

# Regional inequality in university attainment in seven African countries since 1960<sup>1</sup>

Rebecca Simson

Wadham College, University of Oxford

Rebecca.simson@wadham.ox.ac.uk

## ABSTRACT

Inequalities in access to university education are of concern across the world, but many countries in Africa have faced particularly pronounced regional and ethnic inequalities in educational attainment. Have such disparities increased or decreased since the 1960s? Using census data to trace the sub-national origins of university students in seven African countries (Botswana, Ghana, Kenya, Malawi, Tanzania, Uganda and Zambia) over successive birth cohorts shows that regional inequalities in access have taken a u-shaped path. In the first two decades of independence, as higher education expanded from a low base, graduates were growing more regionally and ethnically representative of the national populations. Since the 1980s regional inequalities have increased in most countries, on account of a growing attainment gap between people born in the largest cities and the remaining populations. This growing educational advantage accruing to those born in the main urban metropolises was initially driven by a slowdown in enrolment growth, coupled with high rates of skills-selective urban migration and higher educational performance in the urban regions. This new urban bias is rapidly changing the composition of the region's educational elites.

**Key words:** Africa; Tertiary education; Educational access; Regional inequality.

---

<sup>1</sup> The author would like to thank Leigh Gardner, Jennifer Kohler and Denis Cogneau for their helpful comments or suggestions. The author is grateful to the statistical bureaus of Botswana, Ghana, Kenya, Malawi, Tanzania, Uganda and Zambia for providing the underlying data that made this research possible, and for the support of the Economic History Society's Anniversary Fellowship and ESRC Postdoctoral Fellowship that enabled the undertaking of this research.

## 1. Introduction

The rapid expansion of university education around the world in the past decades has brought attention to questions about equity in university access (Atherton, 2016; Marginson, 2016; Shavit et al., 2007). Motivated by a growing demand for skilled workers in today's knowledge societies, as well as pressures to democratise access to higher education, countries around the world have expanded the size and scope of their tertiary education systems. Have these changes to university policy created greater opportunities for underprivileged groups to participate? Or has it primarily increased participation from groups and households that are already comparatively privileged? These questions are particularly pertinent in the African context, where university attendance is growing rapidly after a period of stagnation, and where equity in access, not only on a socioeconomic basis, but also on a regional and ethnic basis, is politically salient. Regional inequalities were a major political concern in the early independence era, as politicians were acutely aware of the political tensions resulting from geographic, and by extension, ethnic, disparities in educational attainment and incomes inherited from the colonial era (Frankema, 2012; Ladouceur, 1979; Olson, 1972). Several studies examined these educational fault lines in the 1960s and 1970s, but there has been comparatively little empirical research on how they have evolved since.<sup>2</sup>

This paper contributes to the evidence base by providing and analysing descriptive statistics on regional inequalities in university access in seven anglophone African countries over 50 years using census microdata (Botswana, Ghana, Kenya, Malawi, Tanzania, Uganda and Zambia). It uses census data in an innovative way to provide a historical perspective on educational inequalities and considers the effects of intergenerational transmission of education, internal migration, policy and location-specific determinants on the observed inequality trends.

The study finds that regional inequalities are long standing, with considerable continuity in the ranking of regions on the basis of university attendance. However, inequality in access fell in the first decades

---

<sup>2</sup> A big review study was conducted by the World Bank in 2017, which stressed the existence, and political salience, of regional and urban-rural educational disparities, but also showed the available data to be slim (Darvas et al., 2017, Ch.3).

of independence across all seven countries, as university attainment expanded from an exceptionally low base. But since the 1980s regional inequality has increased again, primarily due to a growing enrolment gap between people born in the main urban metropolises and the rest of their respective countries. This is likely a consequence of a skills-biased urban migration, and initially amplified by falling rates of attainment growth in the 1980 which dampened the pace of intergenerational educational mobility. The urban areas also appear to be more educationally dynamic, as residents have a higher likelihood of reaching university level irrespective of parental education. Conversely, there is little evidence that either affirmative action or regional favouritism is having any noteworthy impact on the regional origins of university students. Consequently, although regional inequality in university education is rising, it is less aligned with historic ethno-regional boundaries than in the past and is instead characterised by the forging ahead of people born in the main multi-ethnic urban metropolises.

## **2. Theories of educational inequality**

How educational inequalities are reproduced and relate to the structure and size of the higher education system is a topic of considerable research globally (Bernardi & Ballarino, 2014; Geven, 2018; Johnstone & Marcucci, 2010; Marginson, 2016, 2018; Shavit et al., 2007). Educational inequalities are commonly discussed in relation to social strata: how far does an individual's socioeconomic background determine educational achievement? The starting assumption is that families with educational and economic advantages are better placed to invest in- and promote the education of their children, contributing to an intergenerational transmission of educational advantage that reproduces existing income group disparities. Governments can intervene to reduce the impact of family background on educational performance, but cannot completely erase its effects (Marginson, 2018).

How various policy interventions affect equality of access remains debated. Governments may use quotas, affirmative action, or needs-based aid to deliberately alter the composition of the university student body. The structure and size of the tertiary sector – whether state or privately funded, the types of tertiary providers, and eligibility criteria - may advertently or inadvertently affect the composition of the student body. Simply expanding the size of the tertiary system, as many countries have done in

recent decades in part to widen participation, has ambiguous effects on equality. Shavit et al (2007) find some relationship between education expansion and inequality reduction in a sample of industrialised countries, but only where educational attainment at the given level is approaching universality or growing exceptionally fast. Bernardi and Ballarino (2014) find a moderate correlation between the size of the tertiary education system and the level of inequality in Europe, while Geven (2018) finds no clear relationship between the rate of expansion and change in inequality across 28 European countries. Studies from developing regions also tends to highlight high, and possibly rising rates of intergenerational transmission of educational status during the last decades of rapid attainment growth, although trends are not always easy to establish. There is evidence of rising inequality in tertiary education in China (Ou & Hou, 2019); and high contemporary levels of inequality in for instance the Middle East and North Africa (Krafft & Alawode, 2018); Latin America (Sarmiento Espinel et al., 2019); and Africa (Darvas et al., 2017).

Regional and ethnic inequality dynamics are partly an extension of an intergenerational transmission of educational performance, as regions or ethnic groups with more educationally advantaged parents will produce more educationally advantaged children. But regional gaps may also be fuelled by additional factors, such as migration, geographic economic inequalities, and community effects. Conversely, government policy can also be used to explicitly target select regions and communities.

Migration often reinforces regional educational disparities, as rural-urban migration rates are commonly higher among the highly educated (Becker, 2008; Becker & Morrison, 1993; Sabot, 1979). This selective migration therefore tends to concentrate the educated in urban areas.

Economic geography may also create an uneven pattern of educational demand that favours educational growth in leading regions. Geographic variation in the returns to skill may encourage greater educational investments among households in regions where returns are higher (Goldin & Katz, 1999). Information asymmetries and financial market failures may dampen educational investments in areas farther from the educational and financial centres.

There may also be local externalities to education (Wantchekon, 2016). Children from poorer households living in richer regions may benefit from better schools and teaching. They may also benefit from a demonstration effect, by living in communities where there are educationally successful role models to emulate. Furthermore, the culture and character of the community may shape regional educational outcomes. Some evidence suggests that (ethnically/racially/economically) homogenous communities are better able to overcome collective action constraints that hamper local educational development, leading to better supply of public goods such as education (Goldin & Katz, 1999; Miguel, 2004).

Governments have a range of levers with which to tilt this playing field in the direction of specific regions or ethnic groups. Quotas and affirmative action can be used to target people from specific regions or groups (as has been done to quite radical effect in Malaysia, for instance (Tzannatos, 1991)). Public investments in educational infrastructure may target lagging or leading regions disproportionately, thereby altering local demand.

However, whether government interventions will mitigate or exacerbate existing inequalities is not always obvious. The African literature in particular, has often emphasised the impact of ethnic and regional politics on educational outcomes. Some have argued that African presidents tend to direct educational resources to their co-ethnic communities, thus altering the regional pattern of educational spread and in some cases amplifying inequalities (Franck & Rainer, 2012; Kramon & Posner, 2016; Li, 2018). Other have argued that African governments, at least in the early independence era, pursued inclusive policies. Because these new states lacked strong national cohesion, it has been argued, independence leaders gave attention to regional balance and inclusion and directed resources to underserved regions (Azam, 2008; Boone, 2007, p. 63; Ladouceur, 1979, p. 7). Education is thought to have played a particularly prominent role in this process of regional integration as universities became sites for integrating elites from across regions and ethnic groups (Gould, 1974, p. 375; Kpessa et al., 2011).

What has been the consequence of these different structural and policy dynamics on higher education participation? While there is a growing body of literature that identifies the nature of inequalities and

elite biases in higher education in African countries (Addae-Mensah, 2000; Atuahene & Owusu-Ansah, 2013; Carr-Hill, 2020; Darvas et al., 2017; Iddrisu et al., 2017; Morley et al., 2009), and some work on spatial and ethnic disparities (Umar, 2014); no known studies provide comparative evidence on long term trends in regional inequalities and their drivers.

### **3. Higher education expansion in Africa**

The pace of university expansion in much of Africa has oscillated over time. In the 1960s Sub-Saharan Africa's university system was rudimentary, with a lower proportion of universities to population, and lower gross enrolment rates, than in any other region of the world.<sup>3</sup> Figure 1<sup>4</sup> traces the expansion of university education since independence in the focus countries, and points to several phases of expansion. Most of the countries saw rapid enrolment growth in the 1960s or 70s from this initial low base. In the 1980s and 1990s enrolment rates remained flat or falling in many countries, before a period of rapid university expansion in the late 1990s or 2000s. Although the focus countries continue to have low university attendance rates by global standards, this belated process of educational expansion mirrors the global trends towards the massification of higher education in the second half of the 20<sup>th</sup> century (Marginson, 2018; Zeleza, 2016).

