Introduction to Data Science

Group Project Report

Evaluating Global Progress Towards UN Sustainable Development Goal 8:
Decent Work and Economic Growth

By C16

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Contents

List of Figures

1 Introduction

This report evaluates global progress towards two United Nations Sustainable Development Goal 8 targets: (1) Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries; (2) By 2020, substantially reduce the proportion of youth not in employment, education or training. We analysed trends across six continents to assess regional and global progress towards the targets.

1.1 Data Limitations

A key limitation of our analysis is missing data for a relatively large number of Least Developed Countries (LDCs) and a small number of non-LDCs.

Missing LDCs: The following countries had either 0 or 1 data point, preventing their inclusion in time series analysis: Burkina Faso, Central African Republic, Chad, Djibouti, Eritrea, Guinea-Bissau, Haiti, Lesotho, Madagascar, Mozambique, Solomon Islands, Somalia, South Sudan, Sudan, and Yemen. These countries are considered among the poorest LDCs; consequently, the reality of LDC progress is likely worse than shown in our data.

Missing Non-LDCs: The following countries lacked required NEET data and were excluded from analysis: China, South Korea, Uzbekistan, Turkmenistan, Qatar, Kuwait, Bahrain, Oman, Libya, Morocco, Gabon, and Equatorial Guinea. The absence of China suggests our analysis of Asia is missing a substantial portion of the continent's population and economy and thus may not perfectly reflect reality.

1.2 Additional Data Source: UN World Population Prospects

To improve the quality and scope of our analysis, we incorporated population data as our additional CSV for two main reasons: (1) **Weighted averages:** Population data allows us to create population-weighted averages for continents, preventing small nations from disproportionately distorting our analysis; (2) **Population drag analysis:** To assess the growth target more comprehensively, we examined how population growth affects overall growth, as shrinking populations with rising GDP per capita present their own challenges.

2 Question 1: Per Capita Economic Growth

2.1 Introduction

We assessed global progress towards the UN target of sustained per capita growth and at least 7% annual growth for LDCs. Our analysis examines whether LDCs are achieving the 7% threshold, the impact of population growth ("drag"), whether LDCs are converging with developed nations, and how many non-LDCs are not experiencing sustained growth in accordance with national circumstances.

2.2 General Methodology

To address multi-year gaps in LDC reporting, we used linear interpolation to create continuous time series. We calculated Compound Annual Growth Rates (CAGR) for GDP and population using geometric means. Throughout the analysis, we employed weighted averages for country aggregates to prevent small nations from distorting wider trends.

2.3 The 7% Target: Are LDCs Succeeding?

We analysed average growth rates per country compared to the 7% target (Figure 1).
Asia: Asian LDCs came closest to the target, largely driven by export-led growth models. Myanmar has since undergone a military coup in 2021 (outside our data period), leading to substantial GDP decline [1]. The two exceptions, Afghanistan and Nepal, have both suffered from internal conflict, albeit of different natures.

Africa: Performance among African LDCs is highly variable. Successes in Ethiopia and Rwanda have been driven by heavy infrastructure investment [2], whilst Togo and Benin utilised their ports to become regional trade hubs. However, many other LDCs remain dependent on global commodity prices, leaving them vulnerable to price shocks.

Oceania: These two small island nations underperform largely due to high import and export costs resulting

