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Ethnic favouritism in Kenyan education reconsidered: When a picture is worth more than a thousand regressions

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Abstract

Does the leader's ethnicity affect the regional distribution of basic services such as education in Africa? Several influential studies have argued in the affirmative, by using educational attainment levels to show that children who share the ethnicity of the president during their school-aged years gain more years of education. In this paper we revisit this empirical evidence and show that it rests on problematic assumptions. Using Kenya as a test case, we argue that there is no conclusive evidence of ethnic favouritism in primary and secondary education, but rather a marked process of educational convergence among the country's larger ethnic groups. This evidence matters, as it shapes how we understand the ethnic calculus of leaders.

Introduction

Since the late colonial era primary school attainment has been growing rapidly across much of Africa. Enrolment has increased sharply across both rural and urban populations, while gender gaps have declined and are today negligible in many countries. Progress in secondary schooling has been more varied, but also shows steady enrolment growth in aggregate.

There remains debate, however, over the drivers of this diffusion of basic education and the role of ethnic politics in shaping its pace. Specifically, have these educational advances benefitted some ethnic or regional groups disproportionately? Several influential papers contend that ethnic politics matters to educational outcomes in Africa, as leaders favour their own districts and ethnic communities by targeting educational resources to them. This is expected to result in an uneven pace of attainment growth that bestows considerable advantage on children who shared the ethnicity of the sitting president and/or minister of education (André et al. 2018; Alwy and Schech 2004; Franck and Rainer 2012; Kramon and Posner 2016; Li 2018).

This evidence has informed broader academic debates about the nature of resource distribution in multi-ethnic countries. Evidence from the education sector has been used to demonstrate that ethnic patronage permeates African societies. It provides a clear economic motivation for voting along ethnic lines as citizens are right to expect greater access to public resources if the candidate from their ethnic group wins (Carlson, 2015). The education sector in particular is seen as ripe for favouritist policies as education spending constitutes a large share of total government expenditure and is a club good, inasmuch as it can be targeted towards specific schools and regions, unlike pure public goods like clean air and national defence.

However, not all scholars of ethnic patronage in Africa agree that it brings benefits to the broader ethnic communities from which the leadership draws its support. Some have argued that ethnic patronage in Africa is an elite game with little trickle-down to the population at large (van de Walle, 2007). A further strand of the literature has argued that leaders of multi-ethnic states usually seek to avoid accusations of capture by allocating resources in equal shares across all groups or regions (Azam, 2008; Francois et al., 2015). An alternative set of empirical studies has found evidence in support of this theory. Francois et al. (2015) have shown that African leaders seek to balance cabinet

appointments amongst all larger ethnic groups,¹ while Simson (2019) finds that public sector employees in Kenya and Uganda are more regionally representative than educational disparities alone would predict. Similarly, a historical study of the Kenyan police force in the early decades of independence found no evidence that ethnicity was linked to preferential treatment, although it did influence and embolden the behaviour of policemen (Vanden Eynde et al., 2018). Finally, Kasara (2007) finds evidence that African Presidents tend to tax the main cash crop products of their co-ethnics at a higher rate than other crops, suggesting a negative rather than a positive effect of being a co-ethnic of the President. This mixed evidence about ethnic discrimination in African settings thus offer conflicting perspectives on why and how ethnicity is politicised, and to what economic effect.

In this paper therefore, we return to and challenge the evidence of ethnic favouritism in primary and secondary education. We argue that it rests on shaky assumptions and remains far from conclusive. Because of the strong growth and convergence in attainment rates, counterfactual educational attainment growth is difficult to specify and invariably rests on debatable assumptions about how educational attainment would develop in a world absent of ethnic favouritism. The existing papers fail to lay out these counterfactuals and a more careful review of their models raises serious doubt about their assumptions. In Kenya at least, our focus country, rapid educational attainment across all larger ethnic groups, and convergence between leaders and laggards, strongly overshadows any marginal advantage of sharing ethnicity with the president. This suggests that the evidence of broad-based ethnic benefits accruing from ethnic voting may be over-stated.

This paper uses the Kenyan case as its main example. We focus our attention on Kenya as a type of most-likely crucial case study (Gerring 2007), such that Kenya is the place where we would most likely expect to find evidence of ethnic favouritism in education, given the extant literature on this topic (Kramon and Posner, 2016; Li, 2018). Indeed, there is currently more scholarship on ethnic and regional favouritism in Kenya than in any other individual Sub-Saharan African country (Burgess et al. 2015; Kramon and Posner 2016; Li 2018; Vanden Eynde et al. 2018), which is arguably due to the highly ethnicized nature of Kenyan politics as well as to its high-quality data and the fact that it has experienced two ethnic presidential transitions.² The fact that we do not find evidence of ethnic favouritism in educational outcomes in Kenya suggests that the much broader literature on ethnic and regional favouritism deserves closer scrutiny.

The rest of the paper is organised as follows. It starts by laying out some descriptive statistics, before discussing how ethnic favouritism is most appropriately conceptualized and measured. It then critiques the evidence of ethnic favouritism given by Franck and Rainer (2012), Kramon and Posner (2016) and Li (2018), showing both the conceptual problems with their models and weaknesses in their empirical results. Lastly, it reviews the evidence on the supply factors that are thought to drive ethnic favouritism and challenges the conclusions reached by Kramon and Posner (2016).

Ethnic favouritism in the context of educational convergence

In many African countries both primary and secondary attainment have grown rapidly since independence. Gender gaps have also fallen. Across the continent as a whole, the gross primary enrolment rate rose from 55% in 1971 to 98% in 2014, while the primary completion rate³ jumped from 46% to 69% over the same period, and the gender parity – the ratio of girls to boys - rose from 0.7 to 0.9. Performance varies considerably across countries, but in the last decade, eleven countries attained primary completion rates above 80%. Secondary school enrolment remains considerably lower, but rose from 17% to 43% (gross) over the same period and gender differences fell among secondary students too (WDI 2018).

¹ Also see Lindemann (2011) for evidence on “tribal balancing” in post-colonial Zambia.

² The only other single-country study of ethnic or regional favouritism in Africa is from Benin (André et al. 2018).

³ I.e. gross intake ratio: number of entrants into the final year of primary schooling divided by size of age cohort.

Those countries approaching universal primary attainment will, by definition, have seen convergence in primary attainment levels. If all children today complete primary school growth in attainment must have been faster among those groups or regions that started the period with levels below average. This, as we shall see, confounds any measure of ethnic favouritism, as illustrated using the Kenyan case below.

The Kenyan case

Kenya is often used to test theories about ethnic effects because it offers two clear and sharp transitions in leader ethnicity without the confounding effects of wars or coups, from a Kikuyu (Jomo Kenyatta) to a Kalenjin (Daniel Arap Moi) president in 1978, and back to a Kikuyu president (Mwai Kibaki) in 2002. Researchers have exploited these leadership transitions to examine whether they coincide with a shift in the flow of public resources from Kikuyu to Kalenjin beneficiaries and vice versa, particularly in the case of primary and secondary schooling (Alwy and Schech, 2004; Franck and Rainer, 2012; Kramon and Posner, 2016; Li, 2018).⁴ These existing studies use survey data to examine the educational attainment of a representative sample of Kenyans by birth year. The studies rest on the assumption that schooling is undertaken at set ages, and a person's year of birth therefore indicates when said person attended school. Cross-sectional data on ethnic group educational performance over successive birth cohorts therefore offers a historical record of enrolment levels by year and allows the authors to test whether the relative educational performance of a given ethnic group changes in the years after a presidential transition.