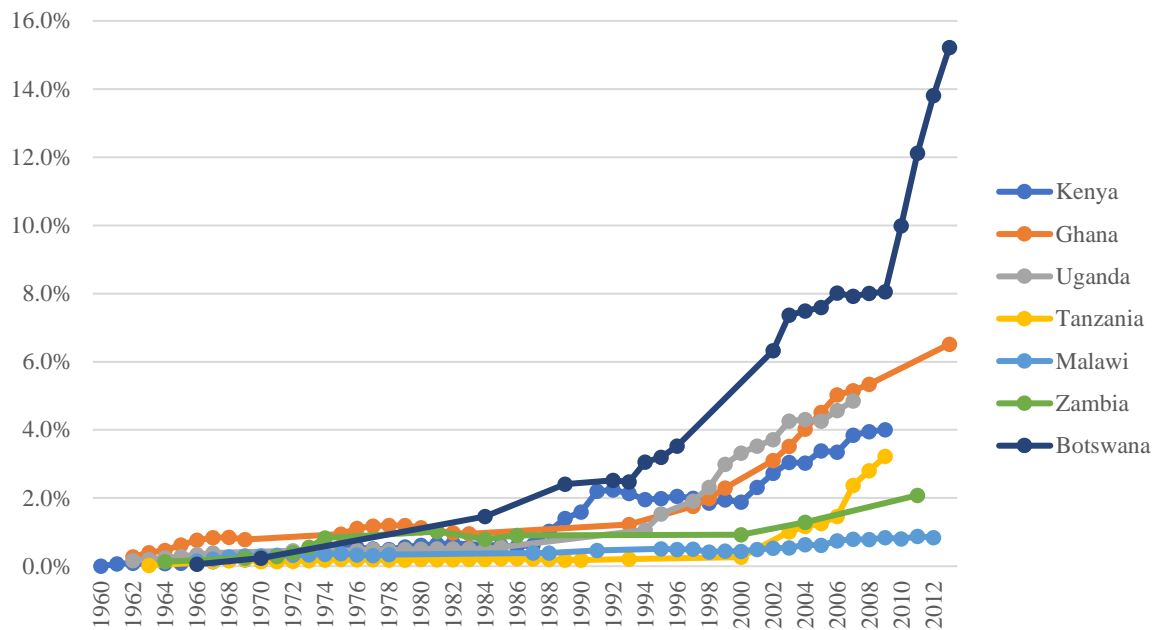
These different periods of university expansion were shaped by different policy imperatives, and thus are likely to have had different distributional consequences. On the eve of independence most of the countries were served by regional university colleges, with one college serving several colonies. With independence the intake began to increase as several new national universities were founded or expanded, although like their colonial predecessors, these institutions tended to be clustered in capital cities or other central locations.

---

<sup>3</sup> If comparing the number of universities and enrolment cited in Zeleza (2016, Table 1.1 and Table 1.5) with population data from the World Development Indicators.

<sup>4</sup> These are rough estimates, calculated by dividing total university enrolment by the estimated size of the cohort aged 20-23. As the statistical records do not always distinguish clearly between degree, diploma and polytechnic students or domestically and internationally educated ones, the level differences between countries should be treated as tentative.

**Figure 1. Estimated gross university enrolment, c.1960-2010**



**Sources:** Author constructed, for full list of sources see Appendix A.

The physical location of these universities, however, was not intended to influence the composition of the admitted students. Governments sought to select the top performing secondary school graduates from across the country and bring them to a central location to create a multi-ethnic educational elite that could replace expatriates in the public service and industry (Hughes, 1987; Oanda & Jowi, 2012). Financial barriers to university access were purposely kept low, as governments subsidized fees, accommodation, meals and travel expenses.

Yet despite low financial barriers to access, the pool of eligible university applicants was largely a function of the regional distribution of primary and secondary schooling. The density of schools was correlated with the economic development and missionary penetration, thus the university student bodies tended to reflect broader regional economic inequalities. Many governments introduced policies to try and level the playing field, such as loosely defined regional quotas, either at university level (e.g. Malawi), or secondary school level (e.g. Tanzania, Kenya) (Gould, 1974, p. 379; World Bank, 1978). But this affirmative action tended to be mild, and whether it had any significant redistributory impact remains debated (Blakemore & Cooksey, 1980).

In the 1980s and 1990s growing economic hardship and fiscal constraints began to impinge on further university growth. As education budgets declined, many governments restrained the growth in enrolments and cut per student costs. Spending per student, as a multiple of GDP per capita, halved between 1985 and 1995 across a sample of African countries and enrolment growth stagnated (cited in Marcucci et al., 2008, p. 104). This intensified the competition for scarce university places and increased the importance of family means on the likelihood of attending university (Oanda, 2013; World Bank, 2001, p. 66).

The growing pressure for admissions on the slim and fledgling university sector, combined with pressure from international donors, eventually led to structural reforms. Most countries (particularly non-resource rich ones) began to liberalize the provision of tertiary education in the late 1990s or early 2000s, by expanding cost-recovery systems and allowing the establishment of private universities, which triggered a growth in tertiary enrolment (Johnstone & Marcucci, 2007; Marcucci et al., 2008).

Private universities account for some of this enrolment growth. Private universities accounted for 59% of all universities in Africa in 2015 (Zezeza, 2016, p. 69), although a considerably smaller share of students. The bigger enrolment growth however, has been within public universities, as the introduction of fees and other cost recovery programmes allowed an expansion in student numbers. In many countries a two-tiered system emerged, with a small, highly competitive and ostensibly free university system for the highest educational performers, alongside growing fee-paying schemes within the public universities, which only required applicants to meet minimum entry requirements (Teferra, 2013, p. 4). The establishment of new university campuses also contributed to the geographic spread of higher education beyond the main urban centres (Oanda & Jowi, 2012).

The pace and scope of these reforms has varied across countries (as reflected in differences in the pace of university expansion shown in Figure 1). Reforms started early in Uganda in the early 1990s; Ghana and Zambia followed in the late 1990s and Kenya introduced parallel programmes in public universities around 2000 (Darvas et al., 2017, p. 92; Marcucci et al., 2008; Masaiti & Shen, 2013; Oanda, 2013). In Tanzania and Malawi reforms proceeded more cautiously. Tanzania introduced cost recovery policies in 1995, but self-financing students remain a comparatively small share of the total student body



(Ishengoma, 2013). Malawi's retained its small and selective university system into the 2000s and did not introduce a parallel fee-paying scheme akin to its neighbours (Darvas et al., 2017, pp. 85–86; Dunga, 2013). Botswana is perhaps the most anomalous among the case studies. While it started from an exceptionally low educational base at independence, the country's economic success facilitated rapid university expansion in the 1980s, and by the late 1990s Botswana's enrolment rates were well above the other case study countries. Private tertiary education was slower to expand, although it has begun to grow in the wake of the 2008 crisis (Samboma, 2017).

How has the regional composition of the university educated population changed over the course of these different university policy 'regimes'? The following sections will measure and analyse regional inequality in university attainment across time.

#### **4. Method and Data**

Recent census data allows us to measure regional inequality trends in university access across birth year cohorts. Because schooling is usually obtained at a set age, educational attainment, examined on a cohort basis, offers a historical perspective on determinants of access in the past. Consequently, many papers have used cross-sectional data on educational attainment to study the impact of policy or political change on past enrolment (Franck & Rainer, 2012; Kramon & Posner, 2016; Somerset, 2007). Using a similar approach, this paper estimates inequality in university attainment on a region of birth or ethnicity basis over successive birth cohorts, which gives a picture of how the university educated population has changed over time.

To measure regional inequality, it uses a Theil-T index of between-region inequality in university attainment across birth cohorts. Entropy indices, such as the Theil index, are increasingly used to measure income inequality using semi-aggregated data at industry or regional level (Galbraith, 2012, Chapter 2). They also have some precedence in the study of within-country inequalities in educational access (D' Hombres, 2010; Umar, 2014). The Theil index has the advantage that it allows the between-

group inequality to be decomposed by group, thus showing which groups are contributing to the given level of inequality.<sup>5</sup>

The Theil index is given by the equation below, where  $p_i$  is the population born in region  $i$ , and  $u_i$  is the proportion of people born in region  $i$  that have university education. The ‘Theil element’ for each region is the product of the region’s population share and its level of university attainment relative to the national mean, multiplied by the logarithm of the relative attainment level (Galbraith, 2012, p. 30). The ‘between-groups component’ of the Theil index is the sum of all Theil elements. Thus in a world of perfect regional equity, where  $u_i = \mu$ , the index is equal to 0.

$$(1) \text{ Theil Index} = \sum_{i=1}^m \left( \frac{p_i}{P} * \frac{u_i}{\mu} * \ln \left( \frac{u_i}{\mu} \right) \right)$$

This inequality index is calculated using census microdata from the Minnesota Population Center’s IPUMS International (available as 10% samples of the full census), and measured over successive five-year birth year cohorts, starting with people born in 1940-44, who would have been of university age around 1960. The data from each country is analysed individually (the data is not pooled). Note that the observed levels of inequality are not comparable across countries, as these are shaped by the number and nature of subnational boundaries, but the direction of change can be compared.

As an alternative approach, I also exploit the availability of multiple censuses and treat each as a single cross-section. This analysis compares the changing regional origins of 25-29 year olds that have university education across successive censuses. While this second set of calculations limits the analysis to the years of the censuses, it is less sensitive to survival and migration biases (discussed below).

Inequality is measured across administrative regions, usually by province or district. Subnational boundaries in Africa tend to have long histories (new divisions are often nested within old ones), and often reflect (albeit imperfect) colonial era understandings of ethnic group boundaries. Thus these boundaries capture at least some of the politically salient ethnogeographic divisions across the sampled

---

<sup>5</sup> As an alternative to the Theil, a population-weighted coefficient of variation has also been tried, and gives consistent results.

countries. In three cases (Ghana, Malawi and Uganda), the censuses also provide data on ethnic identity, allowing a separate analysis based on self-reported ethnicity.<sup>6</sup> For practical purposes, this paper categories only those ethnic groups that constitute at least 2% of the population separately, and groups the remaining smaller ethnicities into a single category.

The university education variable is drawn from the country-specific educational variable that measures a respondent's highest level of educational attainment. Where possible, it includes respondents who did not complete their education or are still attending university, as the focus is on policies shaping admission rather than completion. However, as these are self-reported levels of educational attainment they are be sensitive to aspirational reporting. By limiting the analysis to a single census however, such measurement errors should apply equally across all regions.

