



## Adolescent girls' primary school mobility and educational outcomes in urban Kenya

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### ABSTRACT

With hundreds of primary schools to choose from, young adolescent girls in Nairobi's urban informal settlements commonly transfer schools. We qualitatively investigate the causes and quantitatively investigate the consequences of such mobility. Key reasons for transferring schools include difficulty in paying fees and anticipated net benefits from a different school. Transferring during lower primary leads to a poorer resourced school, while transferring during upper primary a higher resourced school. Correspondingly, transfers during lower primary are associated with falling behind, while in upper primary with getting ahead, as well as with improved basic reading and math test scores.

### 1. Introduction

In recent decades, governments and international development agencies have increasingly promoted Free Primary Education (FPE) (World Bank, 2009). For example, in sub-Saharan Africa over a dozen countries have implemented fee elimination programs since 1994. While evidence of increased educational access is growing, the full effects of FPE on schooling are somewhat contested and remain the subject of research. This is at least in part because of the challenge of assessing causal effects stemming from national policy changes (Lucas and Mbiti, 2012a; Iscan et al., 2015). In Kenya, for example, some find that FPE led to an increase in public school access without compromising public school quality (e.g., Lucas and Mbiti, 2012b), while others find no change in net national public school enrollment (Bold et al., 2011a). Regardless, a common finding is that there was a substantial increase in the number of private schools, an important trend observed elsewhere in the developing world (Baum et al., 2014; Heyneman and Stern, 2014; Dixon et al., 2015; Muralidharan and Sundararaman, 2015), particularly in urban areas (Dixon and Tooley, 2012).

The increase in private schools and therefore in schooling options, has led to a line of inquiry examining school choice and mobility, especially in settings characterized by multiple schools with large differences in resources. Corresponding to more options, evidence is growing that students commonly transfer schools, including in Kenya,

Malawi and Uganda. Qualitative and quantitative research examining the determinants of such transfers point to several relevant indicators of school services and perceived quality (Oketch et al., 2010b; Ngwane et al., 2013; Taniguchi, 2017). In contrast to developed country settings (where research indicates that school transfers are linked to poorer outcomes), however, in developing countries the effects that such transfers have on subsequent educational outcomes is largely unexplored.

In this paper, we investigate the causes and consequences of school mobility in an environment with ample choice and mobility. The approximately 2200 young adolescent girls we examine reside in a compact and densely populated urban informal settlement and attend nearly 250 different local schools. Moreover, many of them transfer during primary school, with one-third having transferred once and another one-third more than once. We employ both qualitative and quantitative methods to examine the schooling experiences of these girls. First, we explore the reasons for school transfers via qualitative interviews and focus groups with parents, teachers and school administrators, and the girls themselves. Second, we explore whether girls who transfer transition to lower or higher resourced schools, using information from detailed school-level surveys. Third, we examine the consequences of school transfers using quantitative evidence from an observational survey of girls. Specifically, we employ multivariate regression controlling for age-cohort school-level fixed effects, alongside key family background characteristics and a measure of individual-level

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ability to estimate the association between school transfers and grade progression,<sup>1</sup> reading and math test scores.

## 2. Literature review

Similar to other East African countries (Oketch and Rolleston, 2007), the 2003 introduction of Free Primary Education (FPE) abolishing school fees in public (or government) primary schools in Kenya removed a significant barrier to schooling—direct tuition fees. Gross primary enrollment rates rose from 96% in 2000 to 107% in 2003. Since then, they have continued to rise with fluctuations and typically have been over 110% since 2007. Gross secondary enrollment rates climbed even more substantially, from approximately 40% in 2000 to 60% in 2009.<sup>2</sup> As a result, public schools have grown (in both size and number).

In part due to overcrowding in public schools in some urban areas, however, increased demand has been met by a proliferation of private (or non-government) schools, particularly low-cost private schools, often started by parents, communities and non-governmental organizations (Abuya et al., 2013; Ngware et al., 2013). Distinct from high fee, elite institutions, some scholars have referred to these low-cost informal schools as “private schools of the poor” (Tooley et al., 2008; Heyneman and Stern, 2014). Because they serve the poor, such schools may have particularly beneficial consequences for economic development (Härmä, 2015). In Kenya, the number of private schools nationwide increased four-fold in the three years after the introduction of FPE (Nishimura and Yamano, 2013). In Kibera, Dixon and Tooley (2012) document net growth from 76 to 116 private schools between 2003 and 2007. While not entirely comparable due to a somewhat different catchment area and sampling frame, retrospective data used in this paper (described in detail below), confirm a similarly large expansion rate in private schools over that same period, as well as continued expansion from 2007 to 2013.

Despite FPE, then, many Kenyan primary school students do not attend public school, especially in urban areas. In two urban informal settlements in Nairobi in 2007, just under half of students attended private primary schools, twice as high as in nearby formal urban settlements (Oketch et al., 2010a). By 2012, the fraction had risen to nearly two-thirds (Ngware et al., 2013). In the sample used in this paper, about three quarters of the girls in lower primary (grades 1–4) currently attend private school, but this falls to about one-half in upper primary (grades 5–8).

Underlying these static snapshots of school choice, however, is substantial school mobility, both within the private school sector and across the private and public sectors. Oketch et al. (2010a) report that primary school transfers were frequent among children from the low fee private to other private schools and from public to private schools, but less frequent from private to public schools (Oketch et al., 2010a). Moreover, school transfers were more common for children living in urban informal settlements than for children living in wealthier formal settlements (Oketch et al., 2010b).

The urban Kenyan context, therefore, is characterized by ample school choice and significant school mobility, with potentially beneficial consequences for students (Muralidharan and Sundararaman, 2015). Although a large developing country literature examines the determinants of schooling outcomes such as enrollment or grades attained (Glewwe, 2014), evidence on the determinants of primary school choice is relatively sparse. There is even less research on the determinants of school mobility although conceptually the two overlap. School mobility can be treated as a repeated or annual school choice decision,

with updated information about and experience with the current choice, as well as possible additional costs associated with transferring. Conditional on residential location, each period individuals decide whether to remain in their current school or to transfer. Underlying reasons for transfers can relate to (changing) individual, household, or current and target school conditions, as well as to individual unobserved heterogeneity of the student related to her ability, motivation or aspirations. Such transfers may encompass strategic grade repetition that allows students an additional year to prepare for important national exams. Related or “joint” residential relocation decisions also play a role in school transfers, whether they are driven by school choice itself (e.g., a girl moving to stay with a relative to be near a preferred school) or by other factors (e.g., a parent relocating the family for work opportunities).

The multiple potential reasons behind school transfers and potential joint decisions that lead to them suggest that the net effect of transfers on subsequent educational outcomes or on the school system as a whole is impossible to sign *ex ante*. Transfers can improve student outcomes if, for example, students achieve a better match, attend a school with resources or conditions that produce better outcomes, or associate with stronger peers enabling them to benefit from positive peer effects. On the other hand, transfers can lead to poorer outcomes if students experience substantial integration or assimilation costs in their new schools or if parents are poorly informed about potentially deleterious school characteristics or unforeseen costs. In addition to these “direct” individual-level effects, there can also be “indirect” or general equilibrium effects resulting from changes in the educational system as a whole. For example, increased numbers of schools can lead to greater competition between schools thereby improving their efficiency and student outcomes. On the other hand, higher student mobility may lead to greater frictions or integration problems with teachers and existing students constantly having to adapt to newcomers disrupting the classroom environment (Alderman et al., 2001; Glick and Sahn, 2006; Muralidharan and Sundararaman, 2015).

With this contextual background and conceptual framework in mind, we briefly summarize the relevant evidence on the determinants of primary school choice and school transfers from recent studies on Kenya (Oketch et al., 2010a,b; Nishimura and Yamano, 2013; Ngware et al., 2013). Findings for Kenya broadly reflect the evidence from other developing countries (Alderman et al., 2001; Glick and Sahn, 2006; Taniguchi 2015, 2017).

Front and center to the literature on the determinants of school choice and mobility is the notion that alongside the importance of price (a component of which is distance capturing direct and time travel costs), perceived school quality is a key determinant. School choice and mobility plausibly are related to a variety of human and material inputs into schools, as well as process and outcome measures (Ngware et al., 2011; Glewwe, 2014).<sup>3</sup> Information available to parents on inputs and outcomes informs their perceptions of school quality, even if research demonstrates that school inputs do not always have a clear relationship with school quality as reflected by student learning (Glewwe, 2014).<sup>4</sup> With this caveat regarding how strong the link between school inputs and school quality is, we consider several studies that examine how school choice relates to specific characteristics of schools.