Building on this approach, the three charts in Figure 1 compare average years of primary schooling for the Kikuyu, Kalenjin and the remaining population ('other') by birth year, for cohorts that would have attended school under the presidencies of Jomo Kenyatta and Daniel Arap Moi respectively. These charts use pooled Kenyan census data, where ethnicity is proxied based on place of birth rather than self-reported ethnic identity.⁵ According to the ethnic favouritism literature, we should expect to see disproportionate access to schooling for Kikuyu children educated under President Kenyatta, and for Kalenjin children educated under President Moi.

[Insert Figure 1 here]

The first chart gives the years of primary schooling for each of the three groups by birth cohort. The second measures the relative attainment of Kikuyu and Kalenjin respondents, by dividing the group average years of schooling by the national mean.⁶ The last chart provides a measure of absolute differences, by subtracting the national mean level of education from the group average. In other words, how many more/less years of primary schooling do the Kikuyu/Kalenjin have than the average Kenyan? The vertical lines mark (roughly) the cohorts that received most of their education under a Kikuyu and Kalenjin president respectively, assuming that primary schooling takes place when a child is 6-13 years of age.

The first chart shows that attainment grew steadily for all groups over the period under review, but, unsurprisingly, the growth in years of schooling slowed as groups began to approach the primary education ceiling of 8 years. The Kikuyu ethnic group started the postcolonial period with a

⁴ Only Kramon and Posner (2016) test this for secondary schooling.

⁵ Kramon and Posner (2016) and Li (2018) in contrast use Demographic and Health Survey (DHS) data, which specifies ethnicity precisely, and use the census as an out-of-sample validation. The choice of data is discussed in Appendix 1, and the two samples are compared to show that these trends are not driven by the choice of data. The advantage of the census data is that it offers larger samples and avoids the gender imbalance inherent in the DHS samples. Note also that we cap the cohorts under consideration, so that only respondents aged 20 and above are included in the sample, to avoid including students who have still to complete their education, as discussed in Appendix 3.

⁶ Because we cannot determine the ethnicity of respondents born in Nairobi, and because of the region's exceptionally high attainment rates, Nairobi-born respondents have been removed from the total and 'other' category. This omission has very little impact however, as the population share born in Nairobi is small.

pronounced educational advantage while the Kalenjin had a small disadvantage, but the gap between the two groups has shrunk over time.

This convergence process is more evident in the second and third charts. Relative to the national mean, the Kikuyu advantage (in percentage terms), fell sharply over Kenyatta's presidency and then stayed relatively constant during Moi's presidency (at roughly 15% above the national mean), while the Kalenjin rose relative to the national mean under Kenyatta's presidency, and then steadied. The same trend is evident on an absolute basis: the gap in number of years of schooling to the national mean closed over the Kenyatta years, then stayed relatively steady at roughly 0.7-0.8 years under President Moi.

The trends in secondary school attainment mirror the primary school trends, but with a lag (corresponding figures are included in Appendix 2). The relative Kikuyu attainment declined under Kenyatta's presidency although the absolute gap in years continued to increase, while the Kalenjin relative performance and gap with the mean began to close roughly midway through Kenyatta's presidency and continued into the beginning of Moi's presidency. The Kikuyu gap increased again from about 1990, during Moi's presidency, possibly reflecting greater Kikuyu uptake of the expansion in secondary schooling that started with the reforms of the mid-1980s.

Given these many different dynamics affecting primary attainment – an unequal postcolonial starting point, strong attainment growth across all larger Kenyan ethnic groups, convergence in years of schooling between those with a head-start and the laggards, as well as the complication that years of schooling has an upper bound after which no further progress can be measured – how exactly should we define and measure ethnic favouritism? The Kikuyu educational advantage was on average larger under Kenyatta than under Moi and vice versa for the Kalenjin, but essentially all the Kikuyu-Kalenjin convergence happened under Kenyatta's presidency. Furthermore, neither group saw attainment levels decline under a non-co-ethnic president. In absolute terms, Kikuyu children continued to outperform the Kalenjin throughout Moi's presidency too.

If Kenyatta and Moi's presidential terms had been swapped, and a Kalenjin president governed Kenya between 1964 and 1978, should we expect to have seen a different trend? Would the Kikuyu educational advantage have been erased overnight through quotas or immediate removal of educational resources from Kikuyu districts? Would the Kalenjin disadvantage have disappeared immediately? Furthermore, how much of the relative educational performance of ethnic groups should be attributed to government policy in the first place, and how much was driven by decisions by families and communities themselves? The next section reviews evidence about the drivers of educational attainment and discusses ways of conceptualizing and measuring inequality, fairness and favouritism.

What drives educational attainment growth?

The literature on educational attainment usually distinguishes between demand and supply factors that influence household decisions to send their children to school (Handa, 1999; Dostie and Jayaraman, 2006). Schooling is rarely costless. In developing countries in particular, a large share of the costs of basic schooling are often borne by households or local communities, in the form of school fees, levies, uniform requirements, community contributions to school management or construction, as well as the opportunity cost of keeping children in school rather than in productive labour. Demand for schooling is therefore thought to be shaped by the expected returns to education and the household's ability to pay, as evidenced by a large body of recent empirical research (Dostie and Jayaraman, 2006; Deininger, 2003; Birdsall Lincove, 2009; Tansel, 2002). Most of these studies find household income or wealth have a positive effect on schooling outcomes; many also find that attitudes towards education, proxied by parental education, are important independently of income. Furthermore, the expected returns to education – namely the future income of the educated graduate – will shape the family's cost-benefit analysis and increase investment in education (Goldin and Katz 1999).

Government policies may amplify or mute these demand forces. By bearing the costs of primary or secondary schooling, government policies will decrease the opportunity cost of sending children to school. In some contexts, negative incentives, such as legal requirements to send a child to school for a set number of years, may conversely increase the cost of keeping children out of school. Active regional policy or affirmative action, which channel more funds to underperforming areas, may help to level the playing field by making education more attractive – all else considered – in the poorest areas. In contrast, policies that rely on household or community co-financing to unlock government funds (also common in many countries), could amplify inequalities as richer communities are more able to raise the locally required contributions (Mwiria, 1990, for an example from Kenya).

When schooling is locally financed (whether through local taxes or community contributions), average educational attainment in the community as well as the strength of community cohesion are thought to influence the level of educational investment. Work by Goldin and Katz (1999) that examined secondary school attainment in the US over the first half of the 20th century, found the level of attainment to be sensitive to community homogeneity as well as household income. More homogenous communities proved more willing to finance the running of secondary schools, as a larger share of households in the community stood to benefit from the investments.

The Kenyan example

How has the Kenyan government organised the supply of education? During the colonial era, ‘ethnic favouritism’ in Kenya was institutionalised, with an educational system officially segmented by race and a disproportionate share of budget resources devoted to educating the small white settler minority, and to a lesser extent, Asian minority (Eshiwani 1990). Racial segregation in education was abolished in 1960. Within the African population, ethnic differences in attainment were also large, and strongly shaped by the degree of missionary penetration and integration into the colonial cash crop economy in the first half of the 20th century (Olson 1972; Tignor 1976; Frankema 2012).