A description of the datasets is provided in Table 1. The share of the population with university attainment varies widely across regions and countries. Attainment is highest in the capital cities, except for the case of Malawi, where the commercial centre, Blantyre, has the highest attainment. Note that in Kenya, Tanzania and Uganda the capital city is a separate region or district, while in Botswana, Malawi, Zambia and Ghana the main cities are nested in a larger, and partly rural, regions, which explains the smaller gap between leading region and the mean in those cases.

**Table 1. Description of data**

Census	Obs	Admin units	# ethnic group categories	Birth cohorts included	Average university attainment	Lowest regional attainment	Highest regional attainment
Botswana 2011	71,194	8 regions <sup>7</sup>	-	1945-1984	6.4%	2.9% (Kgalagadi)	13.5% (South East, incl. Gaborone)
Ghana 2010	671,456	10 regions	14	1940-1979	2.9%	1.4% (Northern)	7% (Greater Accra)
Kenya 2009	971,063	47 counties / 8 provinces	-	1940-1979	2.7%	0.4% (Turkana)	16.5% (Nairobi)
Malawi 2008	327,425	26 districts	8	1940-1979	0.8%	0.2% (Machinga)	2.7% (Blantyre)
Tanzania 2012	1,303,756	19 regions <sup>8</sup>	-	1940-1984	2.2%	1.1% (Lindi)	8.5% (Dar es Salaam)

<sup>6</sup> Respondents choose from a list of ethnic category options but are required to select only one option. In Uganda people of mixed ethnicity are asked to choose which ethnicity they want recorded, while in Malawi they are encouraged to record their father's or mother's ethnicity depending on whether they are in a 'paternal or maternal system'.

<sup>7</sup> 2011 regional divisions reclassified into historic provinces, with some modifications.

<sup>8</sup> 2012 regional divisions reclassified into historical regional divisions to allow comparisons across censuses.

Uganda 2002	590,082	15 district groups <sup>9</sup>	14	1940-1974	1.3%	0.3% (Karamoja)	9.8% (Kampala)
Zambia 2010	270,866	10 provinces	-	1940-1979	1.2%	0.7% (Luapala)	2.6% (Lusaka)

Despite the large sample sizes, these datasets and the method of analysis have their weaknesses. Sampling error is a concern for the older and thus smaller cohorts, and the results for these outer years are therefore less reliable. Furthermore, the assumption that present day attainment rates mirror past enrolment rates needs interrogation. Importantly, the analysis rests on the assumption that education is undertaken at a specific time in life, i.e., that university entrants are (roughly) 18-23 years of age, although we know that in practice, many university students are older than this. This may bias the inequality estimates for the youngest cohorts, if the tendency to pursue a university degree later in life varies across regions or ethnic groups. To minimize the impact of this bias I therefore use a high cut-off age, and only include respondents aged 30 and above in the sample.<sup>10</sup>

A second concern is that survival bias may skew the sample. As education is correlated with income, the highly educated tend to live longer than their lower-educated compatriots. Attainment rates will therefore be overstated for the older cohorts. However, as the interest is in measuring regional inequalities rather than attainment levels per se, this is only a problem if the educated: non-educated survival ratios are themselves different across regions or ethnic groups. In Appendix B also exploit the existence of multiple censuses to demonstrate that the main results remain valid even when using multiple cross-sections.

Lastly, the results may be skewed by international migration if graduates from certain regions have had a higher propensity to migrate than others. In a different paper I have sought to place an upper bound on the possible share of Kenyan, Tanzanian and Ugandan graduates that left the continent (AUTHOR'S WORK TO BE CITED). It concluded that in the order of 5% of university graduates in these countries may have emigrated to Europe, North America and Australia between the mid-1960s and early 2000s. While not insignificant, this level of migration is unlikely to dramatically skew the results presented.

---

<sup>9</sup> 2002 district divisions reclassified into aggregate district groupings, following the 2014 census report.

<sup>10</sup> The appendix C provides a sensitivity analysis to look at the potential size of the remaining bias and finds it to be small.

## *Hypotheses*

The analysis will discuss possible drivers of these trends in regional inequality in university access, building on the following hypotheses.

### *Intergenerational transmission of educational privilege*

Intergenerational transmission of educational privilege is likely to preserve existing regional inequalities, presuming moderate levels of migration. The ability of highly educated families and communities to promote their children educationally will ensure that the highly educated continue to be concentrated in the same regions as at the start of the period.

### *Educational expansion*

However, taking some degree of intergenerational transmission of educational attainment as a given, educational expansion better enables intergenerational educational mobility and vice versa. To see why this is the case it is helpful to think of education as a binary variable, and imagine a world where some parents have education and others don't. Those families with education are better able to promote their children's educational attainment. Assuming no difference in family size between educated and uneducated households, when access is expanding rapidly then all educated households can educate their children, and still leave some space for children of the uneducated to advance. As argued by Raferty and Hout (1993), as demand for education by the privileged strata is saturated, the system becomes less selective and more inclusive. This ought also to improve the regional distribution of education too, presuming that these first-generation graduates are drawn from across the country. At the extreme, as educational attainment approaches 100%, inequality, by definition, approaches 0. Conversely, if educational access is decreasing, the children of the existing educational elite will tend to outcompete others and capture a larger share of the available educational opportunities, by extension increasing inequalities.

### *Skills-selective migration*

Skills-selective migration will push against regional educational convergence. If a disproportionate share of the newly educated migrate to the regions where educational attainment is high (such as the capital city or other economically dynamic regions), their children, who now possess an educational advantage, will be enumerated in the advantaged region, thus amplifying existing regional inequalities.

#### *Location-specific effects and externalities*

Regional differences in educational attainment may also be caused by factors beyond intergenerational transmission of educational privilege. Holding parental education constant, educational attainment could differ across regions, if, for instance, children in urban areas have wealthier parents who can invest more in their education, or have easier access to quality schools, more role models to emulate, or are willing to make greater investments because they anticipate higher returns to skill. This will most likely tilt attainment further in the direction of the educationally advantaged areas, contributing to further inequality.

#### *Policy or political intervention*

Governments can tilt this playing field through regulation or uneven patterns of educational investment. Governments may distribute resources inequitably so that education becomes comparatively cheaper and more accessible in some regions than others, thus boosting access in said region. Or, as in the case of university education, they may simply restrict or promote entry to state universities through explicit quotas or other forms of non-meritocratic selection criteria. Such government interventions could be either inequality reducing or increasing, depending on the criteria used. Regional quotas, which by design lower the entry barriers to candidates from educationally lagging regions, will reduce inequality. Politically motivated ethnic/regional favouritism could have either effect, depending on whether the favoured region(s) is educationally lagging or leading.

The next sections will discuss the observed inequality trends in relation to these drivers.

## Results

### *4.1. Persistence in regional educational inequalities*

As a first exercise, Table 2 considers educational persistence, by measuring the strength of the association between a region's relative university attainment rank and its colonial era educational rank. The table gives the spearman rank correlation coefficients, comparing university attainment levels for the youngest cohort in the sample, those born 1975-79, with the average years of schooling for cohorts born 1930-39, by region of birth.

In several countries – Kenya, Botswana, Ghana and Zambia – the persistence is strong (~0.7 or above). Much of the regional variation in university attainment is ‘explained’ by educational levels among those educated under colonial rule. Regional disparities in Malawi, Uganda and Tanzania are also correlated with colonial era inequalities, but the association is weaker, suggesting greater change to the economic geography of the countries in the postcolonial era. In all cases however, historical inequalities in educational attainment continue to cast a shadow over today's educational landscape.

**Table 2. Rank correlation between recent regional university attainment and colonial-era average years of schooling (\* = significance at 0.05)**

Country	Obs	Coefficient
Botswana	20	0.79*
Ghana	10	0.85*
Kenya	47	0.77*
Malawi	26	0.61*
Tanzania	19	0.48*
Uganda	15	0.63*
Zambia	10	0.68*

Source: Minnesota Population Center, 2017.

### *4.2. Trends in regional inequality*

To examine how regional disparities have changed over time, Figure 2 measures regional inequality in university access by five-year age cohort and country. To illustrate the intuition behind these indices, Table 3 uses Kenyan data to measure the share of population with university education by province of birth and age cohort. It provides data for the cohorts born between 1940-44, 1960-64 and 1975-79. If

the average student enters university at age 20, these cohorts would have been admitted to university in the early 1960s (around the time of independence), early 1980s and late 1990s respectively.

Among people born in 1940-44 and educated around the time of independence, 11% of the (small) Nairobi-born population is university educated, while for the national population as a whole, less than 1% are. For cohorts born twenty years later the range has narrowed, owing largely to the declining over-representation of the Nairobi-born. While attainment rates among the Nairobi-born remained roughly steady, they increased sharply across the rest of the country. Fifteen years later, among those educated in the late 1990s, the trend has reversed again, as Nairobi-born university attainment increased while the national average remained steady. This inequality dynamic is captured by the Theil index, which shows a decline in regional inequality between the cohorts born in the 1940s and 1960s, and a rise in inequality between the 1960s-born cohort and those born in the late 1970s.

