Diversity and Liberalisation Reforms: Evidence from the University of Nairobi[1]

REBECCA SIMSON
Wadham College, University of Oxford
Oxford OX1 3PN, United Kingdom
rebecca.simson@wadham.ox.ac.uk

J. ANDREW HARRIS
New York University Abu Dhabi
A5-139, Saadiyat Campus,
Abu Dhabi, United Arab Emirates
andy.harris@nyu.edu

Abstract: How do university funding reforms influence gender, ethnic and socio-economic inequality in university student bodies? Since the 1990s many countries have introduced dual-track admissions systems, which allow self-financing students to enter public universities with lower academic credentials than those selected through regular, state-subsidised admissions routes. In this paper, we use unique quantitative historical data to explore the evolution of diversity in the student body at the University of Nairobi, Kenya's oldest and most prestigious university, which implemented such reforms in the late 1990s. Via a record of all graduates from the University of Nairobi since its founding, the paper uses information inherent in person-names to examine the gender, ethnic and socio-economic composition of graduating students. The results show that the expansion of fee-paying routes is associated with declining gender and ethnic inequality but increasing socio-economic inequality. These results evince the subtle ways in which education policies may trade-off different equality objectives.

INTRODUCTION

In 1999 student protests at the University of Nairobi led to the temporary closure of the university and banning of the student union. University students had clashed with the university leadership and government on many occasions since independence in 1963, 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 "parallel degree programmes": routes for self-financed students meeting the minimum university entry requirements to enter degree programmes outside the central, competitive admissions

[1] We would like to thank Winnie Mitullah, Germano Mwabu, David Johnson and Neil Cummins and the three anonymous peer reviewers for providing valuable comments and advice. We acknowledge research support from New York University Abu Dhabi that funded data collection and entry.

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 & Otieno, 2008). Despite this opposition, within a decade, parallel degree entrants had become the majority of the university's annual intake and provided an important source of revenue.[2] Two decades have now passed since this reform was introduced; how did it come to affect the composition of students at the University of Nairobi?

The introduction of parallel-degree programmes in Kenya mirrors a global trend towards liberalisation of tertiary education since the 1990s. Governments have sought to balance growing demand for higher education with funding constraints for public universities, leading many to shift higher education costs to students by raising fees (Johnstone and Marcucci, 2007, 2010; Jacob and Gokbel, 2018; Yang and McCall, 2014). Such reforms were common in Sub-Saharan Africa, where governments faced budget constraints, international pressure to liberalise public services, and increasing demand for higher education (Teferra 2013). One popular solution was the introduction of parallel, or dual-track, admissions systems, common in Africa and former Soviet countries (Smolentseva, 2020; Johnstone and Marcucci, 2010). While countries retained a selective, subsidized admissions route for the high-performers, they also introduced entry routes with lower admissions criteria for fee-paying students. The University of Nairobi was an early adopter of this approach, known locally as "Module II" programmes, and other Kenyan universities followed suit (Provini, 2018). These reforms came into effect in a country where educational and income inequalities were already high, and intersected with politically salient ethnic, regional and religious identities.

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

While the past decades of rapid growth in university attainment globally has improved access in absolute terms, its effects on relative mobility remain unclear. Some studies show that the progressivity of university education varies considerably across countries and is shaped by the stratification of the higher education system, the fee and student loan structure, and economic inequality in a given context (Marginson 2016, 2018; Shavit et al., 2007). Enrolment growth alone has ambiguous effects on equality of access, with only weak correlations between university enrolment growth and inequality decline in Europe, for instance (Shavit et al., 2007; Geven, 2018). Kenya thus offers an interesting case study, shedding light on how these reforms played out in a developing country context where university enrolment rates grow from a low base with high pre-existing educational inequalities.

However, empirical evidence on the equity effects of such reforms in African countries are few, in large part due to a dearth of appropriate data that can be used to trace student characteristics (Darvas et al. 2016). A considerable literature describes this neo-liberal turn in tertiary education in Africa (Johnston and Marcucci 2010; Teferra 2013; Mohamedbhai 2014; Zeleza 2016). And case studies describe these reform processes and their origins (Mamdani 2007; Teferra 2013). But, given the absence of micro-level studies, the record on the equity effects of tertiary education reforms remains thin.

To do so we assemble a new dataset of all graduates since the 1970s at Kenya's largest and oldest university, the University of Nairobi, over the course of this reform period. We then introduce a novel method for measuring compositional change using names of graduates. Name analysis has been growing in use across the social sciences, as a means of studying population characteristics such as ethnicity or country origin and social class (for an overview, see: Mateos, 2014). This paper is therefore also a new effort to apply and adapt these methods to an African case, where alternative data sources are

comparatively scarce and non-traditional sources offer opportunities to enrich our understanding of social change.

This article therefore provides new evidence about how liberalisation reforms in higher education affected inequality in access to University of Nairobi degrees. By falling or rising inequality, we mean whether the graduate body is getting closer to or further from a situation of equal enrolment rates across different social groupings, of which we focus on three: gender, ethnicity and socio-economic status (SES). We treat gender as a binary category (male/female); we subdivide the population into nine broad ethnic categories (discussed in detail in the methods section); and we devise proxies that capture - albeit imperfectly - how name differentiation relates to the socio-economic background of the name-holder. By socio-economic background we mean how a graduate's family ranks with regards to indicators such as income, education and occupation.[3]

Our results contribute to the literature in several ways. First, we demonstrate that these reforms are associated with improved gender parity, illustrating how policies may bring rapid changes to entrenched gender inequalities (Mama 2003; Molla 2013). Second, the reforms are associated with a reduction in ethnic and religious inequality at the University of Nairobi, in part due to increased opportunities to pursue fee-paying degree routes. Lastly, using a novel proxy for socio-economic status, we present evidence that the fee-paying Module II admissions system favours students from higher socio-economic backgrounds than those admitted through the meritocratic streams. These results evince the subtle ways in which policymakers may face trade-offs between different equality objectives, improving inequality along some dimensions (e.g., gender and ethnicity/religion), while deepening it along others (e.g., socio-economic). This case also illustrates how the inequality costs of liberalisation can be set against the benefits of

[3] In accordance with the dictionary definition of "socio-economic status", see Scott and Marshall, 2009.

large absolute increases in access, which has arguably contributed to a rise in the overall level of human capital in Kenya.

THE REFORM CONTEXT

Like much of Africa, Kenya had a selective university system dominated by a few government-financed public universities until the 1990s. 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 & Otieno, 2008). In response to the economic decline and constraints on government finances in the early 1990s, the government capped the growth in admissions, which rapidly increased competition for scarce university places. 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).

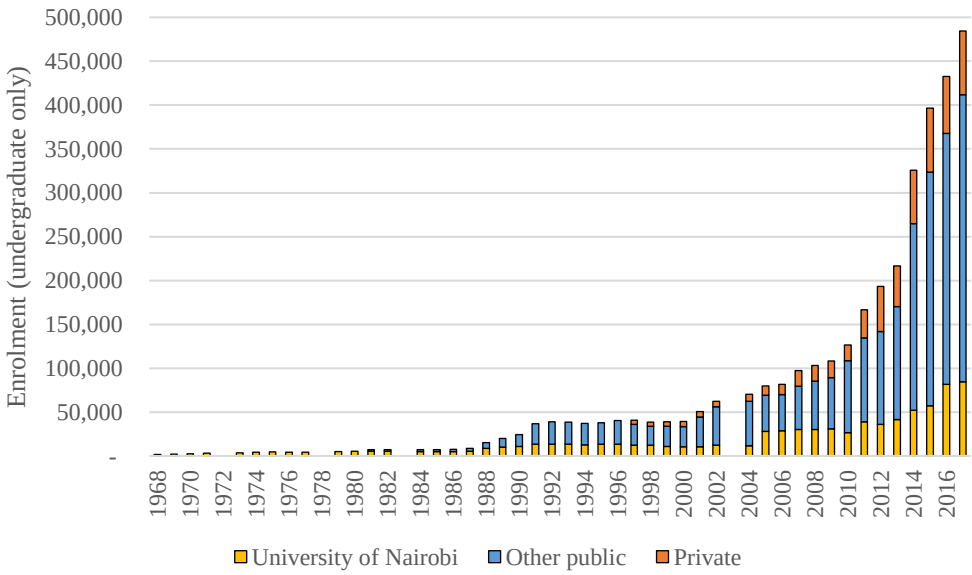
To address growing financial pressures and applicant numbers, Kenyan universities introduced parallel degree programmes, in which self-supporting students paid significant fees to attend university. By 2004, over half of all admissions into the University of Nairobi were from fee-paying parallel degree programmes, also known as 'Module II' programmes, in contrast to the regular, subsidised 'Module I' stream (Munene and Otieno, 2008; see also Appendix 1). The fees paid by these students are high relative to average Kenyan incomes,[4] ranging between approximately US$1,500-5,000 per year. In 2011 these programmes raised almost US$60 million in revenue, roughly equal to the government's contribution to the university (University of Nairobi, 2011:94-99).

[4] For comparison, Kenya's gross national income per capita in 2008 was approximately $901, according to UNCTAD data.

These reforms facilitated a massive expansion in university access across Kenya, mirroring a trend across the continent (Darvas et al., 2017). Figure 1 shows this growth in Kenyan student enrolments in historical perspective. At independence, the country had only 316 university students, and the University of Nairobi, then a university college under the regional University of East Africa, was the only public university in the country. Enrolment growth fluctuated between the 1960s and 1990s and then took off in the 2000s with an increase from roughly 40,000 enrolled students in 2000 to nearly 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 spread improved (Commission for University Education, 2014).

Although it accounts for a falling share of total university enrolment, the University of Nairobi remains the largest university and arguably the most prestigious in Kenya, and the only Kenyan university in the Times Higher Education World University Rankings (Gicobi, 2015; World University Rankings, 2020).

Figure 1. Total university enrolment in Kenya



Sources: Kenya Statistical Abstracts, various years 1967-2018.

Entry into this university system is determined largely by a student's exam performance at the end of secondary school. To qualify, students must obtain a C+ average, usually achieved by only a third of the exam takers. Students meeting this grade threshold can apply to a university course through the Kenya University and Colleges Central Placement Service (KUCCPS). Depending on grades and course competitiveness, a subset of applicants are admitted on a subsidized fee rate through the Module I intake. Some affirmative action is also applied, which lowers the grade-point cut-off for under-represented groups, including women (KUCCPS 2014). Students not placed through KUCCPS but meeting the C+ cut-off, or students unhappy with their offer through KUCCPS, can apply to fee-based parallel degree programmes (Module II).[5] We estimate that in 2015/16 – 2017/18, roughly 40 percent of undergraduate enrolment came through this Module II channel (see Appendix 1).