In the early independence era, Kenya’s educational priorities were first and foremost to reverse the racial inequities of the colonial era. Concerns about inadequate supplies of high-level manpower (secondary schooled graduates and beyond) were deemed by many African governments to be the bigger obstacle to development than an underdeveloped primary school system. Resources were therefore disproportionately directed to the secondary and tertiary level with the expectation that local resources would finance primary schooling (Oketch and Rolleston, 2007; Olson, 1972). In the first decade of independence, funds for primary school construction and teachers houses were raised locally, while the central government provided some or all recurrent outlays (teacher salaries and supplies) once the physical facilities had been built (Eshiwani, 1990, p.25). Kenya’s secondary schooling system, meanwhile, had two tracks, with a largely state-funded national or provincial secondary school system of higher quality and higher unit cost, and locally funded, low quality (and less competitive), ‘harambee’ schools (Mwiria, 1990).

With time however, official government documents came to stress the importance of education for national integration, rather than skills development alone. From a decentralized education system, where much of the provision was in the hands of missions and local governments, the central government gradually assumed greater control over educational resources. The 1968 Education Act brought education policy and financing under the purview of the Ministry of Education with a view to improving distributional outcomes. The 1976 National Committee on Educational Objectives and Policies recognized that the education system reinforced disparities between regions and genders and made reduction of regional disparities a prime government objective. Similarly, the first development plan under President’s Moi’s rule sought specifically to increase educational opportunities in remote areas and among underprivileged groups (Kenya Development Plan 1979-1983, Part 1, p.21 and p.152).

With this policy justification, in the 1970s central governments began to assume a greater share of both primary and secondary school financing (Oketch, 2004; Mwiria, 1990; Somerset, 2007). Primary

school fees were abolished (although shortly after partially reintroduced), while the independent *harambee* secondary schools were gradually incorporated into the assisted school sector. Under President Moi's rule, secondary schooling policies were designed to level opportunities by focusing new school construction in underserved provinces. In 1984 the school system was reformed, lengthening the primary school cycle from 7 to 8 years, and reducing secondary schooling from 6 to 4 years, with a view to making secondary schooling less elitist.

In the 2000s, under President Kibaki, the government committed to free primary schooling and shifted more resources to the primary system, including through a major programme to support primary school construction targeting arid and semi-arid regions where school density is low, and in urban slums with high levels of overcrowding (Ministry of Education Science and Technology, 2005). Alongside the democratisation of the public schooling system came the growth of private primary education supply, which today accounts for roughly a quarter of all primary schools and 16% of primary enrolment (Ministry of Education Science and Technology, 2014).

In view of these education priorities and policies, and given Kenya's ethnic heterogeneity, how would we expect ethnic inequalities in access to have evolved? What constitutes 'ethnic favouritism', as opposed to programmatic policy choices with different distributional outcomes?

In the colonial and early independence period, when communities and households stood for a greater share of school costs, demand factors seem likely to have exacerbated inequality at primary school level. Communities with an educational head-start are likely to invest more in the schooling of their children, both because they were richer and because their higher educational attainment predicts that they would have placed greater social value in education.⁷ These forces are likely to be even stronger if income gaps between high performing and low performing regions were also increasing and returns to education rising faster in the economically advantaged regions. Ethnically cohesive communities may also have possessed an advantage over multi-ethnic ones, if they proved better at mobilizing local resources or petitioning for government support (Miguel, 2004). Working against these demand forces – at least in latter periods – was a supply of educational inputs that (officially at least) targeted disadvantaged regions.

It is also valuable to place Kenya's educational performance in the context of rapid population growth. For most of the period under review, Kenya's population grew at above 3% a year. To maintain a constant level of educational service, educational supplies thus needed to grow at roughly the pace of population growth. The government could therefore reorient resources quite rapidly, by choosing where to place the nominal increase in resources.

Differences at secondary level will likely amplify inequalities at primary level. In Kenya in the 1960s and 1970s the government sought to equalize the proportion of primary school graduates that transitioned to secondary school at the provincial level (Gould, 1974, p.385). Province-level attainment was therefore a direct function of primary completion rates. Under Moi's presidency in the 1980s, provincial secondary schools began reserving 85% of school places for students local to the province (Mwaniki, 2014, p.5). In regions where educational performance was weaker, this was expected to protect local candidates from competition from higher performers in other parts of the country. Meanwhile, national secondary schools– the most competitive of Kenya's secondary schools, albeit catering to only a small share of students – operated province-level quota systems, designed to equalise access (Gould, 1974; Mwaniki, 2014).

Predicting attainment growth in multi-ethnic settings

Given these countervailing demand and supply forces, we would expect inequalities in education to persist for some time. Against this inherent incumbent advantage for regions with high initial attainment, what would educational trends look like in a country unencumbered by ethnic favouritism and how should this be measured?

⁷ Olson 1972 showed that demand for education was highest in richest parts of Kenya.

Absolute inequality. In one sense, level differences alone are a measure of privilege or favouritism irrespective of attainment growth, at least if most of the costs of primary schooling are financed by the central government. If average primary attainment among Kikuyus stayed constant at 6 years of schooling, while that of the Kalenjin grew from 2 to 6, the government would nonetheless have spent more resources on the education of Kikuyu children over the full duration of the period (assuming equal per student spending). Kikuyu communities would have received a disproportionate share of total state resources, a regressive structure of public spending.

This assumes however, that educational attainment is solely a function of government spending, which is patently not the case in most African countries. It also assumes that governments have the autonomy and power to radically redirect resources from one region or community to another. Such radical redistribution may be politically unfeasible, irrespective of the president's ethnicity.⁸

In the context of Kenya moreover, this definition of fairness would paradoxically imply that Kikuyu communities were favoured under both the Presidencies of Kenyatta and Moi, given that their attainment levels, and thus presumably state per capita spend on education, were higher for the Kikuyus than for any other group under both presidencies.

Absolute change. Assuming that all communities clamour for continued attainment growth, we might instead compare absolute gains in attainment. Rather than seeking to equalize attainment levels, we assume that the government will try and equalize the amount of additional, new resources it delivers to each group. In other words, we would consider the situation fair if, over a given period, the Kalenjin attainment rate grew from 2 to 3 years, while the Kikuyu rate grew from 6 to 7. In this scenario then, the absolute attainment gap between groups remains constant.

This measure, however, loses relevance when as one group begins to approach the upper limit. If the Kalenjin attainment grows from 2 to 3 years while the Kikuyu rate, already nearing the maximum number of primary years of schooling, stays constant, the Kalenjin group would be considered the favoured group.

Percentage change. Alternatively, if we place more weight on demand as the driver of attainment growth and assume a laissez-faire system, we may expect the absolute gains will be largest in the communities that already have an education head-start. Where few people are benefitting from schooling already, additional demand for schooling and social pressure to send children to school may be low (Olson 1972, for an example from Kenya).⁹ Groups with higher attainment levels, conversely, may have larger numbers of expectant children clamouring to take part in the next school year. In this context we may argue that the system is equitable if the growth rate in years of schooling is equal across groups. In other words, the system would be 'fair' if both groups saw an attainment growth of say 10% in a given year, from 2 years to 2.2 years for the Kalenjin for instance, and 6 years to 6.6 years for the Kikuyu.

However, measuring percentage change suffers from the same upper bound problem as when measuring absolute change. Once a group approaches the upper limit, the rate of growth must slow. It also has the somewhat perverse implication that absolute gains will continue to be largest among the high achieving groups.