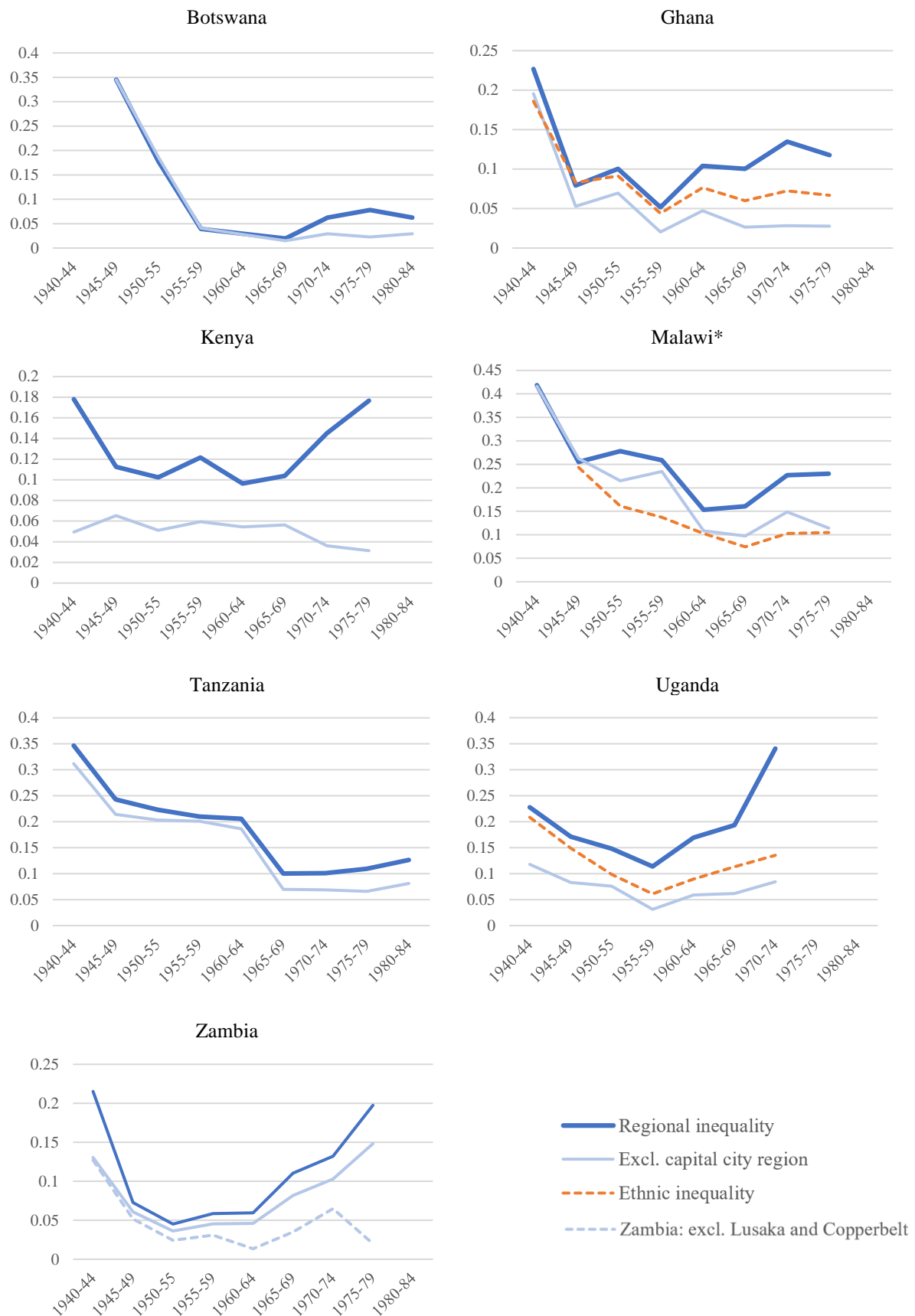
**Table 3. Kenya: Share of population with university education by province of birth and birth cohort**

Province of birth	% of birth cohort with university education (standard errors)			Population share		
	1940-44	1960-64	1975-79	1940-44	1960-64	1975-79
Nairobi	11.3% (0.0201)	12.0% (0.0084)	18.5% (0.0051)	0.6%	1.2%	2.4%
Central	1.2% (0.0012)	3.6% (0.0012)	3.4% (0.0009)	21.2%	18.5%	16.5%
Coast	0.7% (0.0016)	1.7% (0.0014)	1.7% (0.0010)	7.4%	6.9%	7.5%
Eastern	0.6% (0.0009)	1.9% (0.0009)	2.4% (0.0007)	19.7%	19.1%	18.8%
North East	0.4% (0.0019)	0.8% (0.0012)	0.8% (0.0009)	2.9%	4.5%	4.6%
Nyanza	1.1% (0.0013)	3.5% (0.0013)	3.2% (0.0009)	15.2%	15.8%	15.2%
Rift Valley	0.5% (0.0008)	1.9% (0.0009)	2.6% (0.0007)	18.6%	19.9%	21.9%
Western	1.0% (0.0013)	2.3% (0.0011)	2.6% (0.0009)	14.4%	14.0%	13.1%
National average	0.9% (.0005)	2.6% (.0005)	3.0% (.0003)			
Max/min ratio	28	15	23			
Max/mean ratio	12.6	4.6	6.2			
<b>Theil index</b>	<b>0.18</b>	<b>0.10</b>	<b>0.18</b>			

Source: Author's calculation using Kenya 2009 Housing and Population Census, Minnesota Population Center, 2017.



**Figure 2. Theil index of between-region of birth or ethnicity inequality in university attainment by cohort**



\*Malawi light blue line excludes Blantyre rather than Lilongwe.

Source: Author's calculations using census data from Minnesota Population Center, 2017.

This exercise is repeated for Botswana, Ghana, Malawi, Tanzania, Uganda and Zambia and the resulting Theil index is plotted by five-year birth cohorts (Figure 2). A u-shaped inequality trend is evident across all samples. In all cases, regional disparities in university access narrowed across cohorts educated in the first 15-25 years of independence and increased thereafter. The turning point varies across countries. In Botswana, Kenya, Tanzania and Malawi disparities decreased between those cohorts born in the early 1940s and those born in the early or late 1960s. In Ghana, Uganda and Zambia the rebound started earlier, with an uptick in inequality among the cohorts born in the late 1950s or early 1960s. Assuming that the average student starts his or her university education at age 20, the resurgence in regional inequality access started in the early 1980s in Ghana and Uganda, and in the late 1980s or early 1990s in Botswana, Kenya, Malawi, Tanzania and Zambia. The rise in inequality roughly coincided with the peak of the economic crises in these countries, before the liberalisation reforms of the late 1990s and 2000s. In Botswana, Zambia and Uganda the inequality rise has been particularly steep. Regional inequality in university access rose moderately in Kenya, Malawi, Ghana and Tanzania.

To examine which regions are driving this inequality rise, Figure 2 also includes a second set of lines that trace regional inequality with the exclusion of the capital city (or in the case of Malawi, the commercial centre, Blantyre). In most cases this reduces the observed level of inequality and weakens or flattens the upturn considerably. Most of the recent rise in inequality is driven by the growing size and educational advantage of the capital city region relative to the rest of the country.

Ethnic inequality in Ghana, Malawi and Uganda, in contrast, also plotted in Figure 2, similarly declined in the first two decades of independence, but shows a weaker increase in inequality since the 1980. If the capital city region were removed from these estimates, the ethnic inequality rise would be virtually non-existent. This suggests that in these countries at least, economic geography, rather than ethnicity per se, is driving the rebound in regional inequality.

The appendix also provides country-by-country charts that decompose the Theil by region, showing which regions have driven the decline or rise in inequality. The fall in inequality among cohorts educated in the first decades of independence was a consequence of declining exceptionalism of the main urban regions. In Kenya, besides the overrepresentation of the Nairobi-born, the other main urban

areas also saw a relative decline (Mombasa, Kisumu, Kiambu). In Tanzania inequality in attainment among the early independence cohorts was driven by the overrepresentation of Dar es Salaam and Kilimanjaro, the main centre of cash crop production and European settlement during the colonial era, which subsequently declined in educational importance. In Zambia the overrepresented regions map onto the colonial railway lines, with higher attainment among the older cohorts born in Lusaka, the Copper Belt and the Southern Region. In Malawi, Blantyre and districts in northern Malawi, where missionary school penetration was historically higher, are overrepresented among the older cohorts. In Ghana it is primarily greater Accra and the Ashanti region that initially dominated, and in Uganda, Kampala and the central region. Botswana is somewhat anomalous in that the economic geography of the country changed at independence with the creation of a new capital city, but the colonial commercial centre, Francistown, in the North East, predictably shows a falling relative share.<sup>11</sup>

As an alternative analysis, which enables examination of more recent change, Table 4 provides inequality estimates across successive censuses for the age cohort 25-29. Zambia is excluded from this analysis due to inconsistencies in the measurement of educational attainment across censuses. This shows continued growth in inequality for the more recent graduates educated in the 2000s, except in Botswana. The growth was particularly marked in Ghana and Uganda; modest in Kenya, Malawi and Tanzania; while regional inequality fell slightly in Botswana for this youngest cohort. The capital city region has continued to drive the rise in regional inequality amongst the youngest cohorts.

**Table 4. Regional inequality in university access, measured across censuses**

Country	Theil for age group 25-29	c.1990	c.2000	c.2010	Census years
Botswana	Regional inequality		0.079	0.072	2001, 2011
	<i>Excl. capital</i>		0.049	0.028	
Ghana	Regional inequality		0.04	0.17	2000, 2010
	<i>Excl. capital</i>		0.01	0.06	
Kenya <sup>12</sup>	Regional inequality	0.12	0.16	0.19	1989, 1999, 2009
	<i>Excl. capital</i>	0.03	0.03	0.02	
Malawi	Regional inequality	0.23		0.26	1987, 2008
	<i>Excl. Blantyre</i>	0.22		0.11	

<sup>11</sup> The Botswanan results also suggest an overrepresentation of Ngamiland, which is most likely a coding error. The 2011 census has coded an implausibly large share of Francistown residents as born in Ngamiland, a pattern that is not evident in the 2001 Botswanan census.

<sup>12</sup> Note, because of smaller sample sizes, this analysis uses provincial rather than district groupings.

Tanzania	Regional inequality <i>Excl. capital</i>		0.07 <i>0.04</i>	0.10 <i>0.07</i>	2002, 2012
Uganda	Regional inequality <i>Excl. capital</i>	0.23 <i>0.07</i>	0.39 <i>0.09</i>		1992, 2002

Source: Minnesota Population Center, 2017.

In sum, the results suggest a universal decline in university attendance inequality in the first 15-20 years of independence followed by growing inequality since roughly 1980. This inequality rise was driven by growing disparities between the capital city region and the rest of the country, or, in a few cases, other commercial metropolises, such as Blantyre in Malawi, and the Copperbelt in Zambia. What has driven this u-shaped trend?