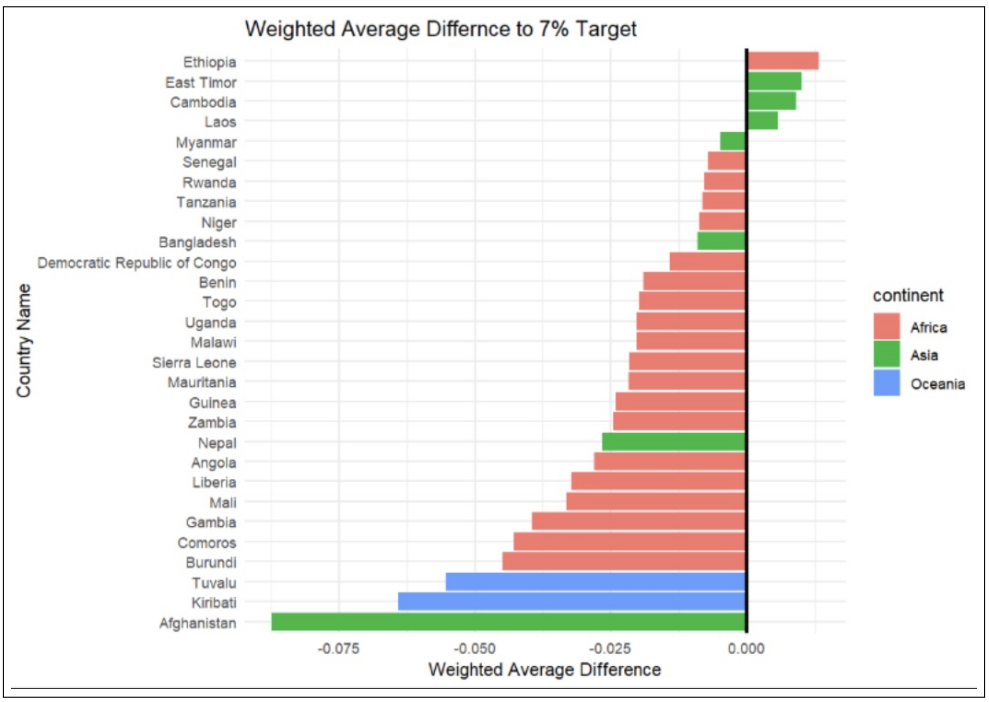

Figure 1: GDP growth rates of LDCs by continent compared to the 7% target.

from their remote geographies.

2.4 Population Drag Effect

High GDP growth does not always translate to per capita terms. Figure 2 illustrates the effect of population growth on per capita growth.

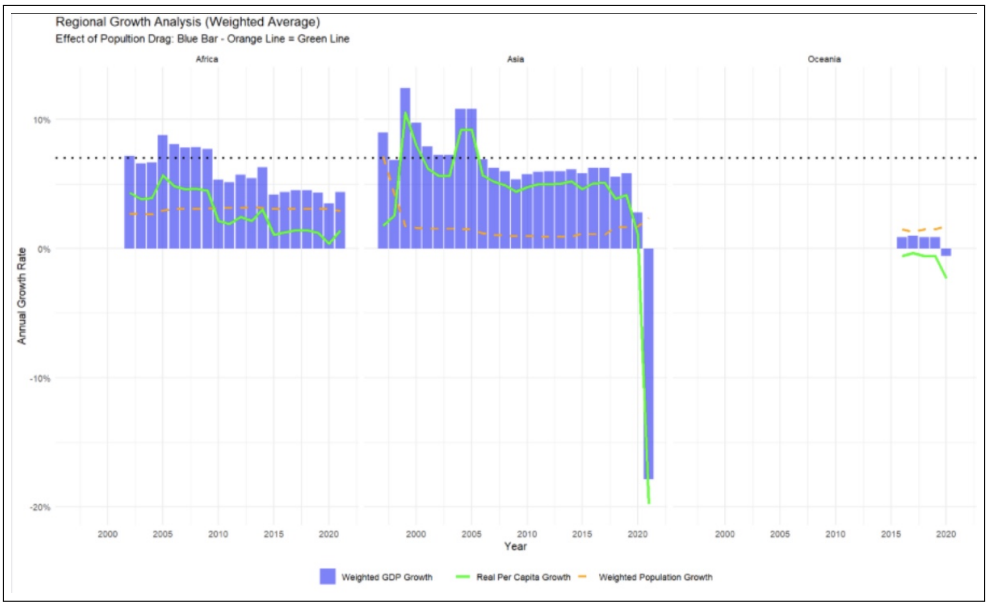

Figure 2: Population drag effect on GDP per capita growth in LDCs.

Africa: African LDCs frequently achieve 7% GDP growth, but high population growth erodes these gains in per capita terms. Since 2010, GDP growth has slowed whilst population growth remains high, pushing per capita growth rates close to 0%. This demonstrates that African LDCs are not succeeding in hitting the 7% GDP per capita growth target.

Asia: Conversely, Asian LDCs exhibit higher growth rates and lower population growth, meaning per capita growth approaches the 7% target more closely. Although Asian countries are not hitting the target, they are approaching it, despite Afghanistan reducing the average.

