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Regional Inequalities in Early Childhood Education Access in Ethiopia: Evidence from National EMIS Data

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Research Article

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Abstract

Early Childhood Care and Education (ECCE) is internationally recognized as the foundation for lifelong learning and human development. In Ethiopia, ECCE has received renewed policy attention through the revised Early Childhood Development and Education (ECDE) framework and the Education Sector Development Program VI (ESDP VI). Despite national progress in pre-primary enrolment, significant regional disparities persist. This study analyzes regional inequalities in access to pre-primary education using national Education Management Information System (EMIS) data from the Education Statistics Annual Abstract (ESAA) 2024/25 published by the Ministry of Education, Ethiopia. Using Gross Enrolment Ratio (GER), Net Enrolment Rate (NER), Gender Parity Index (GPI), school distribution, o wnership patterns, and computed inequality indices (coefficient of variation, Theil index), the study reveals stark contrasts between urban administrative regions and pastoral, emerging, and peripheral regions. While Addis Ababa and Harari show enrolment rates exceeding 100%, regions such as Somali, Afar, Benishangul-Gumuz, and Southwest Ethiopia exhibit critically low participation, with GER values below 30%. The coefficient of variation across regions for GER is 0.68, indicating very high disparity. The findings highlight structural inequities linked to geography, livelihood patterns, infrastructure, ownership models, and historical investment patterns. The study argues that national averages conceal deep territorial inequalities and that conventional center-based ECCE models are incompatible with pastoralist livelihoods. It calls for differentiated ECCE strategies tailored to regional realities. These findings have implications for achieving Sustainable Development Goal (SDG) 4.2 and Ethiopia's ECDE policy goals.

1. Introduction

Early childhood education is widely acknowledged as the most cost-effective investment in human capital development (Heckman, 2006). Participation in quality pre-primary education enhances cognitive development, school readiness, and long-term educational attainment (World Bank, 2018). Recognizing this, Ethiopia has positioned ECCE as a priority within its ECDE policy framework and ESDP VI targets, which aim to raise pre-primary gross enrolment from 59.8% to 73–74% by the end of the program period (Tomora, 2026; Ministry of Education, 2025).

However, expansion in access does not necessarily translate into equitable participation. National statistics often mask substantial disparities between regions with different socio-economic, geographic, and cultural contexts (UNESCO, 2021). Ethiopia's federal structure, combined with pastoralist livelihoods, urban concentration of services, and uneven historical investment in infrastructure, makes ECCE access highly uneven across regions. Previous studies have noted urban–rural gaps in primary and secondary education (e.g., Gebre & Ayele, 2020), but less attention has been given to systematic regional inequality in pre-primary education using recent, nationally representative EMIS data.

This study investigates how early childhood education access differs across Ethiopian regions using the most recent EMIS data. It moves beyond national averages to examine the territorial dimension of inequality in pre-primary education, employing both descriptive statistics and inequality indices to

quantify the extent of regional disparities. It further interrogates school distribution, ownership patterns, and the compatibility of conventional ECCE models with pastoralist livelihoods to explain the structural nature of observed inequalities.

2. Literature Review

2.1. ECCE and Educational Equity

Global evidence shows that inequitable access to ECCE reproduces long-term educational and socio-economic disparities (UNESCO, 2021). Children from rural, pastoral, and marginalized communities are least likely to access pre-primary services, creating a “capability deprivation” that persists throughout schooling and into adulthood (Walker & Unterhalter, 2007). The concept of horizontal equity treating equally those who are similarly situated is often violated when geographical location determines educational opportunity (Berkhout & Van den Berg, 2010). In multi-ethnic federal systems like Ethiopia, regional disparities in ECCE can also reinforce ethnic and spatial inequalities (Mekonnen, 2019).

2.2. ECCE in Ethiopia

Ethiopia’s ECCE expansion has accelerated since the 2010 ECCE policy and its 2023 ECDE revision. The government has introduced one year of pre-primary education (ages 5–6) as part of the formal edu cation structure. Despite progress, previous studies note disparities between urban and rural regions, especially in emerging regions and pastoral areas (Belay & Mulugeta, 2021). A study by Woldesenbet (2022) using earlier EMIS data found that regional variation in pre-primary enrolment was strongly correlated with poverty rates and infrastructure availability. However, these studies often relied on older data or focused on a limited set of regions. The present study updates and expands the analysis using the 2024/25 EMIS data and introduces quantitative measures of inequality to capture the full magnitude of regional gaps.

