and Von Fintel, 2016), with a few making the opposite case that the scheme results in reduction in schooling and literacy (e.g., Angrist and Lavy, 1997; Chicoine, 2019). Hence, learning in native languages can potentially increase participation in the labour market by raising educational attainment; however, gains in human capital associated with MTI may not necessarily lead to gains on the job market. For instance, people from less-favoured linguistic groups, who are schooled in their native languages, could face an undue penalty on the job market – notwithstanding their qualifications – because of market imperfections which includes biases in favour of those with sufficient mastery of the dominant language.

Indeed, while there are studies that show that early mother tongue education might help in mastering international languages better at a higher grade (e.g., Seid, 2019), several empirical studies show that MTI may hamper fluency in dominant languages, and this may in turn affect employment and earnings negatively (e.g., Chiswick and Miller,

2002). Further, in a country like Ethiopia, where the current study is based and there is a pre-existing dominant domestic language and a history of ethnic-based horizontal conflicts and discrimination (Henze, 1992)<sup>1</sup>, the adoption of MTI by the speakers of less-favoured native languages can be a source of inbuilt biases and discrimination on the job market, thus adversely affecting the occupational and life outcomes of individuals obtaining their education in their native languages.

Overall, there are two primary transmission mechanisms through which learning in non-dominant native languages affects employment and wage outcomes. The channels appear to generate contrasting effects – a positive effect through school performance, and a negative one by hampering proficiency in prominent languages and due to discrimination. Hence, whether mother-tongue instruction affects labour market outcomes is an empirical research question which calls for rigorous analysis in different contexts. In this paper, we strive to conduct a coherent empirical investigation on the subject, aiming to provide some answers to a research question that is still largely underexplored.

Identification of the labour market impacts of MTI is a non-trivial undertaking, because the observed associations between MTI and labour market outcomes are influenced by a number of unobserved factors, in ways that are not straight-forward to accurately identify. To overcome the endogeneity of MTI in job market outcomes, we rely in this study on a major policy shift that introduced MTI in Ethiopia in 1994, following a regime change that installed ethnic federalism in the country. Prior to this change, Ethiopia had a dominant language, Amharic, which served as the official language of the Ethiopian state and the language of instruction in primary schools.

The regime change created a number of ethnolinguistic regional states which – in accordance with the new national policy pertaining to languages of instructions in primary and middle schools – proceeded to adopt MTI in their schools *with different rates of intensity*<sup>2</sup>. There are significant differences in how the different local states in the Ethiopian federation implemented the 1994 language of instruction policy, and it is this aspect of the scheme that we utilize to correctly gauge the economic impacts of MTI. Since the possible effects of mother tongue instruction on labour market outcomes are largely mediated through education, our initial task is to pin down the consequences of the policy on two different indicators of education, which we treat as intermediate outcomes. By so doing, we seek to contribute to the research on the likely payoffs of mother tongue instruction.

The spatial variation in the take up of the policy at the state level generates differences

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<sup>1</sup>Henze, Paul B., The defeat of the Derg and the establishment of new governments in Ethiopia and Eritrea. Santa Monica, CA: RAND Corporation, 1992. <https://www.rand.org/pubs/papers/P7766.html>. Also available in print form.

<sup>2</sup>FN here regarding a map of Ethiopia divided into ethnic regions. The map should be included as an appendix.

in the distribution of native tongue instruction, and we conjecture that the disparity in the diffusion rates of MTI might have led to different rates of human capital accumulation and labour-market outcomes across the country. This presents a unique opportunity to test the research question using an IV-2SLS empirical framework, where the instrumental variable is defined based on an attribute of the students assigned by nature – their ethnicity. To be more precise, the IV in this study is an index variable constructed using a unique interaction of student ethnicity and regional state policy re: MTI, thus it is exogenously determined in the empirical model.

The evidence on the impact of MTI on labour market outcomes is mixed. While it increased the probability of salary employment by about 5%, it did not seem to have any effect on wage employment. The conclusion that the introduction of MTI in Ethiopia has had a positive effect on the probability of gaining salaried jobs but no effect on wage employment is consistent with the prevailing social infrastructure in the country. We also find that mother tongue education enhances human capital accumulation; it improves student test scores in Mathematics and verbal comprehension.

The introduction of MTI in Ethiopia has thus proven to be a double-edged sword for its beneficiaries. Mother Tongue Instruction’s labour market advantages associated with the increase in human capital are limited only to salaried jobs which are mostly in the public sector, where employees have legal right to work in their native tongues. In the private sector, where mastery of the dominant language, Amharic, is still considered useful for gaining wage employment, the human capital benefits accruing from MTI appear to be offset by the unique disadvantages it imposes in terms of employability, perhaps due to its likely unintended adverse consequences on the mastery of the still somewhat dominant Amharic language.