Oceania: With population growth exceeding GDP growth, these small island nations are experiencing negative GDP per capita growth.

2.5 Convergence: Are LDCs Catching Up?

Figure 3 examines whether and how quickly LDCs are converging with the "Rich World" (top 35 economies by GDP per capita).

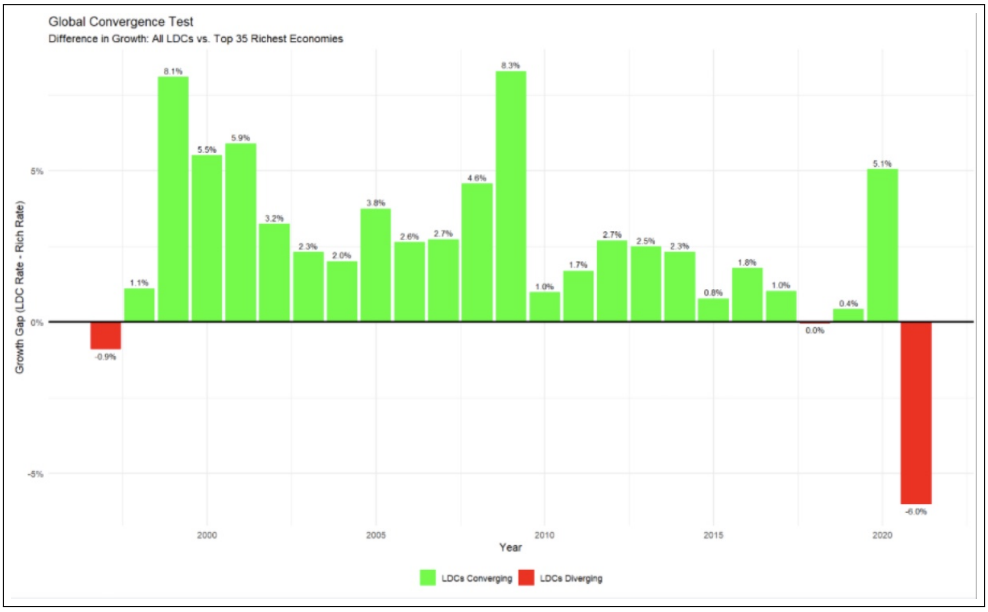

Figure 3: Convergence of LDCs with developed economies over time.

1990–2008: LDCs showed strong convergence, growing considerably faster than advanced economies. **2008–2019:** Convergence slowed as falling commodity prices reduced African growth rates. **Post-2020 (COVID-19):** LDCs began to diverge from the Rich World as developed economies could borrow and spend substantially more during the crisis.

To visualise the compounding effect of growth over time, we employed indexing using the cumulative product of weighted annual growth rates (Figure 4). This allows comparison of total accumulation speed rather than merely annual growth.

