How do education resources respond to the quality of local governance in Africa?

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Abstract
We empirically investigate the extent to which weak local governance such as corruption, lack of effectiveness, and responsiveness in local government offices in Africa affects the likelihood that citizens experience educational resource challenges in their local public schools. We consider the challenges of lack of textbooks, poor school facilities, expensive school fees, teacher absenteeism, overcrowded classrooms, and poor teaching quality. Our perception-based indicators of local governance are measured at the regional/provincial level, the smallest geographical location in our pooled Afrobarometer data set across 33 African countries. We find that local government officials' corrupt behaviors and ineffectiveness increase the local inhabitants' probability of experiencing challenges in their local public schools, even after controlling for government expenditure on education. The cross-region analysis with instrumental variables reports that a one-point increase in the percentage of citizens who perceived their local government officials as corrupt yields an increase that ranges between 0.4 and 0.9 in the percentage of people who face poor human or physical school resources in their local public schools. These values range between 0.2 and 0.4 for a one-point percentage increase in the measure of local government ineffectiveness.

KEYWORDS
Africa, education, local governance
Several African governments have increased their investment in education in the past years. As a result, school enrollment has increased significantly in this region, decreasing the existing persistent gap from the rest of the world. Despite these acknowledged financial efforts, investments in school resources have not been sufficient to eradicate school dropouts and close the learning outcome gap between African countries and more advanced economies (Galiani & Perez-Truglia, 2014). The lack of adequate learning resources, infrastructures and facilities; low teacher pay; and high teacher absenteeism are the real challenges that impede learning outcomes in this region. The Afrobarometer surveys over the period 2005–2013 highlight that more than 50% of the interviewees across 33 African countries identified the lack of textbooks and learning supplies, poor teaching quality, and teacher absenteeism as part of the challenges they faced in their public schools. One may raise the question of what factors may explain why some communities have better public education services and resources than others.

Many studies have revealed that better school resources, good quality of teachers, and low teacher absenteeism have fueled the quality of learning in parts of developing countries (Duflo et al., 2012; Glewwe et al., 2013; Muralidharan & Sundaraman, 2011). However, policies toward supplying more financial resources for better public service delivery may not necessarily guarantee greater improvement if accompanied by poor governance, corruption, mismanagement, and lack of accountability and transparency at the central and local government levels. In the African context, there are a few studies on the effect of local governance quality on learning outcome mainly due to the lack of reliable learning assessment surveys, comparable across countries. In this paper, we investigate how corrupt activities and lack of effectiveness and responsiveness by local government officials affect the likelihood that local inhabitants experience weak learning resources in their local public schools, which is detrimental to the much-needed learning outcome quality in African countries.

Local government officials are in close contact with their people. Therefore, they are expected to know better the most suitable policies that address adequately the needs of their local people and are often in charge of overseeing or delivering public goods and services to their communities. In the education sector, this would mean the delivery of teaching materials such as textbooks, repairs of school and classroom infrastructure, or the management/coordination of teachers’ recruitment and payments among others. It has been shown in the literature that well-governed localities improve the quality of public service delivery (Deininger & Mpuga, 2005) and reduce the incidence of conflict in sub-Saharan Africa (Wig & Tollefson, 2016). In this paper, we also argue that good quality of local governance is necessary to guarantee that educational resources such as textbooks and teaching materials reach local public schools and students. Furthermore, good quality of local governance may also determine the effectiveness and transparency of how public sector employees such as teachers and school managers are recruited, treated, and held accountable for the services they provide to students. In addition, local government councillors’ good behaviors and attitudes are crucial to avoid misuse of public funds dedicated to improving schools and classroom facilities.

To carry out our analysis, we rely on subjective indicators of bad/good governance practices by local government representatives as perceived by the local citizens. We take advantage of the series of rich information collected in round 3 (2005–2006) and round 5 (2011–2013) of the Afrobarometer surveys.
surveys,³ which include information on the perception that citizens have of the behaviors and performance of their local government representatives across 33 African countries. We mainly focus on the extent of corruption by local officials, how effective they are in fulfilling their jobs, and their degree of responsiveness to the local population.