An alternative approach is to assume a quadratic growth function, where for each ethnic group, the rate of attainment growth slows as values approach the upper limit. As each ethnic group has a different starting point, we would predict different rates of attainment growth across groups, depending on where the group lies on the curve.

⁸ Insights from behavioural economics moreover, show that people perceive a loss more keenly than a gain, which would suggest that a government loses more support than it gains by creating new winners and losers (Tversky and Kahnemann 1991).

⁹ In predominantly pastoral communities for instance, the uptake of education has lagged agrarian regions, despite large governmental and non-governmental investments.

However, this makes the notion of favouritism far less intuitive, as favouritism is defined in relationship to a complex counterfactual, where levels and rates of attainment growth will vary across ethnic groups and time. It is conceivable that a group is considered favoured even if its attainment levels are stagnant while other groups experience growth. Furthermore, we cannot specify this quadratic function other than through observation, which makes it hard to disentangle it from the policy drivers we are trying to measure.

Achievement and improvement indices. Alternatively, if we assume that incremental gains in schooling are harder to make at a higher level of achievement, i.e., we assume convergence as the default, then improvement indices offer an alternative measurement approach. These functions are designed for measures that have ‘asymptotic limits’, with minimum and maximum achievement levels, such as years of primary schooling on infant deaths per 1,000 (Kakwani 1993).

Sen (1981) has proposed that we measure the achievement as the percentage decrease of the difference between initial level and upper limit. Thus a gain from 2 to 3 years of schooling is measured as a change of 1 year, over a gap of 5 years to the upper limit of 7 years, for an achievement index of 0.2, while a gain from 6 to 7 (where 7 is the maximum), gives an achievement of 1. Developing Sen’s model further, Kakwani’s improvement index improves on Sen’s by ensuring that it is additive and that the main variable x , is concave (Kakwani 1993). It measures achievement from a scale of -1 to +1, where negative values imply a decline in level.

This method has primarily been used to measure health variables such as life expectancy and infant mortality. It is less obvious that the relative achievement in approaching universal primary education is quite as stark as in the health example. To give an example, in a country with a 7-year primary school system, Sen’s model would consider the raising of primary attainment from 6 to 7 years a greater achievement than raising it from 0 to 6. The first group, in this example, would be the favoured group.

Perception indicators? Irrespective of statistical models or definitions of fairness, for these definitions of ethnic favouritism to hold analytical relevance, they also need to be anchored in popular perceptions and understandings of favouritism. The reason political scientists study ethnic favouritism is not because of normative notions of fairness, but because they assume that ethnic favouritism or discrimination influences political behaviour, by fuelling support for politicians or grievances that may result in poor policy outcomes, conflictual elections or outright conflict. Imagine a situation where the Kikuyu attainment rate has grown from 6 to 7 years and the Kalenjin from 2 to 3.5 years, which, using an improvement index or assuming a counterfactual quadratic growth path, implies that the Kikuyu were favoured. Would the average layman, even if presented with these statistics, perceive this to be favouritism, or are absolute level differences or absolute change, regardless of their causes, a greater source of contention? Furthermore, could smaller growth rate differentials be perceived by the public with any accuracy, in the absence of detailed analysis and high statistical literacy?

How is the counterfactual modelled in existing papers on ethnic favouritism in education?

How do the existing papers on ethnic favouritism model their counterfactual world absent of ethnic favouritism? Kramon and Posner (2016) offer three alternatives. Their main model, also replicated by Li (2018), predicts the number of years of schooling of a respondent, conditional on being of a school age during the tenure of a co-ethnic president and controlling for time fixed effects and ethnic group fixed effects. Based on this model they conclude that being a co-ethnic of the president during one’s school-aged years boosts the number of year of primary schooling by 6% and years of secondary schooling by 12%.

By including a simple ethnic group fixed effect, they are assuming that in the absence of ethnic favouritism, we would observe a constant absolute gap in years of schooling between groups and over

time. Given that primary attainment levels in Kenya are approaching the upper limit,¹⁰ this is a problematic assumption. It risks confusing the decrease in the size of this ethnic dummy, owing to convergence effects, with ethnic favouritism. This is starkly illustrated in the Kenyan case shown in Figure 1. The absolute gap in mean years of primary schooling between the Kikuyu and national average was higher during the Kenyatta period than the Moi period, in large part because Kikuyu attainment was higher under colonial rule. However, all the narrowing in the attainment gap happened under Kenyatta's presidency, while the gap between the two groups stayed constant under Moi's presidency. While it would be accurate to describe the inequalities under Kenyatta as larger than under Moi, it is hard to see how this can be attributed to President Kenyatta. If anything, these trends lend themselves to the opposite interpretation, namely that Kenyatta sought to reduce the Kikuyu educational advantage.

In a second specification, designed to control for the possible effects of convergence, Kramon and Posner (2016) introduce a linear ethnic-group specific time trend in addition to year and ethnic group fixed effects. Introducing a linear time trend assumes that all ethnic groups will see steady, continuous growth in years of schooling, although those rates of growth (the slope of the line) are allowed to differ between groups, given their variation in initial conditions. Ethnic favouritism is then measured by examining whether the annual rate of change in years of schooling for a given group is smaller or larger than its mean during a period when the president was of its ethnicity.

However, this tweak to the model does not overcome the problems just discussed in relation to using ethnic group fixed effects. Clearly the attainment growth rate will slow as groups approach 8 years of primary schooling (or 4 years of secondary schooling). Because the Kikuyu start butting against the years of primary school ceiling earlier than the Kalenjin, their rate of attainment growth slows more quickly under Moi's presidency than it does for the Kalenjin, and this will therefore be confused for ethnic favouritism.

The third specification offers a more defensible counterfactual. Rather than assuming that years of schooling will grow linearly, it assumes that each group follows its own quadratic time trend. In every ethnic group, attainment will grow faster at lower levels of attainment and slow down as the attainment level approaches 8 years of primary schooling. The model allows the pace of growth and pace of slow-down to vary by group. This last specification is similar to the model used by Franck and Rainer (2013). Their paper, which covers 18 countries, also uses the DHS, and examines ethnic favouritism in relation to ethnic group- and survey-specific quadratic time trends. In contrast to Kramon and Posner (2016), their dependent variable is not years of schooling, but whether a respondent has some primary schooling, or (alternatively) has completed primary school, but the same logic applies.

While this approach takes better cognizance of convergence forces, it creates a very abstract notion of ethnic favouritism, defined as a rate of educational attainment growth higher than what would be predicted by a quadratic time trend. This can give some unintuitive interpretations. Depending on the trend, we may capture an ethnic favouritism effect even where the favoured group sees no attainment growth at all. While this may be theoretically defensible, it is hard to see how such situations can have any political significance. It seems unlikely that the supposedly favoured group feels that they are getting their political reward because their relative attainment is not falling as fast as a quadratic time trend predicts that it should fall.

To show this effect visually, Figure 2 below plots the predicted years of primary schooling for the Kikuyu and Kalenjin in a world absent of ethnic favouritism (i.e., setting the ethnic match dummy to zero). It compares this to the actual ethnic group trend. Gender, religion and urban/rural controls are excluded from this model, and the sample is limited to respondents aged 20 or above.¹¹

¹⁰ The upper limit was 7 years up until 1984, and then extended to 8 years.