2.3. Measuring Inequality through GER and NER

GER reflects overall participation regardless of age, while NER captures age-appropriate enrolment. Comparing the two provides insight into both access and system efficiency (UNESCO Institute for Statistics, 2019). When GER exceeds 100%, it often indicates enrolment of over-age or under-age children, as well as potential data inaccuracies or cross-region migration. A small gap between GER and NER suggests that most enrolled children are of the official age. However, in low-access regions, both indicators are low, indicating systemic exclusion rather than age misalignment.

To quantify inequality, scholars often use the coefficient of variation (CV) and the Theil index (Theil, 1967). The CV is a normalized measure of dispersion, while the Theil index decomposes inequality into within and between group components. Applying these measures to pre-primary enrolment data allows for a more rigorous assessment of regional disparities than simple range comparisons (Tomora, 2026).

3. Methodology

3.1. Data Source

This study uses secondary data from the Education Statistics Annual Abstract 2024/25 (2017 E.C.) produced by the Ministry of Education, Ethiopia, through its EMIS unit. The abstract compiles administrative data from all regional education bureaus and city administrations. It is the most comprehensive publicly available dataset on Ethiopian education.

3.2. Indicators Analyzed

The following indicators were extracted for the pre-primary level (ages 5–6, though definitions vary slightly by region):

- Gross Enrolment Ratio (GER) = (total enrolment / population aged 5–6) x 100
- Net Enrolment Rate (NER) = (enrolment of children aged 5–6 / population aged 5–6) x 100
- Gender Parity Index (GPI) = (female GER / male GER)
- Number of kindergarten (KG) schools and ownership (government vs. non-government)
- Enrolment share from pastoralist *woredas* (districts) for Oromia, South Ethiopia, and Southwest Ethiopia

All indicators were taken directly from the ESAA; the original calculations by the Ministry of Education use population projections from the Ethiopian Statistical Service.

3.3. Analytical Approach

The analysis was conducted in three stages:

1. **Descriptive statistics** – Regional GER, NER, and GPI were tabulated and compared. School distribution and ownership were examined using counts, proportions, and school-to-population ratios.
2. **Inequality indices** – To quantify regional disparity, the coefficient of variation (CV) for GER across the 13 regions and city administrations was computed. The Theil index was also calculated using population weights to decompose total inequality into between- and within-region components (though with aggregated data, the within-component was limited to intra-regional variation as reported in pastoral versus non-pastoral areas for Oromia, South Ethiopia, and Southwest Ethiopia).
3. **Trend analysis** – Where comparable data from the 2021/22 ESAA were available, changes in GER were examined to identify whether regional gaps are narrowing or widening.

All calculations were performed in Microsoft Excel using standard formulas. Because the ESAA provides aggregated regional data, no inferential statistics (e.g., significance tests) were applied; the analysis is descriptive and exploratory.

4. Results

4.1. National Progress Masks Regional Gaps

Nationally, pre-primary GER reached 59.8% and NER 58.1% in 2024/25. However, this average conceals extreme variation. The coefficient of variation for GER across regions is 0.68, indicating very high disparity (CV > 0.5 is typically considered high).

4.2. Urban Administrative Regions: Over-Enrolment

- **Addis Ababa**: GER 145.9%, NER 140.0%
- **Harari**: GER 102.9%, NER 95.7%

These figures indicate enrolment exceeding the official age population, reflecting a combination of urban service concentration, private provision, and possible enrolment of children younger than 5. The gap between GER and NER is small (5.9 and 7.2 percentage points, respectively), suggesting most enrolled children are age-appropriate.

4.3. Emerging and Pastoral Regions: Severe Under-Access

- **Somali**: GER 17.7%, NER 14.3%
- **Afar**: GER 26.8%, NER 24.6%
- **Benishangul-Gumuz**: GER 29.9%, NER 29.2%
- **Southwest Ethiopia**: GER 28.5%, NER 28.2%

These regions fall far below the ESDP VI target of 73–74%. Their GER values are less than half the national average. The small GER–NER gap indicates that even the limited enrolment is predominantly age-appropriate, but overall coverage is minimal.

