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“A Public and a Private University in One”

*Equity in University Attendance in Kenya since the
Liberalization Reforms of the 1990s*

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Prepared for the UNRISD project on
Universities and Social Inequalities in the Global South

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Introduction to Working Papers on Universities and Social Inequalities in the Global South

This paper is part of a project which explores what role universities play in overcoming persistent and rising inequalities. Participation in tertiary education has increased significantly across the globe, in parallel with heightened social aspirations and the expectation of better labour market opportunities stemming from a university degree. However, these assumptions rely on certain economic and social conditions being fulfilled, some of which have worsened in the age of jobless growth. The project asks: What potential does higher education have today to increase social mobility, reduce inequality and contribute to the advancement of society through the production of knowledge and skills? Are institutions of higher education contributing to inequality rather than equality, and if so, through what specific actions and mechanisms? How can the transformative potential of such institutions be fully harnessed for overcoming inequality?

Working Papers on Universities and Social Inequalities in the Global South

“A Public and a Private University in One”: Equity in University Attendance in Kenya Since the Liberalization Reforms of the 1990s
Rebecca Simson and J. Andrew Harris, March 2020

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Acronyms

| | |
|--------|---|
| GDP | Gross Domestic Product |
| IPUMS | Integrated Public Use Microdata Series |
| KCPE | Kenya Certificate of Primary Education |
| KCSE | Kenya Certificate of Secondary Education |
| KES | Kenyan shilling |
| KUCCPS | Kenya Universities and Colleges Central Placement Service |
| OLS | Ordinary Least Squares |
| PSC | Public Service Commission |
| SES | Socio-Economic Status |

Abstract

Until the 1990s Kenya had a selective state-financed university system where students bore few educational costs. This limited the number of university students that the government could afford to educate and created fierce competition for university places. In the late 1990s the Kenyan government responded to this crisis in supply by liberalizing the tertiary sector. Barriers to accreditation of private universities were loosened and public universities began to establish parallel, fee-paying programmes, which only required applicants to meet minimum entry requirements, alongside the state-sponsored, selective programmes. By the late 2000s self-financed students accounted for roughly half of university admissions. Consequently, undergraduate enrolment rose sharply, from 33,000 in 1999, to close to 500,000 by 2017. The number of universities increased from a single public university in Nairobi in 1970, to over 50 tertiary institutions nationwide by 2014.

Critics have worried that these privately funded university tracks have undermined equity in access to university education. Many have argued that these reforms enabled lower-performing students from richer families, who could pay full fees, to enter Kenya's most competitive public universities. This may have increased the elite bias in student composition and heightened Kenya's already considerable regional and ethnic skews in university access. Others have posited the opposite, that restrictive, even if ostensibly free, higher education is more easily captured by children of the existing elite. Therefore, an expansion in opportunities to pursue university education, even if self-financed, would enable a more diverse group of students to study at universities.

This paper brings new empirical evidence to these debates by analysing inequalities in university access in Kenya since the 1990s, drawing on two main sources. First, we use census data to examine trends in equity in the 1990s and early 2000s. Second, we use a new dataset of all University of Nairobi students to study educational equity at Kenya's most prestigious university.

We find that horizontal inequalities in university access - between ethnic and religious groups and the sexes—have declined, while vertical, “class”, inequality is likely increasing. Using a subsample of University of Nairobi graduates, we argue that parallel degree programmes absorbed a higher share of women and ethnic minorities than through the regular competitive admission stream, but that these students were on average from higher socioeconomic backgrounds. In this sense, the programmes are regressive. However, this should not overshadow the fact that students entering through the regular,

meritocratic track are on average from socioeconomically privileged backgrounds too. We also show that intergenerational persistence in university access in Kenya is considerable, and its high level predates the reforms of the 1990s.

Keywords

Higher education; universities; inequality; Kenya

Bios

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It is very painful that universities are open to you if you can pay. [...] There is buying of education as a commodity; education has become a commodity, and you just have to be rich to have a good education. [...] You start buying it from the primary school. You buy the most expensive if you have money; you buy it in secondary school and then in university, now you do not need the best grades to do medicine or architecture. You just need to have money. [...] That is a serious problem because you block those who could have had the education as the way out of poverty, and as something to create social mobility; also universities have a challenge. [...] the amount that the Government is providing to universities is not enough to educate as many students as we would like. Parallel or Module II courses are an income generation project for universities, as they are faced with a situation where the Government cannot put in all the money; universities have to find a way of being innovative and raise extra income to be able to support their own lecturers and students.

It is as we have two systems in our universities. We have a private and a public university in one.

—Dr. Mwiria, Assistant Minister for Higher Education, Science and Technology, responding to a parliamentary motion for the admission of 75 per cent of qualified students to public universities (Kenya National Assembly Official Record (Hansard) 2012:36-38)

Introduction

In 1999, student protests at the University of Nairobi led to the temporary closure of the university and banning of the student union. In the past, Kenya's university students had clashed with the university leadership and government on many occasions, and students played an outsized role in Kenya's pro-democracy movements (Amutabi 2002). The trigger for the 1999 protests, however, was not national political grievances but university-level policy reform. Students opposed the introduction of what was termed parallel degree programmes: routes for self-financed students meeting only the minimum university entry requirements to enter degree programmes outside the central, competitive admissions system. The student union deemed this scheme exploitative and prone to corruption (SONU 2019). Many feared that it would devalue all University of Nairobi degrees, undermine the merit-based education system and increase inequality in access (Munene and Otieno 2008). Yet despite this vocal opposition, within less than a decade, parallel degree entrants came to form half of the university's annual intake.¹

Parallel degree programmes were the creation of the University of Nairobi's Vice Chancellor, F. J. Gichaga, who had, in the early 1990s, begun to search for means by which the cash-strapped university could raise funds independently to complement their rapidly declining funding from government grants (Provini 2018). Since the early 1990s, per student funding had declined sharply across Kenya's public universities, and real earnings of university faculty and staff had more than halved between 1985 and 1994 as high inflation eroded salaries (Klopp and Orina 2002:56). Ideas about university "cost-recovery" and "entrepreneurial activity" also had enthusiastic support from some of Kenya's largest creditors, particularly the World Bank (World Bank 1999).

These commercial university programmes marked a break with Kenya's early independence university tradition. As in most of Africa, up until the 1990s, Kenya had a highly selective university system dominated by a few government-financed public universities. The highest secondary school performers were admitted to university and entitled to bursaries or subsidized student loan schemes covering most of their study and living expenses (Munene and Otieno 2008).

¹ The growth in parallel degree programme entrants is discussed in depth in Appendix 2.

But with the economic downturn of the 1980s and growing pressure to expand higher educational opportunities for a rapidly growing number of secondary school graduates, funding became increasingly stretched (Hughes and Mwiria 1990:225). In the early 1990s, the government capped the growth in admissions to 3 percent a year, which rapidly increased competition for scarce university places. To trim costs further, student allowances were cut and fees introduced in 1991, while the loan system was reformed in 1995 (Klopp and Orina 2002:55). By the late 1990s, less than 20 percent of eligible secondary school graduates were admitted to universities in Kenya (Oanda 2013).

Catering to the large pool of university aspirants that were unable to enter through the subsidized stream, parallel degree programmes quickly became the university's most lucrative income generating stream and were soon emulated by universities across Kenya. Fees from self-supporting students were used to supplement staff salaries and running costs. By 2004, over half of all admissions into the University of Nairobi were from fee-paying parallel degree programmes, also known as "Module II" students, in contrast to the regular "Module I" admissions (Munene and Otieno 2008; see also Appendix 2). In 2011 these programmes raised almost KES 5 billion (approximately USD 60 million) in revenue, roughly equal to the government's contribution to the university (University of Nairobi 2011:94-99).

Kenya's path towards the liberalization of university education in the 1990s was by no means a unique case. Across Africa, and indeed the world, governments have sought to balance growing demand for higher education with financial constraints at public universities over the past three decades, leading many governments to shift more of the costs of higher education to students. Johnstone and Marcucci argue that this trend towards greater self-financing of higher education was a consequence of three global, secular trends: rising unit costs in higher education due to low productivity growth in this service sector ("Baumol's disease"); rising participation due to the growth in secondary school attainment and skills-selective technological change; and stagnant government revenues, in proportion to GDP (Johnstone and Marcucci 2007). These challenges were particularly serious in Sub-Saharan Africa, where many governments faced severe budget constraints in the 1990s.

Responding to these constraints and new incentives, governments and universities around the world have sought to cut costs and raise revenue. This has most often been achieved by passing on more of the costs of higher education to students and their families, through cost-sharing arrangements. As described by Johnstone and Marcucci, these cost-sharing arrangements have taken different forms in different countries, including the introduction of fees (for instance China and the UK), increases in fees (North America), the introduction of charges for accommodation and board (across eastern and northern Europe and Africa), and the introduction of loan-based financing or reforms to student loan schemes (Johnstone and Marcucci 2007:17). Many governments also began to encourage the establishment of fully private universities alongside public institutions. Lastly, some countries, predominantly in Africa and Eastern Europe, introduced dual track admissions schemes that sought to retain a narrow, meritocratic and highly subsidized scheme for the highest educational performers, with alternative self-financed routes within public universities for the rest (Johnstone and Marcucci 2007:17).²

² These reforms have provoked resistance in many settings. In the United Kingdom, for instance, students have protested against fee rises repeatedly since their introduction in 1998. One of the most noted cases was the South African 'fees must fall' movement, which intersected with grievances about the lack of transformation of South Africa's universities since Apartheid, and led the South African government to suspend its intended fee increase.

Kenya is a particularly apt example of these trends, owing in part to unusually fast growth in primary and secondary education during the postcolonial period which rapidly increased demand for higher education. Over the course of the 1990s, the Kenyan government introduced university fees, dual-track admissions schemes and reformed the student loan system to improve loan recovery. It also encouraged the growth of a fully private university sector by reducing the barriers to accreditation.

A positive effect of these reforms is that it facilitated a massive expansion in university access across much of Africa, although the economic recovery in the 2000s also aided this process by enabling an increase in government spending on education. Sub-Saharan Africa has seen the world's fastest growth in university enrolment in the 2000s, albeit from a low base (Darvas et al. 2017). In Kenya, undergraduate enrolment rose from 33,000 in 1999, to close to 500,000 by 2017. The number of universities increased from a single public university in 1970, to 22 public chartered universities and 30 private universities or colleges by 2014, and their geographic distribution improved (Commission for University Education 2014).

But alongside these impressive gains in university attainment,³ critics have worried that these privately funded university tracks have undermined the quality and equity of university education. As the opening quote from a Kenyan Parliamentary debate attests to, the Module II expansion has been criticized for lowering standards, undermining meritocratic principles, increasing regressivity in educational access and commercializing education.⁴ The equity effects of this reform have received particular attention. Some have assumed that these reforms enabled lower performing students from richer families who could pay full fees to enter Kenya's most prestigious universities, thereby increasing the elite bias in student composition and possibly heightening Kenya's already considerable regional and ethnic skews in university access (Munene and Otieno 2008; Oanda and Jowi 2012).

Others have questioned this argument, pointing to the fact that more restrictive access, even when the financial barriers to entry are low, often benefits the existing elite. Thus, expanding supply, even if self-financed, tends to lower the average socioeconomic status of entrants.⁵ In Latin America, where many countries have encouraged a private tertiary sector to develop alongside the more competitive government-financed universities, it is, perversely, wealthier and higher performing students who are more likely to benefit from subsidized education while poorer students are more numerous in the lower-quality private sector (Johnstone and Marcucci 2007:21).

Quantitative evidence of the impact of these reforms remains limited. This paper assembles existing and new data to study changes to the composition of Kenya's university graduates since the introduction of the Module II scheme in the late 1990s. The first empirical section uses census data to discuss broader trends in equity in the 1990s and early 2000s. The second empirical section presents a case study of the University of Nairobi, using a new custom-built dataset of graduates. Kenya provides an interesting case because of the rapid speed and scope of the liberalization reforms, as a result of which roughly half of all students were self-financing their studies by the

³ University attainment refers to the share of people in a given birth cohort that are university educated.

⁴ See Mamdani (2007) for one of the most high-profile critiques of parallel degree programmes, focusing on Uganda.

⁵ See Sabot and Knight (1990) for an example of this in the case of secondary schooling.

mid-2000s. Furthermore, these reforms took place in a context of high educational and income inequalities, which intersect with politically salient ethnic, regional and religious identities, making equity concerns particularly poignant.

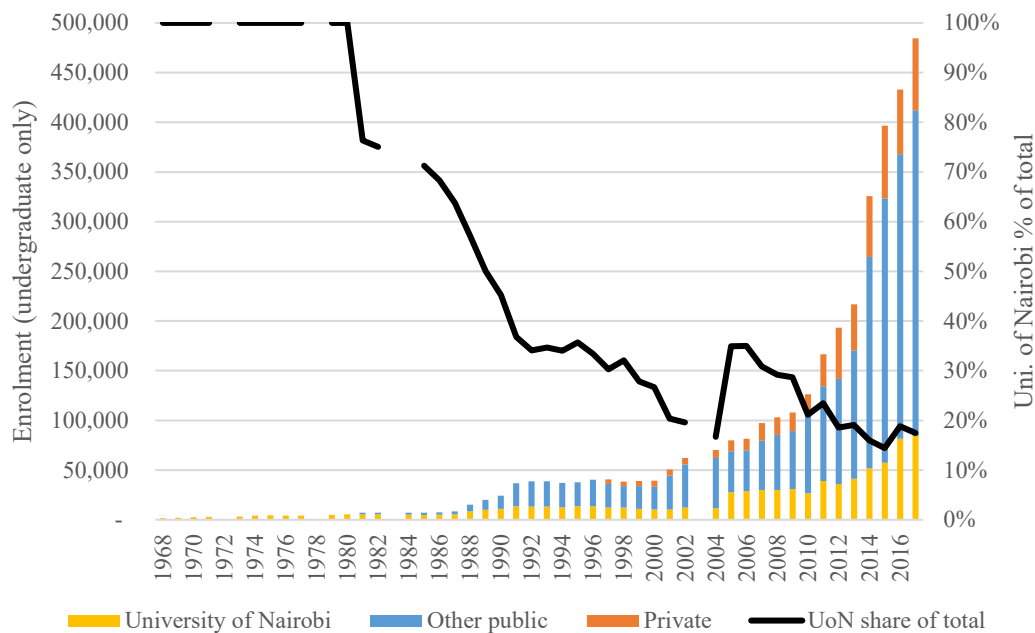
Our results show that university reforms and expansion have had mixed effects on equity in access. Gender gaps have decreased and are nearing parity, and ethnic inequalities continue to narrow. But disparities in access to university education appear to be growing between Nairobi and the rest of the country. We also present tentative evidence that the Module II admissions system favours students from higher socioeconomic backgrounds compared to those admitted through the regular system.

History of University Education in Kenya

Higher education was late to develop in colonial Kenya. Before any tertiary institutions existed in Kenya, Makerere University in Uganda, serving the entire British East African sub-region, was the only institution offering university degrees, admitting students from Uganda, Kenya and Tanganyika. In 1956, the first tertiary institution in Kenya, the Royal Technical College in Nairobi, was founded, and in 1961 it was upgraded to a university college and incorporated as one of the constituent colleges into the then-regional University of East Africa (together with Makerere and the University of Dar es Salaam). In 1970, the regional university gave way to three national universities, giving birth to an independent University of Nairobi. It remained the only public university in Kenya until 1984, when two new public universities were created (Moi University and Kenyatta University). Since the 1990s, several other public polytechnics have been upgraded to universities, bringing the total number of public universities or university colleges to 22, while a growing number of private institutions offer degree courses.