To verify if the exclusion restriction implied by our IV-2SLS identification strategy holds, we conduct a test à la (Angrist, 1990), and rule out the existence of discernible correlations between the outcome variables (salary employment, wage employment and test scores) and the instrument in a sample where there is no obvious reason for association between the causal and the outcome variables. Additionally, we conduct a test that nullifies the possibility that there may be unobserved differences in state-level characteristics driving the results, providing another evidence corroborating our main findings.

The rest of the paper proceeds as follows: Section two summarizes the empirical literature that is closely related to the current study. In section three, we describe the data as well as the institutional setting and the policy shock that made this study possible. After spelling out our key identification strategy in section four, we proceed to discuss the main findings in section five, contextualizing them with the social environment in which MTI was implemented. After demonstrating that our key findings remain robust by conducting some tests in section six, we conclude by examining the study’s prominent

policy implication.

## 2 Related Literature

Empirical studies exploring the impact of mother tongue instruction on labour market outcomes are rare and their conclusions are markedly mixed. Generally, the effectiveness of a mother-tongue literacy program is highly sensitive to choices of inputs and outcome measures as well as implementation details (Kerwin and Thornton, 2020). Studies that have found that learning in native languages improves the employment and earnings of the beneficiaries link those gains to the positive effects of MTI on human capital accumulation (e.g., Eriksson, 2014; Seid, 2017).

Despite the dearth of sufficient rigorous evidence demonstrating that gains in schooling due to MTI translate into gains in employment and earnings as might be expected, several studies show that mother tongue instruction has positive impacts on various measures of educational outcomes in different contexts (e.g., Alidou et al., 2006; Walter and Chuo, 2012; Eriksson, 2014; Taylor and von Fintel, 2016; Seid, 2016; Ramachandran, 2017; Laitin et al., 2019). In general, MTI is observed to increase participation in schools, and reduce grade repetition and dropouts (Benson, 2000, 2005; Bender et al., 2005). One channel for these results is better access: students could be more likely to enter school because they can understand the language. Moreover, mother tongue instruction in the formative years of education can raise the chances of building non-language cognitive skills such as literacy and numeracy (Eriksson, 2014; Trudell, 2012).

On the other hand, there are studies that show that learning in a well-developed second language (usually international) instead of a local language improves outcomes (e.g., Angrist and Lavy, 1997; Munshi and Rosenzweig, 2006; Shastri, 2012; Casale and Posel, 2011; Parinduri and Org, 2018). Angrist and Lavy (1997) found that elimination of compulsory French instruction in Morocco led to a marked decline in French-language skills and reduced earnings among affected groups. More recently, Parinduri and Org (2018), using data from Malaysia, have shown that having English as a medium of instruction improves English proficiency and educational attainment, but has a weak link to later labour market outcomes. In a study conducted in Ethiopia, Chicoine (2019) asserts that the shift to mother tongue instruction has led to a reduction in schooling and had no impact on literacy, with the negative impact being concentrated in regions that made the switch from an Amharic script to Roman script.

Where mother-tongue instruction may have resulted in less desirable labour market outcomes, reduced proficiency in a dominant national and international language appears to be the main culprit (e.g., Angrist and Lavy, 1997). In several studies, having greater proficiency in the dominant language is shown to be the key factor for success in the labour

market (Chiswick and Repetto, 2000; Chiswick and Miller, 2002; Bleakley and Chin, 2004; Lang and Siniver, 2006; Aldashev et al., 2009). According to Kahn et al. (2019), being fluent in the dominant language enhances job seeking outcomes (through better access to information, for example), productivity on the job, and promotion to higher paying positions. Hence, early mother-tongue instruction, by hampering fluency in the dominant language, could negatively affect employment and other economic opportunities in the long-term, although it is unclear why there is a trade-off between learning in mother tongue and mastery of dominant languages.

Most of the evidence on the effects of mother-tongue education is based on reforms or interventions comparing instruction in mother tongue education against an international (usually former colonial) language, such as English, French, Portuguese, etc. (e.g., Benson, 2000; Angrist and Lavy, 1997; Eriksson, 2014; Taylor and von Fintel, 2016; Laitin et al., 2019). Eriksson (2014) examined the effect of mother-tongue vs. English or Afrikaans instruction using the Bantu Education act of 1955 in South Africa as a natural experiment. She finds that increasing mother-tongue instruction for black students from four to six years positively affected wages, literacy, educational attainment, and English-speaking skills. Taylor and von Fintel (2016), also using data from South Africa, have found that mother tongue instruction in the early grades significantly improves English acquisition in later grades.