Qualitative focus group evidence (Tooley et al., 2008; Ngware et al., 2013) and quantitative survey evidence (Oketch et al., 2010a) both suggest that parents considered perceived school quality when deciding

<sup>1</sup> We use the term grade although in Kenya primary school years also are known as standards 1 through 8.

<sup>2</sup> Statistics from World Bank Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>) accessed on 25 January 2018.

<sup>3</sup> The empirical measure we develop below reflects to some extent all of these aspects, though it does not capture well accountability to parents and students (Mbiti, 2016), a potentially important dimension of improving quality that might increase with expansions in private schooling (Heyneman and Stern, 2014).

<sup>4</sup> In Kenya, for example, there is evidence at the national level that the growth of private schools has increased standardized test scores, despite public schools having generally greater resources (Bold et al., 2011b).

to transfer their children, particularly from public to private schools.<sup>5</sup> In these studies, an important observable measure was the student-to-teacher ratio which, especially after the introduction of FPE, is often higher in public than in private schools, with notable classroom congestion—a pattern confirmed in our sample.

Oketch et al. (2010b) also find aspects of school leadership (captured by whether the school head was male), the propensity of students to progress to upper grades and the availability of a feeding program were all positively linked to transferring into a school. Other factors they consider were not influential, or were even potential barriers. These included more teachers and availability of piped water and electricity. They are careful, however, not to directly infer that these are causal relationships and posit they may reflect unobservable community-level factors or prior accumulated demand, i.e., that schools superior on some of these dimensions may already have been overcrowded (e.g., with high student-teacher ratios) and therefore unable to accept or accommodate additional students. Other reasons that may have motivated parents to transfer children from one school to another include the disciplinary environment and past performance of students on national exams, accessibility and the cost of the school. Overall, different studies employ different measures as potential indicators of quality (most often governed by data availability) as well as different analytical approaches (such as individual versus school level) so there is little consensus on which specific measures are most important.

Literature on the effects of transfers on subsequent educational outcomes, on the other hand, is more limited, possibly reflecting the complex nature of the transfer decisions and the difficulty in empirically determining convincing counterfactuals against which to judge those effects (Muralidharan and Sundararaman, 2015). Associational evidence from developed countries, including longitudinal designs following children over time, generally conclude that school transfers are a “risk factor” and point to negative consequences on educational and other outcomes in early adulthood (Herbers et al., 2013). The relevance of this work to low-income settings such as urban Kenya, however, is unclear.

School transfers are common in the urban informal settlements in Nairobi and appear to have been increasing. Against this backdrop, and more than a decade after the introduction of FPE, our study contributes to the literature by documenting how and why girls residing in Kibera transfer schools and what the likely consequences of those transfers are.

### 3. Study context and data

The study is set in the densely populated urban informal settlement of Kibera in the capital city Nairobi.<sup>6</sup> Kibera has an ethnically and religiously diverse population and is characterized by high levels of poverty and crime, alongside a lack of formal basic services and infrastructure. Only 20% of households have access to electricity and half have simple pit latrines rather than flush toilets. It is Nairobi’s largest informal settlement and the vast majority of its residents (85%) were born elsewhere in Kenya. Adults face an unemployment rate above 50%. However, Kibera’s residents have relatively high levels of educational attainment: a third of adults have completed primary school and nearly one-half secondary school, compared to 27 and 34% nationally (APHRC, 2012, 2014). Many of these characteristics are likely to influence schooling decisions in Kibera.

We use data from a 2015 quantitative survey administered to girls and their households, a subsequent administrative school survey of the schools they attend, and later qualitative interviews with girls, parents, and teachers. The data comprise baseline information for the evaluation

<sup>5</sup> There may also be relevant gender differences, but in the present study we have detailed data only on girls so these aspects cannot be considered (Nishimura and Yamano, 2013).

<sup>6</sup> The study sample is not representative of the entire Kibera settlement, however, as it excludes a small number of more established subdivisions classified as formal (Austrian et al., 2015).

of the Adolescent Girls Initiative-Kenya (AGI-K), an action research program with nested combinations of four different single-sector interventions (violence prevention, education, health and wealth creation) that began after the 2015 survey used in this research.<sup>7</sup>

The team first implemented a census of households in the Kibera study site to identify all girls ages 11–14. The survey sampling frame excluded girls attending boarding school (as the AGI-K interventions necessitated that girls be resident). One girl per household was randomly selected for the baseline survey and of the eligible 2606 girls, 2383 girls (91.4%) were interviewed successfully. Reasons for non-response included refusals by the parent or guardian, or girl herself and in a small number of cases inability to locate the household or girl.<sup>8</sup>

The survey was administered in March and April by a team of trained female enumerators. A household-level survey was done with the consenting head of household or guardian adult and collected information on household characteristics and assets, attitudes toward education and the global positioning system (GPS) location of the residence. An individual-girl level survey was administered after obtaining written permission from the respondent’s parent/guardian (consent) and the respondent herself (assent, given her age < 16).<sup>9</sup> This instrument collected information on socio-demographic characteristics, a retrospective schooling history, educational attainment, aspirations and current school. Girls also completed three tests that assessed basic literacy in Swahili and English, basic mathematics and nonverbal cognition.

Starting two months after the baseline survey, the team visited all schools with a girl scheduled to receive education transfers under AGI-K to obtain contact information for the administrative functions of the program, such as payment of tuition fees. During those visits, a school-level survey was implemented collecting detailed school characteristics including the number and qualifications of teachers, numbers of students, services provided and infrastructure and GPS location of the school. Two hundred thirty-five schools were surveyed.

In May 2016, after nearly one year of program implementation, the research team designed and carried out qualitative research in Kibera on a number of subjects germane to the AGI-K evaluation using semi-structured interview guides. These included experience with, and reasons for, school choice and school mobility before the program (for those interviewed who had previously transferred). In total, 24 girls (across all ages 11–14) were selected from the baseline survey for one-on-one semi-structured interviews and, separately, a total of 6 mothers and fathers. Additionally, two focus group discussions were held with a total of 19 teachers and school heads from both public and private schools in the program.<sup>10</sup>

<sup>7</sup> AGI-K delivers interventions to over 6000 young adolescent girls for two years in two marginalized areas: 1) Kibera and 2) Wajir County in Northeastern Kenya. We focus on Kibera because in Wajir, characterized by isolated villages, girls typically only have access to a single school so there is minimal school choice or mobility. A randomized trial will compare the impact of the different packages of interventions, to assess whether and how intervening in early adolescence improves girls’ lives after four years. See Austrian et al. (2016) for further details on the interventions and the evaluation design. In this paper, we examine baseline quantitative data collected prior to randomization and program intervention.

<sup>8</sup> Approximately 20% of girls 11–14 were excluded prior to interviewing the baseline sample because they were attending boarding school. Table 3 of Austrian et al. (2016) reports 2402 eligible girls interviewed in 2015. In follow-up after the baseline survey, corrections to ages yielded a small number of girls below or above the target age range. We excluded 6 girls determined to be 9 years old at baseline and also 13 girls due to incomplete information needed for this study, yielding a sample of 2383, before further limiting to those attending primary school as described in Section 4.2.

<sup>9</sup> The study protocol was approved by both the Population Council Institutional Review Board and the AMREF Ethical and Scientific Review Committee. In addition, the protocol was reviewed by the Kenyan National Commission for Science, Technology and Innovation to obtain research permits for study investigators.

<sup>10</sup> See Muthengi et al. (2016) for further information regarding sampling for the qualitative study, interviewer training, semi-structured interview guides for the different subjects, protocols, qualitative data coding and analysis.

#### 4. Results

We organize presentation of the results as follows. First, we present the qualitative findings on the various reported reasons for previous school transfers. Next, we describe the quantitative sample of girls and their educational trajectories and outcomes, assessing the frequency of transfers. We then use the rich school-level data to characterize schools in this context and to develop an index measure of school resources. In the final subsection, we examine in a multivariate context the associations between transfers and educational outcomes for young adolescent girls in Kibera.

##### 4.1. Qualitative evidence on the reasons for previous school transfers in Kibera

While nearly all girls expressed a strong desire to remain in their present school, many had in fact transferred schools in the past. Consistent with prior literature described above, respondents reported a variety of different reasons for transferring, involving both individual- and household-level factors as well as school-related considerations.<sup>11</sup> Often, girls or their parents reported multiple reasons, including reasons that were not necessarily mutually exclusive. The qualitative findings, even though only on a small sample, provided a rich characterization of the various possibilities.