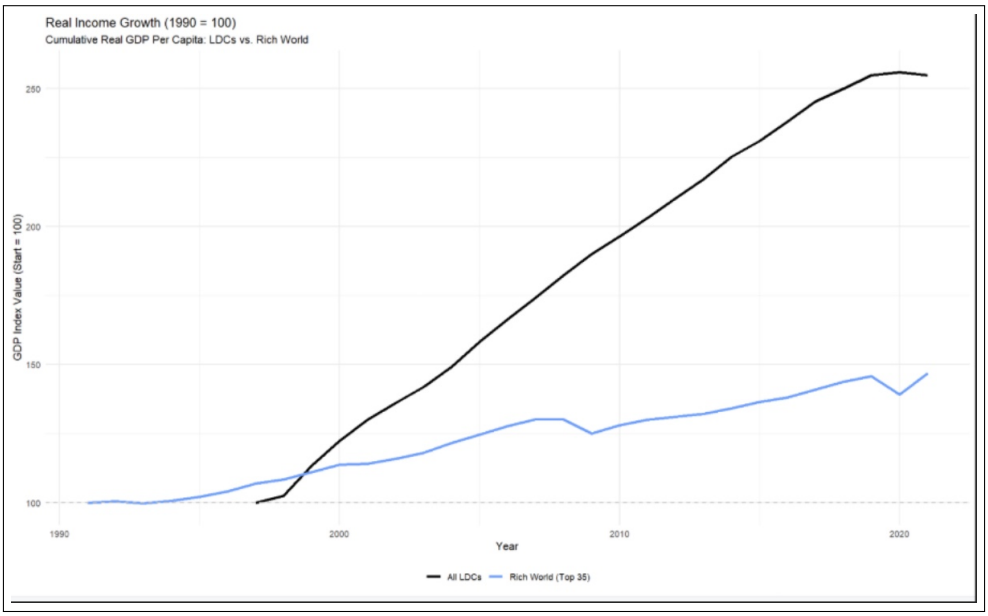

Figure 4: Indexed GDP per capita growth showing cumulative divergence.

Figure 4 demonstrates that LDCs are catching up with the developed world in per capita terms, but this is not uniform across all LDC countries. As shown in Figure 2, Asian LDCs have substantially higher per capita growth rates than African LDCs, implying many African countries are not converging with the rich world. Slowing rates in the second half of the time series raise concerns that the strongest economies may be entering the "middle-income trap".

2.6 Stagnation in Non-LDC Nations

We calculated the CAGR of per capita growth for non-LDC nations and filtered for countries with less than 0.5% per capita growth, indicating long-term stagnation (Figure 5).

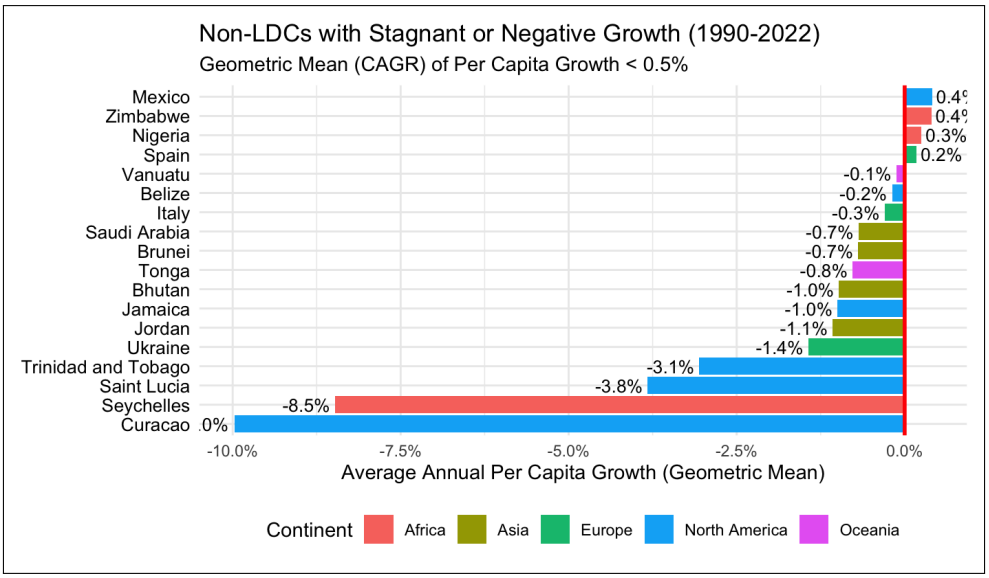

Figure 5: Non-LDC countries experiencing economic stagnation.

Data Issues and Tourism Collapse: Tourism-driven economies (Seychelles, Curaçao, Saint Lucia, Trinidad and Tobago, Belize, Vanuatu, and Bhutan) appear deceptively weak due to short-term data reporting. The COVID-19 tourism collapse caused substantial GDP declines that disproportionately affect these countries' data. Their performance between 1990–2022 was likely better than reflected.

External Shocks: For Ukraine and Jordan, negative growth reflects "national circumstances" beyond their control—invasion and refugee crises—rather than policy failures [3].

Structural Stagnation: *The productivity challenge:* Italy and Spain suffer from decades of low productivity growth and rigid economies [4]. Mexico suffers from a large informal sector [5], whilst Jamaica faces high debt that has crowded out public investment [6]. *Dutch disease:* The dominance of natural resource exports in these countries has hollowed out other sectors. Brunei additionally faces depleting oil reserves [7]. *Governance failure:* Zimbabwe represents a clear case of leadership failure. The country has suffered immensely under ZANU-PF, first under Mugabe then Mnangagwa, leading to prolonged economic stagnation [8].