INEQUALITY IN UNIVERSITY ACCESS IN KENYA

These reforms to the Kenyan university admissions system took place against a backdrop of considerable educational inequality, both on an interpersonal basis ('vertical inequality') and group basis ('horizontal inequality'), between regions and ethnic groups. These inequalities are amplified within the higher education system by this institutional legacy focused on merit. As the university system caters to only a small proportion of the population and selection is based largely on educational achievement, comparatively privileged households that invest in a child's education, and by extension regions and ethnic communities with higher educational attainment and wealth, have claimed a disproportionate share of these educational opportunities. Studies from Kenya show that access to public universities and the most competitive government-subsidised secondary schools (which feed the university system), is strongly correlated with parental education

[5] There are also ways for students with less than a C+ KCSE to enter university if they also hold tertiary diplomas or certificates.

and wealth (Kinyanjui, 1981; Prewitt, 1974; Sabot & Knight, 1990). Empirical studies from across Africa, and globally, tend to confirm that even when university education is free, it disproportionately benefits students from privileged backgrounds (Carr-Hill, 2020; Mayanja, 1998; Appleton, 1997). In the Kenyan context, merit-based selection also appears benefit male students, who on average perform better on national exams, than female students.

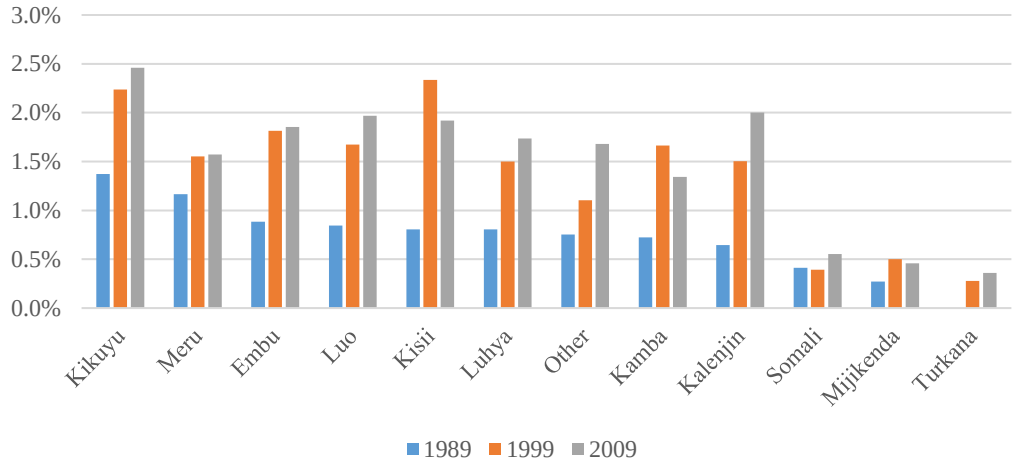
Kenya's censuses (1989, 1999 and 2009) shed some light on the resulting levels of inequality in university access in the decades leading up to the reforms of the 1990s.[6] They show that female participation in university education continues to lag behind male participation, but has increased across the postcolonial period, with women comprising over 40 percent of university students by the early 2000s, compared to around 15 percent in 1960.[7] However, administrative data shows gender differences by course of study, with fewer women in the more competitive courses, particularly the sciences.

On a regional basis there are also considerable – and predictable – differences in university attainment. Matching educational attainment with census information about respondents' place of birth reveals how university attainment rates varies across geographic regions of Kenya. As place of birth is a strong predictor of ethnicity, this allows us to trace inequalities across the geographic 'ethnic regions'.[8] Figure 2 measures the share of the population born in each ethnic region, aged 25-30, that have attended university, across the three latest censuses. The differences in university attainment across groups is largely explained by differences in income and a persistence in educational inequality dating back to the colonial era. Regions inhabited by the Kikuyu ethnic group – from which Kenya's first president came – have the highest university attendance rates

[6] This analysis draws on census microdata from IPUMS International, Minnesota Population Centre, 2019. Note that although the latest available census data is from 2009, most of the university graduates that can be observed in this census would have obtained their education before the Module II expansion.
[7] According to the 2009 census, women constituted roughly 43 percent of university attendees born in 1984, and thus likely educated in 2004.
[8] This approach has been used in Simson 2019, Kramon and Posner 2016, and Burbidge 2015.

– a long-standing pattern – while the predominantly poorer and more rural Somali, Mijikenda and Turkana regions have exceptionally low rates. There appears to be some mild convergence in attainment rates across the nine highest performing regions, where attainment levels range from 1.3-2.5 percent when measured in 2009.

Figure 2. University attendance rate by ethnic region (share of population aged 25-30 that have or are attending university), 1989, 1999 and 2009 (excl. Nairobi-born)



Source: Authors own, based on Kenya 2009 Housing and Population Census, IPUMS International.

For a subset of the census sample, where children and parents reside in the same household, we can also link the educational attainment of children with that of their parents to shed light on intergenerational educational persistence. However, as the people who continue residing with their parents in adulthood may not be representative of the population as a whole (selection bias), we treat these results as suggestive only. We estimate the probability of attending university, conditional on the father's education, for people aged 25-34, from this census sub-sample. We find that roughly 54 percent of respondents with university-educated fathers go on to attend university, compared 11 percent of those with fathers holding a secondary school degree, 3 percent of those with fathers with only a primary school education, and 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. This suggests that parental education – an important dimension of socio-economic background – very strongly influences the likelihood of attending university.

Hypotheses

Given that the pre-existing merit-based selection system resulted in considerable inequalities in university access, what are the likely effects of the Module II expansion on the composition of university graduates?

Evidence from other countries suggests that university expansion tends to benefit students with high educational aspirations relative to their educational performance, and aspirations, in turn, are usually higher among children from privileged socio-economic backgrounds (Jonsson, 2014; Gil-Flores et al., 2011). In the Kenyan case this tendency is likely to be amplified by the financial cost of taking part in self-financed programmes; Module II programmes at the University of Nairobi are out of reach for all but a small proportion of the population. Previous studies from Kenya have emphasised the financial barriers to partaking in Module II programmes, finding that many Module II students are older students with incomes that they can use to support their studies, while some receive family support (Oanda and Jowi, 2012; Kessio et al., 2014). Similarly, studies from post-Soviet states that implemented dual-track admissions systems similar to that of Kenya, have found that the fee-paying routes are dominated by students of high socio-economic background, at least at the most prestigious universities (Smolentseva, 2020).

However, given that educational performance is strongly correlated with socio-economic status in Kenya, and the highest performing students are also on average from comparatively privileged backgrounds, it is not clear that Module II participants will necessarily score higher on a socio-economic gradient than those selected on merit. Evidence from Russia, for instance, found no significant difference in social status of fee-paying and non-fee paying students (Smolentseva, 2017).

How expanding university opportunities affects ethnic composition is also not obvious. In Europe many ethnic minorities, often of immigrant background, have comparatively high educational aspirations relative to their socio-economic status. Thus some ethnic minorities have benefitted from university expansion, and increased their

participation relative to the majority ethnic group (Jonsson, 2014). However, ethnic cleavages unrelated to migration may be less likely to exhibit this pattern. Furthermore, in Kenya the high cost of Module II participation could create further barriers to ethnic diversification, as existing ethnic inequalities overlap considerably with economic inequalities.

In many Western countries women now have higher educational aspirations and higher educational attainment than men (Gil-Flores et al., 2011). In Kenya, educational expansion at all levels has been correlated with growing female participation. A 1993 study found that Kenyan parents had high educational aspirations for both boys and girls (although fathers had slightly higher aspirations for sons than daughters) (Davison, 1993). Given that male students on average perform better on the KCSE than female students, and therefore the share of female students eligible for university (C+ and above) is larger than the share admitted through Module I, it is plausible that female participation in Module II will be higher than in Module I. Some existing studies from Kenya point in this direction (Mulongo 2013; Odhiambo 2016).

The international evidence also points to possible trade-offs between different forms of social equity.[9] In particular, greater opportunities for female progression tends to increase socio-economic and ethnic inequalities, as lower female participation overall means that the women who participate in higher education tend to be from higher socio-economic backgrounds than the men (Hughes, 1987). Similar effects have been noted with regard to race/ethnicity. University participants from underrepresented ethnic or regional communities, for instance, tends to come from particularly socio-economically privileged backgrounds (see Blakemore and Cooksey, 1980, for a discussion in the African context). Although Module II participation did not explicitly target women or ethnic minorities, it could have similar effects, if the Module II programmes help to meet

[9] For a finer theoretical discussion of these points, see Fraser (1995) and Fraser (2000).

the unmet educational aspirations of comparatively underperforming women and ethnic minorities from socio-economically advantaged backgrounds.

DATA AND METHODS

Student-level data on class, gender, and ethnicity is not systematically collected in Kenya. To understand how different forms of social inequality evolve across time in response to educational reforms, we assembled a novel dataset of 215,000 University of Nairobi graduates from 1961 to 2018, extracted from the annual graduation ceremony booklets. In this paper, we focus on those graduating with bachelor's degrees since the early 1970s (about 145,000 students). While the graduation booklets provide no explicit information about class, gender or ethnicity, we use recent methodological innovations to estimate these variables using students' names.[10] In this section, we discuss these methods and how they are employed to aid in examining changes in equity across time.

Across cultures, names reflect communal naming traditions as well as parental tastes, which are in turn shaped by social factors such as religion, ethnicity and class (Lieberson, 2000; Mateos, 2014). Researchers use these variations in name frequencies across subpopulations to study identity (ethnic, religious, cultural) and socio-economic status. Examples abound in economic history (Cummins 2013, Cook et al. 2014); sociology (Goldstein and Stecklov 2016, Lieberson and Mickelson 1995); and microeconomics (Bertrand and Mullainathan 2004, Fryer and Levitt 2004). Clark and Cummins (2014), for instance, have used registers of university students at Oxford and Cambridge in England to measures rates of social mobility over several centuries.

Recent work on Africa – and Kenya in particular – has employed the use of ethnically distinct names to examine patterns in political behaviour (Posner 2005, Hassan

[10] While we have graduation lists dating back to 1961, up until the mid-1970s graduates still included a considerable share of Ugandan and Tanzanian students admitted while the university belonged to the University of East Africa. We therefore include data from 1974, when the student body comprised largely Kenyan students.

2017, Kasara 2013, Harris 2021). Kenya has over 40 distinct ethnic groups, with the precise number recorded dependant on the source and historical period (Balaton-Chrimes 2021). Our focus lies in the largest nine of these groups: Kikuyu, Luhya, Luo, Kamba, Kisii, Kalenjin, Meru, Muslim, and a residual "Other" category for smaller groups comprising less than 4% of our university sample. Taken together, the eight named groups comprise over 90% of the population, and represent the largest ethnic groups in Kenya.