Despite the many different reported reasons for transferring, the one most often given by parents was difficulty in paying school fees (and covering other school-related expenses such as uniforms and transportation expenses) and the resulting need to transfer to a less expensive school. This was especially common in households without regular incomes. When a household defaults on fees, most schools send the student home so that she misses classes and can quickly fall behind. One mother commented as follows:

*She transferred schools because she was being sent away from school every day and so I told her that I am tired of her being sent away from school every day so I told her to just stay at home because I did not have any money and there was no job that was coming forth and I did not even have the money to buy them food so I told her to just stay in the house until the day that I will get the money that is when she can go, like today if she went to school they would tell her to buy shoes then the next day they would tell her to buy uniform and then the day after she would be told to go and shave her hair and that really stressed me so I told her to just stay at home because I did not have any money, so when I finally decided to take her back to school I was told to just look for another school for her because she has stayed away for too long we don't want her back in our school. **Kibera, 36-year old female parent***

Similarly, one girl indicated:

*Yes, I have, I transferred from a private school because the fee was too high and my father could not afford all that money so they had to transfer me from that school and they brought me to Mbagathi [public primary school]. **Kibera, 14-year old adolescent girl***

Related, heads and teachers reported that sometimes parents prefer to transfer children to public schools due to anticipated benefits including the free (primary) education program offered—eliminating most school fees. One private school teacher remarked:

*Okay as per my experience parents bring children to private schools, just to get that foundation, maybe up to class four or five. Like if you come to our school, from kindergarten to class 5 we are very many. As in the kids are very many. But starting from class 6, 7 and 8 they start withdrawing. I think the reason is, in upper classes, the school fees is a bit high and the*

*parents think that their children are old enough to manage maybe in public schools so they take their children to public schools. Another reason is school fees. A parent who has been having a challenge paying school fees, will withdraw the child from the school. **Kibera, 30-year old female private school teacher.***

Another potential benefit related to transferring to a public school was the possibly greater likelihood that completing public primary education would enable children to perform better on the primary school leaving exam (the Kenya Certificate of Primary Education or KCPE). This exam largely determines entrance into and choice of secondary school. The same teacher went on to indicate how school fees also can play a role if the girl is not performing well:

*The kids who are performing poorly, I think some parents lose hope very fast and they think that they are wasting a lot of their money so they would rather take the kid to a public school where they won't pay anything. **Kibera, 30-year old female private school teacher.***

A distinct set of reasons for transferring related to the household included distance to the school, for example, selecting a school closer to home to reduce travel distance and associated costs, particularly after residential relocation. Relocations that led to school transfers were the result of a variety of phenomena including the death of a parent, insecurity during periods of civil unrest (for example, as occurred around the 2007 Kenyan national elections), destruction of the home (for example, due to fire or on-going infrastructure development in the informal settlement) and parental employment transfer (for example, periodic transfer of government employees such as police).

From the perspective of the girls, the most common reasons mentioned for transferring were dissatisfaction with the teachers or fellow students. Sentiments expressed included 'teachers do not teach well,' 'teachers do not bother with children,' and 'children are spoiled and do not like to study.' As one girl in a private school indicated:

*Learning is not going on well. There is no learning...they don't teach well...I repeated class one in Catholic... **Kibera, 14-year old adolescent girl***

Other reasons for transferring relate to the school and its perceived quality. These included administrative corruption or failure to deliver expected services or benefits (for example, the termination of a school feeding program), poor quality teaching or even malfeasance among teachers (for example, male teachers making sexual advances toward female students) and even the school itself shutting down.

Short of shutting down, the frequency with which students transfer, and its association with delinquent payment of school fees, also has possibly disruptive implications for the schools themselves. In private schools, it can lead to difficulties in paying and retaining teachers, potentially reducing the quality of education due to high teacher turnover.

*Others will base on performance...they don't pay teachers, so teachers are forced to go. **Kibera, 29-year old male private school teacher***

And, if proportionally more of these students transfer to public schools, there is the potential for crowding.

Taken together, these accounts demonstrate the multitude of possible factors while also pointing to the important role that cost and aspects of perceived quality on the part of the parents play in school choice and the decision to transfer.<sup>12</sup>

They suggest a possible tendency for students to transfer from

<sup>11</sup> School transfers, however, are themselves not without costs. Transferring can involve direct increased expenses such as purchasing a school-specific school uniform, among other things. As one parent indicated:

*Because changing the child from one school from another is expensive because you have to buy new uniform and many other things so changing schools is a hard task. **Kibera, 36-year old female parent***

<sup>11</sup> The key decision maker regarding schooling for girls 11–14 in Kibera is typically the parent(s) or guardian(s) and they presumably make decisions based on information available to them which may not always be accurate or complete (Ajayi et al., 2017).

private to public school, especially as they progress to higher grade levels. As developed in the conceptual framework and seen in the literature review, however, even with a better understanding of the reasons underlying transfers, implications for subsequent educational outcomes remain ambiguous. Therefore, in what follows, we turn to the quantitative data to explore the patterns and some of the possible consequences of school transfers on girls' educational outcomes in Kibera.

#### 4.2. Adolescent girls' characteristics and educational outcomes in Kibera

The AGI-K baseline sample targeted young adolescent girls (age 11–14) eligible for the program, i.e., residing in Kibera and not attending boarding school. Given their ages, all of the girls have spent their entire educational careers in the post-FPE (since 2003) era. The vast majority (2225 or 93.4%) of the 2383 girls interviewed in 2015 was attending primary school, with 5.4% attending secondary school and only 1.2% not attending school. Despite the challenges of residing in Kibera, schooling for this age group is nearly universal. For the analyses, we use the sample of girls attending primary school allowing focus on school transfers not directly related to advancement to secondary school.

Sampled girls averaged 12.5 years old (standard deviation [SD]: 1.2) (Table 1). Nearly 10% report their mother is deceased, and nearly 20%, their father; just under 5% are double orphans. Approximately 90% of girls whose mother is alive reside with her, 80% whose father is alive reside with him, and 70% whose parents are both alive reside with both of them. Despite the transient residency patterns for many in Kibera, more than three-quarters have lived in Kibera for at least five years and consequently most of their schooling has taken place while residing there. Average maternal education is 8.0 grades attained (completed primary) and paternal 9.3 grades. Most girls identify as Luo or Luhya, with much smaller percentages from other ethnic groups. Ownership of important assets and reported difficulty meeting food security or hypothetical expenditure needs confirm that it is a relatively poor population. This is unsurprising given their residence in the Kibera informal settlement, referred to locally as an urban informal "slum" area. More than half of the girls live in households in which they had gone without food for a day in the previous month. Moreover, 45% live in households in which they did not have enough savings or something to sell readily to meet an expenditure of 1000 Kenyan Shillings (KES) or approximately 10 U.S. dollars<sup>13</sup>—this lack of liquidity likely has implications for their ability to cover school fees or other schooling-related expenses.

The average current grade level of girls in the sample was 6.5 and 80% have completed grade 6 or higher. We measure schooling progress by the number of grades a girl is "ahead" of where she should be given her age, had she begun primary school at age 6 and completed one grade each year. A zero indicates the girl was on schedule for her age, 1 that she was a grade ahead, -1, a grade behind, and so on. For example, a 12 year old in grade 6 would have a measure of zero, while her friend the same age in grade 5 a measure of -1. On average, girls were on schedule, but one-third were a grade or more behind and one-third a grade or more ahead.

Trained female enumerators administered in the home three education-related tests. The first was a literacy test assessing the girl's ability to read aloud completely without error two sentences in Swahili and two sentences in English.<sup>14</sup> The average number of questions answered correctly was 3.8 (SD 0.6) and 93% of girls read all four sentences correctly. The second was a numeracy test assessing the girl's

**Table 1**  
Girls' Characteristics.

Age	12.5 (1.2)
Has always lived in Kibera	53.7
Has lived in Kibera 5 or more years	78.1
Mother's highest grade attained [N = 1908]	8.0 (2.3)
Father's highest grade attained [N = 1688]	9.3 (2.4)
Ethnicity	
Luo	38.7
Luhya	31.7
Kamba	8.1
Nubian	6.3
Kisii	5.7
Kikuyu	3.9
Other (including those reporting more than one)	5.6
<i>Components of household-level wealth index (assets, housing characteristics)</i>	
Own television	76.0
Own watch	31.1
Own mosquito net	39.2
Own agricultural land	46.6
Own livestock (typically small animals)	32.5
Number rooms for sleeping	1.3 (0.6)
Household went without food for day last month	56.0
Household has enough savings or something to sell	
if need 1000 KES	54.3
if need 5000 KES	24.8
if need 10,000 KES	9.2
<i>Educational outcomes</i>	
Grade currently attending	6.5 (1.2)
Grades ahead for age (assume start at age 6)	-0.04 (1.2)
Literacy (read all four sentences correctly) [N = 2211]	92.8
Math (number correct of 20) [N = 2211]	18.8 (2.0)
Raven Progressive Matrices (number correct of 18) [N = 2211]	10.2 (3.1)
Attends public school	44.0
Attends public school (if currently in grades 1–4)	26.9
Attends public school (if currently in grades 5–8)	45.1
Straight line distance to school in meters [N = 1778]	695.6 (613.1)

Notes: N = 2225 unless otherwise indicated. Standard deviations in parentheses for non-binary indicators. In mid-2015 the official exchange rate for Kenyan Shillings (KES) was 98.5 per U.S. dollar.

facility with basic addition, subtraction, division and multiplication using a portion of the Kenya National Learning Assessment tool (Uwezo, 2012). The test includes 26 mathematics questions based on the Kenyan grade 2 level curriculum. Virtually all girls answered the first six questions correctly (counting the number of dots in a row on a placard), so we do not examine those questions but use the score for the remaining 20 more difficult questions. The average score was 18.8 (SD 2.0). Fifty-two percent earned a perfect score, with an additional 20% answering 19 out of 20 correctly.