#### 4.3. Educational expansion and intergenerational mobility

As hypothesised, high rates of attainment growth are likely to aid regional convergence in educational attainment and vice versa. Table 5 therefore examines the share of respondents with university education across cohorts born in 1940, 1960 and 1975, and the rate of growth in attainment across these cohorts. Attainment levels more than doubled between 1940-60 in all countries except for Ghana, where university attainment growth started and peaked earlier. This created better preconditions for a levelling of educational access. Growth in attainment slowed or reversed in the second period (1960-75), thus weakening the convergence force. Thus by the late 1970s, children of the (now larger) existing educational elite could more fully fill the available university places.

**Table 5. Estimates of university attainment across cohorts and by country**

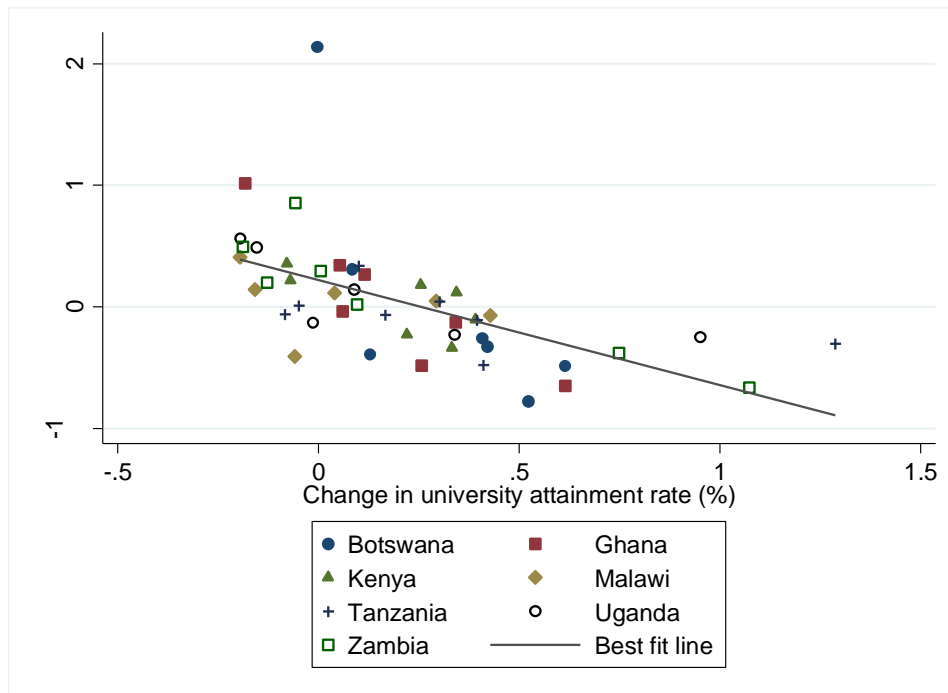
Inequality growth since 1960		University attainment (% with uni education)			Growth in attainment	
		Cohort born 1940-44	Cohort born 1960-66	Cohort born 1975-79	Cohorts born 1940/44-60/64	Cohorts born 1960/64-75/79
High	Botswana	0.9%	4.7%	7.2%	422%	53%
High	Zambia	0.4%	1.5%	1.0%	275%	-33%
High	Uganda	0.6%	1.3%	1.2%*	117%	-8%
Medium	Kenya	0.9%	2.6%	3.0%	189%	15%
Medium	Malawi	0.3%	0.9%	0.8%	200%	-11%
Low	Ghana	1.4%	2.5%	3.8%	79%	52%
Low	Tanzania	0.5%	1.6%	2.8%	220%	75%

\*1970-75.

Source: Minnesota Population Center, 2017.

Figure 3 compares the growth in the inequality index and the growth in the attainment rate across each cohort. It shows a strong negative relationship (statistically significant,  $p < 0.01$ ). On average, inequality was declining faster for cohorts that experienced higher attainment growth and vice versa.

**Figure 3. Correlation between the change in regional inequality and the change in the university attainment rate, by cohort and country**



Source: Author's calculation using census data from Minnesota Population Center, 2017.

#### 4.4. Skills-selective urban migration

Skills-selective internal migration may also have contributed to this reversal in the regional convergence of university attainment rates. Table 6 shows that skilled internal migration is high across all the country cases. Between a third and half of all university graduates born outside the capital cities in the early 1960s had migrated to the capital by the time we observe them in the censuses of the 2000s. How has this reconfigured geographic inequality in university attainment?

The table below compares the inequality in university attainment on a region of birth basis and residential basis for each of the seven countries, focusing, for illustration, on the cohort born 1960-65. In all cases inequality is considerably higher on a residential than birth basis. Assuming that most of

the children of these highly educated urban migrants were born in the capital cities, and that they in turn stand a disproportionately high probability of attending university, this will, in the next generation, sharply increase the share of urban-born university graduates. Internal migration, then, has likely had a significant impact on the geographic location of the educated segment of the populations.

The effect of migration has been particularly marked in Botswana and Zambia, and to a lesser extent Uganda, the three countries with highest rates of regional inequality growth. Botswana is an interesting case, as Gaborone, the capital, was only founded after independence. Therefore, the capital region did not inherit a marked educational advantage at independence, but has experienced rapid skills-selective migration since. Gaborone's educational advantage therefore grew from an unusually low base, which contributed to a rapidly rising regional inequality index for Botswana.

**Table 6. Inequality by birth region and residence region compared, for cohort born 1960-64**

Inequality growth (1960-75)	Country	% of university-educated migrated to capital*	Inequality by birth region ( $I_b$ ) (Theil index)	Inequality by residence region ( $I_r$ ) (Theil index)	Ratio of $I_r/I_b$
High	Botswana	47%	0.04	0.36	934%
High	Zambia	51%	0.06	0.51	844%
High	Uganda	33%	0.17	0.51	300%
Medium	Kenya	32%	0.10	0.25	259%
Medium	Malawi**	30%	0.15	0.45	293%
Low	Ghana	30%	0.07	0.15	217%
Low	Tanzania	35%			

\*Share of university-educated respondents enumerated in the capital city, but born outside it.

\*\* Blantyre

Source: Minnesota Population Center, 2017.

#### *4.5. Location-specific effects and policy and political intervention*

As discussed above, holding parental education constant, educational attainment levels may differ across regions, if, for instance, children in certain areas have parents with more resources to investment in their education, face easier access to (quality) schooling, or anticipate higher returns to skill. Alternatively, an effective affirmative action or regional policy designed to boost attainment levels in lagging regions, may mean that children from those regions temporarily have higher probabilities of attending university, conditional on parental education.

To throw some light on these types of geographic effects, a binomial logistic model is introduced that predicts the log odds of having university education, conditional on the respondent's father's education and characteristics of the respondent's place of birth, using pooled data from across the seven countries.

$$(2) \log \left( \frac{P(y_i=1)}{P(y_i=0)} \right) = \alpha + \beta_1 x_{1i} + \beta_2 x_{2i} \dots + \beta_k x_{ki}$$

y: University educated (1 = yes, 0 = no)

*Dummies for birth in:*

x<sub>1</sub>: Capital region

x<sub>2</sub>: Other urban region (urban pop >50%)

x<sub>3</sub>: Lagging region (region/s with lowest average years of schooling)

x<sub>4</sub>: Presidential region (shared region of birth with sitting president at age 20)

*Controls:*

X<sub>5</sub>: Father's level of education (1 = less than primary, 2 = primary, 3 = secondary, 4 = university)

x<sub>6</sub>: Gender (1 = female, 0 = male)

x<sub>7</sub>: year of census (approximate)

x<sub>8</sub>: country

x<sub>9</sub>: region of birth (used in conjunction with presidential region only)

This is a highly simplified model and is vulnerable to omitted variable bias, and I therefore treat the results as illustrative only. Furthermore, the exercise uses a particular sub-sample from the main census data, where the educational characteristics of a respondent's parents can be identified. All the censuses provide possibilities of linking children and parents where they continue to reside in the same household. This restriction could introduce biases, if the reasons for adults to live with their parents varies across regions. Recent studies have concluded that co-residency biases associated with these types of data samples are comparatively small (Narayan et al., 2018), but the method should nonetheless be treated as speculative. As the likelihood of living with parents decreases with age, the sample is limited to comparatively young respondents aged 25-35. Across all seven countries, and utilizing 14 censuses in total, this gives us a total sample of just under 320,000 observations.

Our variables of interest are characteristics specific to a respondent's place of birth. The model looks at whether place of birth appears to have an independent effect on the probability of attending university, other than through the father's education. Specifically, are attainment rates higher for people born in the capital cities and other urbanised regions (x<sub>1</sub> and x<sub>2</sub>)? Or do people born in lagging regions, defined here as those with the lowest educational attainment, have an educational advantage, which might signal

affirmative action ( $x_3$ )? Lastly, is there any sign that people born in the same region as the president, at age 20 when they most likely started their university education, have higher probabilities of attending university ( $x_4$ )?

**Table 7. Regression results: predictors of the probability of attending university**

VARIABLES	Probability of having attended university				
	(1)	(2)	(3*)	(4)	(5)
Father's level of education					
Primary	0.880*** (0.0634)	0.917*** (0.0586)		0.901*** (0.0552)	0.911*** (0.0582)
Secondary	2.000*** (0.136)	2.037*** (0.133)		2.020*** (0.127)	2.005*** (0.0849)
University	3.474*** (0.265)	3.491*** (0.251)		3.491*** (0.256)	3.437*** (0.203)
Region of birth characteristics					
Capital city region	0.896*** (0.183)	0.892*** (0.0392)	0.657*** (0.170)	0.912*** (0.167)	
Other urban metropolis (>50% urban)	0.381** (0.158)		0.327** (0.167)	0.448*** (0.136)	
Lagging region	-0.230 (0.167)		-0.359** (0.162)		
President's region of birth (at respondent age 20)				-0.117 (0.0885)	0.0595 (0.0987)
Capital city # country interaction (base = Botswana)					
Ghana		-0.0970* (0.0551)			
Kenya		0.498*** (0.0770)			
Malawi		-0.307*** (0.0489)			
Tanzania		-0.667*** (0.0650)			
Uganda		0.891*** (0.0960)			
Zambia		0.311*** (0.0513)			
Controls					
Gender	YES	YES	YES	YES	YES
Country	YES	YES	YES	YES	NO
Birth region	NO	NO	NO	NO	YES
Census year (approximate)	YES	YES	YES	YES	NO
Pseudo R2	0.1734	0.1746	0.0536	0.1732	0.1776
Observations	316,330	316,330	181,949	316,330	306,622

Robust standard errors in parentheses; Errors clustered at country level; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

\*Model 3 restricted to respondents with fathers with less than a primary school degree.