2.7 Conclusion

Our analysis of Target 1 highlights a regional divide between Asian and African LDCs, largely due to high population growth in Africa and many African economies' dependence on commodity exports. Furthermore, convergence of LDCs with the rich world has slowed post-2008. Additionally, our omission of 15 LDCs with insufficient data means our results likely understate the severity of economic stagnation among LDCs as a whole.

3 Question 2: Youth Not in Employment, Education or Training

Target 2 of Sustainable Development Goal 8 states that by 2020, countries should "substantially reduce the proportion of youth not in employment, education or training". We examine progress made by six continents (excluding Antarctica) towards this goal using data on countries and their continents, youth NEET rates, and population data.

3.1 Unweighted Analysis

Figure 6 shows how youth NEET has changed over 22 years (2000–2022). Europe, Asia, and Africa show clear declines in NEET proportions, characterised by decreasing curves. Figure 7 presents a simplified version showing change over time. Europe's youth NEET decreased by 4.61% from 2000 to 2020, with similar falls of 3.80% in Asia and 4.94% in Africa.

Oceania and North America exhibit steadily worsening youth NEET, rising from approximately 17% in 2005

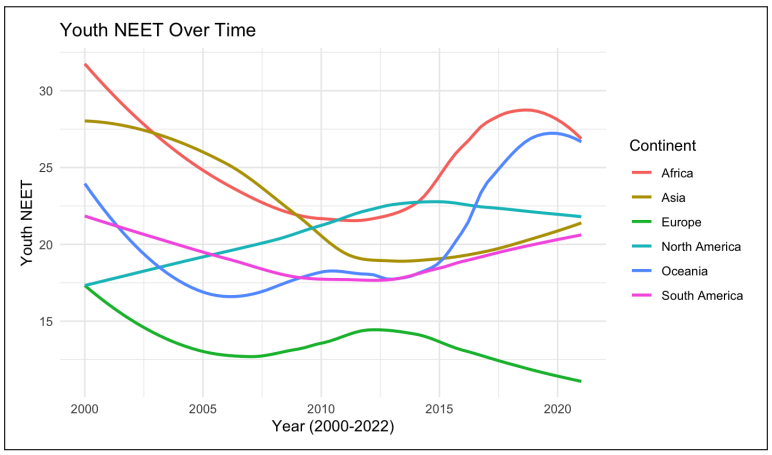

Figure 6: Youth NEET trends by continent (unweighted).

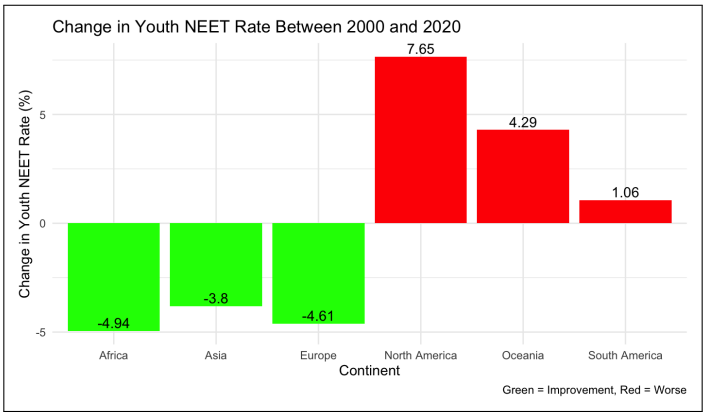

Figure 7: Change in youth NEET 2000–2020 by continent (unweighted).

to 27.5% in 2020 in Oceania, and from 17.5% in 2000 to about 21% in 2020 in North America. South America appears to have relatively neutral change between 2000 and 2020 in Figure 6. Youth NEET improved steadily from 2000 to 2012, falling by approximately 4.3%. After 2012, youth NEET worsened steadily, rising from about 18% in 2012 to about 21% in 2022. However, Figure 7 suggests youth NEET actually rose by 1.06% between 2000 and 2020. The disparity between Figures 6 and 7 arises because Figure 6 presents a smooth trend line across many countries and thus will not align perfectly with each data point. We chose smooth trend lines rather than connecting sequential points to enhance readability and reveal overall trends. Consequently, Figure 6 effectively shows overall trends over two decades but requires support from Figure 7, which provides more accurate individual data points.