The final assessment was the Raven's Coloured Progressive Matrices test (Raven et al., 1984), a nonverbal multiple-choice assessment of cognitive ability where the respondent identifies the missing element that completes a pattern. The test measures one's ability to make sense out of confusing or complex data and the ability to perceive new patterns and relationships, rather than achievement on a school-subject related test. We administered every other problem from the Raven Progressive Matrices AA, AB and BB, for a total of 18 problems; the average number correct was 10.2 (SD 3.1) and while no girl earned a perfect score, about 15% answered 14 or more correctly.

On average, girls live 0.7 kilometers (straight-line distances calculated from GPS locations) from the school they attend, though there is substantial variation in distances (SD 0.6). While half of the girls in the

<sup>13</sup> In mid-2015, the official exchange rate was 98.5 KES per U.S. dollar.

<sup>14</sup> The two Swahili sentences are: 1) *Ukulima ni kazi ngumu*; 2) *Mtoto anasoma kitabu*. The two English sentences, also administered in the 2008–09 Kenyan Demographic and Health Survey, are: 1) Parents love their children; 2) Farming is hard work.

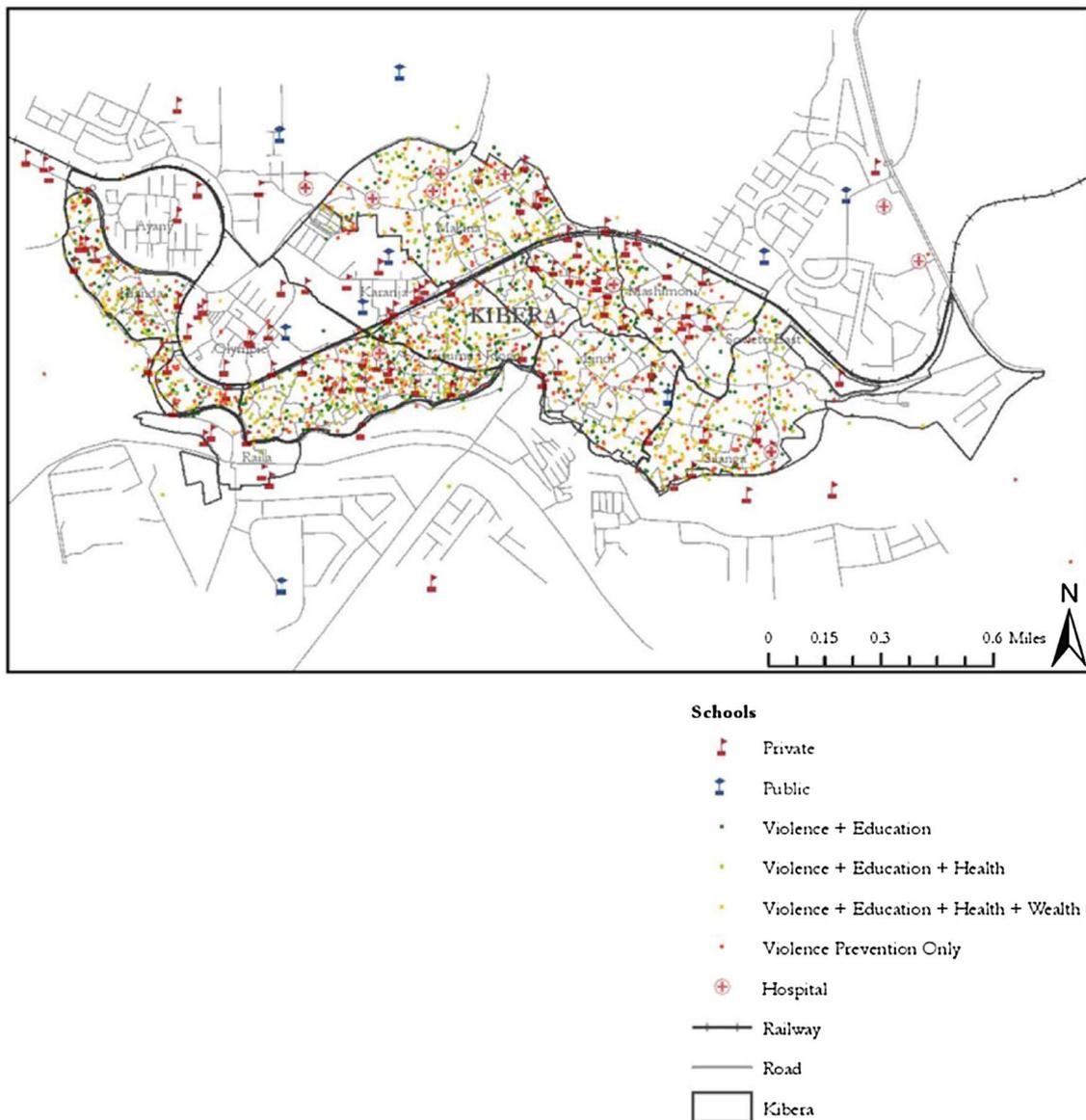


Fig. 1. Locations of girls and schools.

study sample are concentrated in just a dozen primary schools the rest, despite residing in the same area, attend more than 200 different schools. Three large public schools each attract more than 100 sample girls, though some longstanding private schools also attract many with more than 50 sample girls each. In contrast, however, in more than 150 other schools there are four or fewer girls from the sample, suggesting a highly skewed distribution among schools.

To visually display school choice, we map household residence and linked school attendance (Figs. 1 & 2).<sup>15</sup> There is a high density of primary schools in or near Kibera (Fig. 1). Girls commonly attend schools outside their immediate neighborhoods, rarely attending the school nearest their residence (as defined by straight-line distance). Fig. 2 exemplifies the latter pattern, with a straight line connecting each girl to the school she attends. Girls are concentrated in a small number of schools and spatial proximity clearly does not fully determine which school a girl attends; some schools attract larger numbers of girls and attract them from larger catchment areas. Enlarging the map for a portion of Kibera, we see that despite living closer to a number of other

(public and private) schools, many girls attend a primary school further away, though still relatively close (for the example in Fig. 3, attending a public school just outside of Kibera).

Consistent with these patterns observed in the 2015 cross-section and the many nearby schools to choose from, the retrospective schooling histories for each girl reveal that transferring from one school to another is relatively common. For each year starting when she entered grade 1 until the year of the survey (2015), the girl was asked whether she was attending school in that year, in which grade and in which school. On average, girls transferred 1.0 times through eighth grade—about one-third never transferred, one-third transferred once, and the remainder two or more times. Examining transfers at each grade level (conditional on having reached that level), transfer probabilities increase during grades 1–4 (so-called lower primary) peaking at 20% in grades 3 and 4 and then begin to decline in grades 5–8 (upper primary), though they remain 14% through grade 7 (Fig. 4).<sup>16</sup> These

<sup>15</sup> The figures include the approximately 80% of all girls (and their associated schools) for which there are valid GPS locations.

<sup>16</sup> At higher grades, a small percentage of these are likely due to unavailability of the grade in her previous school. Separately, transferring was nearly universal for the 130 girls (not included in the analysis) who had completed primary and continued on to secondary school, i.e., to grade 9 (known in Kenya as Form 1).