University enrolment in Kenya increased rapidly in the 1960s and 1970s, from a very low base (Figure 1). At independence in 1963, only 316 students were enrolled in university; by 1970 enrolment had risen to roughly 2,500, and by 1980 to 5,400. A reform to the school system in Kenya in 1984 removed the previous two-year A-level, so that students graduating with four years of secondary schooling became eligible to enter universities, which increased the number of eligible university candidates (Hughes and Mwiria 1990). Initially, the government sought to meet this growing demand by expanding Kenya's existing universities; between 1987-1991 university enrolments increased four-fold, reaching almost 40,000 by 1992. Unable to adequately finance this expansion, per student expenditure fell sharply (Sifuna 1998) and the government eventually made a policy U-turn. The enrolment growth was capped at a maximum of 3 percent a year in the 1990s, leading to a stagnation in the enrolment rate.

Figure 1: Total university enrolment and the share of total attending the University of Nairobi



Sources: Authors, based on data from Kenya National Bureau of Statistics, various years 1967-2018

With the liberalization reforms of the 1990s and development of the parallel admissions system, enrolment began to grow again in the 2000s, increasing more than ten-fold from 40,000 in 2000 to close to 500,000 in 2017. The University of Nairobi’s share of enrolment declined from the 1980s, as other public universities were formed, and today comprises roughly 20 percent of enrolments. It remains the largest university, and among the most prestigious of Kenya’s higher education institutions (Gicobi 2015). Fully private universities, despite their large number, still contribute a comparatively small share of total enrolment, at roughly 15 percent of the total in 2017.

Admission to Kenya’s university system in large part hinges on access to quality primary and secondary schooling. The Kenyan school system centres around two national competitive exams at the end of primary school after eight years of schooling (the Kenya Certificate of Primary Education, KCPE), and at the end of secondary school after four further years of secondary education (the Kenya Certificate of Secondary Education, KCSE). Primary enrolment is near universal, but provided through a mixed public and private system, with an ostensibly free public system of comparatively low quality, and a private system comprising both low-quality, low-cost schools, and selective, high-cost schools. Consequently, school disparities in KCPE performance are large, which has a knock-on effect on selection into the secondary school system.

Secondary enrolment is high by regional standards, with a gross enrolment rate of roughly 66 percent,⁶ but marked by large quality disparities across different tiers of schools. The highest performing primary graduates are admitted to Kenya’s competitive national secondary schools (predominantly boarding schools, many of which are single-sex). These schools apply some affirmative action, designed to improve the regional balance of students, but a disproportionate share of the students herald from the most exclusive or expensive primary schools (Kinyanjui

⁶ Authors’ calculations based on total secondary enrolment and population reported in Kenya Statistical Abstract 2018. Population share aged 14-17 based on age profile from 2009 census.

1981:21). The middle tier is made up of former provincial and district schools of varying quality (boarding and day schools). Finally, private, non-competitive secondary schools provide on average the lowest quality education (former Harambee schools). However, a small number of highly selective private schools compete with the top national schools. Unlike primary schools, public secondary schools have historically charged fees (albeit with some scholarship opportunities), which is likely to further skew access to schooling by limiting participation by poorer students. In 2008 the Kenyan government removed tuition fees at secondary day schools, although these schools frequently charge other auxiliary fees that continue to pose barriers to access (Ohba 2011).

Exams at the end of secondary school determine progression to tertiary education. To qualify for university, students need to obtain a C+ average, which only roughly a third of exam takers achieve (students with lower grades can be admitted to certificate courses and polytechnics). Eligible students can then apply to university through the Kenya University and Colleges Central Placement Service (KUCCPS) to the course of their choice. Depending on grades and course competitiveness, a smaller proportion of these students are admitted (these form what is known as the Module I intake) at a subsidized rate. These students are eligible to apply for student loans, which are distributed on a need-basis.

Those students that are not placed through KUCCPS but meet the C+ cut-off can apply directly to parallel degree programmes (Module II) to their university and programme of choice, provided they are willing to pay full fees. We estimate that in 2015/16–2017/18, roughly 40 percent of undergraduate enrolment came through this Module II channel (see Appendix 2), although not all would have entered directly from secondary school, as many were older graduates entering the university system after some years in the labour market. The Module II streams are sometimes fully integrated into the regular degree programmes, but many universities also have dedicated evening and part-time degree programmes catering to people who wish to remain in employment. Module II uptake has varied considerably across departments and faculties, but appears to be largest, relative to regular admissions, in the most competitive courses, such as medicine and law, as well as in business studies (see Appendix 2).

Inequality in Access to University Education in Kenya

Inequalities in access to university education have long been of concern in Kenya, as policymakers have recognized the elite bias in an education system with such strong stratifications in school quality. These inequalities were particularly salient because the private returns to higher education in Africa have historically been high, and as a result inequalities in income and wealth to a large extent come to mirror inequalities in university access (Bigsten et al. 2000; Patrinos and Montenegro 2014; Teal 2011).

In the decolonization era, government policy was focused firstly on removing racial stratification in Kenya's school system, to overcome a colonial legacy of separate and unequal education for Kenya's European, Asian and African students. By the late 1960s, internal divisions between Kenyans from different parts of the country and different social milieus formed an increasing political preoccupation, and politicians frequently debated the regional and ethnic distribution of public resources. Early independence literature on schooling focused on the extent to which school systems in postcolonial Africa had become sites of elite reproduction, by ensuring that the children of the highly educated maintained or increased the educational, and by extension

occupational and earnings, advantages of their parents. An empirical literature emerged that sought to determine and debate the extent to which family background determined a child’s educational performance and attainment, and the degree to which children from underprivileged backgrounds were incorporated into the educational elite.⁷

In the 1960s and 1970s however, rapid educational expansion ensured high rates of absolute mobility, even though children of the existing educational elite were more likely to attend post-primary education than others. A 1968 study showed that 72 percent of secondary school students had fathers with only 0-4 years of schooling (Olson 1972:51). A rare study of the social background of University of Nairobi students from graduating classes between 1970-1983, found that the educational status of parents of university graduates had in fact fallen over time, possibly due to the rapid expansion of higher education in the 1970s (Hughes 1987).⁸ Hughes concluded that while the average socioeconomic standing of University of Nairobi graduates was higher than the national average, “the educated elite of Kenya are still drawn from a very broad background” (Hughes 1987:594). But many predicted that as educational growth slowed, parental income would come to dictate educational progression to a growing extent (Blakemore and Cooksey 1980:84). Indeed, these concerns of increasing educational inequality would intensify with the introduction of parallel degree programmes.

A further reason for this interest in educational mobility in multi-ethnic societies such as Kenya, is that educational inequalities often intersected with other social cleavages. Colonial era regional differences in educational access, often driven by the uneven diffusion of missionary activity, meant that educational inequalities are pronounced not only between people (what is sometimes called “vertical inequality”), but across geographic, ethnic and religious groupings (“horizontal inequalities”) (Frankema 2012). Such horizontal inequalities are thought to have deleterious political consequences, as they exacerbate social grievances and sense of difference and fuel identity politics. Various studies have found that regional and ethnic socioeconomic inequalities are associated with higher risk of conflict, worse governance, and poorer economic outcomes.⁹

In one of the earliest empirical studies of horizontal educational inequalities in Kenya, Olson found noteworthy ethnic inequalities in secondary school access in Kenya. Between 1961 and 1968, the number of students in the last year of basic secondary school (Form IV) had increased by a multiple of eight (the rise was particularly sharp among female students) (Olson 1972:46). But over this period, ethnic inequalities remained largely unchanged, with overrepresentation among the ethnic groups from regions most exposed to colonial settlement, particularly the Kikuyu, and to a lesser extent Luhya (Olson 1972:47). Later studies suggest that the ethnic inequalities of the 1960s have continued to persist (Munene and Otieno 2008:466).

Since the 1990s the equity effects of the Module II reforms have been discussed in the recent literature on Kenya’s university education system.¹⁰ Several studies have found improved gender ratios in university access, since the expansions of the 1990s. Female enrolment is higher in the private than public universities (Mulongo 2013; Odhiambo 2016), and women make up a larger share of part-time students, which are predominantly Module II students (Oanda and Jowi 2012).

⁷ Blakemore and Cooksey 1980; Kinyanjui 1981; Olson 1972; Somerset 1974.

⁸ Although the author does emphasise that these results rested on a small and unrepresentative sample (n=464).

⁹ Alesina et al. 2016; Cederman et al. 2013; Østby et al. 2009; Stewart 2008.

¹⁰ Mulinge et al. 2014; Mulongo 2013; Oanda and Jowi 2012; Odhiambo 2016; Oketch 2004.

Module II students also comprise a large share of mature students, re-entering university from the labour market, who are better able to self-finance their education (Oanda and Jowi 2012). A study of self-sponsored students at Moi University found that almost half (46 percent) self-financed their studies, compared to 21 percent receiving support from parents, and 13 percent from spouses (Kessio et al. 2014).

Oanda and Jowi (2012) have also argued that the university expansion of the 2000s has led to a ruralization of university education, as politicians responded to public pressure by converting colleges and training centres into university colleges, often in rural or peripheral areas. Munene has argued that this has also led to an increasingly ethnically polarized higher education system, as each ethnic regions vies for its own university (Munene 2012).

A related question concerns the effect of this university expansion on returns to higher education. All else being equal, and assuming a competitive labour market, an increase in the supply of skilled graduates will decrease the wages that these graduates can command. Evidence suggests that labour markets have tightened for Kenyan graduates, among whom unemployment is considerable, with likely knock-on effects on average graduate wages (Awiti and Scott 2016). Some have also suggested that the heterogeneity in employment opportunities and earnings is increasing, and that employers favour graduates from the more competitive universities and courses (Nganga 2015).

Taken together, this literature shows strong regional, rural-urban and socioeconomic inequalities in university access, but provides only limited evidence of how patterns of inequality have changed over time, or what the specific impact of the Module II reforms have been.

Hypotheses

This diffuse empirical evidence aside, what are the predicted effects of the Module II expansion, based on theory rather than empirics? Under what conditions will the introduction of parallel degree programmes improve or worsen the national representativeness of the university student body? The section below presents a simple model, to illustrate the factors at play.

We start with the simplifying assumption that entry into the government-sponsored Module I programme is mechanically related to secondary school exam performance (KCSE). This is a slight simplification, as the central admissions systems also applies some (relatively mild) affirmative action that lower the entry requirements for female applicants, applicants living with disabilities, and applicants from arid and semi-arid lands (which comprises some of the most economically-deprived regions of Kenya) (KUCCPS 2014).¹¹ Nonetheless, KCSE scores remain the main determinant of admission.

A second assumption is that grade performance is correlated with family socioeconomic status (SES), so that students in the highest KCSE performance bracket will, on average, come from a higher SES background than those scoring in a bracket below, as a result of having a more conducive home environment for learning, greater access to educational resources and higher

¹¹ The geographic affirmative action is set by the Commission for Revenue Allocation's policy for identifying marginalized areas. Admissions are also shaped by the applicant's course choice, so that applicants for more competitive courses may lose out to lower scoring applicants applying to less competitive courses. For simplicity, we leave out this strategic choice on the part of the student.

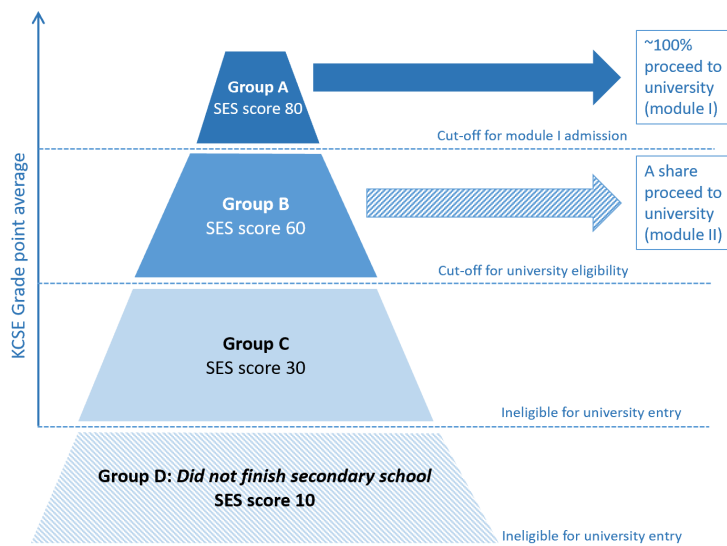
quality primary and secondary schools, etc. In the Kenyan context, as will be shown in the analysis below, this seems to be a reasonable assumption (for an earlier example see also: Kinyanjui 1981).

Figure 2 illustrates this process. At the bottom of the pyramid, in group D, are children who dropped out of school before taking the KCSE and have on average the lowest hypothetical SES score in our model. Group C comprises the majority of secondary school completers, with KCSE grades below the cut-off required for university entry, and with a lower SES score than eligible students, albeit higher than among school dropouts. Group B comprises a smaller group of students with grades above the cut-off for university entry, but whose grades were not high enough to gain admission through Module I. This group has on average a higher socioeconomic status than the ineligible students. Group A meanwhile, comprises a small and high performing group, which have met the cut-off for Module I admission, and have the highest average SES score of our four groups. Kenya's Module II stream then, allowed students from Group B to enter the same universities and courses as the Group A students, provided that they were willing to pay the full cost of their university education.

This illustrates that the equity effect of this new university admissions route will depend on the type of students from within Group B that take up this self-financing option. If all students in Group B pursued Module II options, the Module II group would by definition have a lower socioeconomic score than the Module I admissions, with the overall effect of lowering the socioeconomic privilege of university students and improving socioeconomic equity in university access (although Group B students will still, on average, comprise a comparatively privileged segment of Kenyan society, relative to Groups C and D). However, if only a select sub-group from within Group B, those with a SES score higher than that of Group A, chose to pursue a Module II degree, the outcome would be the opposite, and inequality in university access would rise. Thus the difference in SES scores between Group A and B, and the share of Group B entering through Module II programmes, are going to be determinants of the likely direction of this selection effect. If Group A is vastly more privileged than Group B, and a relatively large share of Group B enter through Module II, the Module II route is more likely to comprise a set of students of lower SES than in Group A, and vice versa.

Keep in mind however, that this refers only to relative outcomes. As long as some students with SES scores below the Group A average enter university through Module II, the absolute level of mobility will still have improved relative to a counterfactual scenario where university entry is limited to Group A only.

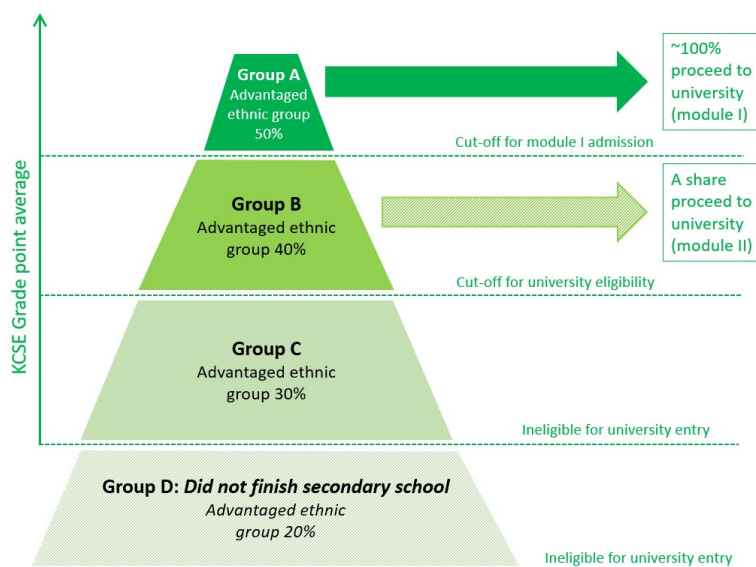
Figure 2: Illustration of hypothetical secondary student segmentation by grade performance and hypothetical SES scores



Source: Authors

This logic can be extended to horizontal inequalities. Let us assume, for instance, that one ethnic group is overrepresented in university education relative to the rest of the population. They will therefore by definition form a smaller share of the non-university eligible population. The students in Group B eligible for Module II admissions are therefore likely to be more representative of the overall ethnic composition of the population, than are students in Group A. Thus, the final ethnic composition of the overall university student body will depend on what subset of eligible students self-select into Module II, and whether this group includes a higher or lower proportion of students from the advantaged ethnic group than in Group A. The same logic could be applied to gender, assuming a disproportionate share of males at the top of the pyramid.