¹¹ While Kramon and Posner (2016) and Li (2018) include respondents aged 15 and above, we restrict the sample to those aged 20 or more, as the census data shows that Kenya's primary schools contain a high share of

[Insert Figure 2 here]

What the model captures as ethnic patronage is the slightly greater tendency for the actual Kikuyu trend to lie on or above the predicted trend during Kenyatta's presidency and below it under Moi, and vice versa for the Kalenjin. This is a heroic interpretation. Not only is this supposed ethnic advantage small in this specification (an estimated 0.1 years, or 1.7% of average years of schooling), and barely visible in the charts below, but the results are very sensitive to how the counterfactual curve is modelled. Furthermore, the closing of the gap seems to happen before, rather than after the presidential transition.

Consequently, the results are unstable. Regression results are given in Table 1, using both the census and DHS samples (including the 2014 DHS¹²). The first row replicates Kramon and Posner (2016)'s model, and includes only cohorts educated in the postcolonial era. The DHS results are presented with and without Kramon and Posner (2016)'s controls for religion, gender and region of birth. Using the census data, the ethnic match dummy is positive and significant (at the $p < 0.1$ level), but small (0.1 years). Using the DHS sample instead, the coefficient loses significance and the coefficient changes sign. Adding religious, gender and regional controls makes little difference to the results.¹³ Furthermore, the coefficient on our ethnic match dummy fluctuates depending on the birth cohorts included in the model. Including the colonial era increases the size of the ethnic match coefficient, while shortening the period under review reduces it. If we started our period in 1958 instead, the ethnic match coefficient loses significance. These results then, depend crucially on the period of transition to independence, a period of significant educational reform and flux.

[Insert Table 1 here]

Favouritism in secondary schooling

Modelling secondary schooling is more complex than primary schooling, as attainment rates are also a function of past inequalities in primary education. Franck and Rainer (2013) use only primary school data. Kramon and Posner (2016) examine secondary school attainment, using the same specifications as for primary schooling to measure favouritism. They argue that their stronger results at secondary level are particularly important evidence of their thesis, as ethnic patronage is more likely to manifest itself at secondary level where returns to schooling are higher and degree of state subsidization larger.

However, their secondary schooling models suffer from the same weaknesses as those discussed for primary schooling above. Furthermore, given that only students who have completed primary school are eligible for secondary schooling, there is a path dependency in secondary school inequalities, which makes it problematic to consider secondary attainment in isolation. It is therefore more appropriate to measure favouritism in relation to the number of eligible pupils, rather than the entire population.

Although the censuses and DHS do not ask respondents whether they passed their primary school exams, we can use attendance in the final year of primary schooling as a proxy for primary completion, assuming that ethnic differences in pass rates don't vary markedly over time. Figure 3 thus measures average years of secondary schooling conditional on having at least 7 years of primary

over-aged children. As the likelihood of attending primary school at an older age is correlated with socioeconomic factors, a low age threshold risks biasing the results. This is discussed further in Appendix 3.

¹² Kramon and Posner (2016)'s dataset did not include the most recently available 2014 DHS.

¹³ In Appendix 4 however, we question the theoretical motivation for including these controls in the first place.

schooling.¹⁴ Note that the differences between the groups are small, once differences in primary schooling are controlled for. The Kikuyu retain a small advantage throughout the period. But the gap between the Kikuyu and Kalenjin transition rates declined under Kenyatta's presidency, not Moi's. Kikuyu primary school completers continue to maintain a small advantage over the Kalenjin throughout Moi's presidency.

For a single year, 1989, we have district-level data on not only primary and secondary enrolment, but also the average student performance on the Kenya Primary School Exam (KPSE). We can therefore examine the rate of transition from primary to secondary school at the district level, by measuring the share of secondary students to primary school exam candidates and average district-level exam performance. In the results below we therefore regress the average district KPSE score against the ratio of secondary school students to KPSE candidates by district, and include dummy variables for Kalenjin and Kikuyu districts (the full dataset is given in Appendix 4).¹⁵ If Kalenjin districts were favoured under President Moi through the provision of more secondary school inputs, we should expect to see a disproportionate share of Kalenjin students transitioning from primary to secondary schools. If Kikuyu districts were discriminated against, the Kikuyu dummy should be negative.

[Insert Table 2 here]

The results do not conform to these predictions. The Kalenjin transition rate is lower than that predicted by the model, although the coefficient is insignificant. In relation to their exam performance, there is no evidence that students in Kalenjin regions had a higher rate of educational progression than students in other regions. The Kikuyu dummy is likewise insignificant, albeit positive. It is hard to see how these descriptive results could be consistent with the understanding of ethnic favouritism given in the literature.

Favouritism in the supply of schools and teachers?

One of the compelling aspects of Kramon and Posner's (2016) paper is that it offers a clean causal explanation for how ethnic patronage shapes educational inequalities. The authors argue that these ethnic inequalities in educational outcomes are supply driven, with, for instance, a Kikuyu-led government directing more state resources, such as schools, to Kikuyu districts. To test this, they examine the number of schools per district and conclude that school construction disproportionately benefitted districts in predominantly Kikuyu/Kalenjin districts under their respective coethnic presidents' tenure.

However, a school to school-aged population ratio is only an appropriate measure of political favour under certain assumptions: firstly, that school construction was financed by the government, and secondly, that schools are roughly uniform in size. On closer inspection, neither of these assumptions hold in the Kenyan case.

In the first decades of independence, primary school construction was primarily financed by the local community. It remained official policy until at least the 1980s that the development of physical facilities was the responsibility of school committees and parent associations, not the central government (Eshiwani, 1990, p.25). Some may have been financed through donations by politicians through *harambee* funds, which indirectly came from political spoils, but a community's number of wealthy *harambee* benefactors is likely to have been a function of far much more than the President's ethnicity. In latter decades aid has also been an important source of financing for school construction, which is presumably less susceptible to ethnic targeting. Furthermore, although hard to verify, the

¹⁴ A data problem is that the school reforms of 1984, which extended primary schooling in Kenya from 7 to 8 years. This may interfere with the results for the early 1970s, as we may not be able to pinpoint the exact respondents who completed their primary schooling under the old and new system. For simplicity, the figure below therefore uses 7 years of primary schooling as the measure of 'completion' throughout the entire period.

¹⁵ As the secondary school enrolment data is not disaggregated by form, we divide the total enrolment (Form 1-4) by 4. As both the primary and secondary data is from 1989, we make the simplifying assumption that district-level enrolment did not vary substantially between 1985 and 1989.

data used by Kramon and Posner does not appear to distinguish between public and private primary schools. By 2014, roughly a quarter of Kenyan primary schools were private. Private provision has been growing over time but varies considerably across counties. In Nairobi, 83% of primary schools were private in 2014, compared to 5% in West Pokot (Ministry of Education Science and Technology, 2014).

Nor are Kenyan primary schools uniform in size. Unsurprisingly, denser and wealthier areas tend to have larger primary schools. The average number of students per school across Kenyan counties in 2014 ranged from 926 in Nairobi to 219 in Baringo and Tharaka-Nithi. It is therefore difficult to deduce, from data on the number of school alone, whether more schooling opportunities were being created in some districts relative to others.