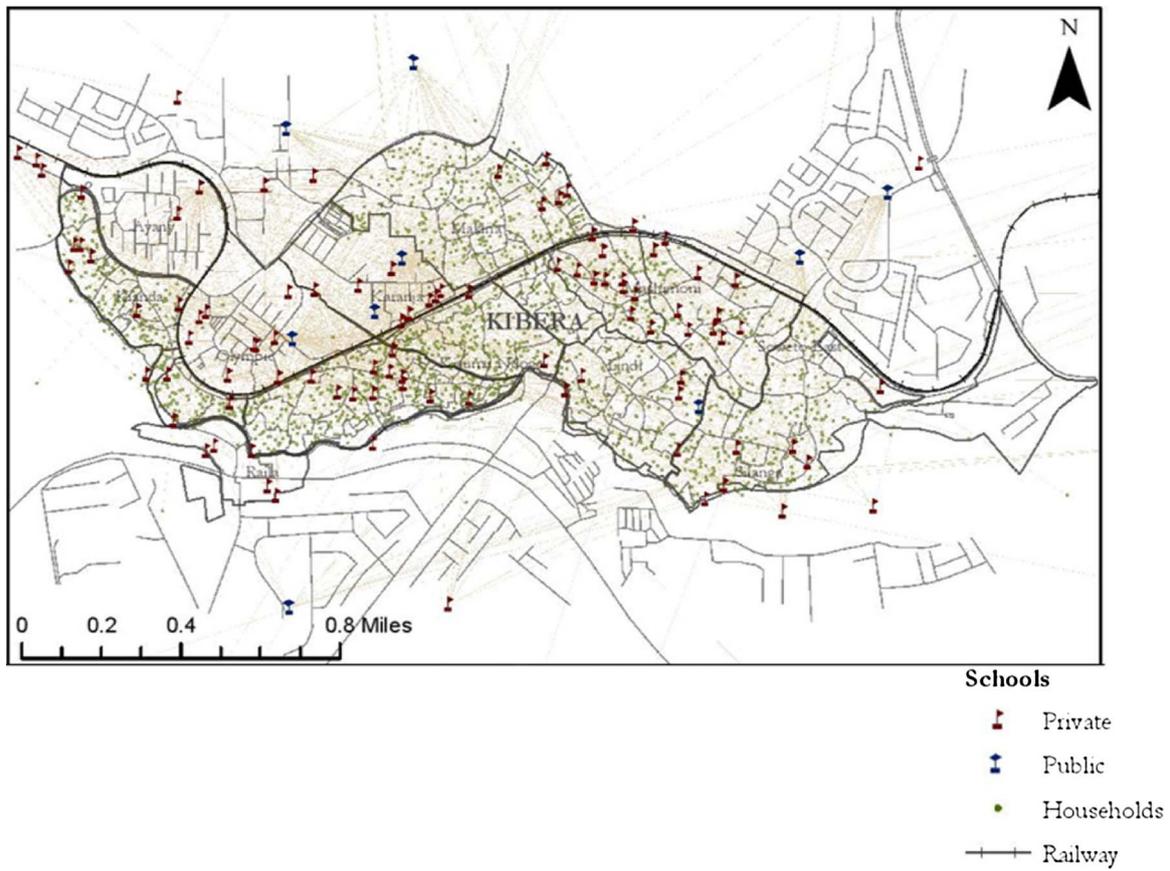


Fig. 2. Straight Paths from Household Location to School.

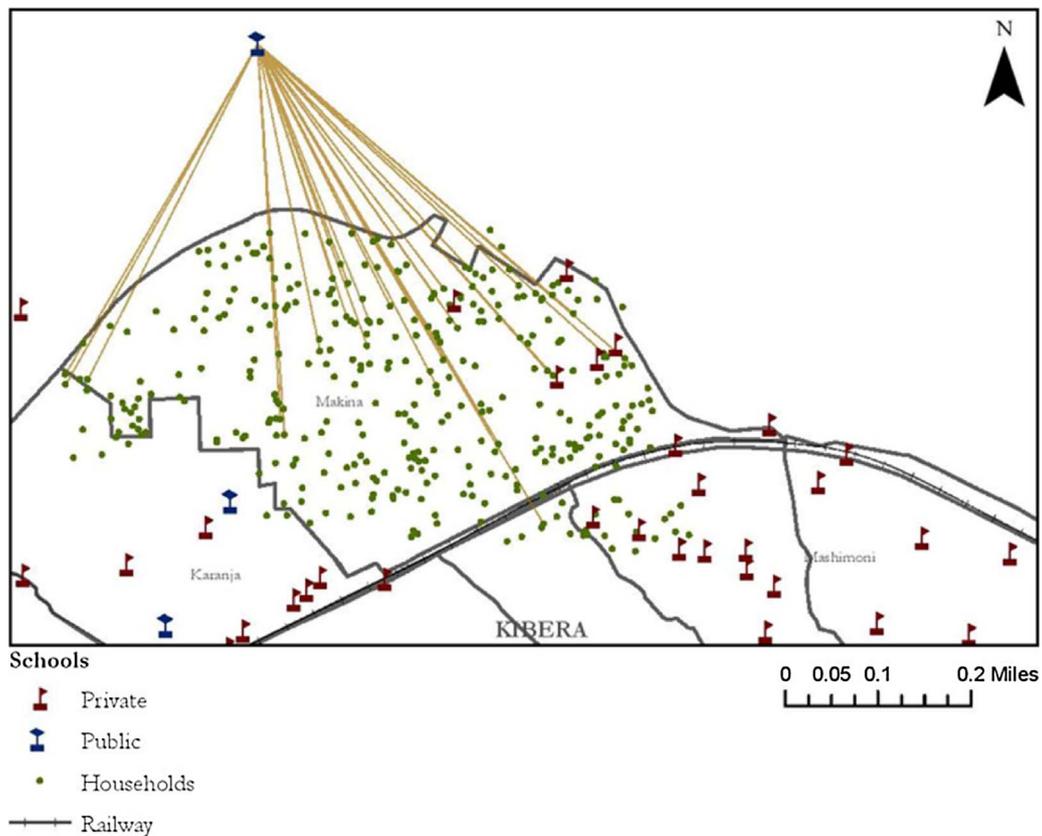


Fig. 3. Girls attendance at large school.

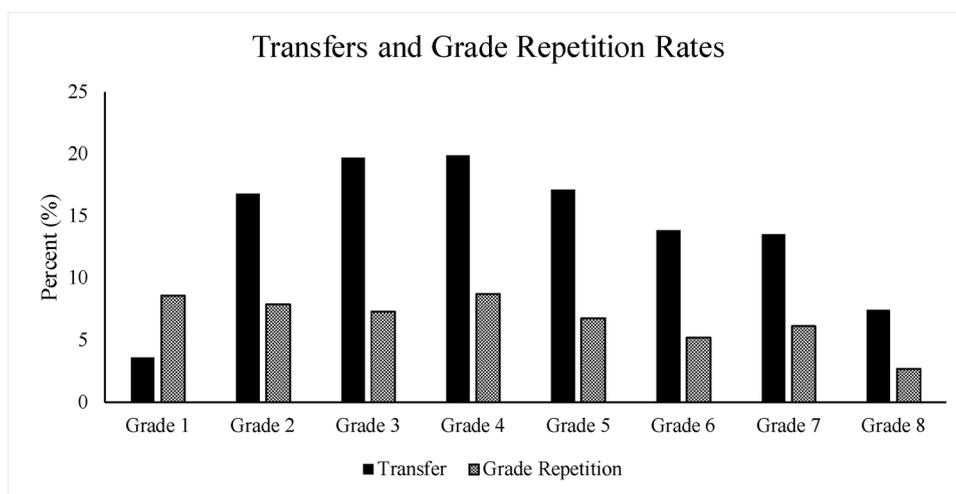


Fig. 4. Transfers and Grade Repetition Rates.

rates are similar to primary school transfer rates reported in Malawi and Uganda (Taniguchi 2015, 2017). Though less common than transfers, grade repetition in the overall sample fluctuates between 5 and 8% through grade 7 and is slightly more common in lower primary. Conditional on transferring, however, grade repetition is much higher (not shown). In grade 1 it is the norm (80%) whereas in grades 2–8 it averages just over 20%. In other words, for grade 1 about four in five girls who transfer repeat a grade when doing so while for grades 2–8 only about one in five repeat. Even for those repeating grades, however, while implications on grade attainment for age are mechanically negative, effects on other educational outcomes are uncertain as they may be repeating strategically to solidify learning.

#### 4.3. School characteristics and resources in Kibera

As described in the review of the literature and demonstrated in the qualitative results, girls transfer schools for many different reasons while a variety of factors can influence their (next) choice of school, a focal set of factors are perceived school quality.

Some reasons for transferring are more likely to lead to schools with higher perceived quality and others, to lower. While the specific underlying reasons for the reported transfers are not observable in the available quantitative data, it is nonetheless possible to characterize changes in school type (public or private) or school resources corresponding to such transfers. There is a substantial literature on the measurement of school quality, and similar to understanding which school level characteristics influence transfers it is unclear which if any best reflect quality (Glewwe, 2014). For this reason, in what follows we describe the schools and their characteristics and develop a school resource index but remain agnostic as to how well it reflects the many important elements of quality or how directly linked it is to outcomes.