Laitin et al. (2019) conducted a randomized evaluation of a local language schooling program in Cameroon and found that students that were exposed to three years of the local language (Kom) in early grades scored significantly higher than untreated students, who were instructed solely in English, in math and English tests. In contrast to these findings, Angrist and Lavy (1997) found that the shift in the language of instruction in Morocco from French to Arabic had negative effects on French writing skills and earnings. However, we should be careful to extrapolate such results to developing countries since the degree of exposure to the international language in day-to-day life is different in the two contexts (Ramachandran, 2017; Laitin et al., 2019).

In Ethiopia, the shift occurred from a dominant local language to a number of other ethnic languages. Amharic has been the only official language Ethiopia has had in all of its recorded history. And given that Ethiopia has never been officially colonized by European powers, there is an economic premium in favour of Amharic instead of a foreign language (e.g., English), unlike what is the case in most other African countries (Seid, 2019). One might rightly expect the behavioural responses of a shift in the language of instruction from a dominant local language to other ethnic languages to be different from those resulting from an international language to a domestic one. This is because a change in the language of instruction is not a politically neutral innovation. As Cummins (2009) rightly notes, “Use of a language as a medium of instruction confers recognition,

status, and often economic benefits (e.g., teaching positions) on speakers of that language. ... It is also a socio-political phenomenon that is implicated in the ongoing competition between social groups for material and symbolic resources.”

### 3 The Setting and Data

Ethiopia is an ethnic federation of 83 different ethnolinguistic groups, where the three major groups – the Amhara, the Oromo, and the Tigray groups – constitute about 70 percent of the country’s population.<sup>3</sup> The Amhara – which according to the most recent Census constitute slightly over 25 percent of the population – have played the dominant role politically until the early 1990’s, when the then government was militarily defeated and replaced by the so-called Ethiopian People’s Revolutionary Democratic Front (EPRDF) – a coalition of different ethnic-based liberation movements, in which the Tigray People’s Liberation Front (TPLF) played a significant role (Henze, 1992).

Before this sea change took place in the country’s political landscape, Amharic – the language spoken by the Amhara people – was by far the most dominant language, serving as the official working language of the Ethiopian state as well as the language of learning in all primary schools (cite). With English being used as a medium of instruction for all subjects, Amharic was also taught as a subject in secondary schools in all corners of the country. The learning and dissemination of Amharic was enforced by state policy, and, for all practical reasons, proficiency in the language was essential for success in the job market.

With the ascension to power of the TPLF-led EPRDF government, the status of Amharic as the dominant language in the social and political life of the country diminished significantly. The EPRDF instituted ethnic federalism and issued a new language of instruction national policy in 1994, empowering the ethno-federal units that constitute the country to establish mother tongue instruction in primary and middle schools under their jurisdiction (MoE document).

Interestingly, member states of the federation adopted the new language of instruction policy creatively and *differently* to meet their specific needs, with some implementing it fully (up to and including the first eight grades of schooling, consistent with the policy), while others executed it only partially. The spatial variations in the take up of the policy at state level generate significant differences in the rate of students’ exposure to native language education, and the differences in the rates of diffusion of MTI are expected to have resulted in variations in human capital accumulation and labour market outcomes across the country.

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<sup>3</sup>These numbers come from the country’s most recent Census which was conducted in 2007.

## Data and Descriptive Figures

We utilize the Young Lives Survey (YLS)<sup>4</sup> conducted in Ethiopia for the study. The YLS is a longitudinal dataset in which a random sample of about 800 young people and their families – in four different regional states of Ethiopia (Amhara, Oromia, Southern Nations and Nationalities, and Tigray) and in the country’s capital – were followed and surveyed in five rounds every four years, beginning in 2001 when the subjects were eight-years old. A significant proportion of the surveyed subjects obtained their primary and middle school education in their mother tongue. The latest round of the YLS was conducted in 2016 when the subjects were 24, the majority of whom had completed their schooling and are in some form of employment or seeking employment. The middle rounds and the most recent round of the Young Lives Survey contain data on the outcome variables used in the current study – math and verbal scores (intermediate outcomes) and wage and salary employment (final outcomes). All four rounds contain rich sets of information pertaining to the characteristics of the subjects and their families.