These problems aside, the existing data on school construction is far from conclusive. In Table 3 we replicate Kramon and Posner's data collection effort and present descriptive data, showing how the number of primary schools (per 1,000 school-aged children) changed across districts grouped by main ethnic group over the course of the Kenyatta, Moi and Kibaki presidencies. We provide data for four benchmark years (based on data availability): 1966, 1977, 2002 and 2014.¹⁶

[Insert Table 3 here]

This descriptive evidence shows no clear evidence of the influence of presidential ethnic favouritism on the location of new schools. Kikuyu districts had among the lowest rates of new school construction under Kenyatta's presidency. Kalenjin districts had school construction rates at the higher end of the spectrum under Moi's presidency, but broadly in line with those in Luo, Kamba and Embu regions. With the exception of the Somali region, the relationship between initial school endowment and the rate of school construction is negative. Ethnic groups with unusually low school penetration saw more schools being built in their region and vice versa, suggestive of a catch-up effect.

Alternatively, and arguably less problematic measure of educational supply is the number of teachers in a given district. Unlike school construction, the Kenyan central government has been the main source of finance for teacher's salaries in public schools since independence. Data on number of teachers is available at province, if not always at district level. In the following calculations we use the same benchmark years,¹⁷ and calculate the primary teacher to school-aged population ratio for each province in Kenya. Provinces roughly correspond with ethnicity in Kenya, with the Kikuyu predominant in the central region, and the Kalenjin comprising just under half the population of the Rift Valley.

At the primary level, the 1966 and 1977 data does not distinguish between public and primary schools, but accounts suggest that private primary schooling catered to a very small share of African students in the 1960s and 1970s.¹⁸ Data for 2003 and 2014 records the number of public school teachers only. Population data is taken from the 1969, 1979, 1989, 1999 and 2009 censuses for cohorts aged 6-13. We interpolate assuming a constant rate of population growth between census years.¹⁹ The results are provided in Table 4.

[Insert Table 4 here]

¹⁶ 1966-77 is fully within Kenyatta's presidency, 1977-2002 corresponds roughly with Moi's presidency (1978-2002), and 2002-14 is roughly Kibaki's tenure (2002-13).

¹⁷ With the exception that due to difficulty obtaining full data for 2002, we use data from 2003 data instead.

¹⁸ Kinyanjui (1981) identified 14 private primary schools in Nairobi, Mombasa, Nakuru and Kisumu in 1976 (7%), but these catered primarily to expatriates and Asian and European Kenyans, only 19% of the students were African Kenyans in 1972.

¹⁹ The 2009 North-Eastern province population estimates are thought to be inflated. We retain the published figures but reserve judgement on the North-Eastern trend.

Consistent with the attainment trends, the teacher to population ratios have converged over time. Over the course of Kenyatta's presidency (1966-77) the ratio of school aged children to teachers dropped substantially across the country, but the Kikuyu-dominated central province registered the smallest improvement. Bucking the convergence trend, Nairobi saw a considerable improvement in teacher coverage, from an already favourable position, but it is worth keeping in mind that Nairobi represented only 3% of the country's population at this time.

Over the course of Moi's presidency the population to teacher ratio stayed relatively constant, with small improvements in the Central, Eastern and Rift Valley provinces, while the teacher density fell dramatically in Nairobi – presumably on account of rapid population growth and increased private primary schooling in the capital. Under Kibaki's presidency the population to teacher ratio increased even further in Nairobi, and rose slightly in the Central, Eastern and Rift Valley, while it remained relatively constant elsewhere. The coefficient of variation fell once more. Note that the main outlier region throughout the postcolonial era has been the North-Eastern province, where the teacher supply remains dramatically lower than in the rest of the country. Here too, however, the ratio has improved over time.²⁰ Taken in sum, this does not provide strong evidence of favouritism. Kikuyu districts had unusually low rates of input growth under Kikuyu presidents. Kalenjin areas did see comparatively strong growth in inputs under Moi's presidency, but as with attainment, this is hard to distinguish from a broader catch-up effect.

Conclusion

This paper has reviewed some of the evidence of ethnic favouritism in African educational provision, much of which rests on the Kenyan example. Revisiting the Kenyan case shows the available evidence to be far from conclusive. When analysed descriptively, the trends in ethnic group educational attainment do not conform to any intuitive models of ethnic favouritism, and the regression results are very sensitive to the years under review. The relative performance of the Kikuyu ethnic group declined under the Kikuyu presidency of Kenyatta, while the Kalenjin group saw their relative performance improve prior to the transition to a Kalenjin presidency. There is no evidence of clear ethnic group discontinuities around the time of presidential shifts.

In both the enrolment and input analysis, perhaps the more striking omission from the ethnic favouritism story is the noteworthy convergence in attainment across Kenya's larger ethnic groups (see Appendix Figure 5). Among Kenyan millenials – the last cohorts included in our sample born around 1989 – average years of primary schooling do not differ markedly between the Kikuyu, Kisii, Kamba, Luo, Luhya, Meru and Kalenjin, with a range from 6.3 (Kalenjin) to 7.4 (Kikuyu).²¹ In contrast, for the first cohorts to be educated in independent Kenya, the average years of schooling ranged from 3.3 to 5.4. The educational divide has grown more marked between the larger ethnic groups in the Kenyan 'core', relative to smaller groups at the 'preiphery', particularly groups that retain pastoralism, notably the Somali, Turkana and Masai. This educational fault line does not align with the main political divides in Kenyan party politics.

In the Kenyan case, then, the changing ethnic group attainment patterns are very hard to ascribe to government action in the first place, but are, if anything, more consistent with the idea that governments sought to balance access to services such as education roughly equally among regions. But one should also be careful not to read too much government agency into these patterns. Demand for education has been strong across most ethnic groups, and educational attainment growth, particularly at primary level, was largely driven by grassroots action rather than top-down planning. Furthermore, the rates of convergence in educational attainment are themselves conditional on the rate of attainment growth. During the periods when the educational system was expanding rapidly – which

²⁰ Note also that the 2009 population of the North-Eastern Province is thought to be substantially over-estimated.

²¹ These groups constitute roughly 77% of the Kenyan population.

coincides with periods of strong economic growth – convergence also tends to be more rapid. The rapid educational convergence under Kenyatta, and slowdown under Moi, may have more to do with the changing economic climate than any explicit policy shift.

A further consideration, not discussed in the reviewed papers, is the extent to which citizens of Kenya – or indeed any country – would be able to gauge these levels of supposed ethnic favouritism. It is usually assumed that ethnic favouritism serves a political purpose, by rewarding and cementing support for a leader from within his or her core constituency. But for this strategy to work citizens have to have a reasonably accurate perception of the privileged bestowed, or conversely withheld, from them. In a context of rising educational attainment across the entire country, it seems very unlikely that the average Kenyan citizen would have any ability to judge the marginal advantage or penalty accrued by their ethnic group – particularly if the measure of favouritism is conditioned on a hypothetical rate of educational convergence. Indeed, as Carlson (2018) argues based on experimental and Afrobarometer evidence, perceptions of favouritism may be greater in situations when individuals lack access to information about government expenditures and instead rely upon informal comparisons with members of other groups. Furthermore, the economic benefits of education may accrue many years after that education is obtained, by which time the ethnicity of the president may well have changed. Regardless of the historical causes of them, it seems likely that absolute inequality between groups is more politically salient than relative rates of change under a given presidency.