3.2 Population-Weighted Analysis

Figure 8 shows youth NEET change over time weighted by population. Countries with larger populations have greater representation than smaller ones, preventing small countries (which are more likely to deviate from trend lines) from skewing data. This approach makes sense, as it would be inappropriate for China to have equal weighting with Bhutan. Figure 8 is effectively a more representative (and accurate) version of Figure 6; similarly, Figure 9 is more representative than Figure 7. This adjustment has substantial impact on our results. Once population is considered, all continents show reductions in youth NEET. The most notable difference is Oceania, which initially appeared to have worsening youth NEET but is actually the most improved continent, followed by Africa.

Using Oceania as an example, we can understand why incorporating population weighting made such a difference. Australia had youth NEET of 11.02% in 2013 (population: 23,236,271), whereas Nauru, Oceania's smallest country, had youth NEET of 36.4% for the same year (population: 10,539). Small countries like Nauru can thus distort data if weighted equally with much larger countries.

3.3 Analysis of Results

Using our more accurate population-weighted data (Figures 8 and 9), we observe that Oceania and Africa have indeed "substantially" reduced youth NEET by 2020. Figure 9 shows Africa reduced youth NEET by 13.12%

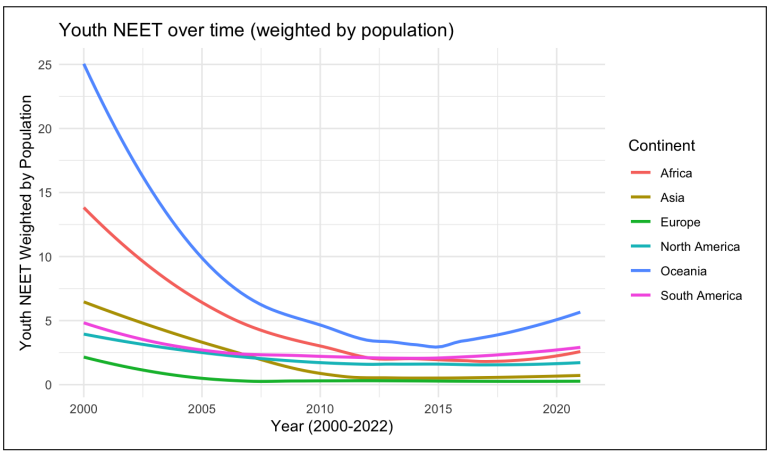

Figure 8: Youth NEET trends by continent (population-weighted).

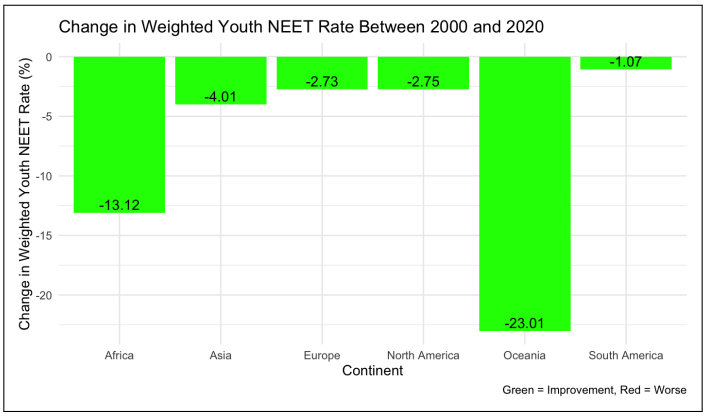

Figure 9: Change in youth NEET 2000–2020 by continent (population-weighted).

between 2000 and 2020, whilst Oceania reduced youth NEET by around 23% during the same period.

Africa: Africa's improvement can be attributed to multiple factors: substantial expansion in schooling and education through higher public spending and increased enrolment [9], rapid economic growth from commodity booms and urbanisation [10], large investments in technical and vocational training and youth employment programmes, and demographic changes alongside improved gender norms [9].

Oceania: Oceania's improvement stems from strong labour markets in Australia and New Zealand (which dominate the region). The region has invested in tertiary and vocational education and targeted programmes for Indigenous youth. Many Pacific islands have undergone labour mobility reforms [11], creating new employment opportunities.