We take in each lowest-available geographical location (i.e., region or province in the Afrobarometer) within each country the proportions of individuals who perceive their local government representatives as corrupt, ineffective, and unresponsive. Using these constructed indicators of local governance quality, we investigate whether individuals who live in regions with bad local governance are more likely to encounter school challenges. We consider six different school challenges: expensive school fees, lack of adequate textbooks and teaching materials, poor teaching, teacher absenteeism, poor conditions, and inadequate facilities in local public schools.

We propose two empirical approaches to analyze how local governance quality may determine the incidence to experience any of these challenges. First, we estimate a multilevel logit model that allows us to control for the region and country fixed effects that might affect both individual responses and local governance measures. This method also enables us to cluster simultaneously at the region and country levels. Second, we propose a cross-regional analysis, aggregating both local governance and the incidence of experiencing poor learning resources at the region/province level. To strengthen our efforts to reduce endogeneity bias, we run fixed-effect estimations, given that the Afrobarometer data are repeated at the regional level, and two-stage least squares estimations. We instrument the quality of local governance in a given region by the quality of local governance in the other regions within the same country.

We find that individuals who live in regions with poor local governance quality are significantly more likely to claim having experienced education resource challenges in their public schools. The results are robust regardless of the challenges we consider. However, the effect varies across the measures of local governance. Local corruption and ineffectiveness are more robust determinants than is responsiveness, with corruption having a higher impact. These results are robust to different specifications, and the inclusion of varying individual- and country-level characteristics, such as the level of government expenditure on education. More interestingly, our cross-region analysis results reveal that a one-point increase in the percentage of citizens who perceived their local governments as corrupt is associated with an increase of ~ 0.4–0.9 points in the percentage of people who face poor human or physical learning resources at public schools. These values vary between 0.2 and 0.4 points for the measure of local government ineffectiveness.

This paper contributes to the literature on the impact of governance on development. Most important, it adds new empirical evidence to the limited literature on local governance's role in public service delivery, focusing on education. To date back, the findings in the influential paper by Mauro (1995) have shown that corruption tends to lower efficiency in public investment, thereby deviating public funds into sectors that yield high revenues for rent seekers. Education expenditures (e.g., textbooks and teachers' salaries) are not necessarily the most prominent source of increased profits for rent seekers unlike large infrastructure projects. As such, corrupt countries might deviate their disposal resources on education to more-profitable rent-seeking activities (Mauro, 1998), undermining the quality of services delivered in public schools.

More recent literature has considered the effects of governance on public service delivery in developing countries, and results have highlighted that corruption impedes both access and quality of public services (Barr et al., 2009; Beekman et al., 2014; Davis, 2004). In their seminal paper, Deininger and Mpuga (2005) have focused on the extent to which accountability among government officials determines the quality of public service delivery, including education, in Uganda. They have pointed out that greater accountability reduces corruption, and in turn, it significantly increases the quality of
service delivery in education. Also, it is worth noting that in an environment with weak governance, citizens tend to pay additional costs by paying bribes to access public services. However, bribe payment to access public goods and services is disproportionally distributed across different groups of people, raising the question of whether corruption in the education sector is progressive or regressive. Emran et al., (2013) and Choe et al., (2013) have supported the thesis that corruption is regressive, meaning poor households are more likely to pay bribes to access education services and resources. Therefore, this would lead to higher school fees for poor households.