Figure 3: Illustration of hypothetical secondary student segmentation by grade performance and ethnicity



Source: Authors

So far, these models have assumed that given the choice, any eligible student would enter through Module I. In practice, however, students from Group A could opt into Module II instead, if it gave

them the option of pursuing the course or university of their choice for instance, or offered a faster degree route. This would likely lower the socioeconomic status of Module I students, and raise that of Module II, all else being equal. Furthermore, educational decisions prior to the 1998 reform were also shaped by the option to migrate. Students without the necessary grades to be admitted to university in Kenya but with the means to do so could pursue degrees abroad, meaning the Module II reform may have simply brought some of these students into the domestic rather than international private university system (Hughes and Mwiria 1990). The outcomes could also be affected by an affirmative action programme, which should, theoretically, lower the SES score in Group A relative to Group B (assuming that the affirmative action targets on the basis of SES).

It is also worth highlighting that the model above assumes that all students enter directly after completing secondary school. In practice the Module II avenue also created opportunities for older secondary school graduates, many of whom were already in the labour market, to upgrade their educational qualifications. Many Module II programmes are offered as standalone evening or part-time courses. It is not clear how this would influence the average socioeconomic background of students.

A last point to consider is that it is also likely that irrespective of household income, Module II entry is more common for people living near a university. All else being equal, the possibility of continuing to live with family would lower the cost of university education. This is particularly the case for mature students, many of whom retain a foot in the labour market.

Data and Methods

To study broader compositional trends in access to university education since the 1990s across the Kenyan education system, this paper draws on the 1989, 1999 and 2009 Kenyan population censuses. The Kenyan bureau of statistics, through the IPUMS International repository, makes available census microdata for a 10 percent sample of the Kenyan population, or close to 3.6 million observations in the latest 2009 census. When studying a comparatively rare characteristic, such as university attainment, the size of this sample is a major advantage. Note that because many of the respondents included in the sample will have started, but not completed their university education, we use a broad measure of university educated in the analysis below, which includes all respondents with at least some university-level education, even if they have not finished their degree. Note also that because the last available census is from 2009, this source of data captures only the beginning of Kenya's university liberalization reform period. As a result, only the youngest cohorts in the sample are likely to have entered university after the introduction of Module II streams, and most at a time when these programmes remained comparatively small. Consequently, the effects we are trying to observe will be weaker than if we could observe younger cohorts.

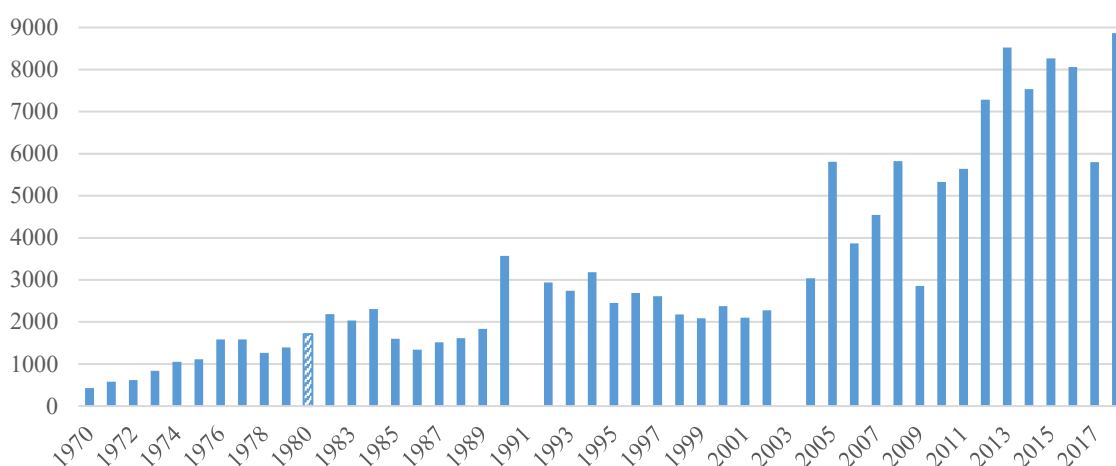
The census allows us to examine a set of characteristics of the university educated Kenyan population, including gender, place of birth and place of residence. In the Kenyan case, place of birth is a strong proxy for ethnic identity. In some of the analyses we therefore cluster birth counties by the main ethnic group living in said county, giving us a proxy for ethnicity (see method used in Simson 2019a). The censuses also offer provisional insights into the degree of intergenerational educational mobility, albeit for a small subsample of census respondents. In cases where a university student or graduate resides in the same household as his or her parents,

the characteristics of child and parent can be linked. For this census subset, we can therefore examine the effects of parental education on the likelihood of a respondent attending university.

The second analytical section of this paper examines compositional trends across graduating classes at the University of Nairobi. This analysis builds on a custom-made dataset drawing on the University of Nairobi’s graduation ceremony booklets. These booklets list all graduates by date of graduation, degree, faculty and degree class, although they do not distinguish between students from Module I and Module II (the total number of graduates by year is illustrated in Figure 4). From this database of names, we use statistical methods to extract information on gender and ethnicity for each individual i in the dataset using i ’s name. Building on data and ideas developed in Harris (2015), we use information in the Kenyan voter register to estimate the probability that individual i belongs to each of the 12 major ethnic groups, given i ’s middle and surnames.¹² We assign individual i to the ethnic group showing the highest estimated probability given i ’s name. To infer gender, we proceed in a similar manner, this time relying on information in i ’s first name, which confers gender-specific information. To do so, we calculate, for each first name in the voter register, the probability that the holder of the name is female. Then, we match this first-name-specific probability to i ’s first name in the education data, coding i as a female if the estimated probability is greater than 0.5. This allows us to see how and when ethnic and gender compositions shifted across time, and in response to what. Lastly, we also exploit name data from the voter registers and secondary school lists, to create socioeconomic proxies derived from first names, as described in greater detail in the empirical section.

In addition to the graduation lists, the University of Nairobi has also posted lists of all bachelors’ students admitted through the regular Module I stream for the years 2012 and 2013 on its website. This added source of data allows us to identify a subset of graduates in the graduation database that we know entered through the Module I stream, and compare their characteristics with the remaining graduates, most of whom would have entered through Module II.

Figure 4: Total number of bachelor’s degrees conferred by year from the University of Nairobi



Source: Authors’ own dataset, based on graduation booklets.

Note: No graduation ceremony in 1991 and 2003; 1980 missing from authors’ dataset, total from University of Nairobi (2014a).

¹² We exclude first names—usually English or biblical names—from this process, as they are commonly used across many different ethnic groups and provide little implicit information on ethnicity.

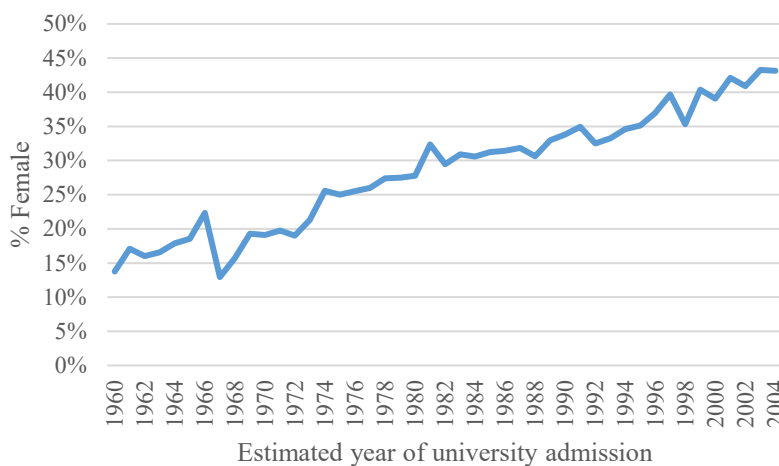
Linking names and race or ethnicity is one common way scholars measure identity in the absence of comprehensive census or survey data. Such methods work well, even in cases where names may not be strictly related to a single racial or ethnic group (Enos 2016; Imai and Khanna 2016). Kenya is particularly well-suited to using names as an identity measure, given the strong relationship between names and ethnic identity (Harris 2015; Kasara 2013). In addition to identity, economic historians have used name frequencies to track economic mobility across time (Clark et al. 2015). This methodology has made use of registers of university students at Oxford and Cambridge to measure rates of social mobility in England (Clark and Cummins 2014). To date, however, these methods have primarily been applied to data from Europe and North America.

The Composition of Kenya’s University Educated Population

What are the characteristics of the average university student in Kenya? Have these characteristics changed over the past decades? Using data from the 1989, 1999 and 2009 census, this section discusses how the makeup of university educated Kenyans differ from the population at large, with regards to gender, region of origin and parental educational status, a proxy for socioeconomic status.

Kenya is nearing gender equality in access to university. Since the introduction of university education in Kenya, the gender balance of students has been steadily improving. While women constituted around 14 percent of all university students in 1960 (cohort born in 1940), they constituted roughly 43 percent of university entrants in 2004 (cohort born in 1984). This growing gender equity has been steady and relatively constant in pace, albeit with some acceleration in the 1990s. It has largely mirrored improved gender equity in primary and secondary schooling over the same period.

Figure 5: Female share of university-educated population, by birth year



Source: Authors’ own elaboration, based on Kenya 2009 Housing and Population Census (Minnesota Population Center, 2019a).

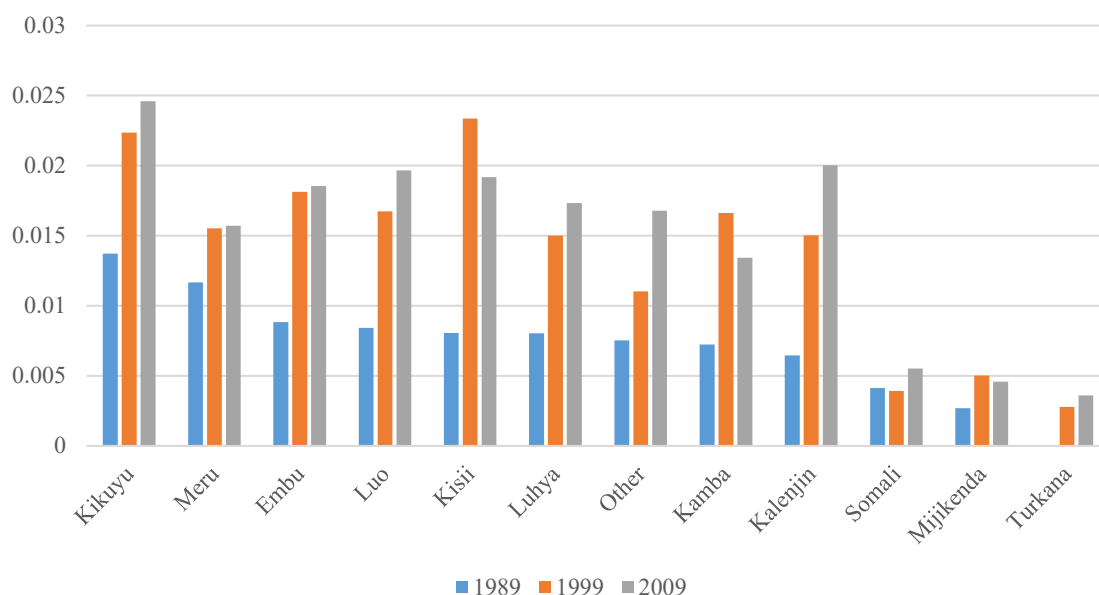
On a regional and ethnic group basis, the inequality trends are more mixed. The Kenyan censuses provide information about respondents’ place of birth on a district or county basis. This allows us to look at how the university attainment rates – that is the share of a given cohort that gained

university education – varies across geographic regions of Kenya. Note that the focus is on where people were born, rather than currently living, to avoid capturing the fact that many people with university education will migrate to Kenya’s main cities. In the figures below we examine inequality across Kenya’s eight former provinces.

Although the Kenyan census data available to researchers does not contain variables on ethnic identity, a Kenyan’s place of birth is a strong predictor of a person’s ethnic identity. Most of Kenya’s counties contain a majority ethnic group that constitutes well above 50 percent of the population. We therefore leveraged this to create another variable that classifies people by the “ethnic region” where they were born, allowing us to trace inequalities across these ethnic units.¹³ In cases where no ethnic group constitutes at least 50 percent of the population, respondents born in these areas are grouped into an “other” category. People born in Nairobi are treated as a separate category, given the considerably larger educational attainment among people born in this multi-ethnic metropolis.

To give a sense of how university attainment differs by ethnic region in Kenya and across census years, Figure 6 measures the share of the population born in each ethnic region, aged 25-30, that have attended university. The groups are ordered from highest to lowest, based on the 1989 census. This shows considerable growth in attainment across all groups across successive censuses. Across the ethnic regions, there appears to be some convergence in attainment rates across the 9 highest performing regions, where attainment levels range from 13-25 percent in 2009. But there is a large gap between the three laggards, people born in predominantly Somali, Mijikenda and Turkana regions, and the rest of the country.

Figure 6: Share of population that have or are attending university, by “ethnic region”, 1989, 1999 and 2009 (excl. Nairobi-born)



Source: Authors’ own elaboration, based on Kenya 2009 Housing and Population Census (Minnesota Population Center, 2019a).

Irrespective of the original level of regional or ethnic inequality, has inequality increased or decreased over time? To measure regional and ethnic inequality we use a Theil index, which

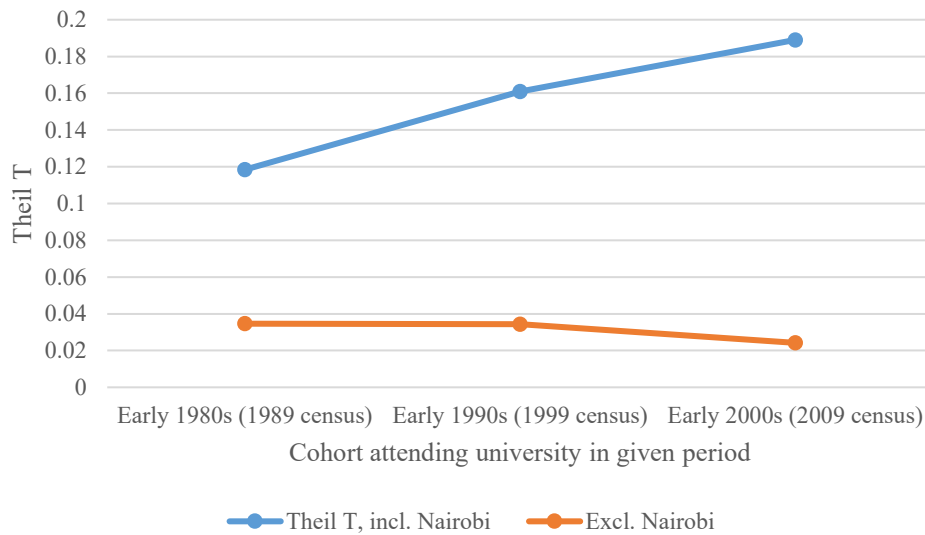
¹³ This method has been used in Simson (2019), Kramon and Posner (2016) and Burbidge 2015.

provides a summary measure of inequality across all groups. The Theil is a synthetic measure of inequality, which captures the variation in the share of people born in each region that attended at least some university schooling, with regions weighted by their population size. Entropy indices, such as the Theil index, are commonly used to measure income inequality using semi-aggregated data at industry or regional level (Galbraith 2012), but have also been used to study inequalities in educational access (D’ Hombres 2010). It has the further advantage that it allows the inequality index to be decomposed by group, thereby showing which groups are driving the inequality.

Figure 7 shows how the Theil index has risen across successive censuses, when measured across Kenya’s eight former provinces. It shows rising regional inequality over time. This rise was particularly steep between those cohorts who would have entered university in the early 1980s, and those of the early 2000s. However, if Nairobi-born people are excluded from the sample, the path is quite different, as shown by the orange line. Inequality among the remaining regions was virtually unchanged between the 1940-1965 cohorts, and then fell modestly.¹⁴ This suggests that all the regional inequality growth is accounted for by the disproportionately rapid rise in university attainment among Nairobi-born urbanites.