Results are given in Table 7. Unsurprisingly, the education of the father strongly influences the probability of attending university. All else being equal, respondents with university-educated fathers are more than 10 times more likely to attend university than respondents with a father with less than primary schooling. But there is also a strong and significant independent effect of being born in the capital city on the likelihood of attending university (Column 1). Capital city born respondents are more than twice as likely to attend university than respondents born elsewhere, holding the father's education constant. Similarly, people born in other urban regions are roughly 50% more likely to attend university than those from non-urban regions. The capital city coefficient is positive across all individual country samples (Column 2). These effects also hold when restricting the sample to children of uneducated fathers alone (less than primary schooling), which suggests that it is not driven by differences in quality or type of father education (Column 3). This urban advantage could be a result of multiple factors, such as better quality basic education in urban areas, higher parental earnings and consequently family spending on education, or a greater awareness of the economic returns to education.

In contrast there is no clear evidence of policy or political influence on regional educational inequality. There is little sign that affirmative action is contributing to levelling educational opportunities. Being born in a lagging region on average decreases the probability of attending university after controlling for the father's education, although the coefficient is insignificant. Nor is there any sign that being born in the same region as the sitting president confers any advantage, with an insignificant, and negative coefficient on the variables that identify respondents that attended university under a president from the same birth region. The presidential co-ethnicity match is examined in two different ways. Column 4 tests whether people from the president's birth region and educated under the given president have a higher probability of attending university in general. Column 5 introduces a difference-in-difference strategy, building on the methods used by Franck and Rainer (2012) and Kramon and Posner (2016). It examines the difference in probability of attending university for those hailing from the president's birth region and being of the right age to have attended university under that president's rule, compared to people from the same region who were educated under a different president. In neither set of results is the coefficient significant.

In summary, differences in educational performance across regions appear to be reinforcing existing urban-rural disparities, particularly between the capital city-born and the rest of the populations. These (admittedly crude) measures show little sign of any strong affirmative action or presidential favouritism benefiting students from the president's home region.

## **5. Conclusion**

Regional and ethnic inequalities in university access matter politically. They shape the contours of the economic elite, and by extension the exercise of economic power in a society. In many African countries such inequalities have proved highly divisive and posed barriers to national cohesion. This paper therefore asks how these regional inequalities evolved after independence in relation to structural and political change. It is the first known study to trace trends over a 50 year time horizon for a group of African countries using a comparatively novel method and source of data (cohort analysis using census data).

The results suggest that in the first 15 to 25 years disparities in university attainment across provinces or regions did in fact decline. In those countries where ethnic inequality can be measured, it similarly fell over the same period. This decline in inequality coincided with a decade or more of strong growth in university attainment which appears to have enabled greater participation from regions across each country.

But this period of growing inclusiveness was short. Starting in the 1980s (when cohorts born in the 1960s reached university), regional disparities stagnated or began to grow again. These regional disparities were largely due to a growing gap in attainment levels between people born in the capital cities, and in some other major urban areas, and those born outside these metropolises. These rising geographic inequalities in university access have been sharper than the inequality increase on an ethnic group basis, in the three countries where ethnicity is given by the census. This suggests that the nature of horizontal inequality may have shifted since independence, with the multi-ethnic urbanites pulling ahead.

A confluence of factors have contributed to this growing rural-urban chasm. Falling, and in some cases negative, rates of university attainment growth in the 1980s and 1990s initially reduced the rate of absolute mobility and is likely to have increased the extent to which parental education and wealth determined educational progression. High rates of urban migration amongst the highly skilled have also helped to concentrate the educated in the capitals, which increased the share of their educationally high-achieving children that were born in urban areas. Furthermore, these urban areas appear to have provided better educational conditions, not just for the children of the highly educated, but also for urbanites with parents of low educational standing. Affirmative action or other redistributory policy strategies seems to have done little to counter these structural trends.

What does this bode for the future? Since roughly 2000 university attendance has grown rapidly across Africa. In absolute terms this will likely increase attendance rates across all regions, including the poorest ones. But the relative advantage of the capital regions may well continue to grow. Although this the available census data only allows us to examine the beginning of this period of educational expansion, the urban-rural inequalities show no sign of decline for the cohorts educated in the 2000s. In fact, the high urban concentration of university-educated parents of today's 20-year olds coupled with continued high rates of urbanisation suggests that this trend will continue.

However, the social consequence of these shifts in educational attainment are not self-evident. Changes to enrolment numbers and patterns have also coincided with changes to the quality of education and labour market absorption of graduates. Anecdotal evidence suggests a greater variability in university education quality today and a tighter labour market for graduates. Unlike in the 1980s, few countries offer their graduates guaranteed state jobs today. The censuses provide little means of distinguishing between different types of university education, and therefore cannot show whether trends within the most prestigious universities or programmes differ from those at the university level overall.

Nevertheless, if this broader trend continues, the face of Africa's educational high-achievers will change. From a comparatively regionally balanced and slim educational elite of the 1970s, where most university-educated people had rural or small-town roots, the university educated ranks are increasingly dominated by people born and raised in the main, multi-ethnic urban areas.

## References

- Atherton, G. (2016). *Access to higher education: Understanding global inequalities*. Palgrave Macmillan.
- Atuahene, F., & Owusu-Ansah, A. (2013). A descriptive assessment of higher education access, participation, equity, and disparity in Ghana. *SAGE Open*, 3(3), 1–16.
- Azam, J.-P. (2008). The political geography of redistribution. In B. J. Ndulu, S. A. O'Connell, R. H. Bates, P. Collier, & C. C. Soludo (Eds.), *The political economy of economic growth in Africa, 1960-2000*. Cambridge: Cambridge University Press.
- Becker, C. M. (2008). Urbanization and rural-urban migration. In A. K. Dutt & J. Ros (Eds.), *International Handbook of Development Economics, Volumes 1 & 2* (pp. 516–532). Edward Elgar M.U.A.
- Becker, C. M., & Morrison, A. R. (1993). Observational Equivalence in the Modeling African Labor Markets and Urbanization. *World Development*, 21(4), 535–554.
- Bernardi, F., & Ballarino, G. (2014). Participation, equality of opportunity and returns to tertiary education in contemporary Europe. *European Societies*, 16(3), 422–442.
- Bigsten, A., Isaksson, A., Söderbom, M., ans, Collier, P., Zeufack, A., Dercon, S., and others. (2000). Rates of return on physical and human capital in Africa's manufacturing sector. *Economic Development and Cultural Change*, 48(4), 801–827.
- Blakemore, K., & Cooksey, B. (1980). *A sociology of education for Africa*. London and Boston: Allen & Unwin.
- Boone, C. (2007). Africa's New Territorial Politics: Regionalism and the Open Economy in Côte d'Ivoire. *African Studies Review*, 50(1), 59–81.
- Carr-Hill, R. (2020). Inequalities in access to higher education in Africa: How large are they? Do they mirror the situation in the metropole 60 years ago? *International Journal of Educational Development*, 72, 102-122.
- D' Hombres, B. (2010). *Inequality in tertiary education systems: which metric should we use for measuring and benchmarking?* (Background paper for World Bank "Equity of access and success in tertiary education" study). Washington D.C. : World Bank.
- Darvas, P., Gao, S., Shen, Y., & Bawany, B. (2017). *Sharing Higher Education's Promise beyond the Few in Sub-Saharan Africa*. Washington D.C.: World Bank.
- Dunga, S. H. (2013). Financing Higher Education in Malawi: Prospects, Challenges and Opportunities. In D. Teferra (Ed.), *Funding higher education in Sub-Saharan Africa*. Palgrave Macmillan.
- Franck, R., & Rainer, I. (2012). Does the Leader's Ethnicity Matter? Ethnic Favoritism, Education, and Health in Sub-Saharan Africa. *American Political Science Review*, 106(02), 294–325.
- Frankema, E. (2012). The origins of formal education in sub-Saharan Africa : was British rule more benign ? *European Review of Economic History*, 16, 335–355.
- Galbraith, J. (2012). *Inequality and instability: A study of the world economy just before the great crisis*. New York: Oxford University Press.
- Goldin, C., & Katz, L. F. (1999). Human Capital and Social Capital : The Rise of Secondary Schooling in America , 1910-1940. *The Journal of Interdisciplinary History*, 29(4), 683–723.
- Gould, W. T. S. (1974). Secondary school admissions policies in Eastern Africa: Some regional issues. *Comparative Education Review*, 18(3), 374–387.