Asia and Europe: Figure 9 shows Asia and Europe made good progress towards achieving UN SDG Goal 8, with youth NEET reductions of 4.01% and 2.73% between 2000 and 2020 respectively. These improvements can be explained by long-term economic growth and increased investment in education and training programmes [12]. Increased globalisation has helped these continents offer more employment opportunities, increasing the proportion of youth in employment.

The Americas: North and South America achieved only minimal improvements to youth NEET of 2.75% and 1.07% between 2000 and 2020 respectively. However, Figure 8 shows these continents already had relatively low youth NEET in 2000 (as did Europe and Asia), leaving limited room for improvement. For example, North America and Europe already maintained high rates of youth in education, making further improvements challenging. Oceania's apparently superior policies in Figure 9 may partially reflect their substantially higher youth NEET in 2000, offering greater room for improvement. Additionally, Europe and North America were among the worst affected by the 2008 Financial Crisis, causing spikes in youth unemployment and halting demand for skilled workers and training.

3.4 Conclusion

The goal to "substantially reduce the proportion of youth not in employment, education or training" by 2020 provides an imperfect measure of continental progress towards UN Sustainable Development Goal 8. Our data

show Oceania and Africa substantially reduced youth NEET, Europe and Asia achieved decent reductions, whilst the Americas lagged behind. However, regarding the goal of achieving full employment (or low youth NEET), all six continents performed quite well, achieving youth NEET below 5% in 2020 (Figure 8). Europe particularly excelled, maintaining incredibly low youth NEET (below 1% in 2020) whilst achieving good improvement despite already low percentages in 2000.

4 Overall Conclusions

This analysis of UN Sustainable Development Goal 8 reveals significant regional disparities in progress towards economic growth and youth employment targets. For economic growth, Asian LDCs demonstrate stronger performance than their African counterparts, primarily due to lower population growth rates and successful export-oriented policies. The slowing convergence of LDCs with developed economies post-2008, particularly following COVID-19, highlights the vulnerability of developing nations to global economic shocks.

For youth employment, all continents showed improvements when population weighting is applied, with Oceania and Africa achieving the most substantial reductions in youth NEET rates. Europe maintained exceptionally low youth NEET throughout the period, whilst the Americas showed more modest improvements from already favourable baselines.

The omission of 15 LDCs due to insufficient data suggests our findings may underestimate the challenges facing the poorest nations. Future analysis would benefit from improved data collection mechanisms in these countries to ensure comprehensive global monitoring of development targets.

References

[1] World Bank (2022). *Myanmar Economic Monitor: Reforms Reversed*. Washington, D.C.: World Bank Group.

[2] ISS African Futures (2025). *Ethiopia: Geographic Futures*. Pretoria: Institute for Security Studies.

[3] World Bank (2022). *Jordan Economic Monitor: Global Turbulence Dampens Recovery*. Washington, D.C.: World Bank Group.

[4] European Commission (2023). *Post-Programme Surveillance Report: Spain and Italy*. European Economy Institutional Papers. Brussels: European Commission.

[5] OECD (2022). *Mexico Economic Survey*. Paris: Organisation for Economic Co-operation and Development.

[6] IMF (2019). *IMF Lending Case Study: Jamaica*. Washington, D.C.: International Monetary Fund.

[7] CSPS (2017). *Economic Diversification in Brunei Darussalam*. Bandar Seri Begawan: Centre for Strategic and Policy Studies.

[8] MPRA (2025). *An Overview of Zimbabwe's Political and Economic Track 1980-2020*. Munich Personal RePEc Archive.

[9] Benveniste, Luis & Mpemba, Chido (2023). "Transforming Education and Skills Development in Africa". *World Bank Blogs*.

[10] World Bank Group (2025). "Economic Growth is Speeding Up in Africa, but Uncertainty Clouds Outlook". *The World Bank Group*.

[11] Jackson, Lagipoiva Cherelle (2025). "'Humanitarian' visa must be created for Pacific Islanders displaced by climate crisis, experts say". *The Guardian*.

[12] European American Chamber of Commerce (2025). "European Commission | Investment in education across Europe is on the rise, boosting for EU competitiveness".