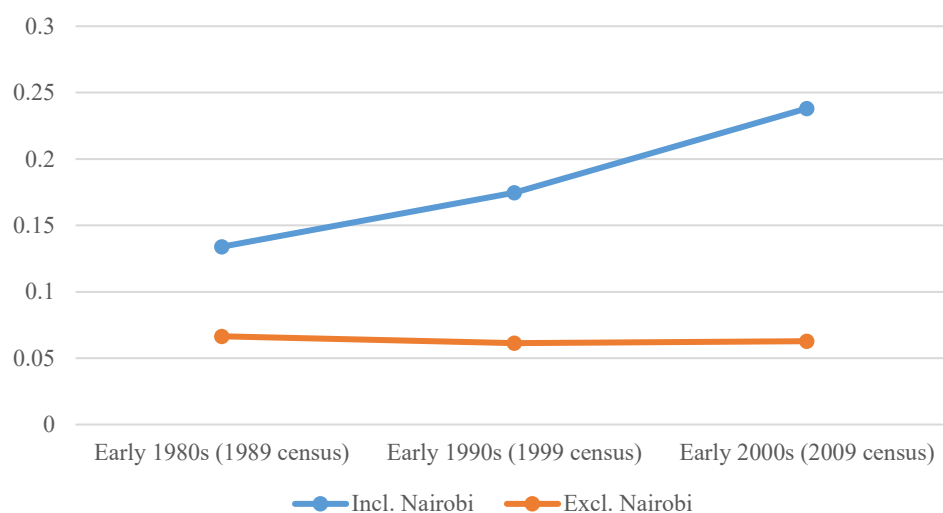
In Figure 8 this exercise is repeated using ethnic regions instead of provinces of birth. The results are similar. Again, inequality has grown over time, on account of the rapid attainment growth in the separate Nairobi-born category (because ethnicity is measured based on place of birth, the Nairobi-born population cannot be assigned to ethnic groups). Excluding Nairobi, ethnic inequality remains virtually unchanged across censuses. This is also illustrated in greater granularity in the Appendix 1 figures.

Figure 7: Regional inequality in university attainment by cohort (by census)



Source: Authors’ own elaboration, based on 1989, 1999 and 2009 Kenya Housing and Population Censuses (Minnesota Population Center, 2019a).

¹⁴ Appendix Figure 1.1 illustrates this differently. Here the coloured stacked bars capture each province’s contribution to the given level of inequality. Regions above 0 are overrepresented, and those below 0 are underrepresented in higher education, relative to the national mean. The main change over time has been the growing overrepresentation of Nairobi relative to other regions.

Figure 8: “Ethnic” inequality in university attainment by cohort (by census)

Source: Authors’ own elaboration, based on 1989, 1999 and 2009 Kenya Housing and Population Censuses (Minnesota Population Center, 2019a).

We also consider regional inequalities for male and female graduates separately (Table 1). This reveals that the regional distribution of female graduates is more unequal than among males. While the gap in attainment rates between Nairobi-born and North-Eastern-born is 11:1 amongst men, it is 48:1 amongst women. The coefficient of variation across birth regions is considerably higher for women (1.5) than men (1.1). On average, the women who enter universities are more likely to come from economically advantaged regions than men. The consequence of this is that there is in effect a trade-off between gender and regional equity. All else being equal, an improvement in gender equality will increase inequality on a regional or ethnic group basis and vice versa.

Table 1: University educated population by province of birth and gender (age 25-34, 2009 census)

| Province of birth | Male | Female |
|---------------------------------|-------------|-------------|
| Nairobi | 19.4% | 17.9% |
| Central | 4.1% | 3.0% |
| Coast | 2.5% | 1.3% |
| Eastern | 2.8% | 2.0% |
| North Eastern | 1.7% | 0.4% |
| Nyanza | 4.3% | 1.9% |
| Rift Valley | 3.5% | 2.1% |
| Western | 3.4% | 1.8% |
| Mean | 3.8% | 2.4% |
| Max/Min | 11 | 48 |
| Max/Mean | 5 | 7 |
| Coefficient of Variation | 1.1 | 1.5 |

Source: Authors’ own elaboration, based on Kenya 2009 Housing and Population Census (Minnesota Population Center, 2019a).

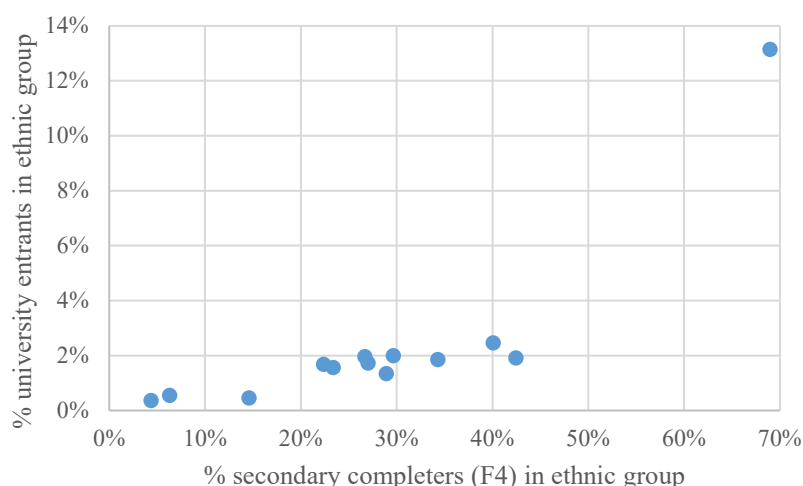
What drives this regional and ethnic inequality in access to university? To what extent is it an automatic consequence of inequality in secondary schooling? The scatterplot in Figure 9

compares ethnic inequality in university attainment, with ethnic inequality in secondary school attainment (for the same 25-30 age group). The two are, unsurprisingly, strongly correlated, with a coefficient of determination (adjusted R^2) of 0.67, meaning that in a statistical sense, 67 percent of the variance in ethnic group university attainment is explained by unequal secondary school attainment. However, the outlier in the top left quadrant, Nairobi, seems to have a university attainment level above that predicted by secondary schooling alone.

Figure 10 introduces a measure of conditional university attainment, by calculating the share of people with secondary education from a given ethnic region that proceed to university. We can think of this as the regional/ethnic transition rate from secondary school to university. The results reinforce the point made above; the Nairobi-born's high university attainment level is not only a factor of high secondary school attendance, but also an exceptionally high transition rate from secondary school to university, with almost 20 percent of secondary graduates proceeding to university, compared to a national average of 7 percent. Although not shown in the figures below, this transition rate appears to have grown faster for the Nairobi-born than for other groups across successive censuses. While this may reflect better quality schools in Nairobi than elsewhere, this is also likely to be a result of skills-selective migration. Across Africa, skilled and educated workers tend to form a disproportionate share of urban migrants (Becker and Morrison 1993), while lower educated migrants are often those with high educational aspirations for their children. Consequently, a disproportionate share of secondary students from educationally privileged or aspirational backgrounds are found in Nairobi. These students, by extension, have a higher probability of performing well in school, and those from highly educated households are more likely to have the financial support that will allow them to proceed to university (Simson 2019b). Thus, the growing Nairobi university attainment lead is both a function of high secondary school attainment, and a growing rate of transition from secondary school to university.

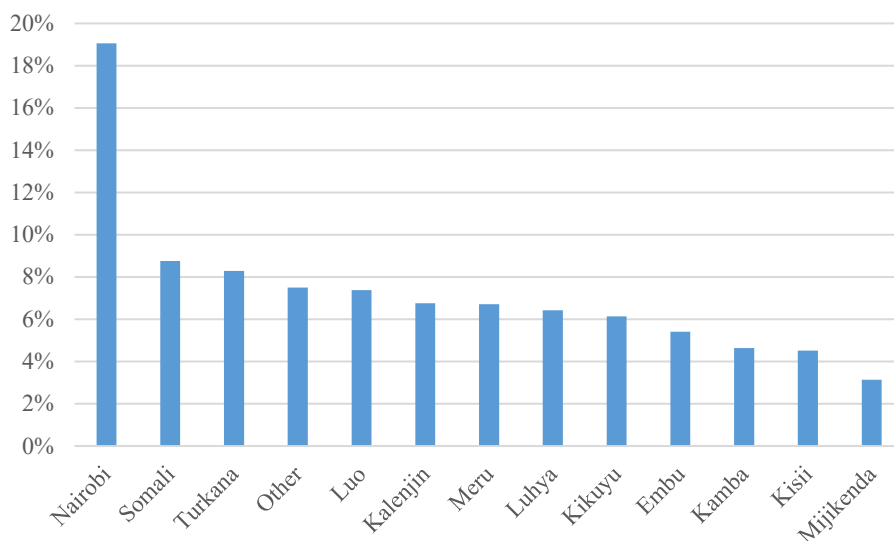
For most of Kenya's larger ethnic regions, the transition rate varies between 5-7 percent. Interestingly, the Somali, Turkana and other, groups with low educational attainment, have above average transition rates. This could reflect the effects of affirmative action, which reduces the entry requirements to university for students from lagging regions, but it might also be a function of unusually low school attainment. Where educational attainment is low, it is often only "elite" children that attend secondary school in the first place, so the selection into university is on the basis of a small and more exclusive secondary student population (Blakemore and Cooksey 1980).

Figure 9: Correlation between ethnic group university attainment and secondary school attainment (ages 25-30, 2009 census)



Source: Authors' own elaboration, based on Kenya 2009 Housing and Population Census (Minnesota Population Center, 2019a).

Figure 10: Share of secondary school completers that have or are attending university, by "ethnic region"



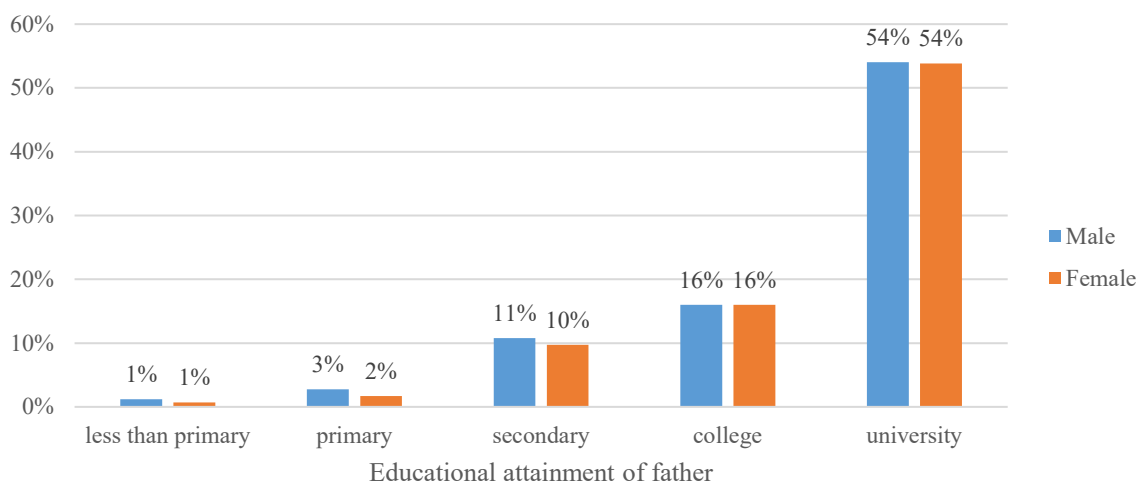
Source: Authors' own elaboration, based on Kenya 2009 Housing and Population Census (Minnesota Population Center, 2019a).

How strongly does a person's family background influence the likelihood of attending university in Kenya? For a subset of the census sample, where children and parents reside in the same household, we can link the educational attainment of children with that of their parents. This does introduce possible biases, however, if the tendency for adults to live with their parents is related to educational attainment. Several recent studies have examined this data and found these co-residency biases to be relatively small when examining primary and secondary education (Alesina et al. 2019; Narayan et al. 2018). However, the risk of selection bias is a more serious issue when considering adult university graduates, as a far smaller share continue to reside with their parents at this age. To limit this bias, we restrict the sample to a comparatively young cohort, people aged 25-34. We also place more trust in the results for men, as we find that male graduates are more likely to live with their parents than women. Appendix 3 also examines how the characteristics of

co-resident respondents differ from the total population, and suggests that the results are likely underestimated, as co-residency is less common in Nairobi, the country’s richest and most educated region. Nonetheless, these results should be considered as indicative orders of magnitude, rather than firm results.

With these caveats, the results suggest that parental education has a large effect on a person’s likelihood of attending university. Figure 11 measures the share or probability of attending university, conditional on the father’s education, for people aged 25-34, by gender. This cohort would likely have entered university in the late 1990s or early 2000s. Roughly 54 percent of respondents with university-educated fathers do themselves attend university, compared to 1 percent of those with fathers who hold less than a primary school degree. Thus, a person with a university-educated father is roughly 50 times more likely to attend university than a person with an uneducated father.¹⁵ Calculated another way, 45 percent of the university educated respondents in the sample have fathers with tertiary education (college and university) and 72 percent have fathers with at least a secondary school degree. By comparison, across the full sample of respondents, university educated or otherwise, only 8 percent have tertiary educated fathers and 20 percent have secondary educated fathers. Even if we were to assume a considerable margin of error, it is clear that family background strongly influences a person’s likelihood of attending university.

Figure 11: Probability of attending university by gender and the education of the father



Source: Authors’ own elaboration, based on Kenya 2009 Housing and Population Census (Minnesota Population Center, 2019a).

Overall, the differences in the probability of attending university for children of fathers with high versus low levels of education are slightly higher for women than men, although this effect is unlikely to be statistically significant. It does suggest, however, that female university entrants are more likely to have highly educated fathers than male entrants. This again echoes findings by Hughes (1987: Table 10), who found that female university of Nairobi students of the 1980s were on average from higher socioeconomic backgrounds than their male peers.

¹⁵ By comparison, in Ghana this same ratio is roughly 40:1 (2010), and in Botswana roughly 15:1, albeit at a higher overall level of university attainment (2011) (Minnesota Population Center 2019b, 2019c).

However, this intergenerational persistence in university attainment does not appear to be a recent development linked to the reforms of the last two decades. To measure changing intergenerational persistence, however, we need to be mindful of the fact that educational attainment levels are increasing over time. For instance, having a secondary school educated father signalled a much higher degree of relative privilege in the 1960s, than it does today. For this reason, we calculate the years of schooling of fathers and mothers of respondents in our sample, and then convert the parental years of schooling into z-scores. Z-scores express the parent years of schooling as the number of standard deviations from the mean years of schooling for the corresponding birth cohort, thus a z-score of 1 means that the parent years of schooling lies 1 standard deviation above the mean, or in the top 16 percent of attainment for that cohort.

Table 2 gives the average father and mother years of schooling z-score of respondents with at least some university education, measured across successive censuses. In other words, how far from the educational mean is the education of the parents of the average university entrant in different years? We examine the same age cohort (25-34) across each census, and estimate (roughly) the years in which this cohort would have entered university.

This suggests a modest decline in the degree of intergenerational persistence between university entrants of the late 1970s and late 1980s, although the small number of observations in the first period makes these estimates particularly unreliable. The change in z-score since the late 1980s show different trends across our different subsamples. The average father z-score increased modestly between the late 1980s and late 1990s for men, but remained steady for women. A similar analysis using the education of mothers of university educated respondents, however, suggests a continued decrease in the relative education of mothers over this period.

By the last period, the average male university attendee had a father with a z-score of 1.2, equivalent to a father in the 89th percentile of educational attainment, and a mother with a z-score of 1.3, equivalent to a mother in the 90th percentile of educational attainment. The underrepresentation of Nairobi residents in this sample, moreover, likely understates these z-scores.