- Hughes, R. (1987). Revisiting the Fortunate Few : University Graduates in the Kenyan Labor Market. *Comparative Education Review*, 31(4), 583–601.
- Iddrisu, A. M., Danquah, M., & Quartey, P. (2017). Analysis of school enrollment in Ghana: A sequential approach. *Review of Development Economics*, 21(4), 1158–1177.
- Ishengoma, J. M. (2013). Funding Higher Education in Tanzania: Modalities, Challenges, Prospects and a Proposal for New Funding Modalities. In D. Teferra (Ed.), *Funding higher education in Sub-Saharan Africa*. Palgrave Macmillan.
- Johnstone, D. B., & Marcucci, P. N. (2007). Worldwide trends in higher education finance: Cost-sharing, student loans, and the support of academic research. *UNESCO Forum on Higher Education, Research and Development*, (December), 1–36.
- Johnstone, D. B., & Marcucci, P. N. (2010). *Financing Higher Education Worldwide: Who Pays? Who Should Pay?* John Hopkins University Press.
- Kpessa, M., Béland, D., & Lecours, A. (2011). Nationalism, development, and social policy: The politics of nation-building in sub-Saharan Africa. *Ethnic and Racial Studies*, 34(12), 2115–2133.
- Krafft, C., & Alawode, H. (2018). Inequality of opportunity in higher education in the Middle East and North Africa. *International Journal of Educational Development*, 62, 234–244.
- Kramon, E., & Posner, D. N. (2016). Ethnic Favoritism in Primary Education in Kenya. *Quarterly Journal of Political Science*, 11(1), 1–58.
- Ladouceur, P. A. (1979). *Chiefs and politicians : the politics of regionalism in Northern Ghana*. London and New York: Longman.
- Leinert, I., & Modi, J. (1997). *A decade of civil service reform in Sub-Saharan Africa* (IMF Working Paper No. WP/97/179). Washington D.C.: International Monetary Fund.
- Li, J. (2018). Ethnic favoritism in primary education in Kenya: effects of coethnicity with the president. *Education Economics*, 26(2), 194–212.
- Marcucci, P., Johnstone, D. B., & Ngolovoi, M. (2008). Higher educational cost-sharing, dual-track tuition Fees, and higher educational access: The East African experience. *Peabody Journal of Education*, 83(1), 101–116.
- Marginson, S. (2016). The worldwide trend to high participation higher education: dynamics of social stratification in inclusive systems. *Higher Education*, 72(4), 413–434.
- Marginson, S. (2018). Higher education, economic inequality and social mobility: Implications for emerging East Asia. *International Journal of Educational Development*, 63, 4–11.
- Masaiti, G., & Shen, H. (2013). Cost Sharing in Zambia's Public Universities: Prospects and Challenges. *European Journal of Educational Research*, 2(1), 1–15.
- Morley, L., Leach, F., & Lugg, R. (2009). Democratising higher education in Ghana and Tanzania: Opportunity structures and social inequalities. *International Journal of Educational Development*, 29(1), 56–64.
- Mulongo, G. (2013). Inequality in Accessing Higher Education in Kenya ; Implications for Economic development and Well-being. *International Journal of Humanities and Social Sciences*, 3(16), 49–61.
- Narayan, A., Van der Weide, R., Cojocar, A., Lakner, C., Redaelli, S., Mahler, D. G., ... Thewissen, S. (2018). *Fair progress?: economic mobility across generations around the world*. Washington, DC.
- Oanda, I. O. (2013). Implications of Alternative Higher Education Financing Policies on Equity and

- Quality: The Kenyan Experience. In D. Teferra (Ed.), *Funding higher education in Sub-Saharan Africa*. Palgrave Macmillan.
- Oanda, I. O., & Jowi, J. (2012). University Expansion and the Challenges to Social Development in Kenya: Dilemmas and Pitfalls. *Journal of Higher Education in Africa / Revue de l'enseignement Supérieur En Afrique*. CODESRIA.
- Odhiambo, G. (2016). Higher education in Kenya: an assessment of current responses to the imperative of widening access. *Journal of Higher Education Policy and Management*, 38(2), 196–211.
- Olson, J. B. (1972). Secondary Schools and Elites in Kenya: A Comparative Study of Students in 1961 and 1968. *Comparative Education Review*, 16(1), 44–53.
- Ou, D., & Hou, Y. (2019). Bigger pie, bigger slice? The impact of higher education expansion on educational opportunity in China. *Research in Higher Education*, 60(3), 358–391.
- Sabot, R. H. (1979). *Economic development and urban migration*. Oxford: Oxford University Press.
- Samboma, T. A. (2017). Regulation of tertiary education institutions in Botswana: Issues and options. *Advances in Social Sciences Research Journal*, 4(6).
- Sarmiento Espinel, J. A., Silva Arias, A. C., & van Gameren, E. (2019). Evolution of the inequality of educational opportunities from secondary education to university. *International Journal of Educational Development*, 66, 193–202. <https://doi.org/10.1016/j.ijedudev.2018.09.006>
- Shavit, Y., Arum, R., & Gamoran, A. (2007). *Stratification in higher education: A comparative study*. Stanford University Press, 2007. Stanford University Press.
- Somerset, A. (2007). *A Preliminary Note on Kenya Primary School Enrolment Trends over Four Decades* (Research Monograph No. 9).
- Teal, F. (2011). Higher education and economic development in africa: A review of channels and interactions. *Journal of African Economies*, 20 (SUPPL. 3).
- Teferra, D. (2013). *Funding higher education in Sub-Saharan Africa*. Palgrave Macmillan.
- Tzannatos, Z. (1991). Reverse racial discrimination in higher education in Malaysia: Has it reduced inequality and at what cost to the poor? *International Journal of Educational Development*, 11(3), 177–192.
- Umar, H. (2014). Regional Inequality of Educational Attainment in Nigeria. *British Journal of Economics, Management & Trade*, 4(3), 420–430. <https://doi.org/10.9734/bjemt/2014/7080>
- Wantchekon, L. (2016). Education and Long Term Social Mobility in Benin.
- World Bank. (1978). *Malawi Education Sector Survey*. Washington D.C.: World Bank.
- World Bank. (2001). *Tanzania: Public Expenditure Review FY00, Volume I: Main Report*. Washington D.C.: World Bank.
- Zezeza, P. T. (2016). *The transformation of global higher education, 1945-2015*. Palgrave Macmillan.

## Data sources

- Minnesota Population Center. (2017). *Integrated Public Use Microdata Series, International: Version 6.5* [dataset]. Minneapolis, MN: University of Minnesota, 2017. Retrieved from <https://international.ipums.org/international/>
- Botswana Population and Housing Census, 2001, 2011

- Ghana Population and Housing Census, 2000, 2010
- Kenya Population and Housing Census, 1989, 1999, 2009
- Malawi Population and Housing Census, 1987, 2008
- Tanzania Population and Housing Census, 2002, 2012
- Uganda Population and Housing Census, 1991, 2002
- Zambia Population and Housing Census, 2010

## Appendix A. Sources and Notes for Figure 1

**Kenya, Tanzania and Uganda:** Simson, R. (2017) *(Under)privileged bureaucrats?: The changing fortunes of public servants in Kenya, Tanzania and Uganda, 1960–2010, Appendix 1*. PhD Thesis, London School of Economics.

**Botswana:** 1966: World Bank (1993) *Botswana: Opportunities for industrial development : an economy in transition*, Washington, DC: World Bank; 1984: World Bank (1986) *Botswana: Public expenditure and development*, Washington, DC: World Bank, p.77; 1989: Republic of Botswana, Central statistics office, *Education statistics 1989*, p.65; 1992-5: Republic of Botswana, Central Statistics Office, *Botswana in Figures 1997*, p.9; 1996: Republic of Botswana, Central Statistics Office *Education Statistics 1996*, Table C2; 2000-1: Republic of Botswana, Central Statistics Office *Botswana in Figures, 2003*, p.10; 2002- 4: Republic of Botswana, Central Statistics Office *Botswana in Figures 2006*, p.13; 2006-14: Statistics Botswana, *Botswana in Figures 2017*, Table 33, p.54. (Note: estimates 2003-08 adjusted upwards to account for private students; estimates 1992-5 adjusted downwards to remove students attending university but not at undergraduate level.)

**Ghana:** 1962-69: World Bank (1970) *Ghana: Current Economic Position and Prospects*, Table 5; 1975-83: World Bank (1985) *Ghana Towards Structural Adjustment, Vol 2*, Table 10.04; 1997-99: World Bank (2000) *Ghana Education Public Expenditure Review*, Fig 1; 1995 & 2002-08: World Bank (2010) *Education in Ghana: Improving Equity, Efficiency and Accountability of Education Service Delivery*, para 393 & Fig. 5; 2013: National Council on University Education.

**Malawi:** 1966-78: World Bank (1981) *Malawi: Development of Human Capital*, Table 7; 1987: World Bank (1990) *Malawi Human Resource Development Study*, p.85; 1988 & 1991: World Bank (2004) *Cost, Financing and School Effectiveness of Education in Malawi*, p.88; 1995-2012: Government of Malawi, *Statistical Yearbook 2000, 2006 and 2012*, Table 4.2-3.

**Zambia:** 1964-86: World Bank (1977) *Zambia: A Basic Economic Report, Annex 3: Education and Training*, Appendix 5 & World Bank (1986) *Zambia specialised training study*; 200-04: World Bank (2006) *Education Sector Public Expenditure Review*, Vol I, p.44; 2011:

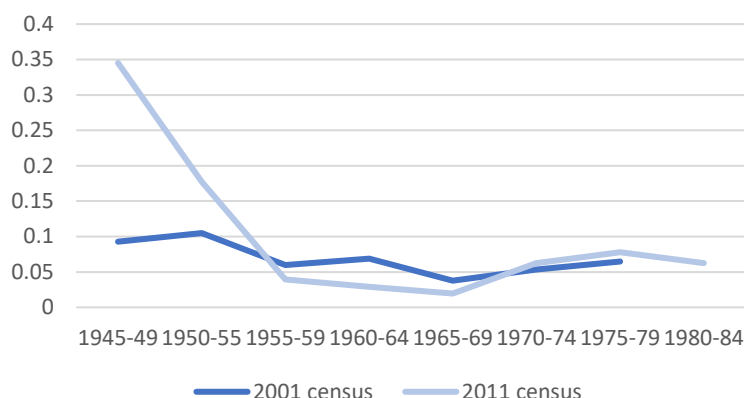
**Population (calculated at 80% of age group 20-24):** World Bank, *World Development Indicators*, Last Updated: 02/16/2018.

## Appendix B: Consistency analyses

This section compares the inequality trend measured across cohorts using the Theil index for different censuses.

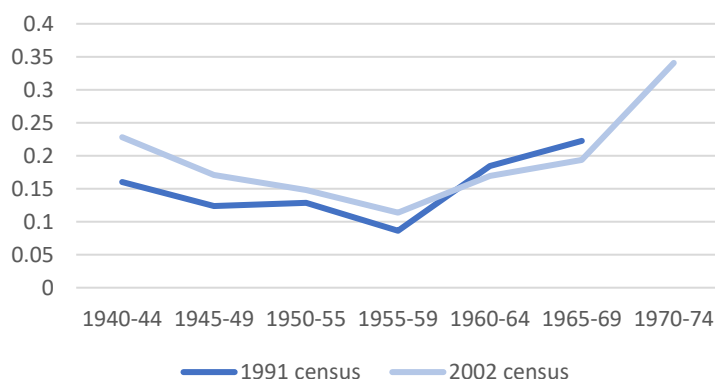
### Botswana

The figure below compares the Theil index for Botswana, calculated with the 2001 and 2011 censuses respectively. The 2011 census shows a sharper fall in inequality across the first three cohorts,<sup>13</sup> but otherwise relatively consistent results. Both record lowest inequality among the cohort born 1965-69, and show a mild uptick in inequality since.