Table 1 presents descriptive statistics for the variables used in the econometric analysis. The first three columns present summary statistics for the sample from the four regions included in the YLS, while the last three columns describe the sample from the capital, Addis Ababa. As will be explained later in some detail, mother tongue instruction is expected to be orthogonal to human capital accumulation and job market outcomes in Addis Ababa. We thus use the Addis Ababa sample for robustness check. The table clearly demonstrates that students in Addis Ababa have higher maths and language test scores compared to the rest of the country. Moreover, employment outcomes are better in Addis Ababa, which is in line with our expectation. Focusing on the non-Addis Ababa sample, we observe that about half have some sort of wage employment, whereas around 16% are engaged in salaried employment by the fifth round. Consistent with the overall distribution of the Ethiopian population, approximately 73% of the overall sample is constituted by rural households.

Figure 1 displays the percentage of pupils that were wage and salary employed by the last round. The region of Tigray outperforms the other regions in terms of both employment outcomes, closely being followed by Oromia. SNNRS and Amhara appear to have the lowest wage and salary employment rates, with the Amhara region and the SNNRS faring the worst in terms of salary employment and wage employment respectively. It is notable that the two regional states with higher rates of salary and wage employment, Tigray and Oromia, are those that implemented the 1994 language of instruction policy fully, whereas the underperformers – the Amhara and the SNNRS – implemented

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<sup>4</sup>The YLS is a longitudinal survey of 12,000 children in four developing countries: Ethiopia, India (Andhra Pradesh and Telangana), Peru and Vietnam. It is administered by Young Lives, based at University of Oxford, Department of International Development.

MTI in their curriculums only partially. Figure 2, on the other hand, is a kernel density estimate of standardized maths and language test scores in each region. Standardized language test score displays more variability across the regions, with students in Tigray and Amhara performing better than their counterparts in SNNP and Oromia. In contrast, the standardized maths test scores appear to be more stable.

## 4 Identification Strategy and Empirical Framework

As described earlier, Oromia and Tigray implemented the 1994 language of instruction policy issued by the Ethiopian Ministry of Education fully, whereas the Amhara state and the Southern Nations and Nationalities Regional State (SNNR) implemented it only partially.<sup>5</sup> Hence, the overwhelming majority of students attending schools in Oromia and Tigray (about 45% of the country’s population live in the two states), take all subjects (except the Amharic language class) up to grade eight in their respective mother tongues. In the Amhara state, Amharic is the language of instruction for all subjects up to grade six, and all key subjects are taught in English beginning in grade seven, with the exception of the Awi and the Oromo zones.<sup>6</sup> In the Southern Nations and Nationalities Regional state with about 18% of the country’s population, mother tongue instruction is offered only up to grade four, and all subjects are taught in English starting in grade five. In the capital city — Addis Ababa — which is home to all of Ethiopia’s ethnic groups, Amharic is the language of instruction up to grade six, and all key subjects are taught in English beyond grade six.

We exploit these differences in how the language of instruction policy was implemented in the four regional states, to assess the impact of mother tongue education on educational and labor market outcomes. Based on a conjecture that the policy-induced disparity in the *intensity of mother tongue instruction* (iMTI) across different states might have resulted in differences in human capital accumulation and labor-market outcomes, an IV-2SLS empirical strategy is implemented to explore the research question under consideration.

Equation (1) is the key (2nd stage) regression equation, with the instrumental variable defined based on ethnicity as described below.

$$Y_{is} = \alpha + \beta \cdot I_{is} + X'_{is}\delta + \epsilon_{is} \quad (1)$$

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<sup>5</sup>In this study, a regional state is said to have fully implemented the policy if students are provided the opportunity to study all subjects in their mother tongue in grades one through eight; states that implemented the policy only up to grade N where N is less than eight, are considered to have implemented the national policy partially.

<sup>6</sup>The Amhara state allows students in the Awi and Oromo special administrative zones of the region to learn in their respective native tongues.



The outcome variables ( $Y_{is}$ ) are test scores (used as proxy for educational outcomes in the current study) and labor market outcomes for student  $i$  in state  $s$  in 2016, when the latest complete Young Lives Survey was conducted. Students test scores (measures of cognitive ability) are intermediate outcome variables<sup>7</sup> through which iMTI is expected to influence labor market outcomes. We use two different test scores to capture variations in human capital accumulation by students schooled under the various regimes of education: the tests measure the students' knowledge and aptitude in mathematics and verbal reasoning. Similarly, we measure labor market outcomes with two indicator variables – dummies for salary employment and wage employment – which are switched on if the subjects were employed when the latest survey was conducted in 2016.<sup>8</sup>

The causal variable in the empirical model ( $I_{is}$ ) represents the intensity of mother tongue instruction for student  $i$  in state  $s$ , and it is measured by the number of years students are schooled in their native tongues. It varies between zero and eight in Oromia and Tigray for students who studied in their native tongues.<sup>9</sup> Similarly, iMTI is at most six for Amhara students in the Amhara regional state, while it is less than or equal to four for students who are schooled in their native languages in their respective local school districts in the South.<sup>10</sup> For students in the capital, Addis Ababa, whose mother tongue is Amharic, iMTI is at most six; for other students in the city, IMT is zero. For the *Never Takers*, which constitute about 3 percent of the overall sample, IMT equals zero.