Table 2: Intergenerational persistence over time: father and mother educational z-score for men and women with some university education

| Approximate year of university entrance | Father years of schooling z-score | | Mother years of schooling z-score | |
|--|-----------------------------------|--------------|-----------------------------------|---------------|
| | Male | Female | Male | Female |
| 1975-1984 (measured with 1989 census) | 1.5 | - | 3.0 | - |
| <i># of observations</i> | <i>(121)</i> | <i>-</i> | <i>(162)</i> | <i>-</i> |
| 1985-1994 (measured with 1999 census) | 1.1 | 1.5 | 1.4 | 2.5 |
| <i># of observations</i> | <i>(400)</i> | <i>(114)</i> | <i>(529)</i> | <i>(164)</i> |
| 1995-2004 (measured with 2009 census) | 1.2 | 1.5 | 1.3 | 1.9 |
| <i># of observations</i> | <i>(1393)</i> | <i>(798)</i> | <i>(1838)</i> | <i>(1153)</i> |

Source: Authors' own elaboration, based on Kenya 2009 Housing and Population Census (Minnesota Population Center, 2019a).

Note: Females for 1975-1984 cohort excluded due to small sample size.

While these are high levels of intergenerational persistence, they have not changed markedly since the 1990s. The father years of schooling z-score rose marginally from 1.1 for the cohorts educated in the late 1980s-early 1990s, to 1.2 for those educated a decade later, pointing to a high degree of intergenerational persistence in the pre-reform "meritocratic era" too.

In conclusion, the censuses suggest that inequalities have remained relatively stable since the 1990s, although the female share of students has continued to increase, and the educational advantage of Nairobi-born Kenyans has continued to grow. Regional and ethnic inequalities are marked by this strong divide between Nairobi and the rest of the country, and between lagging regions and the rest. Among nine of the largest "ethnic groups" however, inequalities are not enormous. Furthermore, these inequalities are largely driven by regional inequalities at secondary level. Parental educational attainment, however, a proxy for the student's socioeconomic background, is highly correlated with the probability of attending university – a relationship that has not changed much over successive censuses. In sum, there are signs of a growing urban bias, but not much evidence of changing ethnic or socioeconomic skews since the university system was liberalized in the late 1990s.

Graduates from the University of Nairobi

While the census data above allows a broad overview of levels and changes to inequality in university attendance in Kenya, one of its weaknesses, for the purpose of this study in particular, is that it captures only the very beginning of the reform period of the 2000s. Furthermore, the coarse census data does not allow us to make finer distinctions between different types of universities, or quality of degrees. As quality disparities in education are also thought to have widened during this period, we may well be seeing different inequality trends across universities or departments of different quality and competitiveness.

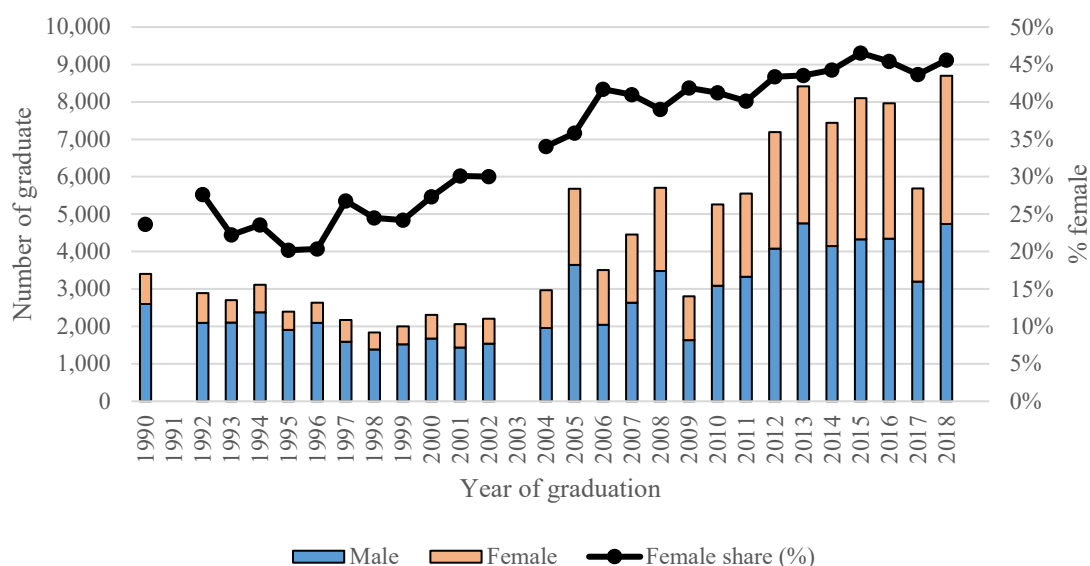
To address these shortcomings, we use a new and novel dataset focused exclusively on compositional trends in Kenya's oldest and largest public university, the University of Nairobi. This has the advantage that it allows us to look at trends up until the present and focuses the analysis on one of Kenya's most prestigious universities. Furthermore, as graduates are grouped by department and degree, we can also look at differences in trends across different types of programmes. As discussed above, this dataset is created from digitized lists of all graduates from the University of Nairobi, and name analysis allows us to classify these graduates by gender and ethnicity.

The first Module II students were admitted in 1998 and would have graduated in 2002/03, but the number admitted was low in the first few years. The Module II introduction appears to begin influencing the graduation rate around 2004 and after, although part of the initial uptick in graduates was likely due to a backlog after the 2003 university closures (see Figure 12). This university expansion followed a period of falling student numbers in the 1990s.

How then has the gender and ethnic composition of graduates changed over this period? The female share of University of Nairobi graduates dipped between 1992 and 1996, although this is partly due to a changing departmental composition at the university, away from courses with higher female participation. Since 1999 the female participation has been increasing (Figure 12). This trend thus pre-dates the Module II expansion and is probably driven by a secular trend

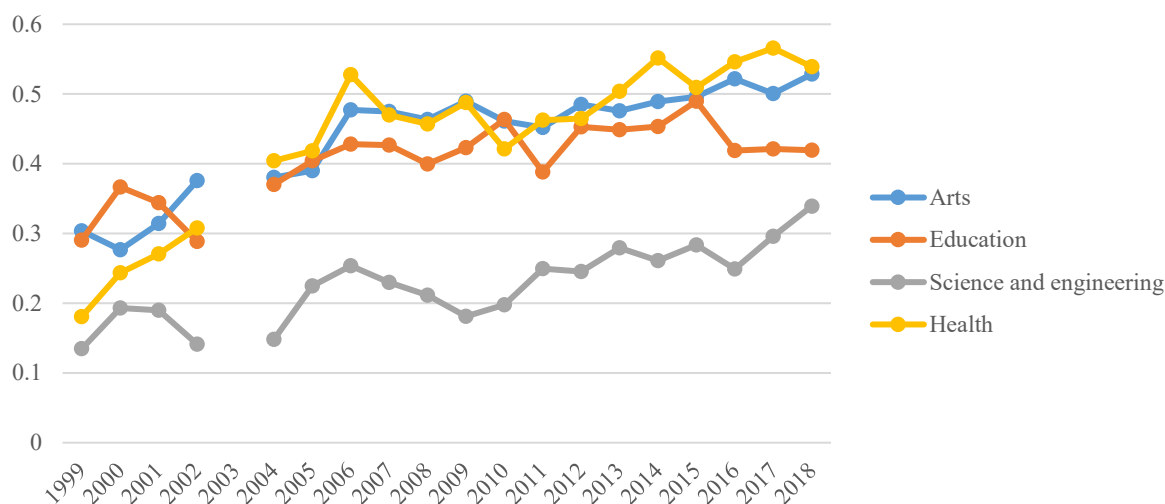
towards greater female educational participation in general,¹⁶ but it is noteworthy that growth has continued rapidly into the Module II era. Female graduates grew considerably, from 30 percent of the total in 2002, to 45 percent by 2018. Moreover, the growth in female participation appears to be strongest in departments with large Module II intakes, suggesting that women may have represented a disproportionate share of the Module II intake. Figure 13 charts the female share across four departmental groupings: arts (including business and social sciences); education; science and engineering; and health (medical, dental, pharmacy and advanced nursing). The female share has increased across all departmental groups, and particularly in the health sector and arts, where Module II expansion was especially strong. However, departmental gender differences persist, with considerably lower female participation in sciences, which include many departments with below average Module II intakes.

Figure 12: Gender composition of University of Nairobi graduates, bachelor’s degrees only



Source: Author constructed dataset

Figure 13: Gender composition of University of Nairobi graduates by department, bachelor’s degrees only

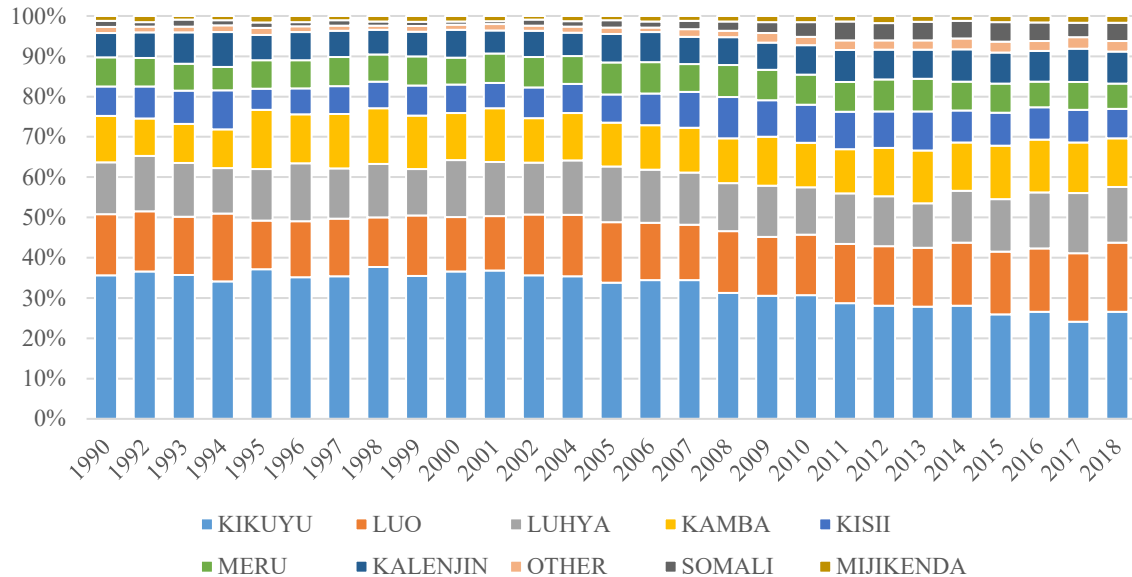


¹⁶ Across Sub-Saharan Africa, the gender parity (ratio of girls to boys) in primary school rose from 0.7 to 0.9 between 1971 and 2014; the secondary level data is patchier but also shows convergence (World Development Indicators 2018).

Source: Author constructed dataset

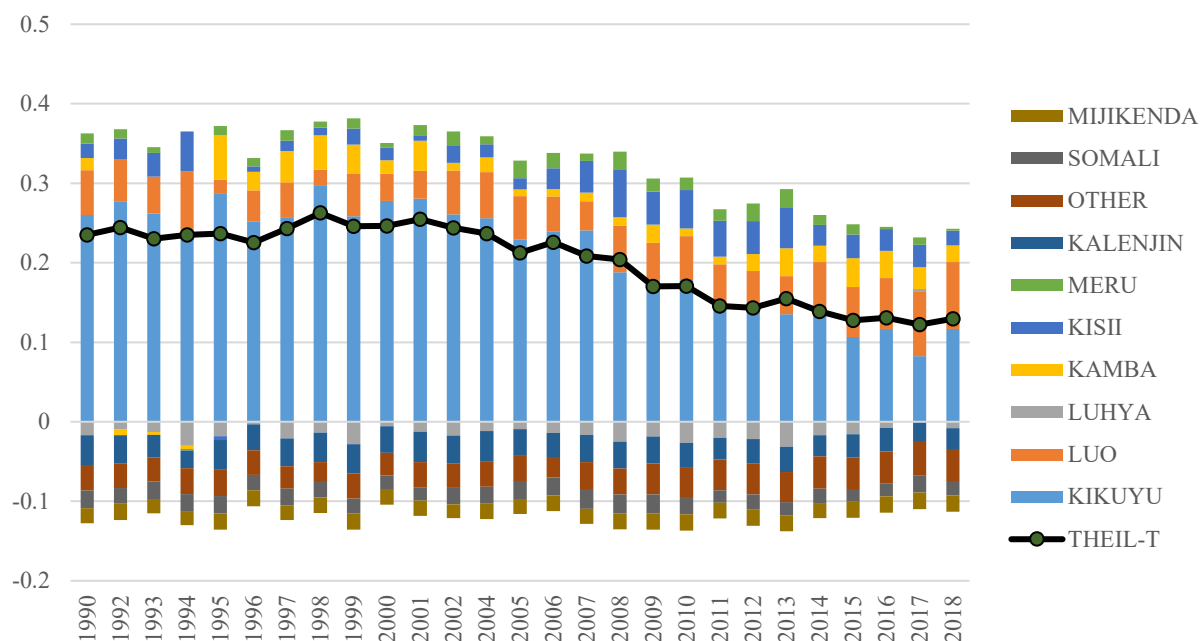
Furthermore, on an ethnic group basis, the University of Nairobi graduates have also grown more representative over time. Figure 14 gives the “raw” ethnic shares of each graduating undergraduate class, unadjusted for that ethnic group’s population size. Ethnic group shares have remained comparatively stable over time, but the Kikuyu share, the ethnic group with the largest educational lead at independence, has fallen noticeably since roughly 2001. The Kalenjin, Somali and “other” shares have increased from low bases.

Figure 14: Ethnic composition of undergraduates by graduating class



Source: Author constructed dataset

Because these results are based on ethnic categories derived from names, there is no perfect way of comparing these ethnic shares among university graduates to the corresponding ethnic share of the total Kenyan population. Although the 1989 and 2009 census give aggregate ethnic composition of the Kenyan population, these are based on self-reported identity, and will therefore not map perfectly onto ethnic identity as measured using name analysis, nor do the two censuses use stable categories over time. Nonetheless, absent other alternatives, in Figure 15 we measure ethnic inequality, using the Theil-T index, by normalizing by ethnic group population share from the 2009 census, and assuming constant ethnic group population shares over time. The black line gives the measure of inequality, and the coloured bars indicate which groups are contributing to this inequality, with overrepresented groups shown with bars with positive values, above zero, and underrepresented groups with negative values.

Figure 15: Theil-T Index of between ethnic group inequality among graduates of UoN

Source: Author constructed dataset

This shows a marked decline in inequality starting in 2001, although the biggest shift comes after 2008, coinciding with the growth in graduate numbers. This decline in inequality is primarily driven by the reduction in the Kikuyu level of overrepresentation, although it is worth emphasizing that the Kikuyu still remain overrepresented in 2018, just less so. The Somali and Kalenjin, meanwhile, are increasing in share and becoming less underrepresented. On the whole then, there has been an improvement in the ethnic representativeness of the University of Nairobi since the introduction of the Module II programmes, although this is not necessarily causal.

While the figures above have traced compositional changes over the period of reform at the University of Nairobi, these changes could of course be driven by factors other than the Module II introduction. Some of these trends may, for instance, be driven by ethnic and gender convergence in primary and secondary school attainment rather than reforms at tertiary level per se (Simson and Green 2019). To examine the effects of Module II admissions directly, we employ a different strategy.

The University of Nairobi has released admission lists for 2012 and 2013 of all students admitted through the regular admissions process (Module I). This allows us to compare these Module I entrants with their respective graduating classes. We match the names from these admission lists with the graduating classes five or six years after said students began their studies at the University of Nairobi. Thus the 2012 admissions are compared with graduates between 2017 and 2018, and 2013 admissions with 2018. In total we were able to identify roughly 54 percent of these admitted students in the respective graduation lists (~5,000). Of the remaining 46 percent, we expect some to be students that dropped out or have yet to graduate, while some will remain unmatched because of a name change or spelling irregularities.