Another strand of the literature has investigated whether empowering local governments through decentralization may improve learning outcome and quality of education (e.g., Ferraz et al., 2012; Galiana et al., 2008; Hanushek et al., 2013). Decentralization is a policy that increases local government authorities’ decision-making power in implementing and delivering public services in communities. Galiana et al., (2008) have found that decentralization has an overall positive impact on student test scores in Argentina. However, Hanushek et al., (2013) pointed out that decentralization has a mixed effect on the quality of education and that this effect depends on the level of development of the country. The authors found that in less-advanced countries, decentralization tends to impede the quality of education. Such a heterogeneous effect of decentralization on education may simply reflect the differences in the quality of local governance between developed and less-advanced countries, something that the authors have not explored in their paper. The paper by Ferraz et al., (2012) has shown that in a federal country like Brazil, the quality of local governance matters for the quality of education. The authors found that students living in corrupt municipalities with detected missing federal education funds record lower learning performance and higher dropout and failure rates.

To our extended knowledge, no studies have investigated the effect of local governance, such as how corruption, effectiveness, and responsiveness in local government affect learning outcomes in a cross-country setting in Africa. In this paper, we propose to consider how the quality of local governance affects the likelihood of people being served with poor educational resources in African public schools. We believe that some educational challenges, such as poor teaching quality, teacher absenteeism, or availability of textbooks, are important determinants of learning achievement. Therefore, it is worth investigating how these challenges may be determined by local authorities' behaviors that play key roles in service delivery in public schools in many places.

The rest of the paper is structured as follows. Section 2 presents the data and some descriptive statistics. Section 3 describes our empirical strategy, while Section 4 presents the results and discussions. Section 5 provides concluding remarks.

2 DATA

For our analysis, we use the Afrobarometer data, a collection of nationally representative surveys in 34 African countries. These surveys provide information on citizens’ opinions regarding democracy, governance, and any other aspects of development. We employ round 3 (2005–2006) and round 5 (2011–2013), the only available surveys for which we have information on the challenges related to the quality of learning resources individuals have experienced in their local public schools when this project started. These surveys also inform the perception that interviewees have of their local government councillors’ behaviors and performance, allowing us to construct subjective local governance quality measures. We exclude Egypt from our analysis due to missing questions related to individuals’ perception of their local government officials’ quality. Our analysis will be thus limited to nationally representative surveys in 33 African countries.
2.1 Measuring school learning resource challenges

We rely on the questions from the surveys that ask the respondents how often, if ever, they have encountered in their local public schools the following challenges in the past 12 months: (1) expensive school fees, (2) lack of textbooks or other supplies, (3) poor teaching, (4) teacher absenteeism, (5) overcrowded classrooms, and (6) poor facilities. For each of these six categories, we create a dummy variable that takes a value of 1 if the individual encountered this specific challenge in the past 12 months before the interview and 0 otherwise. Interviewees for whom this question is not applicable are treated as missing values. Among others these may include people who don’t have children in public schools or whose children are not going to public schools. Also, the responses “I don’t know” or “refuse to respond” are treated as missing values.4

The distribution of the individuals across the “yes” and “no” categories for each of these six school challenges is presented in Table 1.

As we can see, “overcrowded classrooms” is the challenge that records the highest percentage of individuals (60%) who list it as an issue faced in the past 12 months followed by the lack of textbooks or other supplies (58%), teacher absenteeism (55%), and poor teaching (52%). School fees (46%) and poor facilities (47%) are identified by less than 50% of the respondents in our sample.

It is worth noting that these six learning resource challenges on which we focus in this paper are not necessarily equal and might affect education differently. Some of them, such as the lack of adequate textbooks, teacher absenteeism, and poor teaching quality, might directly impact learning outcomes, unlike school fees that we believe have a higher impact on the quantitative aspect of education, such