4.4. School Distribution, Ownership Patterns, and Structural Inequality

Beyond enrolment indicators, the spatial distribution and ownership structure of KG schools reveal another layer of inequality. Nationally, the number of KG schools increased from 14,909 to 18,209 in one year an impressive expansion. However, 82% of all KG schools are located in Oromia, and this region is also the only one where government-owned KGs outnumber non-government ones. In contrast, emerging regions such as Somali, Afar, Benishangul-Gumuz, Gambella, and Southwest Ethiopia have very limited institutional presence relative to their child population. In Somali Region, there are only 542 schools for a population of over 10 million, giving a school to population ratio (per 100,000 children aged 5–6) of 18.2, compared to 156.4 in Addis Ababa.

Ownership patterns further exacerbate inequality. In urban and better-off regions, ECCE expansion is driven significantly by private providers, faith-based organizations, NGOs, and community initiatives. In Addis Ababa and Harari, private provision accounts for over 60% of KG schools. In peripheral and pas

toral regions, where private investment is minimal and communities cannot sustain fee-based ECCE, the absence of strong government provision translates directly into exclusion. Thus, the data show that where the government does not build KGs, children do not attend ECCE.

4.5. Oromia: High Numbers, Hidden Intra-Regional Inequality

Oromia shows a GER of 67%, close to the national target. However, only 5.8% of enrolment comes from pastoral woredas, despite these areas constituting a substantial share of the region's territory and population. This intra regional disparity is captured by a within component Theil index contribution of 0.09 (out of a total Theil index of 0.31), indicating that inequality is not only between regions but also within them.

4.6. Pastoral Enrolment Shares: Evidence of Model Incompatibility

The EMIS report highlights enrolment shares from pastoral *woredas* in Oromia, South Ethiopia, and Southwest Ethiopia. These shares are strikingly low:

- **Oromia pastoral share**: 5.8%
- **South Ethiopia pastoral share**: 3.0%
- **Southwest Ethiopia pastoral share**: 3.3%

This is critical evidence that conventional, center-based KG models are structurally incompatible with pastoralist livelihoods. Fixed-location ECCE assumes sedentary populations, stable settlements, and daily school attendance patterns. Pastoralist communities, characterized by seasonal mobility and livestock-based livelihoods, cannot fit into this model. Therefore, the inequality observed is not merely resource-based but model-based.

4.7. Gender Parity Does Not Mean Equal Access

The national GPI is 0.95, indicating near parity. However, both boys and girls in pastoral regions remain largely excluded. In Somali Region, the female GER is 16.9% versus male 18.5%, a gap of 1.6 percentage points. The exclusion is horizontal: the lack of access affects both genders equally within low access regions.

4.8. Trends from 2021/22 to 2024/25

Compared to 2021/22 data (where available), GER increased nationally by 8 percentage points. However, the increase was uneven: Addis Ababa saw a 12 point rise, while Somali Region increased by only 3 points. The regional CV in GER remained stable (0.69 in 2021/22 vs. 0.68 in 2024/25), suggesting that relative inequality has not improved.

5. Discussion

5.1 Geography as a Determinant of ECCE Access

The findings confirm that region of residence is a powerful predictor of ECCE participation. The low school to population ratios in pastoral and emerging regions point to supply side deficits that cannot be addressed by uniform national expansion strategies. The stark contrast in school distribution 82% of KG schools in Oromia versus negligible numbers in Somali and Afar demonstrates that access inequality is not only a function of enrolment behavior but of institutional availability.

5.2. Urban Bias and Ownership-Driven Expansion

The over enrolment in Addis Ababa and Harari reflects an urban bias in both public and private investment. Private providers concentrate where purchasing power and demand are high, while govern ment resources have historically favored more accessible areas. This creates a virtuous cycle in urban regions and a vicious cycle of neglect in peripheral regions. The ownership data reveal that where government does not provide, and private sector cannot afford to, children are systematically excluded.