Unsurprisingly, the students admitted to the University of Nairobi come from some of Kenya's most prestigious secondary schools. Of those admitted in 2012 and 2013, a quarter attended national secondary schools, the most competitive of Kenya's secondary schools, while these

schools accounted for only 4 per cent of all secondary school graduates. The geographic spread of students shows a skew towards students schooled in Nairobi, Central Province and, to a lesser extent, Eastern Province, reflecting the higher educational performance in those regions—despite some affirmative action benefitting students from Kenya's poorer regions.¹⁷

Although they are therefore likely to comprise a highly privileged group of students, the question at hand is how those admitted through the regular competitive stream compare to students admitted through fee-paying streams, rather than the general population. To approximate this, we compare characteristics of these Module I admissions with the full graduating classes of 2017-2018, of which they form a part.

Table 3 compares the gender and ethnic composition of the regularly admitted students, against the remaining graduating class. Keep in mind that these two groups do not perfectly map onto Module I and Module II, as some Module I students from earlier years will also be graduating in these years, and not all names could be matched, which could lead to some sampling biases. Nonetheless, the first group will predominantly comprise Module I students, and the second group predominantly Module II. Out of interest, we have also included the department or faculty composition of the two admission groups, which shows, consistent with other evidence, that Module II students are more prominent in education, medicine, business and law, and form a comparatively small share of the intake in agriculture, science and mathematics.

¹⁷ This holds true even when excluding national schools, which have a national catchment. Their geographic location is therefore not indicative of the regional origin of the students.

Table 3: Gender and ethnic composition of Module I versus Module II graduates, 2017-18

| | “Module I” | “Module II” |
|--|------------|-------------|
| Gender | | |
| Female share | 42.0% | 46.2% |
| Ethnicity | | |
| Kalenjin | 9.4% | 7.4% |
| Kamba | 12.3% | 12.2% |
| Kikuyu | 25.9% | 25.5% |
| Kisii | 8.5% | 7.2% |
| Luhya | 14.4% | 14.3% |
| Luo | 18.5% | 16.3% |
| Meru | 6.4% | 6.6% |
| Mijikenda | 1.3% | 1.9% |
| Somali/Muslim | 1.4% | 5.5% |
| Other | 1.9% | 3.1% |
| Faculty | | |
| Agriculture and veterinary medicine | 14% | 6% |
| Science and mathematics | 18% | 9% |
| Engineering | 3% | 6% |
| The built environment | 5% | 7% |
| Education and distance learning | 18% | 20% |
| Medicine, dental science, nursing and pharmacy | 3% | 8% |
| Arts (incl. social sciences) | 25% | 17% |
| Business | 9% | 18% |
| Law | 5% | 9% |
| <i>N</i> | 4,851 | 9,814 |

Source: Author constructed dataset

These results show a difference in the gender composition of students admitted from Module I versus Module II, with women comprising only 42 percent of the Module I graduates, against 46 percent of the predominantly Module II graduates. In other words, Module II has contributed to narrowing the gender gap in University of Nairobi admissions.

The differences in ethnic composition between the two streams are comparatively modest. The Kisii, Kikuyu, Luhya, Kamba and Meru shares of Module I and Module II entrants are roughly equal. The Kalenjin and Luo, on the other hand are underrepresented in the Module I intake, relative to their share of regular admissions. Conversely, the Somali, Mijikenda and other smaller ethnic groups are overrepresented in the Module II intake.

The low Kalenjin and Luo shares may reflect the fact that Module II entrants from these ethnic groups are more likely to attend universities in their localities, at least in the Kalenjin case. The Kalenjin population share in Nairobi is small, and several large universities in the Rift Valley offer Module II opportunities (Moi University, Egerton), which presumably weakens the incentive to migrate to the capital for higher education.

Interestingly, however, some of Kenya’s most underrepresented groups in higher education seem to be taking advantage of Module II streams. The Somali are a particularly interesting case, although we must keep in mind that the name-based analysis is not precise, and in this case people

with Muslim names, which includes some people from the coast and other parts of the country, will be captured in this measure. Nonetheless, data on secondary school graduates give some clues to the possible reasons for this pattern. KCSE results suggest a discrepancy between the performance of children with Muslim names in the predominantly Somali North-East of Kenya, and in the coastal regions, relative to those residing in Nairobi. Nairobi’s Somali community has grown since the 1990s, not only because of urbanization, but also due to an outmigration from neighbouring Somalia during the decades of conflict there, and have become important players in Nairobi commerce in particular (Carrier and Lochery 2013). We can hypothesize that the Module II expansion at the University of Nairobi has expanded the opportunities for Nairobi’s Somali community to participate in higher education.

Lastly, we examine whether the socioeconomic status of students differs across these two groups, by introducing a name-based SES proxy. Our measure assigns a poverty score to each first name based on the distribution of said name across electoral enumeration areas with differing poverty incidences. To illustrate the intuition behind this exercise, across the electorate there are 1083 people with the first name Michelle, and on average, people with the name Michelle live in enumeration areas with a poverty incidence of 20 percent, well below the national average of 36 percent. We thus assume that Michelle is on average more of an elite than a poor person’s name, and assign all Michelle’s in the university sample the comparatively low poverty score of 20 percent. Similarly, the 666 Yakub’s in the electoral registers on average live in EAs with a poverty rate of 60 percent. We therefore assume that people holding the name Yakub are on average poorer than the national average.

Table 4: Summary statistics: SES scores by admissions stream, 2017-18

| | Module I | Module II | Full population |
|-----------------------------|---------------|---------------|-----------------|
| Name poverty score | 34.3% | 34.5% | 36.3% |
| <i>(standard deviation)</i> | <i>(6.6%)</i> | <i>(8.9%)</i> | <i>(9.7%)</i> |

Source: Author constructed dataset

On average the poverty name scores are very similar across the Module I and Module II samples, albeit slightly higher for the Module II group, suggesting very little difference between the two student groups, although this measure is coarse. The poverty score is, as we would expect, lower than for the general population. Note however that the standard deviation is relatively low, so there is not a large amount of statistical variation in the data, reflecting a clustering of observations at or close to the mean.

However, as these poverty name score averages could simply reflect ethnic or gender composition differences between the two samples, we introduce a simple OLS regression model to look at the effects of admission stream on poverty name scores controlling for any gender and ethnic group effects. In other words, among all men or women from a given ethnic group, do those admitted through Module II have names associated with higher or lower poverty status than those admitted through Module I? The dependent variable is the name-based SES measure, and the independent variable of interest is the admissions stream (Module I vs. Module II), with controls included for gender, ethnicity and graduation year.

The results show a small but statistically significant negative effect of entering through the Module II stream on the name-based SES we ascribe to graduates. The Module II coefficient

lowers the poverty name score, albeit a small amount (just under 1/10th of a standard deviation). This suggests that the Module II intake is regressive. Relative to the regular admissions from the same ethnic group and gender, these fee-paying students come from more privileged backgrounds, as measured by our name SES scores. However, it should be noted that with this particular measure the differences appear small, and the socioeconomic gap between both groups of admitted students and the population at large is considerably larger than that between the two admissions streams.

Table 5: Regression results: effect of admissions stream on SES scores

| VARIABLES | Poverty name score |
|---|-------------------------|
| Admissions stream (Module I = 0; Module II = 1) | -0.0059*** (0.00108) |
| Gender fixed effect | YES |
| Ethnicity fixed effects | YES |
| Graduation year fixed effects | YES |
| Observations | 14,231 |
| R-squared | 0.348 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors

Conclusion

As in many countries in Africa, and around the world, Kenya privatized parts of its university system in the late 1990s and 2000s, both by encouraging the growth of private universities, and introducing fee-paying programmes within the existing public institutions. Kenya’s university system has expanded markedly since these reforms came into effect, with a more than 10-fold increase in university enrolment between 2000 and 2017, albeit set against a strong economic recovery over the same time period.

The equity effect of this process of change, however, remains unclear. Many have argued that the expansion of opportunities for fee-paying students has made the system more regressive, allowing students from richer families to enter university, compared to those admitted through a meritocratic path and with access to full bursaries. Others have argued the opposite, as those students selected on “meritocratic” grounds are usually drawn from among the most privileged communities in Kenya in the first place.

Using aggregate data on university access from Kenyan censuses, as well as a custom-built dataset of graduate names from Kenya’s largest and oldest university, the University of Nairobi, this paper provides an examination of changes in equity in university access, examining equity in gender, ethnicity, regional origins and, using proxies, socioeconomic status.

This reveals mixed patterns of change, with improvements along some dimensions of equity, and a deterioration along others, since the reforms came into effect. Both at the national level, and at the University of Nairobi alone, gender balance has improved over the past decades. This is partly a consequence of improving gender equity at primary and secondary school levels, but an analysis of the University of Nairobi admissions streams also shows that women have been more numerous

in the fee-paying programmes than the regular, subsidized admissions. These fee-paying opportunities then, have on balance improved gender equity.

On an ethnic group basis, university student composition remained relatively stable up until the mid-2000s, according to our analysis of the available census data. However, evidence from the University of Nairobi suggests a slight improvement in the ethnic representativeness of its graduates since the early 2000s. Again, this is probably in part a consequence of ethnic convergence in secondary school attainment, particularly the falling over-representation of the Kikuyu. But it also seems that some underrepresented ethnic groups, notably the Somali, have taken advantage of Module II opportunities in big numbers, consequently improving both the ethnic and religious equity of the university’s graduates.

These ethnic group patterns aside, however, and with the caveat that data is only available into the early 2000s, regional inequalities in access appear to be on the rise. Specifically, university attainment is growing particularly fast among the Nairobi-born population, pointing to a growing gap between Nairobi and the rest of the country. The reasons for this are likely to be complex, possibly reflecting both differences in income growth across the country, skills-selective migration, and geographic quality differences in primary and secondary education.

Lastly, using a socioeconomic proxy based on the first names of students, we compare the average socioeconomic status of students entering university through the competitive versus fee-paying streams. This suggests that the Module II route is slightly regressive, as our Module I entrants score slightly lower on our measures of SES, once we control for ethnicity and gender. However, this should not overshadow the fact that students entering through the meritocratic Module I track are also a highly privileged group, relative to the population at large.

In sum then, we find that horizontal inequalities in university access—between ethnic and religious groups and sexes—are declining, while vertical inequalities, socioeconomic or class divides, are likely on the rise, although the magnitude of increase is hard to determine from the sources at hand.

However, recent policy changes by the government may be muting some of these dynamics. In 2017, fewer students qualified for university admissions due to stricter admissions testing administration, while the government simultaneously increased the number of students supported through Module I, thus reducing the number of tuition-paying students entering via Module II (Nakweya 2018; Waruru 2017). Furthermore, the government has committed to increase the opportunities for KCSE completers with grades below a C+ to enter sponsored programmes at diploma, certificate or artisan certificate level (News Blaze 2019). An unintended consequence of these reforms has been a reduction in university revenue and growing financial difficulties at Kenyan universities that had come to rely on the fees paid by a large Module II intake (Nakweya 2018). Nonetheless, all else being equal, this should reduce the pace of vertical inequality increase stemming from the Module II programmes.

As diversity in educational institutions may be normatively and educationally beneficial (Card and Rothstein 2007; Hanushek 2009), more targeted efforts to improve student diversity should be considered. The KUCCPS applies some affirmative action in university admissions for students from minority and marginalization groups by lowering the cut-offs for admissions to

degree programmes, but this relatively mild measure may be insufficient to rebalance the student composition in a meaningful way. Moreover, recent government commitments to diversity in the public sector might require consideration of ethnic diversity in university admissions (PSC 2016).¹⁸ The government's commitment to diversity in public service presumably relies on Kenya's public universities to supply its workforce. Without a clear and sustainable pipeline of university-educated ethnic minority graduates, meeting these goals may be difficult.

¹⁸ See Simson (2019) on inequalities in Kenyan and Ugandan civil services.

References

- Alesina, Alberto, Sebastian Hohmann, Stelios Michalopoulos and Elias Papaioannou. 2019. *Intergenerational Mobility in Africa*. NBER Working Paper No. 25534. Cambridge, MA: NBER.
- Alesina, Alberto, Stelios Michalopoulos, and Elias Papaioannou. 2016. "Ethnic Inequality." *Journal of Political Economy*, 124(2):428–88.
- Amutabi, Maurice N. 2002. "Crisis and Student Protest in Universities in Kenya: Examining the Role of Students in National Leadership and the Democratization Process." *African Studies Review*, 45(2):157–77.
- Anami, Luke. 2011. "JAB resolves to have double intake." *Standard Digital*, 7 June. <https://www.standardmedia.co.ke/article/2000036666/jab-resolves-to-have-double-intake>.
- Awiti, Alex, and Bruce Scott. 2016. "The Kenya Youth Survey Report." *The Aga Khan University* (April):1–4.
- Becker, Charles. M., and Andrew R. Morrison. 1993. "Observational Equivalence in the Modeling African Labor Markets and Urbanization." *World Development*, 21(4):535–554.
- Bigsten, Arne et al. 2000. "Rates of Return on Physical and Human Capital in Africa's Manufacturing Sector." *Economic Development and Cultural Change*, 48(4):801–27.
- Blakemore, Kenneth, and Brian Cooksey. 1980. *A Sociology of Education for Africa*. London and Boston: Allen and Unwin.
- Burbidge, Dominic. 2015. *Democracy versus Diversity: Ethnic Representation in a Devolved Kenya*. Working Paper. Oxford: Oxford University.
- Card, David, and Jesse Rothstein. 2007. "Racial segregation and the black–white test score gap." *Journal of Public Economics*, 91(11):2158–2184.
- Carrier, Neil, and Emma Lochery. 2013. "Missing States? Somali Trade Networks and the Eastleigh Transformation." *Journal of Eastern African Studies*, 7(2):334–52.
- Cederman, Lars-Erik, Kristian Skrede Gleditsch, and Halvard Buhaug. 2013. *Inequality, Grievances, and Civil War*. Cambridge: Cambridge University Press.
- Clark, Gregory, and Neil Cummins. 2014. "Surnames and social mobility in England, 1170–2012." *Human Nature*, 25(4):517–537.
- Clark, Gregory, Niel Cummins, Yu Hao, and Dan Diaz Vidal. 2015. "Surnames: A new source for the history of social mobility." *Explorations in Economic History*, 55:3–24.
- Commission for University Education. 2014. "Universities Authorized to Operate in Kenya," http://www.cue.or.ke/images/phocadownload/ACCREDITED_UNIVERSITIES_IN_KENYA_August_2014.pdf.
- D' Hombres, Béatrice. 2010. *Inequality in Tertiary Education Systems: Which Metric Should We Use for Measuring and Benchmarking?* Washington, D.C.: World Bank.
- Daily Nation. 2018. "62,800 KCSE candidates get university slots in Kenya." 10 April. <https://www.nation.co.ke/news/education/Kenya-university-selection-results-2017/2643604-4378538-d90lx1/index.html>.
- Daily Nation. 2009. "Public varsities name 17,000 new students." 6 March. <https://www.nation.co.ke/news/1056-542836-k6nmvwz/index.html>
- Darvas, Peter, Shang Gao, Yijun Shen, and Bilal Bawany. 2017. *Sharing Higher Education's Promise beyond the Few in Sub-Saharan Africa*. Washington, D.C.: World Bank.
- Enos, Ryan D. 2016. "What the Demolition of Public Housing Teaches Us about the Impact of Racial Threat on Political Behavior." *American Journal of Political Science*, 60(1):123–142.
- Frankema, Ewout. 2012. "The Origins of Formal Education in Sub-Saharan Africa: Was British Rule More Benign?" *European Review of Economic History*, 16:335–55.
- Galbraith, James. 2012. *Inequality and Instability: A Study of the World Economy Just before the*