The sample includes 235 primary schools (94.4% of 249 total primary schools attended by at least one girl in the sample). Not only are they in different locations, but schools in the sample vary substantially in size and on a wide range of indicators. Consistent with the literature (Oketch et al., 2010b), public schools are typically larger and better resourced on nearly all dimensions captured in the survey, including teachers (and their educational backgrounds), services, facilities and amenities.

Table 2 presents average school characteristics separately for public (18%) and private (82%) schools, as well as both combined. Results from statistical tests of the equality of means for the two types also are reported; nearly all are statistically different (though several only modestly so in magnitude). Public schools have been open four times longer on average, consistent with the large number of private schools

opening after FPE in the early 2000s (Dixon and Tooley, 2012; Nishimura and Yamano, 2013). All public schools except one are registered with the Ministry of Education, Science and Technology (MOEST) and thus formally recognized as proper educational establishments by the Kenyan government (Oketch et al., 2010b) whereas only one-third of private schools are.<sup>17</sup> Most of the remaining private schools have registered with the Ministry of Gender, Children and Social Development (MGCSO).

On average, public schools are also four times larger than private schools. This is in part because all public schools in the sample offer full primary through grade 8, whereas only 70% of private schools do with the others offering only incomplete primary (10% through grade 7, 10% through grade 6 and the rest fewer). The difference in size persists, however, even when one considers instead average size of each grade. Correspondingly, public schools have more teachers, with 27.1 on average compared to 15.8. A much greater proportion of teachers in public schools are formally registered with and paid by the Teachers Service Commission (TSC) while in private schools relatively more teachers are hired and paid directly by the school management committee (SMC). Nearly one-third of the teachers in public schools have a university degree and one-half have a university or a teaching diploma; only about 10% of teachers in private schools, however, have a teaching diploma or higher. Consistent with the literature, the teacher-student<sup>18</sup> ratio is lower in public schools. The number of non-teaching staff is modestly higher in private schools compared to public.

Although public schools do not have direct tuition fees, they often have additional fees related to maintenance, meals, transport, extra classes (for example, exam preparation) and exams (Oketch et al., 2010a; Abuya et al., 2013). A comparison of total fees makes clear there is wide dispersion, but on average fees are twice as high in private schools.<sup>19</sup>

Not all schools offer the KCPE primary leaving exam (for example, those that do not offer full primary through grade 8, though it is possible to sit for the national exam at another school if not offered in your own), but for most of those that do we recorded average exam scores for

<sup>17</sup> Registration with MOEST comes with land ownership requirements that can be difficult to demonstrate by private parties in urban informal settlements such as Kibera.

<sup>18</sup> We characterize the teacher-student ratio, number of TSC teachers per student, rather than the more commonly used student-teacher ratio, so that an increase in the variable implies an increase in resources.

<sup>19</sup> The wide dispersion, as well as two measurement concerns, translate into low confidence in the accuracy of the school fee data so we do not use it directly in the empirical analyses. First, there is likely measurement error as the survey question was non-specific with respect to grade level. Second, measured school fees are not highly correlated with any of the different resource endowment indicators, even for private schools.

**Table 2**  
Primary School Characteristics.

	Used in FA	Public (N = 43)	Private (N = 192)		All (N = 235)
Number of years open	✓	37.7 (15.4)	9.3 (7.7)	**	14.5 (14.6)
Registered with MOEST <sup>a</sup> (%)	✓	97.7	31.8	**	43.8
Total number of students enrolled		1032.0 (636.3)	227.3 (192.3)	**	371.8 (444.2)
Highest grade offered	✓	8.0 0.0	7.3 (1.3)	**	7.4 (1.2)
Number of students enrolled per grade	✓	128.2 (80.4)	30.9 (25.4)	**	47.9 (54.8)
Number of teachers (TSC & SMC) <sup>b</sup>	✓	27.1 (10.5)	15.8 (10.6)	**	17.9 (11.4)
TSC teachers with university degree	✓	8.8 (4.9)	0.5 (2.4)	**	2.0 (4.4)
TSC teachers with teaching diploma	✓	4.8 (6.4)	1.2 (3.2)	**	1.9 (4.2)
TSC teachers with teaching primary	✓	9.0 (7.0)	4.3 (6.7)	**	5.2 (7.0)
TSC Teacher-Student ratio		0.026 (0.013)	0.032 (0.041)		0.031 (0.037)
Non-teaching school staff		3.0 (4.1)	3.7 (4.1)	**	3.6 (4.1)
Total fees (K Sh)		6287.2 (14,300.3)	12,028.7 (12,524.7)	*	10,978.1 (13,026.7)
KCPE offered and valid score reported (%)	✓	81.3	55.2	**	60.0
KCPE average score 2014 (N = 143)	✓	205.9 (105.7)	145.1 (135.6)	**	156.2 (132.5)
Electricity (%)	✓	97.6	77.0	**	80.8
Water source from a tap or borehole (%)	✓	95.3	64.0	**	69.7
Number of classrooms	✓	22.0 (6.5)	9.8 (5.6)	**	12.0 (7.4)
Facilities: Library (%)		76.7	51.0	**	55.7
Facilities: Sports equipment room (%)		74.4	56.7	*	60.0
Facilities: Staff room (%)		100.0	70.8	**	76.1
Facilities: Headmaster office (%)		100.0	84.8	**	87.6
Facilities: Rooms have teacher table (%)		83.4	64.1	**	67.6
Has WFP or FTC food program (%)		55.8	18.7	**	25.5
Texts per student (lower primary, grades 1–4)		0.77 (0.4)	0.50 (0.5)	**	0.55 (0.5)
Texts per student (upper primary, grades 5–8)		0.77 (0.43)	0.58 (0.50)	**	0.61 (0.49)
Number of flush or VIP toilets	✓	26.05 (16.68)	4.76 (6.85)	**	8.66 (12.50)
Toilets per student		0.032 (0.03)	0.023 (0.03)		0.024 (0.03)
Pit latrine only (%)		9.3	47.3	**	40.4
Percent of students with no desk (%)		6.5	11.2	*	10.3
Percent of students over 14 in lower primary (1–4) (%)		2.0	3.4		3.2
Percent of students repeating grade (%)		0.1	1.3	**	1.1
Percent of special needs students (%)		0.6	2.5	**	2.1
Percent of OVC students (%)		7.8	22.4	**	19.8
School resources index		1.51	–0.33	**	0.00
1st component from factor analysis		(0.76)	(0.67)		(0.99)

Notes: Standard deviations in parentheses. Statistically significant differences indicated as \*\*  $p < 0.01$ , \*  $p < 0.050$ .

<sup>a</sup> Ministry of Education, Science, and Technology.

<sup>b</sup> TSC = Teacher Service Commission; SMC = School management committee.

2014; on this educational outcome public school students score higher than their private school counterparts (206 vs. 145).<sup>20</sup>

The well-established public schools are also in general better resourced in terms of services, facilities and amenities. Virtually all public schools have electricity and water from a tap or borehole whereas only about two-thirds of private schools do. It is more common in public schools to have a feeding program, a potentially important service reflected in the qualitative findings. Corresponding to the larger student body, public schools have more classrooms on average (22 versus 10) and are more likely to have additional physical facilities. These include

<sup>20</sup> The contrast with the national findings reported in Bold et al. (2011b) likely reflect the greater concentration of low-cost primary schools in this urban setting.

spaces dedicated as a library, sports equipment storage room, staff room and headmaster’s office. Public schools also have more and better toilet facilities, in total and per student. In fact, approximately 50% of private schools have only traditional pit latrines. Adequacy and privacy of toilet facilities can be particularly important for schooling decisions of young adolescent girls (Adukia, 2017).

The student body also differs between school type, as reflected in potential correlates of student preparedness. Indicators point to higher fractions of private-school students facing challenges, including the fractions of students: 1) over age 14 but in a lower grade; 2) repeating a grade; 3) with special needs; and 4) who are orphans or otherwise vulnerable children.