| Category                     | Number of observations | Percentage |
|------------------------------|-----------------------|------------|
| Expensive school fees        | Yes 23,831            | 46.06      |
|                              | No 27,907             | 53.94      |
|                              | Total 51,738          | 100        |
| Lack of textbooks/other supplies | Yes 28,956          | 57.55      |
|                              | No 21,362             | 42.45      |
|                              | Total 50,318          | 100        |
| Poor teaching                | Yes 25,737            | 52.23      |
|                              | No 23,542             | 47.77      |
|                              | Total 49,279          | 100        |
| Teacher absenteeism          | Yes 26,976            | 54.58      |
|                              | No 22,447             | 45.42      |
|                              | Total 49,423          | 100        |
| Overcrowded classrooms       | Yes 30,272            | 60.73      |
|                              | No 19,576             | 39.27      |
|                              | Total 49,848          | 100        |
| Poor facilities              | Yes 23,455            | 47.04      |
|                              | No 26,411             | 52.96      |
|                              | Total 49,866          | 100        |

Note: This table shows the distribution of the individuals across the “yes” and “no” categories for each of the six indicators of learning resources. The “Data” section explains the construction of each of the six educational resources.
as school enrollment. Similarly, the size of classrooms, captured in the variable “overcrowded classrooms,” has not been evidenced to be strongly related to learning performance. It is well established that the policy toward reducing the number of students per classroom is not necessarily accompanied by better learning outcome in developing countries as Duflo et al., (2012) illustrated in Kenya.

2.2 Measuring quality of local governance at the regional level

We consider three different sets of indicators to measure local governance quality based on interviewees' perception. These include (1) the pervasiveness of corruption among the local government officials, capturing the extent to which the local government representatives are involved in corruption; (2) local government effectiveness measured by the job performance of the local government representatives; and (3) local government responsiveness that informs us of the degree to which the local representatives listen to their local people.

Regarding category (1) on the extent to which local government councillors are involved in corruption, the surveys ask: “How many of the following people do you think are involved in corruption, or haven’t you heard enough about them to say: local government councillors?” The respondents' different possible answers include “none of the local officials is involved in corruption,” “some of them,” “most of them,” or “all of them.”

For category (2) on the effectiveness of the local government officials, the surveys ask: “Do you approve or disapprove of the way the following people have performed their jobs over the past 12 months, or haven’t you heard enough about them to say: local government councillors?” Respondents can disapprove or strongly disapprove, or they can approve or strongly approve.

Turning to category (3) on the extent to which local government councillors listen to people, interviewees are asked the following question: “How much of the time do you think the following try their best to listen to what people like you have to say: local government councillors?” Individuals may reply “never,” “sometimes,” “often,” or “always.” We code as missing values all the replies that include “I don't know,” “haven’t heard enough about,” or “refuse to answer” when coding the three measures of local governance quality.

We thus take in each region (or sometimes province) within each country the proportion of respondents who have reported that at least some of the local government councillors are involved in corruption; the proportion of people who disapproved of the local government councillors' performance in filling their jobs in the past 12 months, regardless of the degree of disapproval; and the proportion of individuals who replied that local councillors listen to people, regardless of whether it happens only sometimes, often, or always. It is important to recall that region/province is the lowest geographical location available once we merge round 3 and round 5. Aggregating the individuals' perceptions about their local government councillors' behaviors provides an overall assessment of the quality of local governance in each region, reducing subjectivity bias. Also, having the governance indicators at the regional level reduces the number of missing values in our sample. In fact, the respondents with missing values for the questions on their local government councillors' behaviors are included in the estimations as long as we have the overall assessment of the local governance quality in their respective regions/provinces.

Table 2 presents some descriptive statistics for these three local governance measures. We observe that, on average, across the different regions for which information is available, 84% of the interviewees attest that at least some of their local government representatives are involved in corrupt activities with a high standard deviation of 15%, indicating high heterogeneity across the different regions. Local government ineffectiveness shows that about 46% of the respondents disapprove the way the
local government councillors have fulfilled their tasks but with a higher standard deviation and thus higher heterogeneity. Looking at the measure of local government responsiveness, we can see that 55% of the interviewees acknowledge that the local governments are responsive on average.