The sub-population of *Never Takers* are those that are legally entitled by state law to acquire education in their mother tongues but choose to be educated in a different language. These are typically non-Amhara students who choose the Amharic stream in their own ethnic-homeland states for any number of reasons, including perhaps the expectation that learning in Amharic — a well-established language — might enhance their learning and economic outcomes later in life. The significant majority of *Never Takers* are found in the Southern Nations and Nationalities Regional state, and they constitute about  $X$  percent of the sample in the region.

The vector of controls ( $X'_{is}$ ) are the students' and their families' characteristics that were determined in years prior to 2016 - variables that are widely understood to have some effect on the intermediate and final outcome variables: they include the students' anthropomorphic measures when the students were eight, a measure of their stuntedness, a proxy for family poverty (the amount of food consumed by the students' parental

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<sup>7</sup>Say something about intermediate outcome variables

<sup>8</sup>According to the data compiled by the International Labor Organization, the percentage of the Ethiopian workforce with Salary and Wage employments is less than 20 percent, with the remainder identified as self-employed, some of whom might be severely underemployed or unemployed.

<sup>9</sup>Although education is compulsory for children between the ages of 5 to 16, many students drop out before completing elementary education due to a serious lack of enforcement of the national law.

<sup>10</sup>There are more than fifty ethnic groups in the Southern Nations and Nationalities Region and the overwhelming majority of them have adopted MTI in their schools. Have the Gurage done so? If not, why not?

household), an index of family wealth, a measure of the caregiver’s education, family size, various indicators of asset ownership (including, land, house, and consumer durables), access to electricity, an indicator for urbanization, a dummy for the students’ gender, an indicator for school type (public vs. private), and a few other relevant variables.

#### 4.1 The Instrumental Variable (IV)

The instrumental variable  $E_{is}$ , which is defined below in (2), represents the Ethnic background of student  $i$  attending primary school in regional state  $s$ . It is based on attribute of the students assigned by nature; thus, it is exogenously determined in the empirical model. It is an index variable, constructed based on a unique interaction of students’ ethnic backgrounds and the ethnicity-based states’ policies in which the students are schooled,<sup>11</sup> and is given by:

$$E_{is} = \frac{N^s}{8} \cdot i^M \quad (2)$$

$N^s$  is the number of legally mandated years students may be educated in their mother-tongue in ethnic state  $s$ , and  $i^M$  is an indicator variable that is switched on if student  $i$  has access to mother tongue education regardless of where he/she attended school. Whereas some Amhara students attending schools in certain school districts in Oromia and the South, and a segment of Oromo students attending schools in the Amhara state, have the options to be schooled in their native tongues; a significant majority of students attending schools outside their ethnic home states do not have the option of choosing their primary language of instruction. Consequently,  $i^M$  is switched on for a) all students attending schools in their native tongues in their ethnic home states; b) Amhara students who are offered the opportunity of learning in Amharic in some school districts in Oromia and the South;<sup>12</sup> and c) Oromo students attending schools in the special zone of Oromia in the Amhara state.

Since the instrumental variable is constructed based on the ethnicity of the students and the language of instruction policies of the ethnic-based states in which they attend primary and middle schools, it is as good as randomly assigned and varies independently of test scores and job market outcomes. The only source of variation in the instrumental variable comes from a unique interaction of the students’ ethnic backgrounds and the educational policy of the state in which the students reside. Importantly, the IV generates statistically significant variation in the intensity of mother tongue instruction (the causal variable in the empirical model defined above), as demonstrated in section 4 below.

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<sup>11</sup>It bears repeating here that the Ethiopian states are defined based on the ethnic identity of their residents.

<sup>12</sup>Some of the urban school districts in Oromia and the Southern Nations and Nationalities Region offer schooling options in Amharic.

The validity of  $E_{is}$  as an instrumental variable also depends on the key assumption that the instrument affects educational and job market outcomes only through its effects on the intensity of mother tongue education. Hence, the identifying assumption fails if the instrumental variable affects educational and job market outcomes *in samples where there is no obvious reason* for association between the causal and the outcome variables (Angrist, 1990). Finding that the IV has any effect on test scores and labor market outcomes in such a sample would nullify the exclusion restriction, casting serious doubts on our identification strategy.