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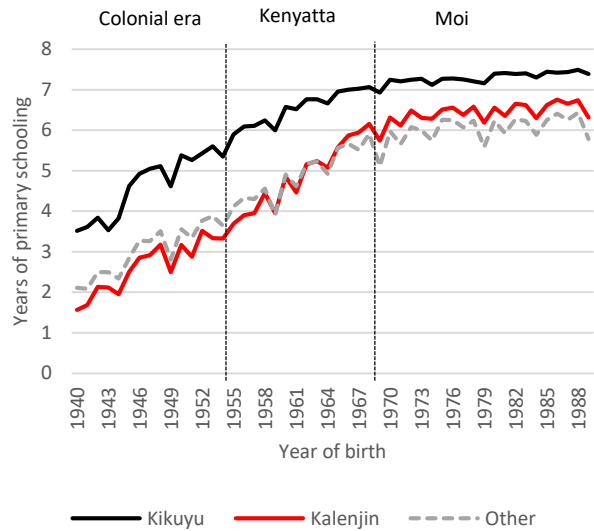
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Data sources

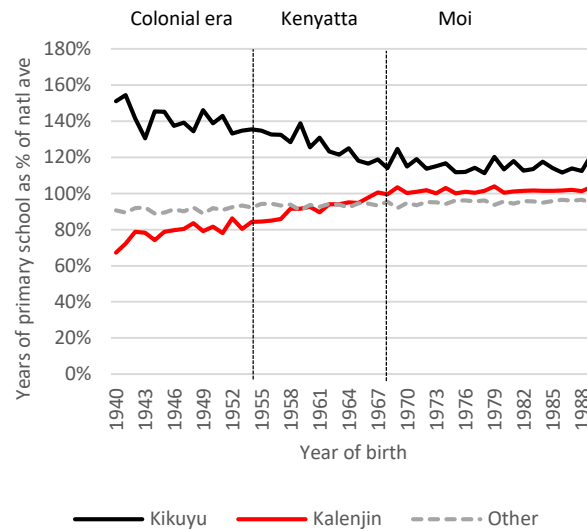
World Bank, *World Development Indicators*, 2018
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Figure 1. Kenya: primary attainment by ethnic group

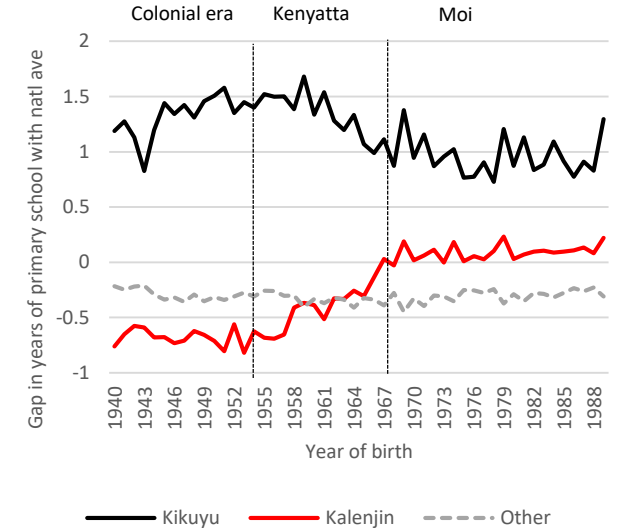
a. Average years of primary schooling by group



b. Primary schooling by group relative to natl. mean



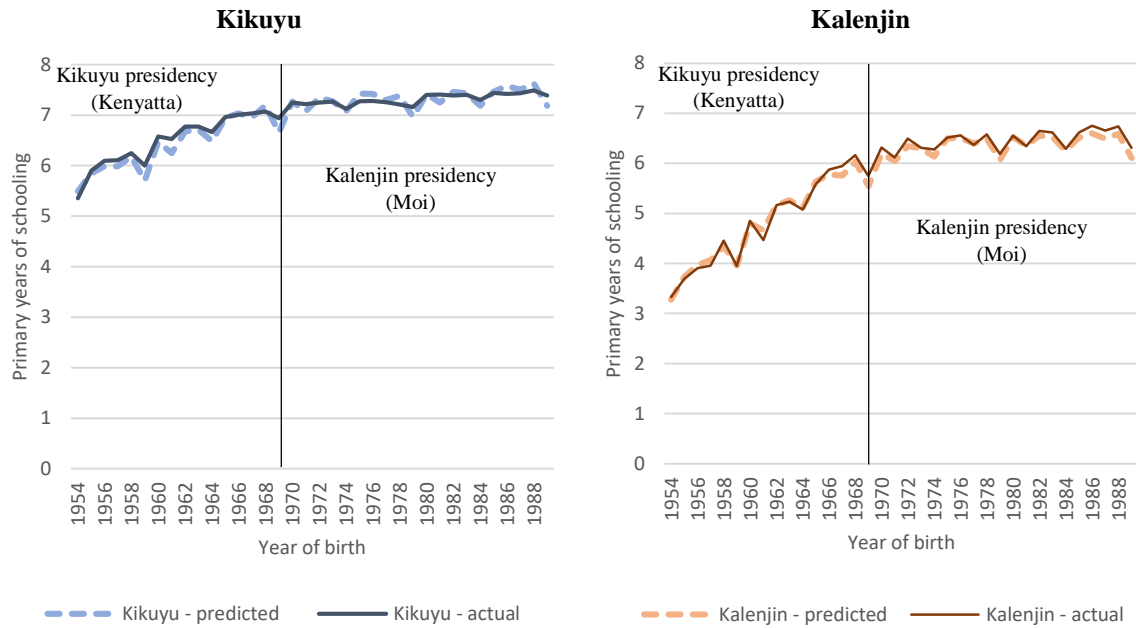
c. Primary schooling by group, difference to mean



Source: pooled data from Kenyan 1969-2009 censuses, Minnesota Population Center, 2018.

Figure 2. Comparing actual years of primary schooling against the predicted level, in a counterfactual world absent of ‘ethnic favouritism’

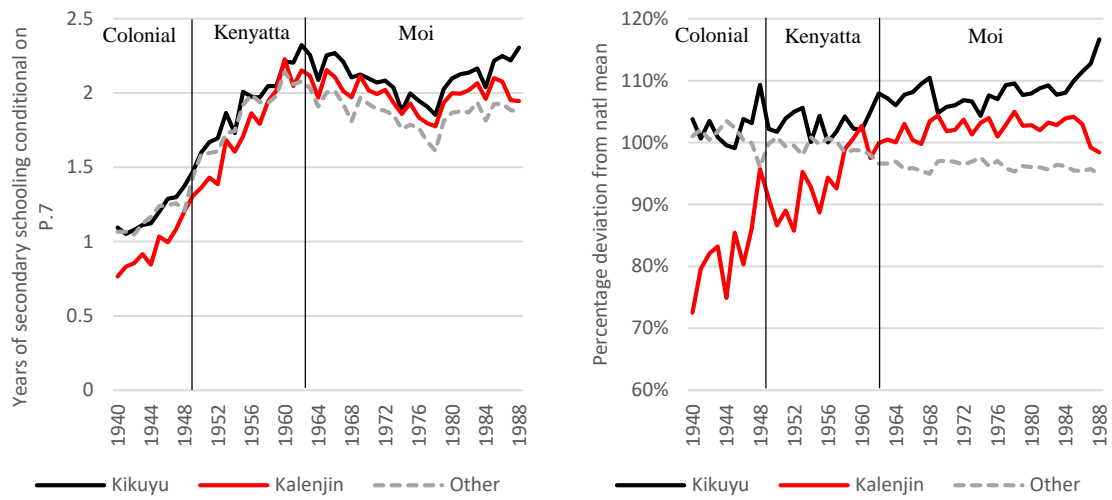
CENSUS DATA



Note: Regression model 1 column 1, with the ethnic match variable set to zero, compared to the actual ethnic trend in years of primary schooling by year of birth. Only respondents aged ≥ 20 included in sample.