- Great Crisis*. New York: Oxford University Press.
- Gicobi, Maryanne. 2015. “University of Nairobi and Strathmore grads most favoured.” *Nairobi News*, 8 April. <https://nairobinews.nation.co.ke/news/university-of-nairobi-and-strathmore-grads-most-favoured/>.
- Hanushek, Eric A., John F. Kain, and Steven G. Rivkin. 2009. “New Evidence about *Brown v. Board of Education*: The Complex Effects of School Racial Composition on Achievement.” *Journal of Labor Economics*, 27(3):349-383.
- Harris, J. Andrew. 2015. “What’s in a name? A method for extracting information about ethnicity from names.” *Political Analysis*, 23(4):212-224.
- Hughes, Rees. 1987. “Revisiting the Fortunate Few: University Graduates in the Kenyan Labor Market.” *Comparative Education Review*, 31(4):583–601.
- Hughes, Rees, and Kilemi Mwiria. 1990. “An Essay on the Implications of University Expansion in Kenya.” *Higher Education*, 19(2):215–37.
- Imai, Koskue, and Kabir Khanna. 2016. “Improving Ecological Inference by Predicting Individual Ethnicity from Voter Registration Records.” *Political Analysis*, 24(2):263-272.
- Johnstone, D Bruce, and Pamela N Marcucci. 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.
- Kasara, Kimuli. 2013. “Separate and Suspicious: Local Social and Political Context and Ethnic Tolerance in Kenya.” *The Journal of Politics*, 75(4):921–936.
- Kenya National Assembly Official Record (Hansard). 2012. *Admission of Seventy Five Per cent of Qualified Students to Public Universities*. 15 February (A).
- Kenya National Bureau of Statistics. Various years. *Statistical Abstract, 1960 – 2018*. Nairobi: KNBS.
- Kenya Universities and Colleges Central Placement Service (KUCCPS). 2014. *Placement Processing*. <https://www.kuccps.net/sites/default/files/Placement%20Processing.pdf>.
- Kessio, David Kipkasi, Jonah Nyagah Kindiki, and Joseph Kiprono Lelan. 2014. “Financing of Private Self Sponsored Programmes (PSSP) in Higher Education in Kenya: Access and Equity.” *Kenya Journal of Educational Planning, Economics and Management*, 7(2).
- Kinyanjui, Kabiru. 1981. *Education and Inequality in Kenya: Some Research Experience and Issues*. Nairobi: IDS.
- Klopp, Jacqueline M., and Janai R. Orina. 2002. “University Crisis, Student Activism and the Contemporary Struggle for Democracy in Kenya.” *African Studies Review*, 45(1):43–76.
- Kramon, Eric, and Daniel N. Posner. 2016. “Ethnic Favoritism in Primary Education in Kenya.” *Quarterly Journal of Political Science*, 11(1):1–58.
- Mamdani, Mahmood. 2007. *Scholars in the Marketplace: The Dilemmas of Neo-Liberal Reform at Makerere University, 1989-2005*. Dakar: CODESRIA.
- Mulinge, Munyae M., Josephine N. Arasa, and Violet Wawire. 2014. *The Status of Student Involvement in University Governance in Kenya: The Case of Public and Private Universities*. Dakar: CODESRIA.
- Mulongu, Godfrey. 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.
- Munene, Ishmael I. 2012. “Our University: Ethnicity, Higher Education and the Quest for State Legitimacy in Kenya.” *Higher Education Policy*, 26(1):43–63.
- Munene, Ishmael I, and Wycliffe Otieno. 2008. “Changing the Course: Equity Effects and Institutional Risk Amid Policy Shift in Higher Education Financing in Kenya.” *Higher Education*, 55(4):461–79.
- Nganga, Gilbert. 2015. “Employer Poll Reveals Preferred University Graduates.” *University World News: Africa Edition*, 17 April.

- <https://www.universityworldnews.com/post.php?story=20150416162015990>.
- Nakweya, Gilbert. 2018. "University admissions reform – What effect will it have?" *University World News*, 23 February. <https://www.universityworldnews.com/post.php?story=2018022009222839>.
- Narayan, Ambar, Roy Van der Weide, Alexandru Cojocaru, Christoph Lakner, Silvia Redaelli, Daniel Gerszon Mahler, Rakesh Gupta N. Ramasubbaiah, and Stefan Thewissen. 2018. *Fair Progress?: Economic Mobility across Generations around the World*. Washington, D.C.: World Bank.
- News Blaze. 2019. "The 2019 Placement of students to Universities and Colleges; Full report." 15 April. <https://newsblaze.co.ke/the-2019-placement-of-students-to-universities-and-colleges-the-full-report/>
- Oanda, Ibrahim Ogachi. 2013. "Implications of Alternative Higher Education Financing Policies on Equity and Quality: The Kenyan Experience." In *Funding Higher Education in Sub-Saharan Africa*, edited by Damtew Teferra. London: Palgrave Macmillan.
- Oanda, Ibrahim Ogachi, and James Jowi. 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*, 10:49-71.
- Odhiambo, George. 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.
- Oduor, Augustine. 2018. "Panic hits universities as scramble for students who scored minimum entry grade." *Standard Digital*, 13 January. <https://www.standardmedia.co.ke/article/2001265816/universities-pain-as-first-year-selection-process-begins> viewed 5/6/2019
- Oduor, Augustine. 2016. "How private universities shared 12,000 government sponsored students." *Standard Digital*, 10 September. <https://www.standardmedia.co.ke/article/2000215379/how-private-universities-shared-12-000-government-sponsored-students>
- Oduor, Augustine. 2015. "80,000 Kenyan students to join varsities, colleges." *Standard Digital*, 16 July. <https://www.standardmedia.co.ke/article/2000169359/80-000-kenyan-students-to-join-varsities-colleges>
- Office of the Auditor General (Kenya). 2016. *Report of the Auditor General on the Financial Statements of the Kenya Universities and Colleges Central Placement Service for the year ended 30 June 2016*. Nairobi.
- Ohba, Asayo. 2011. "The abolition of secondary school fees in Kenya: Responses by the poor." *International Journal of Educational Development*, 31(4):402-408.
- Oketch, Moses O. 2004. "The Emergence of Private University Education in Kenya: Trends, Prospects, and Challenges." *International Journal of Educational Development* 24(2):119-36.
- Olson, Jerry B. 1972. "Secondary Schools and Elites in Kenya: A Comparative Study of Students in 1961 and 1968." *Comparative Education Review*, 16(1): 44-53.
- Østby, Gudrun, Ragnhild Nordås, and Jan Ketil Rød. 2009. "Regional Inequalities and Civil Conflict in Sub-Saharan Africa." *International Studies Quarterly*, 53(2): 301-324.
- Patrinos, Harry Anthony, and Claudio E. Montenegro. 2014. *Comparable Estimates of Returns to Schooling around the World*. Policy Research Working Paper 7020. Washington, D.C.: World Bank.
- Provini, Olivier. 2018. "Negotiating Higher Education Policies in East Africa : Experiences from Tanzania and Kenya." *Higher Education*, Springer Verlag.
- PSC. 2016. *Diversity Policy for the Public Service*. Nairobi: Republic of Kenya. https://www.publicservice.go.ke/images/guidelines/PSC_DIVERSITY_POLICY_MAY_2016.pdf

- Sabot, Richard H., and John B. Knight. 1990. *Education, Productivity, and Inequality : The East African Natural Experiment*. Oxford and New York: Published for the World Bank, Oxford University Press.
- Sifuna, Daniel N. 1998. "The Governance of Kenyan Public Universities." *Research in Post-Compulsory Education*, 3(2):175–212.
- Simson, Rebecca. 2019a. "Ethnic (in)Equality in Public Services of Kenya and Uganda." *African Affairs*, 118(470):75–100.
- Simson, Rebecca. 2019b. "A re-emerging urban bias: regional inequality in university attainment in seven African countries." Unpublished working paper. Mimeo.
- Simson, Rebecca and Elliott Green. 2019. *Ethnic favouritism in Kenyan education reconsidered: When a picture is worth more than a thousand regressions*. LSE International Development Working Paper Series, No.19-196. London: LSE.
- Somerset, H. C. A. 1974. "Who Goes to Secondary School: Relevance, Reliability and Equity in Secondary School Selection." In *Education, Society and Development: New Perspectives from Kenya*, edited by D. Court and D. Ghai. Nairobi and London: Oxford University Press.
- Student Organisation of Nairobi University (SONU). "Our History." http://sonu.uonbi.ac.ke/?page_id=50.
- Stewart, Frances. 2008. *Horizontal Inequalities and Conflict : Understanding Group Violence in Multiethnic Societies*. Basingstoke and New York: Palgrave Macmillan.
- Teal, Francis. 2011. "Higher Education and Economic Development in Africa: A Review of Channels and Interactions." *Journal of African Economies*, 20(SUPPL. 3):iii50-iii79.
- University of Nairobi. 2012-2018. "KUCCPS Admissions Lists." Nairobi. https://a.uonbi.ac.ke/kuccps_admission_lists
- University of Nairobi. 2014a. *Graduates for the last forty-three years 1970-2013*. Nairobi. <https://academics.uonbi.ac.ke/sites/default/files/centraladmin/academics/GRADUATES%20FOR%20LAST%20FORTY%20TWO%20YEARS%20new%20UPDATE.pdf>.
- University of Nairobi. 2014b. *College of biological and physical sciences Annual Report 2013/14*. Nairobi. <https://cbps.uonbi.ac.ke/sites/default/files/cbps/CBPS%20Annual%20Report-07.05.2015.pdf>.
- University of Nairobi. 2011. *2011 Annual Report*. Nairobi. <https://www.uonbi.ac.ke/sites/default/files/ANNUAL%20REPORT%202011.pdf>.
- University of Nairobi. 2010. *2010 Annual Report*. Nairobi. <https://www.uonbi.ac.ke/sites/default/files/UON%20AR%202010%20WEB.pdf>.
- University of Nairobi. 2009. *2009 Annual Report*. Nairobi. https://a.uonbi.ac.ke/sites/default/files/UON%20annual%20reportT%202009_0.pdf
- Waruru, Maina. 2017. "Drop in student numbers rattles private universities." *University World News*, 20 January. <https://www.universityworldnews.com/post.php?story=20170119052601765>
- World Bank. 1999. *Implementation Completion Report: Kenya Universities Investment Project, Report No. 19976*. Washington, D.C.: World Bank.

Datasets

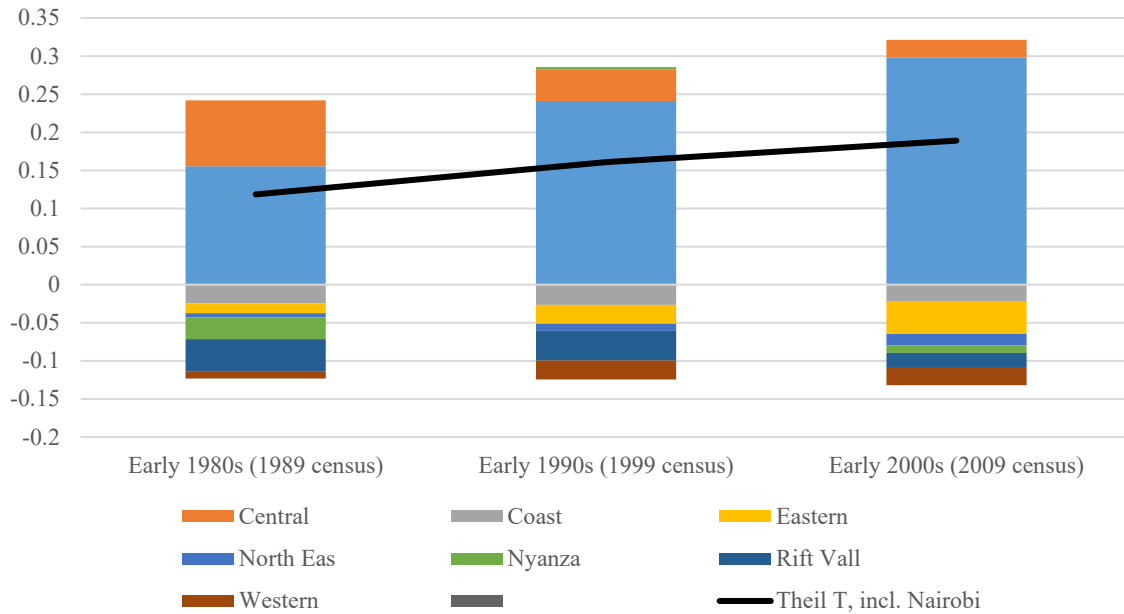
- Harris, J. Andrew and Rebecca Simson. 2020. Purpose-built datasets by authors of University of Nairobi graduates and admissions based on public sources.
- Minnesota Population Center. 2019a. "Kenya Housing and Population Census 1989, 1999 and 2009." Integrated Public Use Microdata Series, International: Version 6.4 [Machine-readable database]. Minneapolis: University of Minnesota.
- Minnesota Population Center. 2019b. "Bostwana Housing and Population Census 2011." Integrated Public Use Microdata Series, International: Version 6.4 [Machine-readable database]. Minneapolis: University of Minnesota.

Minnesota Population Center. 2019c. "Ghana Housing and Population Census 2010." Integrated Public Use Microdata Series, International: Version 6.4 [Machine-readable database]. Minneapolis: University of Minnesota.

World Bank. 2018. World Development Indicators. Washington D.C.: World Bank.

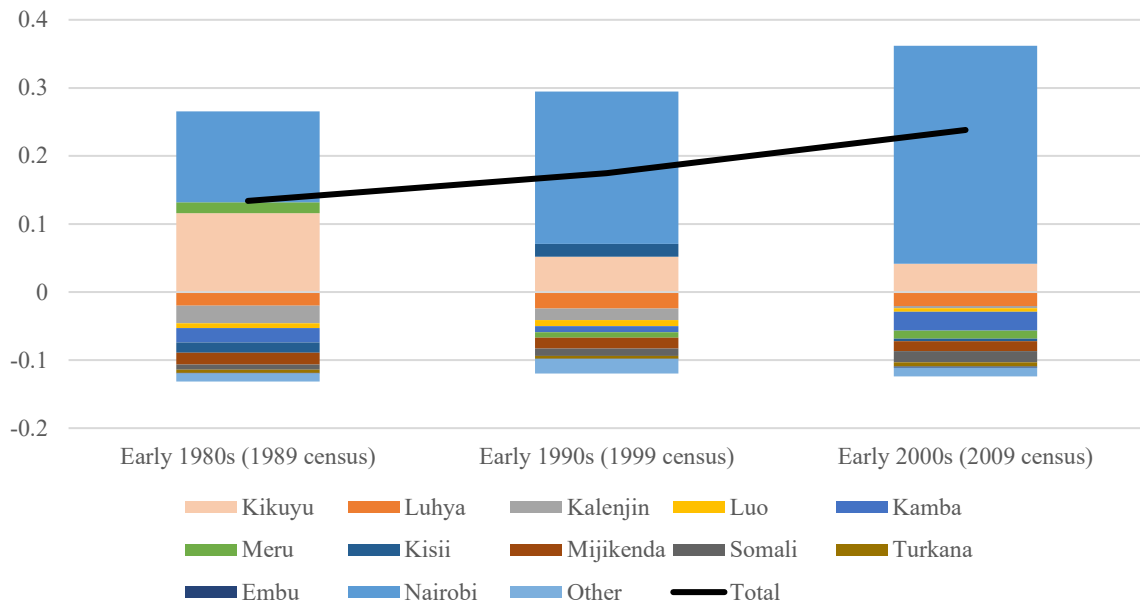
Appendix 1: Extra Figures

Appendix Figure 1.1: Inequality in university attainment across provinces of birth



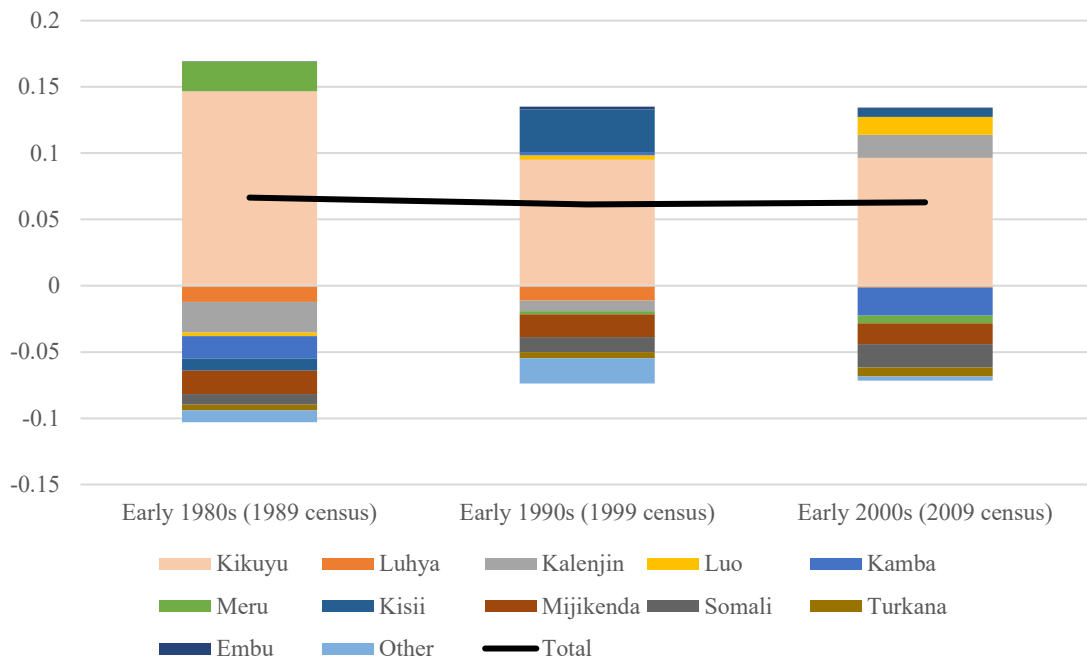
Source: Authors' own elaboration, based on Kenya 1989, 1999 and 2009 Housing and Population Censuses (Minnesota Population Center, 2019a).