If our identification strategy is to remain sound, we expect to see neither ethnicity nor the intensity of mother tongue instruction to have any effect on both human capital accumulation and job market outcomes in the Ethiopian capital, Addis Ababa. There is indeed no persuasive reason why — conditional on the covariates included in our empirical model — ethnicity, thus iMTI, would be the cause of differences in test scores and job market outcomes in Addis Ababa, since Amharic is the language of daily life and the primary language of instruction in primary schools in the city, and all students are proficient in the language regardless of their ethnic backgrounds. These students might use their native languages in their homes, but they use Amharic in their schools and their day-to-day social interactions.

## 5 Results and Interpretation

### Key Findings

The key coefficient in (1) is  $\beta$ ; it captures the impact of native tongue education on the intermediate outcomes (test scores in math and verbal reasoning) and the two final outcomes (the probabilities of salary and wage employments). Table 2 indicates that the probability of salary employment grew by about 5%, while wage employment remained unresponsive to the nationwide introduction of mother tongue instruction. Interestingly, mother tongue education has enhanced human capital accumulation, improving test scores in Mathematics and verbal comprehension by average scores of 1.2 points 2 percentage points respectively. The conclusion that mother-tongue instruction has a positive effect on the probability of gaining salary employment is consistent with the nature of salary employment (types of salary-based jobs) in Ethiopia and the institutional and policy changes that have taken place in the country in the last three decades.

A recent World Bank study shows that the public sector is the largest employer of non-farm labor in Ethiopia, followed by the service, manufacturing and the construction sectors.<sup>13</sup> Whereas the public sector is the largest employer of salaried jobs – with the edu-

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<sup>13</sup>For more detailed information on regarding the distribution of salary and wage employments

cation and health sectors leading the way – most service, manufacturing and construction jobs are private-sector wage employments. Additionally, the bulk of public services are primarily delivered by the state governments, which use local languages to deliver these services. Whereas Amharic – the current working language of the federal government – had been the official working language throughout the country prior to the early 1990’s, the ethno-federal states in Ethiopia have now their own official working languages to go along with the changes made in the languages of instruction policy. Indeed, public sector jobs at different levels of regional governments require potential applicants be conversant in the local language of the state. The finding that mother tongue instruction increases salary employment in formal employment where the public sector is the largest employer, is thus congruent with the inference that adopting native tongue instruction has a favorable effect on cognitive development, corroborating a reasonably well-established positive link between enhanced cognitive development and increased employment opportunities (*cite*).

The insensitivity of wage employment to the introduction of mother tongue instruction (and the attendant increase in mathematical and verbal reasoning) is an outcome of the fact that most private sector jobs in Ethiopia are wage employments and being able to communicate in Amharic effectively is still considered an asset to obtaining and keeping these jobs. Regardless of which state they operate in, private employers do not face language requirements in recruitment and retention of their workers, and they prefer potential employees who are proficient in Amharic, which remains to be a key means of communication in urban centers throughout the country, if not the dominant language it once was. Hence, the majority of those who have benefited from the positive effects of mother tongue instruction in the country (about 75% of the country’s population) might have lost a competitive edge in wage employments as a result of the policy.

To sum up, the introduction of mother tongue education in Ethiopia has proven to be a double-edged sword for its beneficiaries. Although it increased their competitiveness on the market for salaried jobs by raising their mathematical and verbal reasoning abilities, it has put them at a distinct disadvantage when it comes to securing private sector jobs, which require proficiency in Amharic – a language in which many might have become less conversant due to the policy changes in languages of instruction. It appears that Mother Tongue Instruction’s labor market advantages because of the associated increase in human capital are offset by the unique disadvantages it imposes in terms of employability in the private sector perhaps due to its likely unintended adverse consequences on the mastery of the still somewhat dominant Amharic language.

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in Ethiopia, please follow the following link. <https://openknowledge.worldbank.org/bitstream/handle/10986/32093/Ethiopia-Employment-and-Jobs-Study.pdf?sequence=1&isAllowed=y>

## 6 Robustness Checks

We check the veracity of the findings reported above by implementing two different procedures. First, we conduct a test to check whether the exclusion restriction implied by our identification strategy holds, by checking to see if there are correlations between the outcome variables and the instrument in a sample where there is no obvious reason for association between mother tongue instruction and the outcome variables in education and employment. As discussed earlier, our identification strategy would fail if the impact of ethnicity and intensity of mother tongue instruction affected human capital accumulation and job market outcomes in Addis Ababa, where we shouldn't expect a meaningful association to exist between mother tongue instruction and the measured outcomes variables.