5.3. Pastoralism and the Incompatibility of Conventional KG Models

The extremely low enrolment shares from pastoral woredas even within regions that have relatively high overall GER point to a fundamental mismatch between service design and livelihood patterns. Conventional KG models assume fixed locations, daily attendance, and settled populations. For pastoral ist communities, these assumptions are invalid. The inequality observed is therefore not merely a matter of resource scarcity but of model incompatibility. Addressing it requires not just more schools but different kinds of ECCE services.

5.4. When High GER Signals System Distortion

Addis Ababa (GER 145.9%) and Harari (GER 102.9%) present a different kind of inequality. Over-enrolm ent indicates children outside the official age range enrolling early or late, in-migration of children from surrounding regions, and high private sector concentration. This inflates national averages and creates a statistical illusion of progress, while children in Somali or Afar remain excluded. Thus, both very high GER and very low GER are symptoms of systemic imbalance: high GER reflects service concentration and demographic pull; low GER reflects service absence and structural exclusion.

5.5. GER–NER Convergence Revisited: Why It Is Misleading

Nationally, GER (59.8%) and NER (58.1%) are close. At first glance, this suggests age-appropriate enrolment and system efficiency. However, regional analysis reveals that convergence is occurring at both extremes: in Addis Ababa, both GER and NER exceed 140%; in Somali, both remain below 20%. This means efficient access where services are abundant and efficient exclusion where services are absent. Hence, national GER–NER convergence does not indicate equity.

5.6. The Policy–Geography Mismatch in ECDE Implementation

The ECDE policy mandates two years of free and compulsory pre-primary education for ages 5–6. However, EMIS evidence shows that implementation assumes uniform geographic and socio-economic conditions, which do not exist in Ethiopia. The data strongly suggest that a single national ECCE delivery model cannot serve all regions equally. Differentiated approaches are not optional they are structural necessities.

5.7. Limitations

This study relies on administrative data, which may suffer from under reporting or over reporting in some regions. EMIS data do not capture quality of services, learning outcomes, or demand side barriers (e.g., household costs, cultural attitudes). The analysis is cross sectional; causal inferences cannot be drawn. Finally, regional aggregates obscure variation at the woreda level; future research should use disaggregated data to examine within region disparities more finely.

6. Conclusion

Ethiopia has made measurable progress in expanding ECCE, but this progress is geographically unequal. Urban regions experience over enrolment while pastoral and emerging regions face systemic exclusion. National averages therefore obscure deep territorial inequities, as reflected in a high coefficient of variation and persistent gaps over time.

The evidence from EMIS is unequivocal: regions with schools have children in ECCE; regions without schools have children out of ECCE; pastoralist children are excluded not by choice but by design incompatibility; urban regions inflate national progress indicators. ECCE inequality in Ethiopia is structural, rooted in geography, ownership patterns, service models, and historical investment distribution.

Achieving SDG 4.2 and Ethiopia's ECDE goals requires rethinking how and where ECCE is delivered, not merely expanding enrolment numbers. This means moving beyond one size fits all approaches to region specific delivery models, including mobile and alternative ECCE for pastoralists, and targeted infrastructure investment in emerging regions.

7. Policy Implications

1. **Prioritize KG construction in Somali, Afar, Benishangul-Gumuz, Gambella, and Southwest Ethiopia**, using EMIS-guided investment to target low-GER regions.

2. **Introduce mobile and seasonal ECCE centers for pastoral communities**, adapting curriculum and calendar to mobility patterns, and replacing center-based models with alternative delivery mechanisms.

3. **Increase government ownership of ECCE in regions where private provision is absent**, ensuring that the state fulfills its role as service provider in peripheral areas.

4. **Use EMIS regional dashboards for targeted investment planning**, separating reporting of urban vs. pastoral ECCE indicators in national reports to prevent averages from masking exclusion.

5. **Design differentiated ECCE strategies** rather than uniform national rollout, with specific models for:

o Urban administrations: regulation and quality control of private expansion

o Agrarian settled regions: expansion of government KGs and supervision

o Pastoral and emerging regions: mobile, community-based, alternative ECCE centers

o Peripheral low-density areas: cluster-based ECCE and child-to-child models

Declarations

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