### Uganda

The figure below compares the Theil index for Uganda, calculated with the 1991 and 2002 census respectively. The trends are consistent, although the inequality fall across the four first cohorts is slightly weaker using the 1991 census.



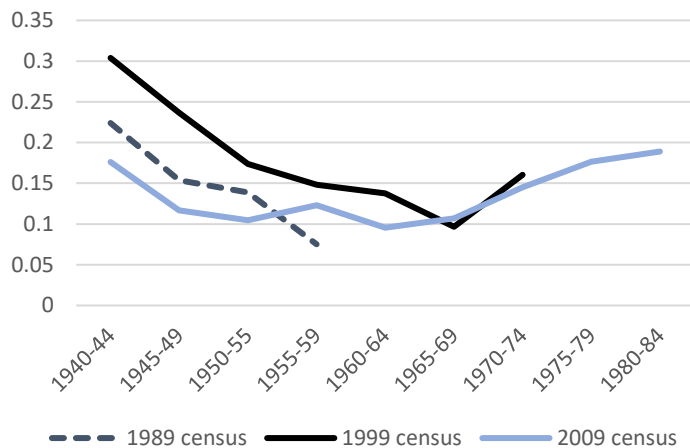
### Kenya

For Kenya I compare results from the 1989, 1999 and 2009 censuses. The census reports note some population estimate inconsistencies, particularly for the North East Province and Nyanza, which may affect the results.

Nonetheless, the fall in inequality across the first four cohorts is captured across all censuses and is starker across the earlier censuses. However, the uptick in inequality captured in the 2009 census for those born in the 1960s and after, is only captured by the 1970-74 cohort in the 1999 census data.

<sup>13</sup> Possibly due to what seems to be a miscoding of people as born in Ngamiland.

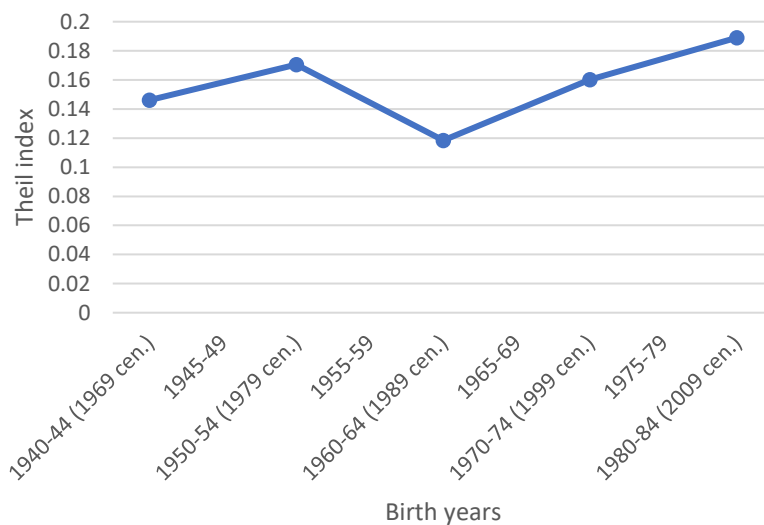




The Kenyan government has also released data from the 1969 and 1979 censuses, making it possible to trace trends even further back in time. However, there are inconsistencies in the population estimates by place of birth variables for these two earlier censuses, and problems with the educational variables. Results from these early censuses are therefore of questionable quality.

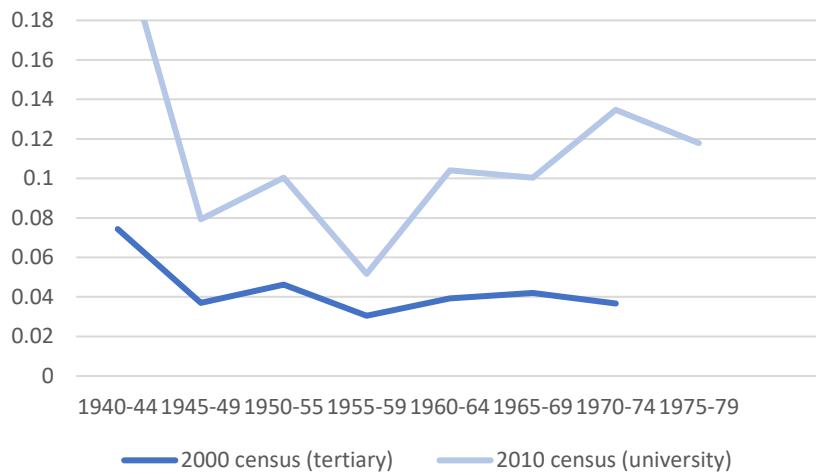
Nonetheless, as a further test, I compare the inequality trend using only one cohort per census, i.e., I examine the place of birth of 25-29 year old university educated respondents in each census year. This gives the trend below, which is roughly consistent with that from the 2009 census alone, bar the uptick between the 1969 and 1979 census (cohorts 1940-44 and 1950-54).

#### Thiel-T statistic for 25-29 year olds, sampled across five censuses (1969, 79, 89, 99 and 2009)



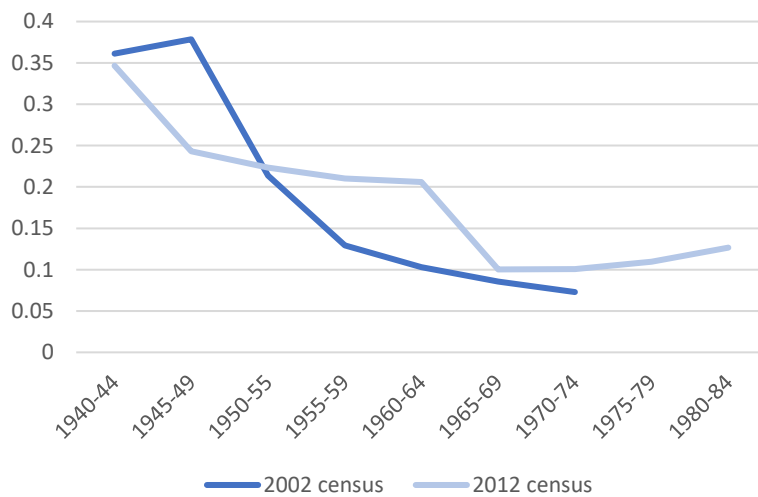
#### Ghana

For Ghana, the educational categorizations changed between censuses. While the 2000 census classifies all tertiary education into one category, the 2010 census distinguishes between university and other forms of higher education. Consequently, the level of inequality recorded by the 2000 census is considerably lower. However, encouragingly, the peaks and troughs largely coincide, with the exception of the 1970-74 cohort, where the 2000 census shows no sign of inequality growth.



## Tanzania

The Tanzanian trends, comparing the 2002 and 2012 census, both show a downward slope, although some of the cohort-to-cohort fluctuations in the outer years are not consistent.



## Appendix C. Are overaged students biasing the results?

The Ghanaian census records university attainment by year of study, making it possible to study the age composition of first/second year current university students. Students tend to start their studies at a wide range of ages, and a full 17% of first year students are aged 30 or above. Thus it is only for cohorts aged roughly 35 and above, that we gain a reasonably complete picture of educational opportunity.

This is not a problem for this study per se, unless the age of university attendance is correlated with place of birth. Unfortunately this is the case. The table below also shows the percentage of each age cohort of current students that were born in Greater Accra, Ghana's richest region. The shares drop with age; people from the richest region are more likely to start (and presumably complete) their undergraduate studies at young ages. The decline is steep, with Accra-born student accounting for 36% of those aged 18-19, but only 21% of those aged 30-34.

How much of an effect might this bias have on the reported attainment levels of the youngest cohort in my sample? I run some simulations, recalculating the Theil index for the Ghanaian age cohort born 1975-79, assuming that there will be an additional crop of university entrants that will join the university ranks with time, which is of the same size and birth place composition as the current over-aged first-year students. I run a second simulation where I assume that this 'still-to-be-admitted' group will be double the size of the current one (given the current rapid rate of attainment growth), and have the same place of birth composition. The effect of these simulations on the Theil index are relatively small. The first simulation lowers the index from 0.118 to 0.112, the second simulation brings it down further to 0.107. Changes of this magnitude have a minimal impact on the reported trend, and do not change the broader findings of the paper. For Ghana at least, this bias is unlikely to affect the broader results.

### Ghana: composition of current university students in their first year of study<sup>14</sup>

Age range	% of total enrolled	% born in Greater Accra
<20	8%	36%
20-24	52%	30%
25-29	22%	24%
30-34	11%	21%
>34	6%	27%

---

<sup>14</sup> Taking all of those who report their level of attainment to be 'university – year 1', and who report still being in school.

## **Appendix D. Coding of presidential birth regions**

### **Botswana**

Seretse Khama (office 1965-80), Central district

Quett Masire (office 1980 – 98), Southern district

Festus Mogae, (office 1998-2008), Central (Serowe)

### **Ghana**

Kwame Nkrumah (office 1957-1966), Western

Ignatius Kutu Acheampong (office 1972-78), Ashanti

Jerry Rawlings (office 1981-2001) – excluded as born in Accra

John Kufuor (office 2001-09), Ashanti

### **Kenya**

Jomo Kenyatta (office 1964-78), Kiambu/Central Province

Daniel Arap Moi (office 1978-2002), Baringo/Rift Valley Province

Mwai Kibaki (office 2002-2013), Nyeri/Central Province

### **Malawi**

Hastings Banda (office 1964-94), Kasungu district

Elson Bakili Muluzi (office 1994-2004), Machinga district

### **Tanzania**

Julius Nyerere (office 1961-85), Mara region

Ali Hassan Mwinyi (office 1985-95), Pwani region

Benjamin William Mkapa (office 1995-2005), Mtwara region

### **Uganda**

Milton Obote (office 1962-71; 1980-85), Langi

Idi Amin (office 1971-79), West Nile

Yoweri Museveni (office 1986 – present), Ankole

### **Zambia**

Kenneth Kaunda (office 1964-91), Muchinga

Frederick Chiluba (office 1991-2002), Copper Belt