Therefore, the confirmation in table 3 that the instrument has no discernible impact on human capital formation and labor market outcomes in Addis Ababa, satisfies the exclusion restriction and validates our identification strategy, lending credence to the main findings reported in table 2. We also report the IV estimates for the Addis Ababa sample in table 4. As expected, the intensity of mother tongue instruction doesn't have statistically significant impacts on test scores and labor market outcomes in the capital, Addis Ababa.

As an additional test of robustness check, we employ an empirical strategy that allows us to compare the conditional educational and job market outcomes in states that have adopted the 1994 language policy *similarly* — designating one of the states as a benchmark case for comparison purposes — to see if the observed variations in test scores and job market outcomes are caused by variations in unobserved state policies and institutions, not differences in the intensity of mother tongue instruction. The framework shown in (3), where all the variables are as defined above except  $T$ , which now is modeled as an indicator variable that is switched on only for the benchmark state, can be used for this purpose, with  $\theta$  capturing the likely impacts, if any, of the unobserved state-level characteristics on educational and labor market outcomes.

$$Y_{is} = \alpha + \theta \cdot T + \beta \cdot I_{is} + X'_{is}\delta + \epsilon_{is} \quad (3)$$

As noted above, only Oromia and Tigray implemented the 1994 language of instruction policy fully in our sample, with Tigray using the Sabeian script (a pre-existing script that has been in use in the country for Millennia), while Oromia introduced a new writing system based on the Roman script that has attracted strong advocates and detractors (*cite*). Consequently, regressions of (3) using the Young Livers Survey samples from these two states, with one of the regions as a benchmark state (we use Tigray as a benchmark case), may reveal if unobserved factors — including differences in the scripts used and other

institutional and policy variables peculiar to each state – have contributed to differences in human capital accumulation and labor market outcomes.

The estimates in table 4 suggest that unobserved differences in institutions and policies that were not accounted for in the empirical model do not appear to explain the observed spatial variation in human capital accumulation and job market outcomes in contemporary Ethiopia. Although Tigray and Oromia, which implemented the 1994 language of instruction policy fully, can be differentiated from one another in terms of their institutional capacities and other policies they might have pursued since the early 1990's (for instance, Tigray adopted the Sabeen script for its language, while Oromia chose the Latin script), the conditional outcomes in education and employment in these states are fairly similar, providing another corroborating evidence for the positive effects of mother tongue instruction on cognitive capacity as well as employability in salaried positions/jobs.

In addition to confirming the key findings reported in table 2, the similarity of the conditional educational and employment outcomes in Tigray and Oromia as reported in table 4, disproves the view that the choice of the Latin script by some states in the Ethiopian federation may have adversely affected student academic achievements (*cite*). The revealing inference of these findings is that the measured outcomes in education and employment are neutral to the choice of script in the two states, suggesting that both states might have chosen the appropriate scripts for their respective languages or both scripts might be equally valid for both languages.

## 7 Conclusion and Policy Implications

The key inference of the study is that mother tongue instruction improves employment outcomes by increasing cognitive capacity if it is complimented with conducive institutional and policy frameworks. In the absence of favorable social infrastructure that could support its effective implementation, MTI may not benefit the employment outcomes of the treated, though it may raise their schooling outcomes. The paper shows that MTI increases test scores and salary employment, but it has failed to yield a corresponding increase in wage employment.

That MTI raises salary employment is very much an expected outcome of the key feature of the reconfiguration of the Ethiopian state along ethnic lines in the early 1990's. The 1994 Ethiopian constitution created local governments whose official working languages are the various ethnic languages of the regional states, and these changes have increased the prospects of securing salaried positions by those that obtain their education in their native tongues. Indeed, the various functions of the state governments in Ethiopia are currently performed predominantly by those who have been trained in their

native tongues.

By the same token, MTI has failed to deliver in terms of wage employment, since the overall social infrastructure in Ethiopia does not support a more robust implementation of the language of instruction policy. Employees do not have legal rights to work in their native tongues in the private sector, and there are no laws in the books that prohibit private employers from requiring workers to speak the historically dominant language, Amharic. It appears that many private wage employers in urban centres throughout the country have continued to use Amharic in conducting their day-to-day operations, restricting the employment opportunities of those who are educated in their native tongues and may have lost some fluency in Amharic.

The policy of mother tongue instruction that Ethiopia adopted in 1994 can thus be judged to have contributed positively to the country's economic development, if only partially. The study also suggests that the impact of MTI on the country's development can be further optimized by implementing creative social policies that support the major changes the country adopted in recent decades in terms of empowering the regional states to run their local affairs. It may be appropriate for regional states to look into instituting labour laws that afford workers the legal rights to work in their native languages, similar to what other multilingual countries (e.g., Canada, Switzerland, etc.) have successfully implemented.