In Kenya, names often provide clear information about ethnicity (Harris 2015; Kasara 2013). This allows us to use a student's name to estimate the probability that that student belongs to a given ethnic group. To do this, we generate name frequencies by ethnic group using the Kenyan voter register, drawing names for each group from ethnically homogenous areas. Then, we normalize these frequencies by group, and calculate, for each name, the probability that an individual belongs to each group, conditional on the name. This probability of group membership conditional on name is then used to infer the individual's ethnicity, assigning the ethnic group with the highest probability to the individual. This approach works well as we show in Appendix Figure 2.3; for the student's assigned group, the average estimated probability of ethnicity given name is 0.94, which suggests that our method successfully extracts the ethnic information from names.

One important limitation of this approach relates to the relationship between religion – Islam in particular – and ethnic naming conventions (e.g., Edwards and Caballero 2008; Finch 2008; Kuipers and Askuri 2017; Raheem and Akande 2019). Some Kenyan Muslims hold names with both ethnic information and religious information. For instance, an individual may have a Muslim first name and an ethnic surname. In our approach, the information contained in the ethnic surname usually overwhelms the information in the Muslim name, (correctly) categorizing the individual by ethnic group. Other Muslim individuals may possess Arabic or Qur'anic names exclusively, with no

ethnic content. In these cases, we can say little about an individual's ethnic identity in the absence of additional information. As a result, we follow other recent work (e.g., Ambekar et al 2009; AlShebli et al. 2018) in including a Muslim group, retaining the Muslim-specific information found in names. As a result, we must remain circumspect about the precise ethnic identity of those identified as Muslim in this study, as the group likely contains individuals from several of the predominantly Muslim ethnic groups in Kenya such as the Somali, Digo, and Swahili, among others. That said, this affects a relatively small proportion of the population, which is around 10% Muslim overall, and 3% in our sample.

To infer gender, we proceed in a similar manner, this time relying on information in first names (e.g., Sarah, Wambui, James, Otieno), which confer gender-specific information. We calculate what gender is most commonly associated with each first name appearing in the voter register, and code an individual as female if the probability that a first name is held by a female is above 0.5.

Lastly, we develop three independent proxy variables that capture variation in socio-economic background as a function of names. The link between socio-economic status and name frequencies has been noted in other work (Willis et al. 1982, Joubert 1994, Güell et al. 2015). Most studies of this kind use variations in family names to identify social origins – by, for instance, distinguishing between aristocratic and common names - but in the Kenyan case this is not suitable as most Kenyans do not hold family names that are passed down linearly from parent(s) to child. Furthermore, many of the largest groups have naming traditions that leave comparatively little within-group variation in names. Among the Kikuyu, for instance, the majority of male names are originally age-set names, while women are often named after the nine daughters of

Mumbi.[11] Consequently, we find that these African names do not carry any obvious socio-economic markers.

Most Christian Kenyans, however, will also be given a Western/Christian name at baptism (usually of English origin), and commonly treated as the first name in school records. Roughly 90% of our sample hold such a name. These names are more varied, and decisions about name choice and spelling reflect, in part, socio-economic background. For instance, we observe a mix of common Anglo-Saxon or Christian names with regular spelling, as well as irregular variations of these names, or rare obscure names, which seem likely to signal lower levels of parental (and community) educational attainment. Furthermore, we would also expect, based on evidence from other parts of the world, that there are context-specific trends in first name choices that are linked to class (Mateos 2014).

We therefore use three complementary and independent strategies to identify some of this socio-economically-influenced name differentiation. Since no name-based method can provide a perfect proxy for socio-economic status, our aim in using three different name-based methods is triangulation: if the three different approaches suggest similar relationships between enrolment and class, we can proceed with some confidence that these name-based approaches track class-related variation.

First, we exploit the spatial relationship between poverty and names to develop a name-based poverty measure. To do this, we use Kenya's voter register, which allows us to link person-names in the register with the specific locations of over 20,000 polling stations. These polling stations are, in turn, located in areas with varying degrees of poverty. We assign a score to each first name based on the distribution of said name across electoral enumeration areas with differing poverty incidences. To illustrate, suppose that

[11] From our university dataset for instance, we estimate that roughly 60% of all Kikuyu women hold the name of one of the nine daughters of Mumbi, the mythical mother of the Kikuyu people. These daughters are regarded as the founders of the nine clans/tribes of the Kikuyu.

in the electorate, there are 1,000 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 Michelles, will, on average, come from above average socio-economic backgrounds. In our database of graduate names we then ascribe all graduates with the name Michelle the comparatively low poverty name score of 20 percent.

Secondly, we use a list of the top 100 most common English and Welsh names measured decennially over the past century (ONS, 2014). We use this historical list given that many names still in circulation in Kenya today are likely to reflect names that were common among the British expatriates and settlers of the colonial era. We regard this names list as set of typical, standard English names with traditional spellings, which we assume to be positively correlated with socio-economic background. We introduce a binary dummy variable, that simply indicates if a graduate holds a name from this list or not. A large share of our sample (~55%) hold one of these common English names.

Lastly, we hand code our list of first names into a group of standard, English/European-origin names, and non-standard spellings or unusual name choices, but nonetheless of 'English' origin. For example, we argue that parents choosing name spellings like Antonate and Collince, are likely to be from poorer and less educated families and communities, on average, than ones naming their children Antoinette or Collins. This last exercise is based on authors' judgement call. It also results in a smaller sample as names of unclear origin are excluded.

Validation analyses suggest these independent measures all track variation in socio-economic status in similar ways, in the expected direction. All three indicators are highly correlated, even when controlling for ethnicity (see Appendix 2). Both the English/Welsh name approach and the non-standard spelling approach are strong and significant predictors of the poverty name score. Moreover, these measures predict

programmes of study as expected, with lower poverty name scores and higher shares of common English names in the more prestigious programmes (such as law, engineering and medicine), relative to those studying education, arts and agriculture. The poverty name scores are also higher for the lower-prestige diploma courses than for degree courses. That said, given the inherent measurement error in name-based approaches, we employ these methods in the absence of other direct measures. Their value comes in indicating the direction of the relationship, rather than in the estimated magnitude of the coefficient.

One further concern with this method is that naming practices change over time, and thus the socio-economic markers in names may vary with a person's age. As Module II students are likely to be older, on average, than Module I students, it is plausible that changing name trends could account for systematic differences between these groups. However, since the mid-1990s we don't see any secular trends towards greater name variability within ethnic groups across our sample of names, nor a decline in use of common English names. This suggests that age differences between the two student groups is unlikely to be driving the results.

To compare characteristics of students across the two stream we also need to distinguish between the Module I and Module II graduates, which is not possible from the graduation lists alone. To differentiate between these admissions streams, we use lists of all bachelors' students admitted through the regular Module I stream for the years 2012 and 2013 posted by the University of Nairobi and compare this to the list of graduates five or six years later (2017 and 2018). This allows us to identify graduates entering via Module I and compare their characteristics with the remaining (predominantly) Module II graduates. In total we were able to match 54 percent of the admitted students with the graduation lists. Of the remainder, we expect that some are students that have yet to graduate, some will have dropped out, and some will remain unmatched because of a

name change or name spelling differences across the samples. In Appendix 3 we discuss the possible biases that this introduces and show how we mitigate these biases by introducing ethnicity and faculty of study controls.

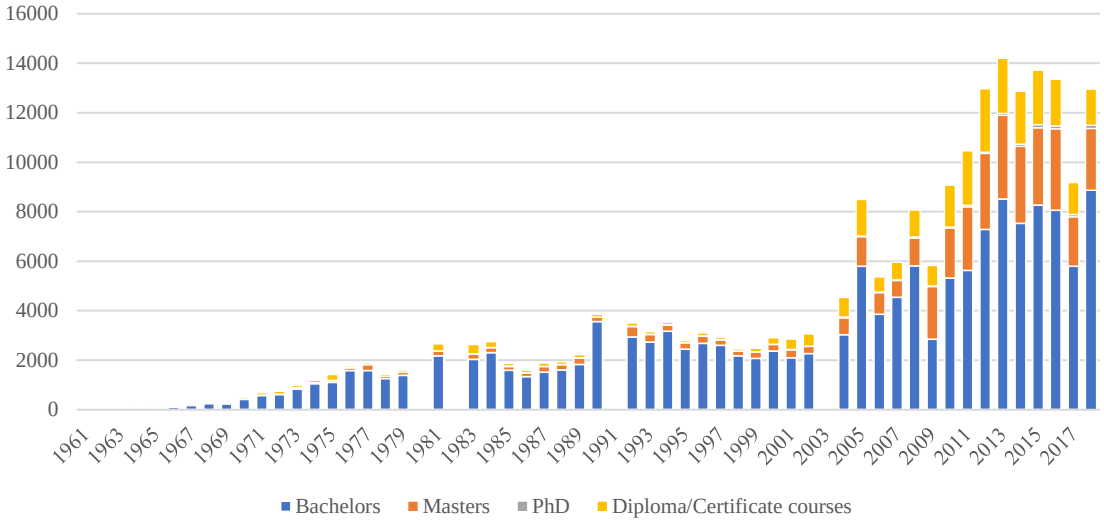
It is important to note some of the limitations of this study. First, it examines equity effects in only one university rather than across the broader university system. However, as the largest, oldest and highest ranked public university in Kenya, understanding the selection effects at this institution is important in its own right. We expect that the elite bias, and possibly ethnic bias, in Module II students ought to be particularly pronounced at this institution. Internationally, social reproduction tends to be most marked at the most selective universities (Marginson 2018; Triventi 2013; Shavit et al., 2007). Second, our implied counterfactual is the existing Module I programme, rather than a projection of what the regular admissions composition would have looked like in the absence of the introduction of Module II. We thus assume that the Module II expansion has had no impact on the Module I size, selection criteria and applicant pool.

RESULTS

General patterns: level of enrolment, gender and ethnic inequality

Figure 3 presents the number of bachelor's degrees conferred by year. After a stagnation in the 1990s, the number of graduates increased sharply in the 2000s as the parallel degree programmes grew. Graduation numbers started to rise around 2004, with the biggest absolute increases between 2010 and 2013.