Source: pooled data from Kenyan 1969-2009 censuses, Minnesota Population Center, 2018.

Figure 3. Average years of secondary schooling among all respondents with at least 7 years of primary schooling



Source: pooled data from Kenyan 1969-2009 censuses, Minnesota Population Center, 2018.

Table 1. Regression results: coefficient on ethnic match dummy, different birth cohorts included

	CENSUS	DHS	
	DV: primary years	DV: primary years	DV: primary years
Birth cohorts >=1954	0.113*	-0.0332	-0.0178
Std err	(0.545)	(0.0531)	(0.0519)
Obs	2,293,126	70,647	45,604
Birth cohorts >=1950	0.150***	0.1008*	0.1460**
Std err	(0.0393)	(0.0547)	(0.0543)
Obs	2,455,153	72,943	47,895
Birth cohorts >=1958	0.0204	-0.0685	-0.0588
Std err	(0.0510)	(0.0876)	(0.0845)
Obs	2,088,997	67,703	42,661
Religion controls	No	No	Yes
Rural/urban birth controls	No	No	Yes
Gender controls	No	No	Yes
Weighted	Yes	No	No

Notes: Only respondents aged >=20 included in sample. DHS 2014 female sample excluded region of birth thus sample is restricted for models that include controls. Robust standard errors, clustered at ethnic group-president level. All models are estimated using OLS. *** p < 0.01, **p < 0.05, * p < 0.1; standard errors in parentheses.

Table 2. Regression results: effect of average district KCPE score on the share of secondary students to primary completers

VARIABLES	District rate of primary-secondary transition (1989)		
	Average KCPE score	0.00199** (0.000787)	0.00209** (0.000781)
Kalenjin dummy		-0.0727 (0.0527)	
Kikuyu dummy			0.0362 (0.0562)
Constant	-0.289 (0.270)	-0.312 (0.267)	-0.208 (0.299)
Observations	40	40	40
R-squared	0.145	0.186	0.154

Source: Data assembled from Kenafic Industrial Services, 1991, Kenya's Primary and Secondary Schools Network: A Statistical Presentation, sponsored by Christian Churches.

Notes: Lamu excluded from the sample due to missing data. Rate of transition calculated by dividing ¼ of total secondary enrolment in 1989 the number of 1989 KCPE candidates. All models are estimated using OLS. *** p < 0.01, **p < 0.05, * p < 0.1; standard errors in parentheses.

Table 3. Primary schools by ‘ethnic districts’

	Schools by ethnic districts				School-aged population (6-13)				Schools per 1000 children				New schools per 1000 children		
	1966	1977	2002	2014	1966	1977	2002	2014	1966	1977	2002	2014	Kenyatta era (1966-77)	Moi era (1977-2002)	Kibaki era (2002-14)
Kikuyu	1119	1457	2882	4490	412215	729658	1209708	1447948	2.7	2.0	2.4	3.1	0.5	1.2	1.1
Luhya	874	1348	2315	3572	153743	488952	1043518	1394494	5.7	2.8	2.2	2.6	1.0	0.9	0.9
Kalenjin	729	1143	2931	4663	376738	392759	865145	1219196	1.9	2.9	3.4	3.8	1.1	2.1	1.4
Luo	817	1115	2884	3355	298686	386796	735005	969365	2.7	2.9	3.9	3.5	0.8	2.4	0.5
Kamba	675	1248	2629	3512	299312	358667	669168	776830	2.3	3.5	3.9	4.5	1.6	2.1	1.1
Somali	9	47	217	703	91175	81788	249718	804544	0.1	0.6	0.9	0.9	0.5	0.7	0.6
Kisii	422	658	1195	1565	160749	213859	384588	449422	2.6	3.1	3.1	3.5	1.1	1.4	0.8
Embu	113	159	366	482	34668	60044	106229	115368	3.3	2.6	3.4	4.2	0.8	1.9	1.0
Meru	353	659	1093	1537	61522	181655	331819	406296	5.7	3.6	3.3	3.8	1.7	1.3	1.1
Mijikenda	202	398	618	1228	79289	150739	331884	470945	2.5	2.6	1.9	2.6	1.3	0.7	1.3
Mixed	233	394	1102	2763	271786	201466	645818	1041504	0.9	2.0	1.7	2.7	0.8	1.1	1.6
Other	153	270	892	1595	41875	132221	356832	621539	3.7	2.0	2.5	2.6	0.9	1.7	1.1
Total	5699	8896	19124	29465	2281758	3378603	6929431	9717451	2.5	2.6	2.8	3.0	0.9	1.5	1.1
CoV									0.58	0.32	0.34	0.31	0.38	0.39	0.30

Sources: MoE Triennial Survey, 1964-66 and annual report for 1966; MoE annual report 1977; Education in Kenya: A situational analysis (drawing data from 2007 EMIS); MoEST, Kenya 2014 basic education statistical booklet. Population data projected from censuses 1969, 1979, 1999 and 2009.

Table 4. Primary school teacher supply by province

Province	Teachers by province				School-aged population (6-13)				population to teacher ratio				Pop to teacher ratio, % change		
	1966	1977	2003*	2014*	1966	1977	2003	2014	1966	1977	2003	2014	'Kenya era' (1966-77)	'Moi era' (1977-2003)	'Kibaki era' (2003-14)
Central	8,183	16,571	24,689	22,041	346,987	569,251	803,358	921,576	42	34	33	42	-19%	-5%	28%
Coast	1,969	5,758	11,217	14,482	173,813	265,542	584,314	767,204	88	46	52	53	-48%	13%	2%
Eastern	6,384	18,001	37,839	40,584	403,449	622,737	1,149,693	1,372,019	63	35	30	34	-45%	-12%	11%
Nairobi	1,609	2,935	4,390	4,278	70,018	66,880	341,424	488,556	44	23	78	114	-48%	241%	47%
North-Eastern	69	330	1,094	2,882	55,237	81,864	361,274	779,028	801	248	330	270	-69%	33%	-18%
Nyanza	6,014	16,458	29,936	35,646	468,032	618,661	1,115,305	1,374,139	78	38	37	39	-52%	-1%	3%
Rift	5,176	16,681	46,960	54,553	460,244	719,435	1,886,964	2,572,519	89	43	40	47	-51%	-7%	17%
Western	4,118	13,039	21,443	27,156	300,511	432,318	902,130	1,136,232	73	33	42	42	-55%	27%	-1%
Total	33,522	89,773	177,568	201,622	2,278,290	3,380,717	7,144,462	9,411,273	68	38	40	47	-45%	7%	16%
CV									1.6	1.2	1.3	1.0			

*Teachers in public schools only.

Sources: MoE Triennial Survey, 1964-66 and annual report for 1966; MoE annual report 1977; Data from 2003 from Republic of Kenya, Ministry of Education & UNESCO, (2012) Kenya education for all evaluation, end decade assessment 2000-10, Table 3.4; MoEST, Kenya 2014 basic education statistical booklet. Population data projected from censuses 1969, 1979, 1999 and 2009.