The laws can be instituted differently in different regional states based on the specific needs and capacities of each state, and they must always be weighed carefully against their potential adverse effect on economic efficiency due to restrictions on labour mobility within the country. For instance, where there are constraints of sufficiently trained local talent, the regional states can adopt laws that provide exceptions to employers in order to allow them to attract the requisite talent from the national labour market. However, while aiming to reduce or eliminate the loss of productivity embedded in the status quo due to a pre-existing bias in favour of Amharic – which as we have shown in this paper denies more qualified local talent from fully participating in the labour market – policy makers in the state governments should guard against undertaking measures that may introduce a different kind of inefficiency in their efforts to promote local languages.

# Tables and Figures

Table 1: Summary Statistics

	Non AA Sample			AA Sample		
	N	Mean	sd	N	Mean	sd
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for male child	728	0.544		130	0.492	
Highest grade completed	723	9.264	3.143	130	11.26	2.813
Maths test Score (Raw)	725	13.12	5.77	130	17.03	4.905
Language test Score (Raw)	728	13.88	4.306	130	17.48	3.344
Dummy for wage Employment	310	0.497	0.501	86	0.605	0.492
Dummy for salaried Employment	487	0.162	0.369	88	0.386	0.49
BMI-for-age z-score	673	-1.682	1.82	128	-0.971	1.407
Dummy for stunting	700	0.213		128	0.18	
Dummy for female caregiver	727	0.978		130	0.985	
Caregiver's age	727	35.17	8.998	130	36.59	9.709
Caregiver's highest grade	719	2.73	5.899	129	4.403	5.269
Household size	727	6.399	2.082	129	6.07	2.312
Wealth index	724	0.343	0.168	129	0.576	0.107
Housing quality index	726	0.327	0.195	129	0.417	0.14
Consumer durables index	727	0.257	0.197	129	0.492	0.157
Household has access to electricity	726	0.482	0.5	129	0.977	0.151
Household owns land where house is on	728	0.779	0.415	130	0.154	0.362
Household resides in a rural area	727	0.726				
Dummy for Amhara	728	0.236				
Dummy for Oromia	728	0.238				
Dummy for SNNP	728	0.268				
Dummy for Tigray	728	0.258				

*Note:* The standard deviations for proportions is not presented.



Table 2: Estimates Excluding the Addis Ababa Sample

	<i>Dependent variable:</i>			
	Maths Score	Language Score	Wage Employ I	Wage Employ II
	(1)	(2)	(3)	(4)
<b>Panel A: First Stage<sup>†</sup></b>				
$E_{is}$	3.684*** (0.257)	3.665*** (0.257)	3.721*** (0.297)	3.641*** (0.388)
<b>Panel B: 2SLS<sup>‡</sup></b>				
IMTI	0.333* (0.175)	0.284** (0.131)	0.043*** (0.016)	0.029 (0.027)
Observations	654	656	437	279
<i>Note:</i>			*p<0.1; **p<0.05; ***p<0.01	

Table 3: Estimates for Addis Ababa Sample

	<i>Dependent variable:</i>			
	Maths Score	Language Score	Wage Employ I	Wage Employ II
	(1)	(2)	(3)	(4)
<b>Panel A: First Stage<sup>†</sup></b>				
$E_{is}$	8.000*** (0.000)	8.000*** (0.000)	8.000*** (0.000)	8.000*** (0.000)
<b>Panel B: 2SLS<sup>‡</sup></b>				
IMTI	-0.200 (0.328)	-0.152 (0.174)	0.0002 (0.031)	0.000 (0.000)
Observations	49	49	41	39
<i>Note:</i>			*p<0.1; **p<0.05; ***p<0.01	

Table 4: Reduced Form Estimates for Addis Ababa Sample

	<i>Dependent variable:</i>			
	Maths Score	Language Score	Wage Employ I	Wage Employ II
	(1)	(2)	(3)	(4)
$E_{is}$	3.273 (2.413)	0.084 (1.373)	-0.313 (0.200)	0.000 (0.000)
Observations	49	49	41	39
R <sup>2</sup>	0.555	0.505	0.755	0.513
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01				

Table 5: Robustness Check: Oromia vs. Tigray

	<i>Dependent variable:</i>			
	Maths Score	Language Score	Wage Employ I	Wage Employ II
	(1)	(2)	(3)	(4)
Tigray	-0.416 (1.099)	0.903 (0.705)	0.113 (0.099)	0.086 (0.147)
IMTI	0.373*** (0.124)	1.271*** (0.127)	-0.002 (0.012)	-0.017 (0.018)
Observations	331	283	227	130
R <sup>2</sup>	0.255	0.446	0.127	0.276
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01				