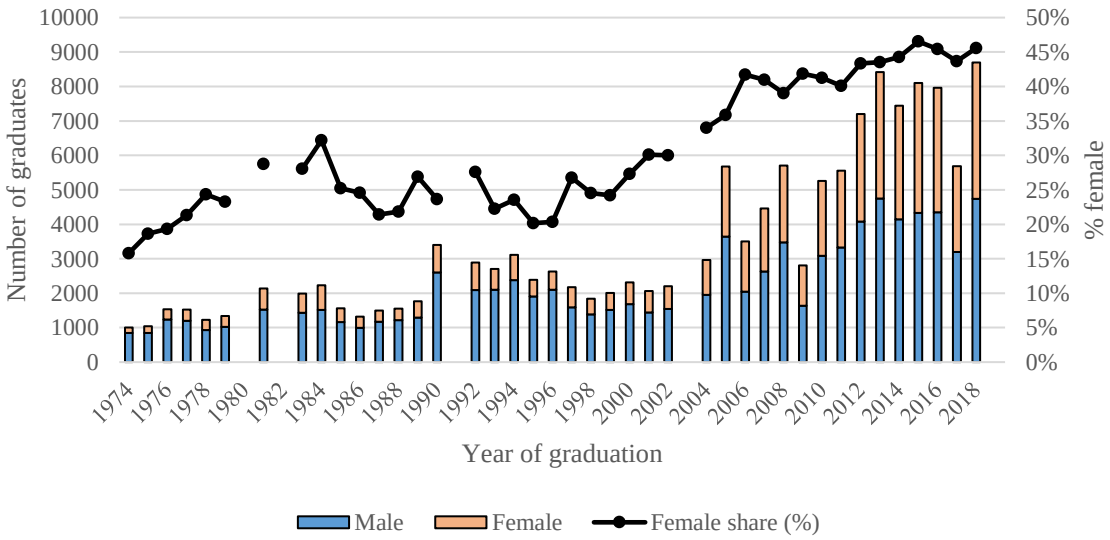
Figure 3. Total bachelor's degrees conferred by year from the University of Nairobi



Note: No graduation ceremony in 1982, 1991 and 2003; 1980 missing from author's dataset.

How has the gender and ethnic composition of graduates changed over this period of university expansion? Since 1997 the female participation has been increasing (Figure 4). Female graduates grew from 20 percent in 1996 to 45 percent by 2018. This trend pre-dates the Module II expansion and is probably driven by a secular trend towards greater female educational participation in general,[12] but female participation growth has been particularly strong during the Module II era.

Figure 4. Gender composition of UoN graduates, bachelor degrees only



Source: Author constructed dataset.

[12] Gender parity (ratio of girls to boys) in primary school in Africa rose from 0.7 to 0.9 between 1971 and 2014; the secondary level data shows similar convergence (World Development Indicators 2018).

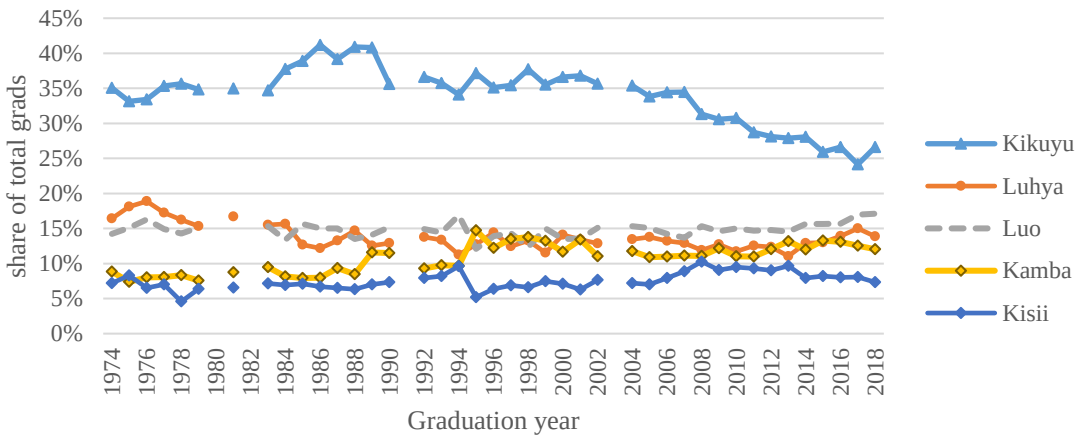
The University of Nairobi graduates have also grown more representative over time in terms of ethnic composition. Figure 5 gives the ethnic shares of each graduating undergraduate class, unadjusted for that ethnic group's population size. Ethnic group shares remained stable over the first 30 years, but show noteworthy compositional shifts in the last 10 to 15 years, coinciding with the Module II introduction.

As shown in Figure 5, Panel 1, the Kikuyu share, the ethnic group with the largest educational lead at independence, has fallen since 2007; the Kisii also saw a slight fall in share around the same time. The Luhya, Luo and Kamba have maintained stable shares over the past 40 years.

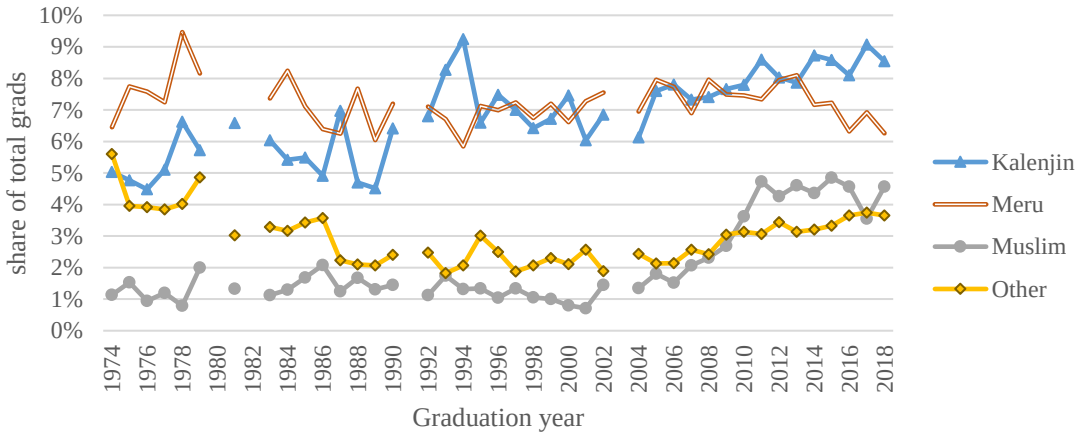
Among historically underrepresented groups, there has been an upward trend (panel 2). The Muslim share rose sharply starting around 2007, from a low base, as did the category comprising other small groups. The Kalenjin shares increased in the 1990s, and again in the late 2000s.

Figure 5. Ethnic group share of graduating undergraduate class

Panel 1: Kikuyu, Luhya, Luo, Kamba and Kisii



Panel 2: Kalenjin, Meru, Muslim and Other



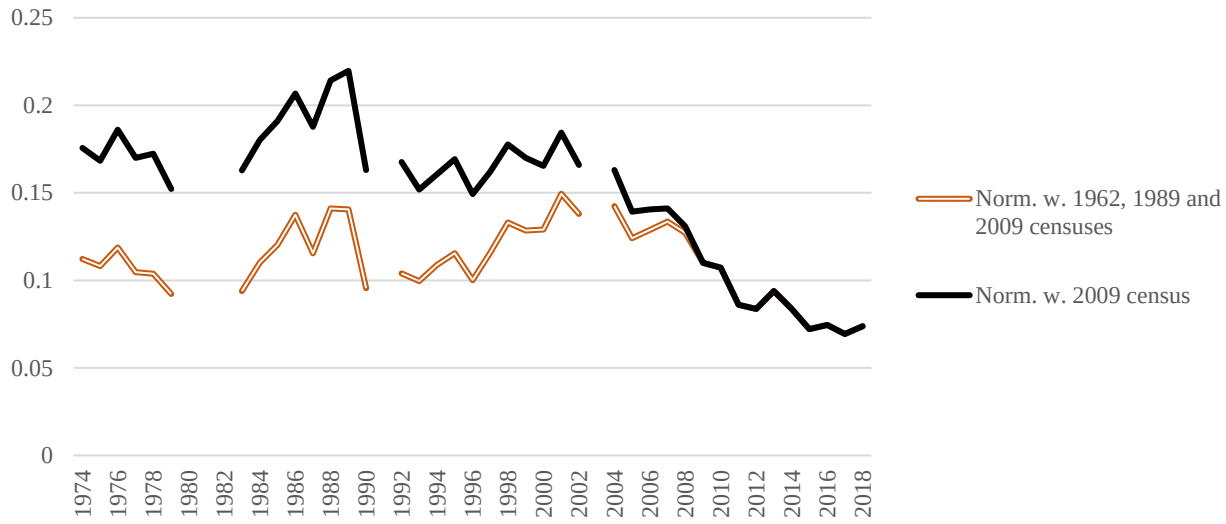
Next we normalise these ethnic group graduate shares by their share of the population. For each ethnic group we calculate a measure of over- or under-representativeness, by dividing the ethnic group's share of the university population in a given graduation year by its population share. We use census data employing two strategies: first, we use the 1962, 1989 and 2009 censuses to estimate variable ethnic group population shares over time, and second, we normalise using only the 2009 population shares and assume stable ethnic composition over time.[13] These values are then used to calculate the yearly between-ethnic group inequality using a Theil-T index (Figure 6). The Theil index is an entropy index, which measures deviation from perfect equality, on a scale from 0 (perfect equality) to infinity. In our case, a baseline of perfect equality would mean that each ethnic group had the same share of graduates to population. One useful feature of the index is that it can be decomposed to better understand inequalities by ethnic group. This inequality measure is often used to measure inequality using semi-aggregated data, such as regions or ethnic groups, including in the education field (D' Hombres, 2010).

Both census data baselines provide similar conclusions: stable inequality levels up to the 2000s with spikes in 1989 and 2001. The time-varying ethnic group population

[13] We use both strategies as the ethnic group categories employed in the different censuses vary meaning that the trends are somewhat unreliable. From 2009-2018 we assume constant ethnic group population shares, as the 2019 census results have yet to be released.

shares shows a sharper rise in inequality in the 1990s from a lower base, as a consequence of the falling Kikuyu population share between the 1999 and 2009 census. Both show a decline in inequality since 2001, with the biggest decline after 2008, coinciding with the growth in graduate numbers.

Figure 6. Theil-T Index of between ethnic group inequality among graduates of UoN



Source: Author constructed dataset.

This decline is driven by the reduction in Kikuyu overrepresentation at University of Nairobi, while smaller underrepresented groups (notably the Muslim group and 'others') have increased. Thus ethnic representativeness at the University of Nairobi has improved since the enrolment expansion and growth of the Module II programmes in the 2000s, although this is not necessarily causal.

Module I and II graduates compared

How do the characteristics of merit-based Module I and self-financed Module II students differ? To answer this question, we compare the 2012 and 2013 Module I admissions lists released by the University of Nairobi with the graduation lists from 2017 and 2018 (roughly when those admitted students would have graduated), allowing a comparison of

characteristics of those admitted via Module I with the full graduating class of Module I and Module II students in 2017 and 2018.[14]

To begin, we compare the gender, ethnicity, and course of study characteristics of the Module I admissions in 2012 and 2013 with the characteristics of the full graduating class (comprising Module I and II) five years later. This is not a perfect comparison: some admitted students may not take up their place at the university, some take longer than 5 years to finish and some will drop out. Moreover, graduation numbers by faculty are not constant across graduation years, suggesting some bunching in graduations. Nonetheless, this approach allows a rough comparison between the merit-based Module I students with fee-paying Module II students in terms of gender, ethnicity, and socio-economic status.