Table 3 presents the coefficients of correlations between the three measures of local governance quality. We find a positive correlation between local government corruption and local government ineffectiveness measures. Such an outcome is expected because corruption is often accompanied by rent-seeking activities and thus may result in the inefficient use of public funds, crowding out the potential public service delivery and then less effectiveness from the local government representatives. However, the correlation between local government responsiveness and each of the two other measures is negative, indicating that higher responsiveness tends to reduce the level of corruption and to provide greater effectiveness by the local councillors in the execution of their jobs. This is consistent with one of the arguments supporting decentralization that claims that local governments are closer to their local people and, therefore, better know the local needs. As such, if the local government representatives listen to their local people, they are likely to perform better than the central governments.

### 2.3 Additional individual- and country-context characteristics

In addition to the indicators of local governance quality, we control for additional variables at both the country and individual levels. For the country-level variables, we control for governance indicators, using data on control of corruption and government effectiveness, both from the Worldwide Governance Indicators. We also control for the share of government expenditure on education on total gross domestic product (GDP), taken from the World Development Indicators.

For the individual-level variables, we control for the gender, the level of education (no formal education, primary, secondary, or postsecondary education), the age group (below 25, between 26 and 35, and above 35), and the geographical location (rural versus urban) of the respondents. We also consider...
whether the respondents have access to news from different sources (radio, television, or newspapers) and whether they are involved in political affairs. The Afrobarometer surveys lack income information. Thus, to capture the respondents’ level of poverty, we refer to the questions in the surveys that ask whether, in the past 12 months, the respondents have ever gone without food, water, medicine, or cash. We then create a dummy variable for each of these items.

3 | EMPIRICAL STRATEGY

We have data for more than 50,000 individuals interviewed from more than 400 regions across 33 sub-Saharan African countries. We denote by nc the number of citizens interviewed in a given country c, and its value varies between 1,200 and 2,400. We first estimate a multilevel logit model. Our dependent variables are the six different dummies on school challenges, which take a value of 1 if the individual has experienced the challenge associated with the specific school learning resources j and 0 otherwise. Recall that, from the previous section, these six school challenges on which we focus on are expensive school fees, lack of textbooks or other supplies, poor teaching, teacher absenteeism, overcrowded classrooms, and poor facilities.

Let us denote by Zj the dummy associated with the school challenge j.

Our estimation model has three levels: the individual level, the regional level, and the country level. Individuals are nested within regions that are, in turn, nested within countries. Considering such a clustering effect is important because individuals who live in the same region are very likely to face similar issues and behave similarly, while regions within a given country are likely to share some similar issues. The use of the multilevel method enables us to account for these double clustering (Hox, 2010).

We estimate the probability that individual i, living in region r of country c interviewed in round t, has experienced the problem associated with the given school challenge j in the past 12 months before the interview. Thus, our estimation model takes the following form:

\[
\text{Prob}(Z_{jirct} = 1) = \frac{1}{1 + \exp(-\omega_{irct})}
\]

where

\[
\begin{align*}
\text{Level 1: } & \omega_{irct} = \beta_{0rc} + \beta_1 \text{localgovernance}_{rc} + \beta_2 X_{irct} + \beta_3 W_{ct} + t + \epsilon_{irc}, \\
& \epsilon_{irc} \sim N(0, \sigma^2) \\
\text{Level 2: } & \beta_{0rc} = \beta_{00c} + \mu_r + \mu_c, \\
& \mu_r \sim N(0, \delta^2), \epsilon_{irc} \perp \mu_r \perp \mu_c \\
\text{Level 3: } & \beta_{00c} = \beta_{000} + \mu_c, \\
& \mu_c \sim N(0, \gamma^2), \epsilon_{irc} \perp \mu_c, \mu_r \perp \mu_c.
\end{align*}
\]

Though \(\omega_{irct}\) can be written as follows:

\[
\omega_{irct} = \beta_0 + \beta_1 \text{localgovernance}_{rc} + \beta_2 X_{irct} + \beta_3 W_{ct} + t + \epsilon_{irc} + \mu_r + \mu_c
\]

The term \(\epsilon_{irc} + \mu_r + \mu_c\) in Equation 3 is the random part of the model where \(\epsilon_{irc}\) is the individual-level error term, \(\mu_r\) is the region/province-specific effect, and \(\mu_c\) is the country-specific effect. The vector X contains the individual-level variables and W the country-level variables that vary across time, and t is the survey year dummy.