Using this comprehensive set of indicators, including and going

beyond many of those typically available in the literature (Ngware et al., 2011), we carried out exploratory factor analysis to reduce the dimensionality and construct an index measure of school resources, estimating parsimonious and expanded models. The parsimonious model included 14 of the school characteristics presented in Table 2 as indicated. The Cronbach alpha for these items was 0.88. Using factor analysis with principal axis factor extraction (Costello and Osborne, 2005), the first component explained 57% of the shared variation (with all factor loadings positive and > 0.35) and the first two components 78%. The eigenvalues suggest the first factor is dominant, but the second component also had an eigenvalue > 1, although with factor loadings higher than 0.35 for only three items: maximum grade available and the two KCPE measures. For this reason, and because subsequent analyses of educational outcomes all contain school fixed effects (and therefore control for all fixed school characteristics including multiple factors), we treat the first component as our index of school resources.<sup>21</sup>

This school resource index is shown at the bottom of Table 2 and averaged 1.51 (SD 0.76) for public schools and -0.33 (SD 0.67) for private. To explore further this average difference, we present the distribution of the index for public versus private schools in Fig. 5. The distributions confirm that resources are higher among public schools but also uncover two additional important patterns. First, there is nontrivial overlap between two distributions for both components—that is, there exist private schools and public schools of similar resource levels including some relatively high resourced private schools. Second, variation in the components across schools is high. For private schools in particular, this is consistent with the existence of both low-cost private schools and the more established high-cost private schools (Tooley et al., 2008; Dixon and Tooley, 2012).

#### 4.4. School transfers, school resources and girls' educational outcomes in Kibera

We first examine the association between school transfers and the school resource index to ascertain whether girls who transfer select lower or higher resourced schools on average. For the majority of girls who transfer, we can characterize the (current) resources of the school transferred from and the school transferred to, and thus examine average differences in the index of schools she attended. We assess the change in two ways. First, using the continuous measure based on the components from the factor analysis model of school characteristics. Second, given the qualitative evidence on reasons for transferring and the generally higher resources available in public schools, using a binary indicator of whether the school is public or private. We then assess the association between school transfers and educational outcomes.

In Table 3, we present average differences in the school resources index for individuals who transfer during lower or upper primary.<sup>22</sup>

<sup>21</sup> The expanded model was based on the 14 variables in the parsimonious model as well as additional ones from Table 2. Results using the school resources index resulting from that exercise are qualitatively and quantitatively similar. See Appendix for further details.

<sup>22</sup> Because the individual- and school-level surveys were administered independently, it is not possible to assign every single girl to a specific primary school with a completed school survey. In particular, schools of girls who were not scheduled to benefit from education transfers under AGI-K were not visited unless there was another girl in the sample who also attended that school. Of the 2225 girls attending primary school in 2015, we match 95% to a school. The match rate is lower (approximately 80% for all schools attended since 2009, fully covering the upper primary grades for all girls in the sample), however, for previous schools attended. For the merged sample, we can directly explore the associations between transfers and current school quality. Mechanically, we do this via an individual-level fixed-effects regression model yielding the average within-individual difference in school quality for those who transferred. This approach is preferable to a cross-sectional comparison (comparing quality of schools for girls who have switched with quality of schools for those who have not) because it controls for potentially confounding time-invariant characteristics of the girls, such as ability or family

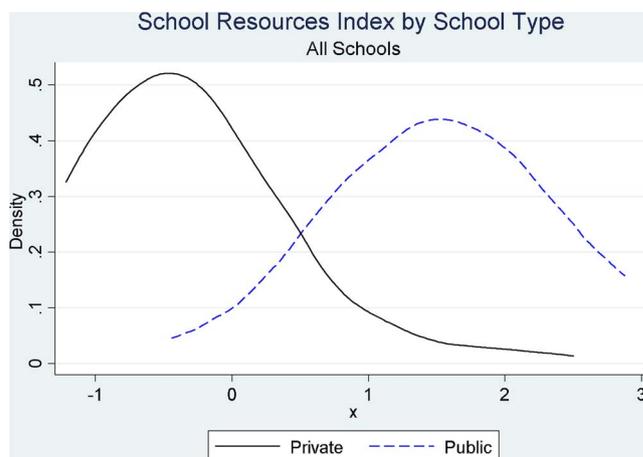


Fig. 5. Distribution of school resources index by school type.

Transferring during lower primary is associated with a decline in the index (of about 0.26 SD), but transferring during upper primary with an increase (0.39 SD). Mirroring those patterns, girls transferring in lower primary are nearly 8 percentage points less likely to move from private to public school and those transferring in upper primary are 9 percentage points more likely to make such a move.<sup>23</sup> Transfers from private to public schools, however, only partially explain the observed differences in the school resources index. Fifty percent of transfers are from one private school to another, while 30% are from private to public, 15% from public to private and 5% from one public school to another public school. And, transfers between private schools in upper primary are also linked to an increase in the index (of 0.07 SD). These patterns are broadly consistent with enrollment rates in public school in the sample, which increase from lower to upper primary. Taken together, this evidence points to the possibility that there could be systematically different reasons for and consequences of transferring at different grade levels, as observed in the qualitative results.

Given these patterns, we explore whether transfers during lower or upper primary are associated with schooling progress and the reading and math test scores administered. Because there are no repeated measures on the test scores, the analysis is cross-sectional, relating previous transfer experience to current outcome measures from the baseline survey. As such, it does not identify the causal effects of transfers on outcomes as might be possible with a randomized treatment influencing school transfers. Using a comprehensive set of controls including age-cohort school-level fixed-effects, alongside individual controls for ability and family background, we instead present associations controlling for a number of important determinants. This framework and the available controls enable us to contrast outcomes for girls in the same school, of the same age and with the same ability level. More specifically, we estimate the following equation via ordinary least squares:

$$Y_{ij} = \beta_0 + \beta_1 T_i^{lower} + \beta_2 T_i^{upper} + X_i \beta_3 + \alpha_{aj} + u_i \quad (1)$$

where  $Y_{ij}$  is the educational outcome considered (grade progress, reading test, math test) for girl  $i$  observed in 2015 in school  $j$ ,  $T_i^{lower}$  is a dummy variable indicator for whether she had transferred in the past from one school to another during lower primary and similarly,  $T_i^{upper}$  if she had transferred in the past during upper primary. All models also include fixed-effects for each single year age-cohort  $a$  and individual school  $j$ ,  $\alpha_{aj}$ .  $X_i$  is a vector of characteristics of the girl and her household and  $u_{ij}$  is the error term. Standard errors are calculated allowing

(footnote continued)  
wealth level.

<sup>23</sup> Consistent with the qualitative findings on the importance of school fees, total average fees decrease for transfers in upper primary (by 10–15% on average).

**Table 3**  
Average School Resource Index Difference After Transfer.

	(1) School resources index: All transfers	(2) School resources index: Private-to-private transfers only	(3) Probability of transfer from private to public	
Transfer in lower primary (grades 1–4)	–0.259 (0.037)	** 0.006 (0.013)	–0.077 (0.014)	**
Transfer in upper primary (grades 5–8)	0.386 (0.064)	** 0.074 (0.026)	** 0.091 (0.023)	**

Notes: Columns (1) and (2) are the differences between the average school resources index after transfer minus before transfer. All estimates calculated via individual girl-level fixed-effects. \*\* p < 0.01, \* p < 0.050. Robust standard errors allowing for clustering at the girl-level in parentheses.

**Table 4**  
Educational Outcomes and School Transfers.

Variable	Grades ahead for age			Reading test (all 4 correct)			Math test Z-score		
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
Transfer in lower primary (grades 1–4)	–0.263** (0.053)	–0.257** (0.053)	–0.233** (0.050)	–0.016 (0.011)	–0.017 (0.011)	–0.014 (0.011)	–0.020 (0.043)	–0.015 (0.043)	0.029 (0.035)
Transfer in upper primary (grades 5–8)	0.381** (0.052)	0.376** (0.051)	0.326** (0.048)	0.055** (0.013)	0.054** (0.013)	0.047** (0.013)	0.160** (0.052)	0.157** (0.052)	0.069+ (0.039)
Ethnicity									
Luo		–0.135** (0.051)	–0.141** (0.049)		0.024 (0.014)	0.024 (0.015)		–0.029 (0.055)	–0.006 (0.052)
Luhya		–0.100 (0.061)	–0.080 (0.057)		0.022 (0.016)	0.026 (0.016)		–0.057 (0.068)	0.034 (0.055)
Other (omitted category)		–	–		–	–		–	–
Mother's highest grade		0.037** (0.010)	0.029** (0.009)		0.002 (0.003)	0.001 (0.003)		0.009 (0.010)	0.006 (0.008)
Father's highest grade		0.023* (0.010)	0.017 (0.010)		0.006* (0.003)	0.005 (0.003)		0.008 (0.011)	0.011 (0.008)
Wealth index		0.049** (0.016)	0.040** (0.015)		0.007* (0.003)	0.006* (0.003)		–0.005 (0.013)	0.005 (0.011)
Raven z-score			0.316** (0.021)			0.041** (0.007)			0.197** (0.021)
Constant	0.049 (0.030)	–0.368** (0.120)	–0.252* (0.114)	0.918** (0.007)	0.832** (0.035)	0.848** (0.035)	–0.031 (0.024)	–0.146 (0.127)	–0.131 (0.090)
Observations	2225	2214	2200	2211	2200	2200	2225	2214	2200
R-squared	0.047	0.071	0.172	0.010	0.018	0.045	0.006	0.007	0.076
Age-cohort school-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of fixed effects	525	525	522	522	522	522	525	525	522

Notes: \*\* p < 0.01, \* p < 0.05, + p < 0.10. Standard errors calculated allowing for clustering at the age-cohort school-level. Missing parental education values imputed with sample medians.

for clustering at the age-cohort school level (StataCorp, 2015).