First, the comparison shows that female students are underrepresented in Module I students relative to all graduates, suggesting a disproportionate share of women among the Module II entrants. This implies that the uptick in the proportion of female graduates in Figure 4 above likely originates in Module II admissions, at least in these years.

Ethnic group differences between the Module I admissions and the full graduating class are not large. Muslim and other smaller groups are underrepresented in Module I intake relative to the full graduating class, suggesting that they form a disproportionate share of Module II entrants. The Kalenjin and Luo, in contrast, are overrepresented among Module I intake relative to all graduates. Thus the Module II intake likely lowers their overall share of graduates. The Kikuyu share is slightly higher in the Module I intake in 2012, but not in 2013, suggesting that the declining Kikuyu share may be a consequence of other factors than their under-participation in the University of Nairobi's Module II stream.

[14] The Module I admissions list alone sheds some interesting light on student origins. Of those admitted through Module II in 2012 and 2013, a quarter attended competitive national secondary schools, which produce 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 and higher levels of economic development in those regions.

This does suggest, however, that some of Kenya's most underrepresented groups in higher education are taking advantage of the University of Nairobi's Module II streams. The Muslim group is particularly interesting: admissions data suggests that a large share of the candidates with Muslim names are drawn from schools in and around Nairobi and Mombasa, rather than the East and North-East of Kenya, which has some of the largest Muslim populations. Nairobi's Muslim Somali community has grown since the 1990s, not only because of urbanisation, but also due to an outmigration from neighbouring Somalia during the decades of conflict there. This community has become an important player in Nairobi commerce (Carrier & Lochery, 2013). It may be that Module II expansion at the University of Nairobi created opportunities in higher education for Nairobi's comparatively prosperous Somali community. This interpretation is consistent with empirical evidence from Europe, which has shown that many ethnic minorities of migrant background have been beneficiaries of university expansion (Jonsson, 2014). It has also been suggested that the University of Nairobi has attracted foreign students directly from Somalia.[15]

Table 1. Composition of Module I admissions compared to full UoN graduating class

	2017 Graduates		2018 Graduates	
	Module I admissions (2012)*	Full graduating class (2017)	Module I admissions (2013)**	Full graduating class (2018)
Gender				
Female share	36.4%	43.7%	38.7%	45.6%
Ethnicity				
Kalenjin	8.9%	8.2%	9.5%	8.0%
Kamba	11.7%	12.5%	11.3%	12.0%
Kikuyu	26.0%	24.1%	26.4%	26.6%
Kisii	8.8%	8.1%	7.3%	7.4%
Luhya	14.1%	15.0%	14.6%	13.9%
Luo	18.7%	17.0%	18.0%	17.1%
Meru	6.3%	6.9%	6.3%	6.3%
Muslim	2.2%	3.6%	3.2%	4.6%
Other	3.3%	4.6%	3.4%	4.3%

[15] However, a study by Kathae (2015) reported only 915 foreign students in 2015 (roughly 40% of which were bachelors students), of which 81 were from Somalia.

Faculty				
Agriculture and veterinary medicine	11.8%	7.3%	14.6%	9.4%
Science and mathematics	18.5%	10.0%	17.1%	13.6%
Engineering	4.7%	6.8%	4.2%	4.0%
The built environment	3.7%	6.1%	2.6%	6.9%
Education and distance learning	14.9%	23.3%	15.5%	16.8%
Medicine, dental science, nursing and pharmacy	5.8%	5.3%	4.2%	7.0%
Arts (incl. social sciences)	29.1%	18.3%	31.2%	20.4%
Business	8.0%	13.5%	6.8%	15.6%
Law	3.6%	9.4%	3.7%	6.4%
N	*4,832*	*5,571*	*5,496*	*17,219*

* Predicted graduation in 2017; ** Predicted graduation in 2018
Source: Author constructed dataset.

The low Kalenjin and Luo shares could signal less participation in Module II programmes, or may reflect greater opportunities to pursue universities studies closer to home. For instance, the Kalenjin population share in Nairobi is small, and several large universities in the predominantly Kalenjin Rift Valley offer Module II opportunities, which may weaken internal migration incentives.

Lastly, the faculty composition suggests that the Module I intake is skewed towards hard sciences and mathematics, agriculture, and arts. By extension, the Module II intake is skewed in the opposite direction, towards education, business, law and, at least in 2013, medicine and architecture. Self-financed students appear to be choosing courses with clear career trajectories (e.g., law, medicine, or business), but with higher progression success rates than the hard sciences.

Socio-economic background differences between Module I and II

To examine the relationship between admission stream and socio-economic background, we introduce the name-based SES proxies discussed above. Table 2 provides summary statistics for these three variables. All three are structured so that a higher score is associated with lower SES.

Table 2: Summary Statistics for Name-based SES Measures

Proxy variables for socio-economic status	**Obs**	**Mean**	**Sd**	**Min**	**Max**
Poverty name score (z-score)	12,965	0.00	1	-6.3	11.7
English name dummy (0 = common English name; 1 = uncommon)	13,256	0.445		0	1
Standard name dummy (0 = standard name; 1 = non-standard)	12,633	0.123		0	1

We estimate a linear probability model using the admission stream as the dependent variable, where admission via Module II is equal to one, and zero otherwise.[16] The main independent variables of interest are the name-based proxies for socio-economic background. We test whether the likelihood of being admitted through Module II versus Module I is influenced by these name-based SES variables controlling for ethnic and gender effects and academic faculty.

$$(1)\ y_i = \alpha + \beta_1 x_{1i} + \beta_2 x_{2i} \ldots + \beta_k x_{ki}$$

y = Module of admission (0 = Module I, 1 = Module II)
x_1 = Name-based SES proxy
x_2 = Gender (0 = male, 1 = female)
x_3 = Ethnicity
x_4 = Faculty/department of study

The main measurement error of concern is that that the matched records may systematically select some types of names over others, either because they are more common (possibly giving us false positive matches on common names), or less prone to spelling irregularities (possibly giving us false negative matches). In general, however, mismatches should attenuate the size of the coefficient, as it means that some MII students will be found in the MI category, and vice versa.

To reduce these potential biases, we also compare the degree to which a student was admitted with the degree of graduation and remove entries where the degree

[16] We use a linear probability model for two main reasons. First, relative to a logistic regression model, LPM is consistent and easily-interpretable. Second, given the preponderance of fixed effects in our specification, the LPM is easier to estimate. See Hellevik (2009) and Gomila (2020) for more in-depth discussions of this question.

programme does not match (roughly 5 percent). Gender and ethnic fixed effects control for the fact that certain ethnic group names may be more or less likely to be matched. In Appendix 3 we compare the matched sample against the full admissions list, elucidating potential compositional biases. Importantly, certain departments are underrepresented, because these degree programmes often take longer than 5-6 years to complete (such as medicine and engineering). As a result, we also introduce a model where we control for faculty of study. This control will reduce the effect of the name-based SES proxies, as there will be some selection into different degree programmes on the basis of socio-economic status – the relationship we seek to measure.

Table 3 presents results the estimated relationship between self-financed Module II entry and the name-based poverty measures. Across all three operationalizations, the relationship is negative and significant. The results thus suggest that Module II graduates are associated with higher socio-economic backgrounds, relative to Module I graduates.

The first measure, the poverty name score, is consistently negative and statistically significant; a lower poverty name score is associated with a higher probability of admission through Module II. For every standard deviation increase in the poverty name score, the likelihood of entering Module II is lowered by 2 percent (Model 1). Including a control for faculty or department reduces the coefficient size, as predicted, but the coefficient remains negative and statistically significant (Model 2). The two alternative proxies give consistent results. The dummy capturing whether a graduate holds a common English or Welsh name is negative and significant; we calculate that holding an English name increases the probability of being a Module II student by 4 percentage points (Model 3). Similarly the standard name dummy is negative and significant; holding a standard name with standard spelling increases the probability of being a Module II student by 3 percentage points (Model 4).

Table 3. Regression results: effect of module stream on poverty name score

VARIABLES	Admission stream (MII=1) (1)	Admission stream (MII=1) (2)	Admission stream (MII=1) (3)	Admission stream (MII=1) (4)
Poverty name score (z-score)	-0.0201***	-0.0164***		
	(0.00407)	(0.00401)		
English name indicator			-0.0390***	
			(0.00843)	
Standard name indicator				-0.0284**
				(0.01236)
Controls				
Gender fixed effect	YES	YES	YES	YES
Ethnicity fixed effects	YES	YES	YES	YES
Faculty fixed effects	NO	YES	NO	NO
Observations	12,936	12,936	13,149	12,572
R-squared	0.0071	0.077	0.0070	0.0046

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

In sum, this evidence points to an elite bias among the students admitted through Module II, relative to those admitted through Module I. However, on a horizontal basis the equity effects are less regressive. The results suggest that Module II introduction has lowered the barriers to female entry and improved gender equity at the University of Nairobi. On an ethnic group basis, some of Kenya's historically marginalised ethnic/religious communities have taken advantage of self-financed educational opportunities. However, within these groups, it is the more socio-economically advantaged candidates entering the University of Nairobi.

CONCLUSION

This paper examined the equity effects of this expansion at Kenya's most prestigious public university, dissecting the micro-level effects of the education liberalisation in Kenya. Using a novel method of examining student characteristics based on names, we show that greater opportunities for self-sponsored study at the University of Nairobi have had mixed equity consequences. Gender equality has improved since the introduction of Module II, and given the low proportion of women among Module I

relative to Module II entrants, this change is likely attributable to Module II. Ethnic equity also improved, in part because the Module II programmes have increased the number of students from some underrepresented minorities attending the University of Nairobi. But controlling for gender and ethnicity, the Module II students come from more economically privileged backgrounds than those entering through Module I. In sum, gender and ethnic inequalities in university access are declining, while socio-economic inequalities are likely on the rise.

These results complement existing work on university reform and dual-track systems in the post-Soviet context (Smolentseva, 2020; Huisman, Smolentseva and Froumin, 2018). In one sense, the trade-offs inherent in Kenya's experiment with a dual-track higher education system exhibit some similar dynamics as the post-Soviet experience, with growing university admissions but high elite bias in both the meritocratic and fee-paying admissions streams at the most selective universities. Future comparative work might consider whether and how these equity effects vary across more contexts in both African and post-Soviet countries.