Our parameter of interest is \(\beta_1\). Its sign will indicate whether the local governance measure has a positive or negative effect on the probability that an individual encounters the school challenge \(Z_j\).
We expect the level of corruption at the local government level to positively affect the likelihood to experience any of the six challenges. Corruption has been argued to impede any government investment’s potential desirable outcome, thereby deviating public funds from its targeted purposes to more rent-seeking-oriented activities.

Turning to the measure that captures the local governments’ ineffectiveness in fulfilling their jobs, we might also expect it to positively affect the probability of experiencing challenges on the quality of learning resources when local government representatives do not perform well in delivering public services. However, the degree of responsiveness of the local government officials, which is also considered a desirable aspect of good governance, is expected to decrease the likelihood that individuals experience bad-quality or a lack of learning resources. Unfortunately, we don’t have information on the issues that people discuss with their local governments. Therefore, if education is not among the main priorities that people would like their local governments to handle, the local government’s responsiveness effect on the probability of reporting bad learning resources might not be as significant as we would expect it to be.

To quantify the effect of local governance on the quality of learning resources, we also propose a cross-regional analysis, aggregating both local governance and the incidence of poor learning resources at the region/province level. We regress the proportion of individuals in a given region who claimed to have experienced challenge $j$ on local governance quality measures. The model can be written as follows:

$$q_{jrt} = \alpha_0 + \alpha_1 \text{localgovernance}_{rt} + \gamma_r + t + \epsilon_{rt}$$

where $q_{jrt}$ is the proportion of individuals who face the learning challenge $j$ in region $r$ at time $t$ and $\gamma_r$ is the region fixed effects. To move beyond the fixed-effect strategy that helps deal with possible endogeneity, we also propose an instrumental variable strategy. As instruments for the measure of local government corruption, we use the extent of corruption in the other regions of the same country by taking the average across these regions. For a given region $r$, from a country $c$, the associated instrument is given by $\text{AverageCorruption}_{rc} = \frac{\sum_{s=1, s \neq r}^{S} \text{Corruption}_{sc}}{S}$, where $S$ is the total number of regions country $c$ at time $t$. We also propose a dummy variable $\text{DistanceCorruption}$ that indicates whether the measure of corruption in a given region $r$ at time $t$ is above the median value of the corruption measures across all the regions within the same country at time $t$.

Intuitively, we argue that when the average level of corruption in the other regions of the same country is high, local government officials from a different region may be more active in corrupt activities since corruption can be considered as acceptable at the national level. For the second instrument, we also intuitively argue that corruption is persistent and that regions that are relatively highly corrupt, meaning being above the median, are regions where we may observe a higher incidence of corruption among government officials than in regions for which the levels of corruption are below the median value. Similar instruments are also computed for the other measures of local governance quality.

4 | RESULTS AND DISCUSSIONS

4.1 | Individual-level analysis (multilevel logit model)

This section presents the results on the effects of local governance on the probability to experience challenges in local public schools in Africa. We apply the multilevel logit model defined in Equation 3. We use interchangeably across the different columns the six measures of school challenges as the
variable of interest. The results are presented in Table 4. Across the different columns, we control for various individual characteristics. We consider the level of control of corruption at the country level or sometimes the level of government effectiveness at the country level to ensure that our local governance quality measures do not simply capture the quality of the governance at the country level. In some of the columns, we add expenditure on education relative to the GDP (in logs) to consider the available funds to provide educational resources in a country. Let us mention that data on government expenditure on education for Nigeria are not available, which reduces the number of countries to 32 in all the estimations where we control for this variable. Individuals are clustered within regions, and regions are, in turn, clustered within countries.