Table 4 presents the multivariate regression results modeling grade progress and reading and math test scores. All models control for age-cohort school-level fixed-effects, i.e., for each year of age in each school.<sup>24</sup> Consequently, the coefficients on transfers are identified by comparing girls of the same age (e.g., 13-year olds) in the same school. The coefficients on the transfer variables, then, show the difference in the outcome between a girl in that age-cohort school-level group who transferred versus another girl in the same group who did not. By limiting to this comparison, we control for fixed unobservable characteristics common to those of the same age and currently attending the same school. However, there is still likely remaining unobserved individual-level heterogeneity associated with the decision to transfer as well as with the educational outcomes, captured in  $u_i$ . To mitigate this concern further, we include several plausibly exogenous individual- and

household-level controls drawn from the literature and suggested by our qualitative work (Oketch et al., 2010b; Glewwe, 2014; Vimelfall et al., 2017). These include dummy indicators for the two main ethnic groups in the sample, parental education, a household wealth index formed by the first component from a principal components analysis estimated using the 11 variables indicated in Table 1 and the Raven (standardized into a z-score) as a measure of individual ability. This final control effectively allows us to compare girls with the same ability, a key control if such ability is driving school choice and mobility.<sup>25</sup>

Controlling for the fixed effects (column 1a), a transfer in lower

<sup>24</sup> For the full sample, there are 525 such fixed-effects, 311 of which have more than one girl in the sub-group. Note that these fixed-effects also directly control for age dummy variables. Models without the fixed-effects but with controls for age are qualitatively similar.

<sup>25</sup> An aspect of this identification strategy (other than unobserved heterogeneity) that may lead to bias relates to possible spillover effects since it compares girls transferring into schools with those who have been there throughout their lower (or upper) primary cycle. If there are substantial net transfers into schools that lead to overcrowding and the possibility of negative spillover effects (Duflo et al., 2008)—school resources may become more constrained and those girls already in the school may get less attention or lower quality instruction, or may be discouraged, so that the net differential we measure on educational outcomes is larger than it would otherwise have been. The data available do not allow us to distinguish further the source of the net differential effect into these component parts, but evidence in the schooling context for large spillovers of this type suggest it may be small (Muralidharan and Sundararaman, 2015).

primary is associated with falling behind 0.26 grades relative to on-schedule progress. In contrast, a transfer in upper primary is associated with being 0.38 grades ahead. Transferring in lower primary is more likely to coincide with repetition than in upper primary. Incorporating ethnicity, parental education and wealth do not change these point estimates appreciably (column 1b). Both Luo and Luhya are modestly behind other ethnic groups, though the latter difference is not statistically significant. Parental education and household resources all have expected positive relationships with grades ahead for age. Finally, incorporating a control for ability as captured by the Raven test score reduces the (absolute value of the) magnitude of the estimated effects by approximately 15%. This is consistent with the possibility that girls with higher ability are more likely to transfer (especially in upper primary), introducing bias in estimates that do not control for it as in column 1b. The same set of specifications for an indicator for the reading test again shows a positive significant association between transferring in upper primary and higher probability (4.7 percentage points in the full specification) of answering all four correctly, but no systematic association with transfers during lower primary, possibly because there is only minimal variation in this outcome variable. As with grades ahead, the point estimate on a transfer during upper primary declines by about 15% when we control for ability. Results for the math test are similar to those for reading—transfers in lower primary are unassociated with the math score while a transfer in upper primary is associated with a 0.07 SD increase in the score (a reduction of over one-half after including the measure for ability). The measure of ability is positively and significantly related to all three educational outcomes.

Girls who transferred in upper primary were more likely to transfer into public schools (Table 3) which were on average better resourced including more likely to offer all grades and the KCPE on site (Table 2). This pattern leads to the possibility that the main driver behind the results stems from girls transferring into public schools, which would be consistent with the possibility that transferring into public school is highly competitive (Oketch et al., 2010b). However, upper primary transfers *within* the private school sector also were associated with transferring into better resourced schools (Table 3). Additionally, split-sample analyses in which we re-estimate the educational outcome relations for the subsamples of girls currently attending private school and, separately, currently attending public school, lead to similar findings—private schools have stronger associations for grades ahead and reading but weaker ones for math (see Appendix). Transferring into public school at higher levels appears to be only part of the story; what may matter most is transferring into a better-resourced school regardless of type.

The results demonstrate that transfers in upper primary school are related to improved current educational outcomes. As the conceptual framework made clear, there are a number of possible mechanisms for this including improved outcomes due to better resourced schools. While infeasible in the present study to pin down exactly what else might be at play, we can explore two other possible mechanisms. The qualitative research demonstrated that students failing to pay school fees typically were sent home, thereby missing school. Transferring schools, therefore, might be associated with higher attendance (and consequently higher learning). We found no evidence, however, that transfers were associated with missing less school in the previous week. We also considered whether transfers were related to aspirations and expectations for university study, but here again there was little evidence of an association (see Appendix). Not only does this suggest that transfers may not influence aspirations, but it also suggests that unobserved aspirations are not the driving force behind our findings. While this does not rule out other aspects of individual-level unobserved heterogeneity explaining our results (such as motivation or other aspects of ability or aspirations not captured by the admittedly crude measures available), it is suggestive evidence that the improved outcomes may indeed be the result of the transfers.

## 5. Discussion and conclusions

School choice and school mobility have important implications for student success. In this paper, we qualitatively explore reasons for school transfers and quantitatively examine the implications of such transfers on the educational outcomes of adolescent girls residing in Kibera, a poor informal settlement in Nairobi, Kenya with significant mobility among the many varied schooling options available. The principal reasons for transferring schools included difficulty in paying school fees and the perceived quality of schools including anticipated benefits from attending a different school and dissatisfaction with teachers and fellow students at the current school.

We then examined whether observed school transfers were consistent with these reasons, by comparing schools before and after transfers on measures of resources. To do this, we carried out factor analysis to reduce the dimensionality of more than 30 potential indicators and constructed a school resources index for the schools. On average, public schools tended to have greater resources than private. There is important overlap between the public and private school resource index distributions, however. These two observations indicate that there exist private schools with low and high resource levels and some of the “better” off private schools have resources similar to the best public schools. Transferring during lower primary (grades 1–4) leads to attending on average lower resourced schools, while transferring during upper primary (grades 5–8) to higher resourced schools.

Similar differences between lower and upper primary transfers are observed when we examine the implications of transfers for educational outcomes. A transfer in lower primary is associated with being one quarter of a grade behind, while a transfer in upper primary is associated with being one third of a grade ahead. Reading and math test scores are not significantly associated with transfers during lower primary, but are positively and significantly associated with transfers that occurred during upper primary. In particular, transferring during upper primary is associated with a higher probability (4.7 percentage points) of answering all reading questions correctly and a modest 0.07 SD increase in the math test score. All estimates are derived from models that include age-cohort school fixed-effects, which control for time-invariant unobservable characteristics common to those of the same age currently attending the same school, individual controls for family background and individual ability, the latter proxied by Raven’s Progressive Matrices test.

These results suggest that transferring schools has different potential effects on educational outcomes, depending on the grade level at which the transfer occurred and notwithstanding the diverse reasons that may have motivated the transfer. Transferring during upper primary is associated with better school progress and higher basic reading and math test scores, while transferring during lower primary is associated with worse school progress but does not seem to influence reading and math scores. Given the negative consequences associated with transferring during lower primary school years, further attention and research targeted to that period may provide policy insights for the most vulnerable girls. Separately, the findings related to transfers in upper primary also merit consideration as these girls are better poised to make a successful transition into secondary school, a key bottleneck in the Kenyan schooling system (Glennerster et al., 2011) and elsewhere. More generally, greater attention on school mobility is warranted. This could begin with more systematic data collection by key bodies such as the World Bank or UNESCO (Taniguchi, 2017) or even within national educational management information systems, though both first may require more comprehensive inclusion of statistics from the burgeoning numbers of private schools (Heyneman and Stern, 2014).

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## Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.ijedudev.2018.02.007>.

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