These results suggest trade-offs between different inequality dimensions, creating challenges for policymakers, as diversity in educational institutions may be normatively and educationally beneficial (Card and Rothstein 2007; Hanushek 2009). Rather than focus on a simple trade-off between a merit-based and a self-financed admissions system, a more aggressive affirmative action policy may be required, taking into account the interactions between different forms of exclusion.

These results also raise questions about biases in 'merit-based' selection criteria. The results imply that women and some religious and ethnic communities are underperforming on exams relative to their ability and willingness to make investments in education. This could point to deeper structural problems in primary and secondary school education and testing systems prior to university.

It is important to note, however, that the Kenyan university reform context is far from static. Recent policy changes may already be altering this picture. 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, consequently reducing the number of tuition-paying students entering via Module II (Nakweya 2018; Waruru 2017). All else being equal, this should reduce the pace of vertical inequality increase stemming from the Module II expansion, but could have the unanticipated consequence of slowing the pace of gender and ethnic convergence.

Additionally, this study considers equity in university access, rather than broader income inequality effects related to university education. The results of this study thus shed little light on the progressivity or regressivity of public spending. If Module II entrants fully cover the costs of their university education, and if these reforms in no way altered the pre-existing Module I admissions systems, the distribution of public funds will remain unaffected.

Lastly, it is important to set potential inequality consequences of these reforms against the gains of a large absolute increase in university access. If the fee-paying students are gaining valuable skills and knowledge that the previously restricted system was curtailing, this will contribute to a more educated workforce, with various ripple effects on the labour market and economy as a whole. In the future it will be valuable to study the consequences of these reforms on the labour market.

REFERENCES

AlShebli, B.K., Rahwan, T. & Woon, W.L. 2018. “The preeminence of ethnic diversity in scientific collaboration.” *Nature Communications.* 9:5163.

Ambekar, Anurag, et al. 2009. “Name-ethnicity classification from open sources.” *Proceedings of the 15th ACM SIGKDD*. 49-58.

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.

Appleton, S., 1997. User fees, expenditure restructuring and voucher systems in education. Working Paper no. 134, Helsinki: UNU-WIDER.

Balaton-Chrimes, Samantha. 2021. Who are Kenya’s 42(+) tribes? The census and the political utility of magical uncertainty, Journal of Eastern African Studies, 15:1, 43-62.

Bertrand, Marianne, and Sendhil Mullainathan. "Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination." *American Economic Review* 94.4 (2004): 991-1013.

Blakemore, Kenneth, and Brian Cooksey. 1980. *A Sociology of Education for Africa*. London and Boston: Allen & 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.

Carr-Hill, R. 2020. “Inequalities in access to higher education in Africa: How large are they? Do they mirror the situation in the metropole 60 years ago?” *International Journal of Educational Development*, 72: 102-122.

Carrier, Neil, and Emma Lochery. 2013. “Missing States? Somali Trade Networks and the Eastleigh Transformation.” *Journal of Eastern African Studies,* 7(2): 334–52.

Clark, Gregory, Niel Cummins, Yu Hao, & Dan Diaz Vidal. 2015. “Surnames: A new source for the history of social mobility.” *Explorations in Economic History, 55*: 3–24.

Clark, Gregory, and Neil Cummins. 2014. “Surnames and social mobility in England, 1170–2012.” *Human Nature*, *25*(4): 517-537.

Cook, Lisa D., Trevon D. Logan, and John M. Parman. "Distinctively black names in the American past." *Explorations in Economic History* 53 (2014): 64-82.

Commission for University Education. 2014. “Universities Authorized to Operate in Kenya,” Accessed 29 August 2019. http://www.cue.or.ke/images/phocadownload/ACCREDITED_UNIVERSITIES_IN_KENYA__August_2014.pdf.

Cummins, Neil. "Marital fertility and wealth during the fertility transition: rural F rance, 1750–1850." *The Economic History Review* 66.2 (2013): 449-476.

D’Hombres, Béatrice. 2010. *Inequality in Tertiary Education Systems: Which Metric Should We Use for Measuring and Benchmarking?* Washington D.C.: World Bank.

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.

Edwards, R., & Caballero, C. (2008). “What’s in a Name? An Exploration of the Significance of Personal Naming of ‘Mixed’ Children for Parents from Different Racial, Ethnic and Faith Backgrounds.” *The Sociological Review*. *56*(1):39–60.

Finch, Janet. 2008. “Naming names: Kinship, individuality and personal names.” *Sociology* 42.4:709-725.

Fraser, N. (1995), “Recognition or Redistribution? A Critical Reading of Iris Young's *Justice and the Politics of Difference*.” *Journal of Political Philosophy*. 3: 166-180.

Fraser, Nancy. 2000. "Rethinking Recognition." *New Left Review* 3: 107.

Fryer Jr, Roland G., and Steven D. Levitt. "The causes and consequences of distinctively black names." *The Quarterly Journal of Economics* 119.3 (2004): 767-805.

Geven, K. 2018. *Public Policy and Inequality in Higher Education.* PhD Thesis, European University Institute.

Gicobi, Maryanne. 2015. “University of Nairobi and Strathmore grads most favoured,” *Nairobi News*, 8 April. Accessed 29 August 2019. https://nairobinews.nation.co.ke/news/university-of-nairobi-and-strathmore-grads-most-favoured/.

Goldstein, Joshua R., and Guy Stecklov. "From Patrick to John F.: Ethnic names and occupational success in the last era of mass migration." *American Sociological Review* 81.1 (2016): 85-106.

Gomila, Robin. "Logistic or linear? Estimating causal effects of experimental treatments on binary outcomes using regression analysis." *Journal of Experimental Psychology: General* (2020): 1-27.

Güell, M., Mora, J. V. R., & Telmer, C. I. (2014). “The Informational Content of Surnames, the Evolution of Intergenerational Mobility, and Assortative Mating.” *Review of Economic Studies*, *82*, 693–735.

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. A. 2015. “What's in a name? A method for extracting information about

ethnicity from names." *Political Analysis* 23(4): 212-224.

Harris, J. A. (2021). "Election Administration, Resource Allocation, and Turnout: Evidence from Kenya." *Comparative Political Studies, 54*(3-4):623-651.

Hassan, Mai. "The strategic shuffle: Ethnic geography, the internal security apparatus, and elections in Kenya." *American Journal of Political Science* 61.2 (2017): 382-395.

Hellevik, Ottar. "Linear versus logistic regression when the dependent variable is a dichotomy." *Quality & Quantity* 43.1 (2009): 59-74.

Hughes, Rees. 1987. "Revisiting the fortunate few: University graduates in the Kenyan labor market." *Comparative Education Review* 31, no. 4: 583-601.

Huisman, Jeroen, Smolentseva, Anna, and Froumin, Isak (eds). 2018. *25 Years of Transformations of Higher Education Systems in Post-Soviet Countries: Reform and Continuity.* Palgrave Studies in Global Higher Education.

Jacob, W. James, and Veysel Gokbel. 2018. "Global higher education learning outcomes and financial trends: Comparative and innovative approaches." *International Journal of Educational Development*, *58*, 5-17.

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.

Johnstone, D Bruce, and Pamela N Marcucci. 2010. *Financing Higher Education Worldwide: Who Pays? Who Should Pay?*, Baltimore: John Hopkins University Press.

Joubert, C. E. (1994). "Relation of Name Frequency to the Perception of Social Class in Given Names." *Perceptual and Motor Skills*, *79*, 623–626.

Kasara, Kimuli. 2013. "Separate and Suspicious: Local Social and Political Context and

Ethnic Tolerance in Kenya." *The Journal of Politics*, *75*(4): 921–936.

Kathae, Lucy Munee. 2015. "The adoption of internationalization strategy at University of Nairobi programmes in Kenya." Master's Thesis, University of Nairobi.

Kenya Universities and Colleges Central Placement Service (KUCCPS). 2014. *Placement Processing*. Accessed 29 August 2019. 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, Eonomics 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.

Kuipers, Joel C. and Askuri. 2017. "Islamization and Identity in Indonesia: The Case of Arabic Names in Java." *Indonesia*, no. 103: 25–49.

Lieberson, Stanley, and Kelly S. Mikelson. "Distinctive African American names: An experimental, historical, and linguistic analysis of innovation." *American Sociological Review* (1995): 928-946.

Mama, A. 2003. Restore, Reform but do not Transform: The Gender Politics of Higher Education in Africa. *Journal of Higher Education in Africa, 1*(1), 101–125.

Mamdani, M. 2007. *Scholars in the Marketplace. The Dilemmas of Neo-Liberal Reform*

at Makerere University, 1989-2005, African Books Collective.

Marginson, S. 2016. The worldwide trend to high participation higher education: Dynamics of social stratification in inclusive systems. *Higher Education*, 72(4), 413-434.

Marginson, S. 2018. Higher education, economic inequality and social mobility: Implications for emerging East Asia. *International Journal of Educational* Development, 63, 4–11.

Mateos, P. 2014. *Names, Ethnicity and Populations: Tracing Identity in Space*, Berlin: Springer.

Mayanja, M. 1998. The Social Background of Makerere University Students and the Potential for Cost Sharing, *Higher Education*, 36, 21–41.

Mohamedbhai, G. 2014. "Massification in higher education institutions in Africa: Causes, consequences and responses." *International Journal of African Higher Education*, 1(1).

Molla, T. 2013. "Higher Education Policy Reform in Ethiopia: The Representation of the Problem of Gender Inequality." *Higher Education Policy, 26,* 193–215. https://doi.org/10.1057/hep.2012.25

Mulongo, 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, 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.

Nakweya, Gilbert. 2018. "University admissions reform – What effect will it have?" *University World News*. 23 February. Accessed 29 October 2019.

https://www.universityworldnews.com/post.php?story=2018022009222839

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.

Office of National Statistics (ONS). 2014. “Top 100 baby names in England and Wales: historical data,” Dataset. Accessed May 2021. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/datasets/babynamesenglandandwalestop100babynameshistoricaldata

Prewitt, Kenneth. 1974. ‘Education and Social Equality in Kenya’, in *Education, Society and Development: New Perspectives from Kenya,* ed. by David Court and Dharam P. Ghai, Nairobi: Oxford University Press.

Provini, Olivier. 2018. “Negotiating Higher Education Policies in East Africa : Experiences from Tanzania and Kenya.” *Higher Education*, Springer Verlag, ffhal-01817296.

Posner, Daniel N. 2005. *Institutions and ethnic politics in Africa*. Cambridge: Cambridge University Press.

Raheem, S.O. and Akande A.T. 2019. “Naming as a marker of identity on

Nairaland." *African Identities*. 17(3-4):191-210.

Sabot, Richard H., and John B. Knight. 1990. Ed*ucation, Productivity, and Inequality : The East African Natural Experiment,* Oxford ; New York: Published for the World Bank, Oxford University Press.