From columns 1–9 we use the measures of local governance separately, and in columns 10–15 we include all the measures of local governance that were previously significant together.

Let’s start with columns 1–3 where we focus on the measure of local corruption. The results show that the higher the level of local corruption, the higher the probability that local inhabitants experience challenges in their local public schools. This finding is robust regardless of the indicator of the school challenge used. Moreover, our results support that individuals who live in countries where corruption is highly controlled are less likely to experience school challenges than individuals who live in countries where corruption is not well controlled. Also, government expenditure on education at the country level tends to decrease the likelihood that people experience any challenges related to educational resources. Despite this expected result, our previous results on the negative estimates of local corruption are still valid. This confirms that the impact of local governance on the quality of learning resources does not simply reflect the level of investment in education in a country.

Similarly, results in columns 4–6, where we replace the measure of local government corruption with the measure of local government ineffectiveness, show that more local government ineffectiveness increases the probability that local people experience challenges in educational resources. More government effectiveness at the country level decreases the probability to experience poor quality of learning resources. However, results in columns 7–9 show that local government responsiveness is not significant regardless of school challenge that we consider.

In columns 10–15, we retain the two measures of local governance that are significant: local government corruption and local government ineffectiveness. We add these two measures simultaneously across the different specifications. The two local government quality measures are positive and significant, but local government corruption has a stronger significance.

Turning to the other included variables, we have found that the significance of the coefficient on being a female is not robust across the different columns. When we have school expenses or textbooks as our variables of interest, the coefficients on female are positive but never significant, meaning men are as likely as women to have experienced challenges with these education resources in the past 12 months. Such an observation may raise the question: Are women less concerned about the importance of school inputs due to their lack of a sufficient education level? Our answer seems to be “no,” since we have also controlled for the respondents’ level of education, yet the findings remain unchanged.