Appendix Figure 1.2: Inequality in university attainment across ethnic regions of birth



Source: Authors' own elaboration, based on Kenya 1989, 1999 and 2009 Housing and Population Censuses (Minnesota Population Center, 2019a).

Appendix Figure 1.3: Inequality in university attainment across ethnic regions of birth, excl. Nairobi-born



Source: Authors' own elaboration, based on Kenya 1989, 1999 and 2009 Housing and Population Censuses (Minnesota Population Center, 2019a).

Appendix 2: Estimating the Module II Intake

All Public Universities

Scattered estimates of the number of Module II admissions is available in secondary literature and media reports, but comprehensive data is not, to our knowledge, published by any government institution. The Commission for University Education does ask universities to provide data on self-supporting students, but reported to us that only a subset of universities comply with this data request.

To produce rough estimates (see Appendix Table 2.2), we therefore collected data on the number of Module I students admitted through JAB or its successor, the KUCCPS, available in media reports and KUCCPS notices. This was then compared with the total annual enrolment across Kenyan public universities. Because the aggregate enrolment data does not break down students by year of study, we make the simplifying assumption that the Module I drop-out rate is negligible, and compare Module I enrolments in the preceding four years against total undergraduate enrolment. This may overstate the Module II share, as few students at public universities will complete their degrees in four years. Pushing in the other direction however, some Module I students will drop out before completion.

This analysis suggests that roughly 30-50% of all admissions were through Module II between 2004 and 2017. These numbers are roughly in line with data given by Munene and Otieno (2008, p.470), which gives a Module II share of 38% in 2003/04 and 45% in 2004/05, using data that the authors obtained from the Commission of Higher Education.

Since 2017, the Module I admissions have increased significantly as the government has set itself the goal of offering admission to all eligible secondary school graduates through regular admissions. Module II admissions are therefore falling. However, neither of the datasets used in this analysis capture this latest policy development.

University of Nairobi

The module II intake at the University of Nairobi appears to be higher than that for public universities at large. Munene and Otieno (2008:470) give Module II shares for University of Nairobi at 48 percent in 2003/04 and 54 percent in 2004/05. Appendix Table 2.3 compares the number of students admitted to UoN through the JAB or KUCCPS (Module I), against the total first year enrolment across all UoN colleges. Assuming a negligible Module I repetition rate, this suggests that Module II students comprised roughly 50-60 percent of all enrolment between 2008 and 2015.

Occasionally, University of Nairobi departmental annual reports disaggregate between Module I and Module II in enrolment statistics. In 2013/14, for instance, Module II students comprised 45 percent of computing and informatics, 69 percent of actuarial science students, but only 22 percent of mathematics students and 32 percent of statistics students (University of Nairobi, 2014b). Medicine and law also have reportedly high module II intake numbers. This suggests considerable variation across departments, and particularly high Module II enrolment in the most competitive courses.

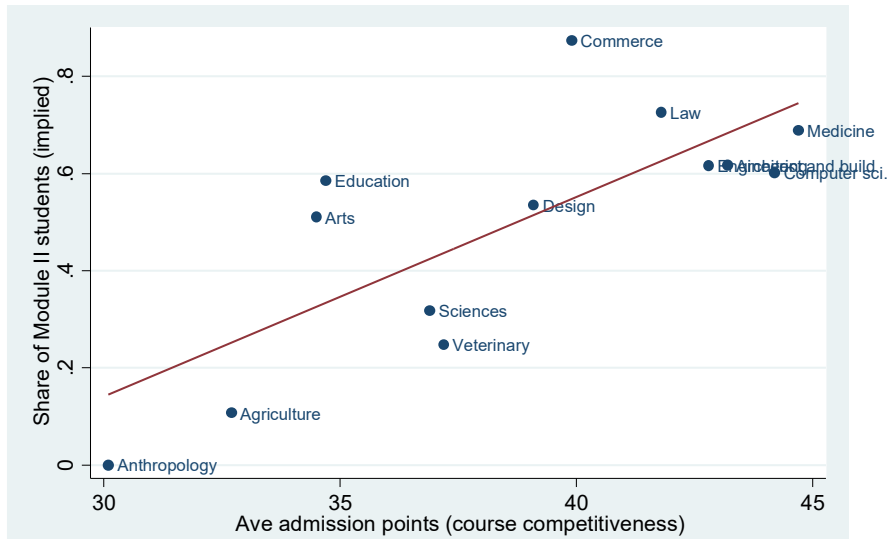
Using the university intake in 2014/15, Appendix Table 2.1 compares the composition of first year students by faculty or college, against the Module I composition. In theory, the difference between these two is made up of the Module II intake, although the faculty classifications used in the Statistical Abstract do not map perfectly onto the admissions list categories. This suggests considerable variation across faculties or colleges. The Module II shares are particularly high in the commerce department (87%), law (73%), medicine (69%), and to a lesser extent architecture, engineering, computer science and education. The Module II intake is low in anthropology, agriculture and veterinary medicine—arguably some of the courses with the lowest income returns for urban residents. The figure below correlates the 2014/15 estimated Module II share with average admission points (a measure of course competitiveness), showing a clear correlation. The Module II share is also correlated with the growth in enrolment since the late 1990s, albeit slightly weaker.

Appendix Table 2.1: University of Nairobi 2014/15 admissions: estimated Module II share by faculty

| First year enrolment | Total Y1 enrolment | Module I | Implied Module II share | Growth in Year 1 enrolment 1998/9-2014/5 |
|--|--------------------|-------------|-------------------------|--|
| Agriculture | 645 | 576 | 11% | 153% |
| Veterinary medicine | 283 | 213 | 25% | 543% |
| Sciences | 1215 | 830 | 32% | 269% |
| Computer science | 88 | 35 | 60% | 167% |
| Architecture and the built environment | 447 | 171 | 62% | 459% |
| Design | 86 | 40 | 53% | 244% |
| Engineering | 624 | 239 | 62% | 237% |
| Medicine | 904 | 282 | 69% | 315% |
| Education (arts) | 1509 | 626 | 59% | 294% |
| Arts | 2559 | 1251 | 51% | 261% |
| Commerce | 3031 | 384 | 87% | 841% |
| Anthropology | 234 | 234 | 0% | 51% |
| Law | 628 | 172 | 73% | 547% |
| TOTAL | 12253 | 5053 | 59% | 153% |

Sources: Statistical Abstracts 2000 and 2015 (Kenya National Bureau of Statistics 2000 and 2015); University of Nairobi (2019).

Appendix Figure 2.1: Correlation between Module II share and course competitiveness



Source: Authors' elaboration, based on University of Nairobi (2019).

Appendix Table 2.2: Estimated Module II enrolment using Module I admissions versus total enrolment

| | <i>Pre-2006</i> | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 |
|---|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| MI admissions | <i>Capped at 10,000</i> | 10000 | 10000 | 10000 | 16151 | 16,629 | 20,073 | 24221 | 32648 | 41996 | 53135 | 57200 | 67790 | 74389 | 74000 |
| MI admissions over 4 preceding years | | 40000 | 40000 | 40000 | 46151 | 52780 | 62853 | 77074 | 93571 | 118938 | 152000 | 184979 | 220121 | 252514 | 273379 |
| Total undergraduate enrolment (public unis) | | 69138 | 70095 | 79520 | 85351 | 89404 | 108528 | 134395 | 141764 | 170417 | 264649 | 323434 | 367757 | 411905 | 439965 |
| Implied Module II share | | 42% | 43% | 50% | 46% | 41% | 42% | 43% | 34% | 30% | 43% | 43% | 40% | 39% | 38% |

Sources: Enrolment: Statistical Abstracts 2005-2018 (Kenya National Bureau of Statistics 2005-2018); Admissions: 2007-2015: Office of the Auditor General, 2016; 2014/15-2015/16: Oduor, 2018; 2016/17: Oduor, 2016; 2017/18: Daily Nation, 2018.

Appendix Table 2.3: Estimated University of Nairobi Module II enrolment using Module I admissions versus total enrolment

| | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 |
|-----------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| UoN Module I (regular) admissions | 3905 | | | 4336 | 4832 | 5496 | 5053 | 5550 | | 5955 |
| UoN Year I students | 8137 | 8727 | 11805 | 9794 | | | 12253 | | | |
| Implied Module II share | 52% | | | 56% | | | 59% | | | |

Sources: Enrolment: Statistical Abstract 2015 (Kenya National Bureau of Statistics 2015); University of Nairobi, 2009 and 2010; Admissions: 2008/09: Daily Nation, 2009; 2011/12: Anami, 2011; 2012/13 - 2014/15 and 2017/18: University of Nairobi, 2019; 2015/16: Oduor, 2015.

Appendix 3: Examining Co-residency Biases

Other papers have examined what has been called "selection on cohabitation" (Card et al. 2018; Alesina et al. 2019) and found it to be of minor consequence for school-aged children. However, this bias could be larger for the university sample, as we are examining the characteristics of a small subset of adults that continue to cohabit with their parents.

In Appendix Table 3.1 below we therefore compare the characteristics of all census respondents aged 25-34 with those co-residing with their fathers. This does reveal some important selection effects that may influence the results. Firstly, men are more likely to reside with a parent than women, and the male co-resident sample is closer in age and educational characteristics to the full census sample than it is for women. Co-resident men are slightly younger on average than the sample as a whole (which is unsurprising). The average years of schooling of co-resident men is slightly lower than for the census sample as a whole, possibly because of the lower average respondent age. However, the incidence of university education is slightly higher—possibly because some university students continue to live with their parents during their studies. Most noticeable, however, is the geographic skew away from Nairobi-based households, which may also account for these educational differences.

How is this likely to bias the results? Appendix Tables 3.2 and 3.3 simulate the main paper figures, scaling up the Nairobi-resident share of respondents by three. On the whole this raises the probability of sons of university-educated fathers attending university, and raises the average father years of schooling z-score among the university educated. This suggests that the results are downward biased—intergenerational persistence may be even higher than reported in the paper.

Is the tendency for university students to live with their parents while studying likely to bias the results? This would only be the case if this tendency was more likely among low- or high-educated families. In the former case, this would downward bias the intergenerational persistence effect. In the latter case, however, it may upwardly bias the results. It is hard to tell which direction this leans. On the one hand, it seems more likely that children from lower SES households would be forced to live with their parents for longer. On the other hand, as rural students are more likely to migrate to the cities for higher education and employment, while urban students may study in closer proximity to the family home, it may be that urban, higher SES households are over-represented among the co-resident father-son pairs.

Appendix Table 3.1: Summary statistics, full census sample vs. co-resident sample

| | All, aged 25-34 | | Male, aged 25-34 | | Female, aged 25-34 | |
|---|-----------------|-------------------------|------------------|-------------------------|--------------------|-------------------------|
| | All | Co-residing with father | All | Co-residing with father | All | Co-residing with father |
| % female | 52% | 37% | | | | |
| Standard deviation | 50% | 48% | | | | |
| Age | 28.9 | 28.0 | 29.0 | 28.0 | 28.8 | 28.1 |
| Standard deviation | 2.8 | 2.6 | 2.8 | 2.6 | 2.8 | 2.7 |
| Years of schooling | 8.0 | 7.9 | 8.3 | 7.8 | 7.7 | 8.1 |
| Standard deviation | 4.2 | 4.5 | 4.1 | 4.5 | 4.2 | 4.6 |
| % with university education | 3.1% | 4.6% | 3.8% | 4.6% | 2.4% | 4.6% |
| Standard deviation | 17.3% | 20% | 19.2% | 21.0% | 15.3% | 20.1% |
| Years of schooling of fathers (55-64), compared to same male cohort | 6.1 | 6.6 | 6.1 | 6.3 | 6.1 | 6.9 |
| Standard deviation | 4.7 | 4.9 | 4.7 | 4.9 | 4.7 | 5.0 |
| Province of residence (%) | | | | | | |
| Nairobi | 13 | 5 | 15 | 4 | 12 | 6 |
| Central | 13 | 15 | 13 | 14 | 13 | 17 |
| Coast | 9 | 9 | 9 | 9 | 9 | 8 |
| Eastern | 14 | 18 | 13 | 19 | 14 | 17 |
| North Eastern | 4 | 7 | 4 | 8 | 4 | 6 |
| Nyanza | 12 | 11 | 12 | 12 | 12 | 10 |
| Rift Valley | 25 | 26 | 26 | 25 | 25 | 26 |
| Western | 9 | 9 | 9 | 9 | 10 | 10 |
| <i>Obs. (rounded)</i> | <i>690,000</i> | <i>47,000</i> | <i>270,000</i> | <i>30,000</i> | <i>290,000</i> | <i>17,000</i> |

Source: Authors' elaboration, based on data from Kenya Housing and Population Census 2009 (Minnesota Population Center, 2019a)

Appendix Table 3.2: Probability of attending university for males by father education

| | Probability of attending uni | | Observations | | National probabilities | |
|-------------------|------------------------------|---------|-----------------|---------------------|------------------------|----------------------------------|
| | Outside Nairobi | Nairobi | Outside Nairobi | Nairobi (scaled x3) | Original | Simulated (scaled Nairobi share) |
| Less than primary | 1% | 0% | 13890 | 342 | 1% | 1% |
| primary | 3% | 8% | 10167 | 1059 | 3% | 3% |
| secondary | 8% | 27% | 2883 | 1347 | 11% | 14% |
| college | 14% | 33% | 1388 | 510 | 16% | 19% |
| university | 44% | 70% | 370 | 666 | 54% | 61% |

Source: Authors elaboration, based on data from Kenya Housing and Population Census 2009 (Minnesota Population Center, 2019a)

Note: simulated with a higher Nairobi-resident share of respondents

Appendix Table 3.3: Average father z-score for university educated men by census

| | Mean father z-score | | Observations | | National father z-score | |
|------|---------------------|---------|-----------------|---------------------|-------------------------|---|
| | Outside Nairobi | Nairobi | Outside Nairobi | Nairobi (scaled x3) | Original | Simulated (scaled Nairobi share) |
| 1989 | 0.95 | 2.88 | 89 | 96 | 1.46 | 1.95 |
| 1999 | 0.81 | 1.86 | 309 | 273 | 1.05 | 1.30 |
| 2009 | 1.06 | 1.68 | 1029 | 1092 | 1.22 | 1.38 |

Note: simulated with a higher Nairobi-resident share of respondents

Source: Authors elaboration, based on data from Kenya Housing and Population Census 2009 (Minnesota Population Center, 2019a)