Scott, John, and Gordon Marshall. 2009. *A Dictionary of Sociology (3rd rev. ed.)*. Oxford: Oxford University Press.

Simson, Rebecca. 2019. "Ethnic (in)Equality in Public Services of Kenya and Uganda." *African Affairs* 118(470): 75–100.

Shavit, Y., Arum, R., & Gamoran, A. 2007. *Stratification in higher education: A comparative study.* Stanford University Press.

Smolentseva, A. (2017) "Universal higher education and positional advantage: Soviet legacies and neoliberal transformations in Russia." *Higher education* 73:(2)209-226.

Smolentseva, A. 2020. "Marketisation of Higher Education and Dual-Track Tuition Fee System in Post-Soviet Countries." *International Journal of Educational Development.* Vol. 78. https://doi.org/10.1016/j.ijedudev.2020.102265

Student Organisation of Nairobi University (SONU), "Our History," Accessed 29 August 2019. http://sonu.uonbi.ac.ke/?page_id=50.

Teferra, D. 2013. *Funding higher education in sub-Saharan Africa*. Springer.

Triventi, M. 2013. "Stratification in Higher Education and Its Relationship with Social Inequality: A Comparative Study of 11 European Countries." *European Sociological Review,* 29(3), 489–502.

University of Nairobi. 2011. *2011 Annual Report,* Nairobi. Accessed 29 August 2019. https://www.uonbi.ac.ke/sites/default/files/ANNUAL%20REPORT%202011.pdf.

Waruru, Maina. 2017. "Drop in student numbers rattles private universities." *University*

World News. 20 January. Accessed 29 October 2019. https://www.universityworldnews.com/post.php?story=20170119052601765

Willis, F. N., Willis, L. A., & Gier, J. A. 1982. "Given Names, Social Class, and Professional Achievement." *Psychological Reports, 51*, 543–549.

World Bank. 1999. *Implementation Completion Report: Kenya Universities Investment Project, Report No. 19976*. Washington D.C.: World Bank.

Yang, L., & McCall, B. 2014. "World education finance policies and higher education access: A statistical analysis of World Development Indicators for 86 countries." *International Journal of Educational Development*, 35, 25–36.

Zeleza, P. T. (2016) *The Transformaton of Global Higher Eucation, 1945-2015,* Palgrave Macmillan.

DATASETS

Minnesota Population Center. 2019. "Kenya Housing and Population Census 1989, 1999 & 2009." Integrated Public Use Microdata Series, International: Version 6.4 [Machine-readable database]. Minneapolis: University of Minnesota. Accessed 15 May 2019.

Office for National Statistics. 2014. Top 100 baby names in England and Wales: historical data. Accessed May 2021.

Simson and Harris. 2021. Purpose-built datasets by authors of University of Nairobi graduates and admissions based on public sources.

Appendix 1. Estimating the Module II intake

To estimate Module II admissions we collected data on Module I students admitted through JAB/KUCCPS. We compared this with the annual enrolment across Kenyan public universities. Because aggregate enrolment data does not break down students by year of study, we compare Module I enrolments in the preceding four years against total undergraduate enrolment. These estimates are given in Appendix Table 1.1. The estimates broadly align with data given by Munene and Otieno (2008, p.470), showing a Module II share of 38% in 2003/04 and 45% in 2004/05, using data obtained from the Commission of Higher Education. The bottom panel uses the same methods to estimate the Module II share for the University of Nairobi only.

Appendix Table 1.1. Estimated Module II enrolment using Module I admissions versus total enrolment

	Pre-2006	**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**
All public universities															
MI admissions	*Capped at 10,000*	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		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%
University of Nairobi															
Module I (regular) admissions						3905			4336	4832	5496	5053	5550		5955
Year I students						8137	8727	11805	9794			12253			
Implied Module II share						52%			56%			59%			

Sources

Enrolment:

Kenya Statistical Abstracts

University of Nairobi Annual Reports 2009 and 2010

Admissions:

Office of the Auditor General, 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, p.16

Oduor, A., 10 Sept 2016, 'How private universities shared 12,000 government sponsored students', *Standard Digital*, https://www.standardmedia.co.ke/article/2000215379/how-private-universities-shared-12-000-government-sponsored-students, viewed 5/6/2019

Oduor, A., 13 Jan 2018, 'Panic hits universities as scramble for students who scored minimum entry grade', *Standard Digital*, https://www.standardmedia.co.ke/article/2001265816/universities-pain-as-first-year-selection-process-begins viewed 5/6/2019

Daily Nation, 10 April 2018, '62,800 KCSE candidates get university slots in Kenya', https://www.nation.co.ke/news/education/Kenya-university-selection-results-2017/2643604-4378538-d90lx1/index.html, viewed 5/6/2019

University of Nairobi admissions:

Daily Nation, 6 March 2009, 'Public varsities name 17,000 new students', https://www.nation.co.ke/news/1056-542836-k6nmvwz/index.html , viewed 6/6/2019

Anami, L. Standard Digital, 7 june 2011, https://www.standardmedia.co.ke/article/2000036666/jab-resolves-to-have-double-intake

University of Nairobi, KUCCPS Admissions Lists (authors' own digitized dataset)

Oduor, A., 16 July 2015, 80,000 Kenyan students to join varsities, colleges, *Standard Digital*, https://www.standardmedia.co.ke/article/2000169359/80-000-kenyan-students-to-join-varsities-colleges, viewed 5/6/2019

Appendix 2. Name-data construction and poverty name scores

Name matching

To examine socio-economic status differences between Module I and II entrants, we match the names from the 2012 and 2013 admission list with the graduating classes five to six years after said students began their studies, i.e. graduates between 2017 and 2018. We code an entry as matched if we can identify at least three names or initials in both datasets, but we allow the name order to vary and first and middle names to be represented by an initial or full name. Thus we assume that a Kenneth B. Odhiambo in the admissions list is the same person as Kenneth Benjamin Odhiambo, or a B. Kenneth Odhiambo, in the graduation list. We also cross-check to make sure that the matched student was admitted to the same faculty or department that he or she graduated from. In total we were able to match 54 percent of the admitted students. Of the remaining 46 percent, we expect that some are students that have yet to graduate, some will have dropped out entirely, and some will remain unmatched because of a name change or name spelling differences across the samples. These matched entries are then compared to the remaining students in the 2017 and 2018 graduating classes, which will predominantly comprise students entering through the Module II stream. Although this identification is imperfect (the residual group will clearly contain some Module I entrants from earlier years or that could not be matched due to more significant spelling differences), the 'true' Module I content of the first group will be considerably larger than in the latter residual group, and vice versa.

Construction of the name-based socio-economic proxies and robustness

We built the poverty name score by calculating the mean poverty rate for each first name using the Kenyan voter register. While the register itself contains no information about poverty, we use the locations of polling stations, combined with GIS data on local poverty rates to calculate the average poverty rate for a given name.[17]

We also do some cleaning of the first name variable, as the name order given in graduation booklets are not consistent. In most cases, graduating candidates have three names: (1) a Christian/Western given name, (2) an African first name, and (3) an African last name. As the naming order is not completely consistent, we then hand cleaned the final names list, and replaced any initials or African names with a Christian/Western name if one appeared in a different column. We excluded entries with only Muslim or African names.

We used the Christian/Western name for this exercise because it shows greater name variation, the names are not ethnically specific, and there is greater spelling variability in names which drives some of the poverty name score variation. The African names in contrast are relatively regularly spelled, and in many ethnic groups there is little sign of naming practice differences across socio-economic groups.

Our second variable, the English name dummy, takes the value 0 if the given name appears on the UK Office of National Statistics dataset 'Top 100 baby names in England and Wales: historical data', and 1 if it does not. This dataset includes the top 100 names measured once each decade between 1904 and 1994. Our intuition is that this serves as a rough proxy for conventional names and spellings, which we believe to be positively correlated with socio-economic status of the graduate's parents.

[17] We use the spatial poverty data described in Tatem et al (2013) to estimate name-specific poverty rates.

Lastly, we hand code the names into 'standard' names and spellings (dummy = 0), versus irregular or unusual names and spellings (dummy = 1). Again, our intuition is that families of higher socio-economic status are more likely to use these common, standard spellings and names and vice versa.

Below we give the correlation coefficients between these three variables, using a simple OLS regression and including controls for ethnicity and gender. These measures are positively and significantly correlated.

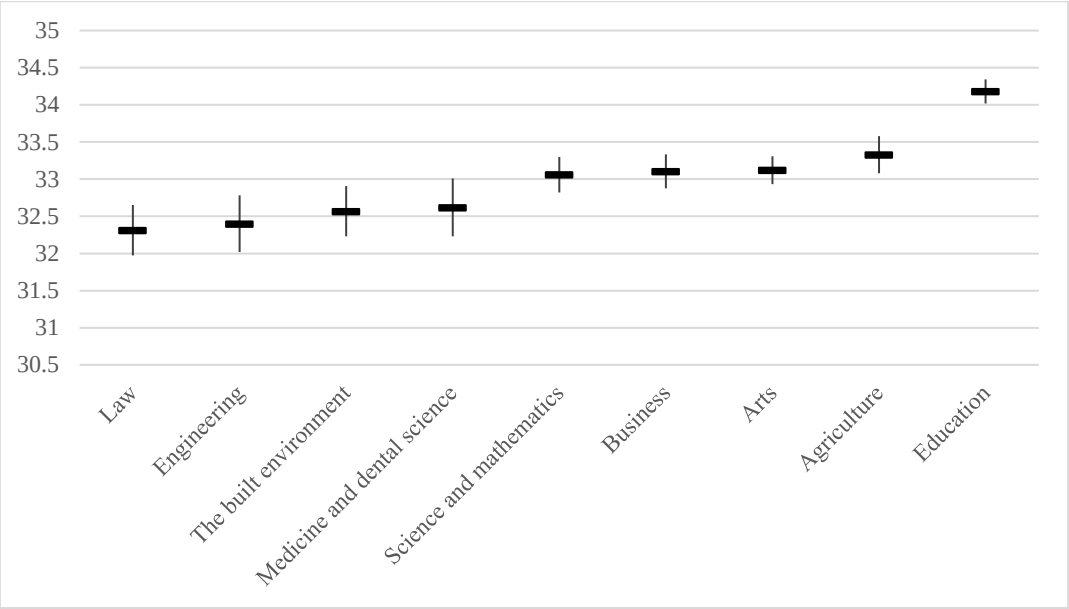
Appendix Table 2.1: Correlation between different name-based SES proxies

VARIABLES	Poverty name score (% poverty) (1)	Poverty name score (% poverty) (2)	English name indicator (3)
English name indicator	1.341***		
	(0.0922)		
Standard name indicator		1.331***	0.6592***
		(0.2130)	(0.0051)
Controls			
Gender fixed effect	YES	YES	YES
Ethnicity fixed effects	YES	YES	YES
Observations	12,936	12,373	12,572

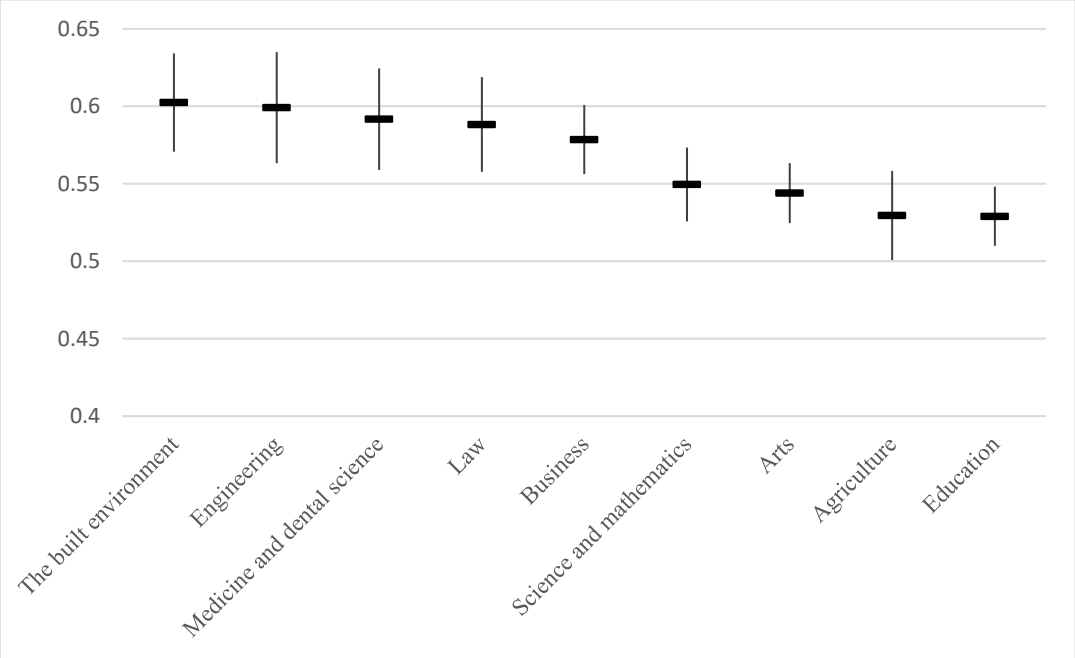
Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Next we examine if these variables correlate with other characteristics that we would expect to be influenced by socio-economic status. We run an OLS regression where we examine how the SES measures vary by university faculty/department, controlling for ethnicity and gender (again focused on years 2017-18 and bachelors degrees only). The figures below gives the predicted poverty name score and English name share by faculty (margins), which correlates well with the expected prestige of different degrees. The lowest poverty score (higher share of standard English names) is among graduates in law, engineering, the build environment (e.g. architecture), and medicine and dental science. The highest poverty name scores are found among graduates in education, agriculture and arts. The results using the standard name indicator are broadly consistent.

Appendix Figure 2.1. Predicted average name poverty score by faculty (95% confidence intervals)

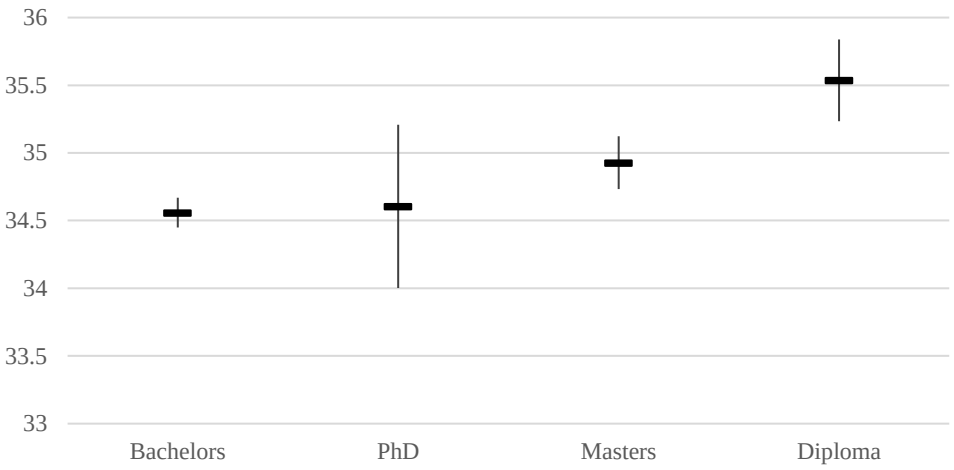


Appendix Figure 2.2. Predicted average English name share by faculty (95% confidence intervals)



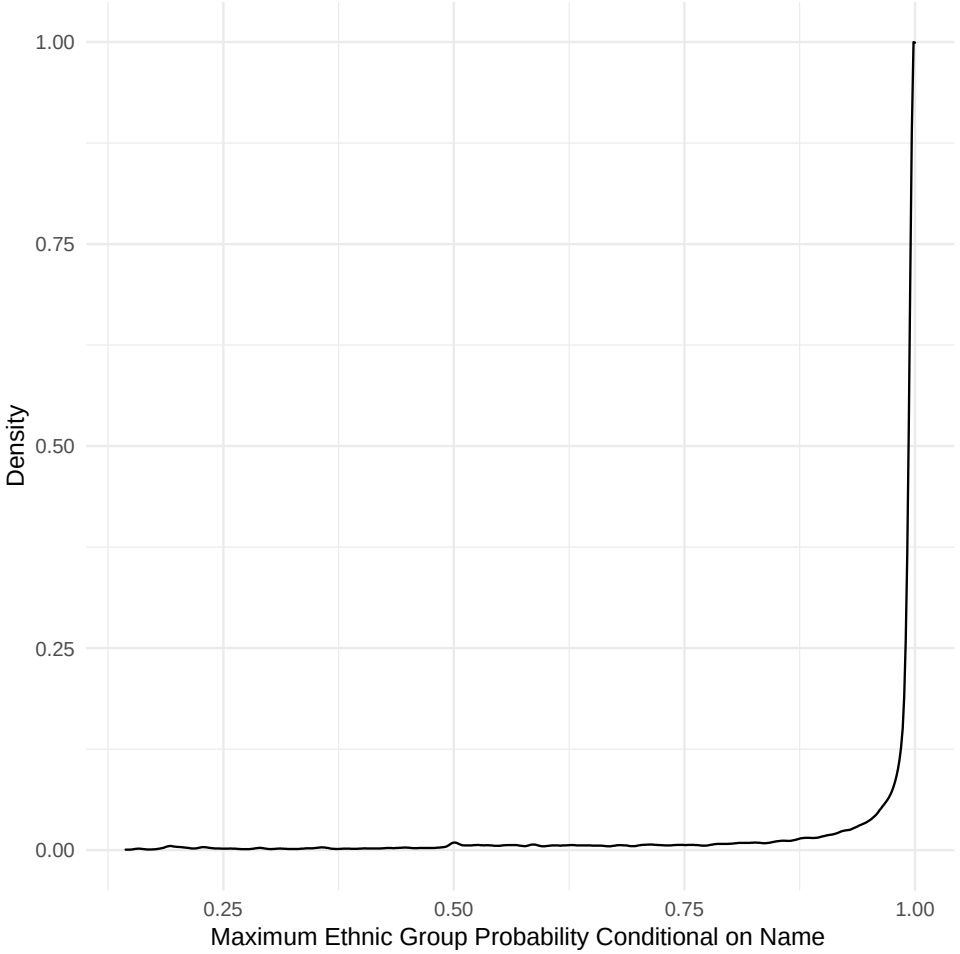
We also examine the predicted poverty name score across degree levels (controlling for gender and ethnicity). This shows that students attending the shorter diploma courses have a significantly higher poverty name score than the other degree courses, in line with expectations.

Appendix Figure 2.2. Predicted average name poverty score by degree (95% confidence intervals)



Finally, Figure 2.3 plots the density of the highest probability estimate of ethnic group membership for each student, conditional on name. The plot is highly right-skewed, with the average highest-probability estimate at 0.94 and the average at 0.99. This implies that our ethnic categorization approach based on names provides fairly certain estimates of ethnicity.

Appendix Figure 2.3. Density of Highest Probability Ethnicity Estimates



Appendix 3. Accuracy of matching the admissions and graduation samples

Table 3.1 compares characteristics of students on the admission list with characteristics of those successfully matched, allowing us to examine matching-related biases. While the characteristics are broadly similar, a few differences stand out. The matched records underrepresent students in engineering, medicine, and the arts, possible because these courses often require more than five years. This also explains the gender differences between the samples, as engineering in particular is male dominated. By introducing a control for faculty of study in the main regression results, we should control for the possible biases that these skews introduce.

The ethnic compositional differences are partly explained by different ethnic distributions across different degree programmes (the Kalenjin for instance, are underrepresented in the medical sciences, which may explain why they are overrepresented in the matched sample). However, there is a discrepancy on the Muslim share, which is lower in the matched records. This is likely to be due to greater spelling variation in Muslim names, making these records harder to match. We exclude Muslim names in the regression results so this will not be driving any of our main results.

Appendix Table 3.1. Comparing composition of admissions list against matched individuals

	2012		2013	
	Full admission list	Matched admission/grad list	Full admission list	Matched admission/grad list
Gender				
Female share	36.4%	40.1%	38.7%	43.8%
Ethnicity				
Kalenjin	8.9%	9.8%	9.5%	9.1%
Kamba	11.7%	11.9%	11.3%	12.7%
Kikuyu	26.0%	25.0%	26.4%	26.8%
Kisii	8.8%	9.0%	7.3%	8.0%
Luhya	14.1%	14.3%	14.6%	14.5%
Luo	18.7%	19.5%	18.0%	17.5%
Meru	6.3%	6.4%	6.3%	6.4%
Muslim	2.2%	1.0%	3.2%	1.7%
Other	3.3%	3.1%	3.4%	3.3%
Faculty				
Agriculture and veterinary medicine	11.8%	13.4%	14.6%	13.6%
Science and mathematics	18.5%	18.6%	17.1%	17.3%
Engineering	4.7%	5.8%	4.2%	0.5%
The built environment	3.7%	5.1%	2.6%	5.6%
Education and distance learning	14.9%	17.1%	15.5%	19.9%
Medicine, dental science, nursing and pharmacy	5.8%	4.8%	4.2%	2.2%
Arts (incl. social sciences)	29.1%	21.2%	31.2%	28.0%
Business	8.0%	9.3%	6.8%	8.46%
Law	3.6%	4.1%	3.7%	5.0%
N	*4,832*	*2,375*	*5,496*	*2,476*