The respondent’s age matters, and youths seem to be more likely to complain about any of the six education issues compared to older people. One possible interpretation of such a result is that the youngest respondents are more likely to be the ones who are still in school and then report their own experience. In contrast, the oldest respondents might report their experiences based on closed ties, such as children or family members. Unfortunately, the questions do not allow us to indicate whether respondents are still in school.
| Dependent variable | (1) Expensive fees | (2) Lack of textbooks | (3) Teacher absenteeism | (4) Expensive fees | (5) Lack of textbooks | (6) Teacher absenteeism | (7) Expensive fees | (8) Lack of textbooks | (9) Teacher absenteeism |
|--------------------|-------------------|-----------------------|------------------------|-------------------|----------------------|------------------------|-------------------|----------------------|------------------------|
| Local corruption   | 1.593***          | 1.402***              | 1.340***               |                   |                      |                        |                   |                      |                        |
|                    | (0.159)           | (0.150)               | (0.156)                |                   |                      |                        |                   |                      |                        |
| Local ineffectiveness | 0.430***        | 0.739***             | 0.605***              |                   |                      |                        |                   |                      |                        |
|                    | (0.143)           | (0.137)               | (0.146)                |                   |                      |                        |                   |                      |                        |
| Local responsiveness | −0.815***       | −0.405***            | −0.530***             |                   |                      |                        |                   |                      |                        |
|                    | (0.106)           | (0.0983)              | (0.103)                |                   |                      |                        |                   |                      |                        |
| Country corruption | −0.286***         | −0.234***            | −0.189***             | −1.197***         | −0.726***            | −0.474***              | −1.244***         | −0.799***            | −0.544***              |
| control            | (0.0190)          | (0.0186)              | (0.0186)               | (0.140)           | (0.129)              | (0.132)                | (0.139)           | (0.133)              | (0.135)                |
| Country effectiveness | −0.295***       | −0.230***            | −0.186***             | −0.295***         | −0.726***            | −0.474***              | −0.230***         | −0.186***            | −0.544***              |
| Education/GDP      | (0.0194)          | (0.0191)              | (0.0184)               | (0.0194)          | (0.129)              | (0.132)                | (0.139)           | (0.133)              | (0.135)                |
| Female             | 0.0406*           | 0.0150                | −0.0795***            | 0.0419*           | 0.0166               | −0.0784***             | 0.0418*           | 0.0162               | −0.0786***             |
|                    | (0.0219)          | (0.0220)              | (0.0220)               | (0.0218)          | (0.0220)             | (0.0220)               | (0.0218)          | (0.0220)             | (0.0220)               |
| Some primary       | −0.0740***        | 0.0412                | 0.0481                | −0.0698*          | 0.0442               | 0.0494                | −0.0694*          | 0.0452               | 0.0501                 |
| education          | (0.0364)          | (0.0370)              | (0.0371)               | (0.0364)          | (0.0369)             | (0.0371)               | (0.0364)          | (0.0369)             | (0.0371)               |
| Primary education  | −0.107***         | 0.0344                | 0.122***              | −0.0993***        | 0.0400               | 0.127***               | −0.0976***        | 0.0442               | 0.129***               |
|                    | (0.0350)          | (0.0356)              | (0.0357)               | (0.0350)          | (0.0356)             | (0.0356)               | (0.0350)          | (0.0355)             | (0.0357)               |
| Secondary education | −0.241***        | 0.0787*               | 0.271***              | −0.234***         | 0.0843*              | 0.275***               | −0.230***         | 0.0916***            | 0.280***               |
|                    | (0.0453)          | (0.0456)              | (0.0458)               | (0.0453)          | (0.0456)             | (0.0458)               | (0.0453)          | (0.0456)             | (0.0458)               |
| Postsecondary      | −0.249***         | 0.152***              | 0.318***              | −0.242***         | 0.159***             | 0.322***               | −0.238***         | 0.166***             | 0.327***               |
|                    | (0.0492)          | (0.0497)              | (0.0502)               | (0.0492)          | (0.0497)             | (0.0501)               | (0.0492)          | (0.0497)             | (0.0501)               |

(Continues)
| Dependent variable          | (1) Expensive fees | (2) Lack of textbooks | (3) Teacher absenteeism | (4) Expensive fees | (5) Lack of textbooks | (6) Teacher absenteeism | (7) Expensive fees | (8) Lack of textbooks | (9) Teacher absenteeism |
|----------------------------|--------------------|-----------------------|------------------------|--------------------|-----------------------|------------------------|--------------------|-----------------------|------------------------|
| Age (26–35)                | −0.141***          | −0.0856***            | −0.139***              | −0.140***          | −0.0847***            | −0.139***              | −0.139***          | −0.139***              | −0.0848***            |
|                           | (0.0303)           | (0.0305)              | (0.0305)               | (0.0303)           | (0.0305)              | (0.0304)               | (0.0303)           | (0.0305)              | (0.0304)              |
| Age 3 (>35)                | −0.0887***         | −0.0976***            | −0.185***              | −0.0870***         | −0.0966***            | −0.185***              | −0.0862***         | −0.0957***            | −0.184***              |
|                           | (0.0289)           | (0.0291)              | (0.0291)               | (0.0289)           | (0.0291)              | (0.0290)               | (0.0289)           | (0.0291)              | (0.0291)              |
| Rural                     | 0.234***           | 0.0416                | 0.0870***              | 0.236***           | 0.0407                | 0.0853***              | 0.236***           | 0.0431                | 0.0853***              |
|                           | (0.0281)           | (0.0281)              | (0.0284)               | (0.0281)           | (0.0281)              | (0.0284)               | (0.0281)           | (0.0281)              | (0.0285)              |
| Constant                  | −1.141***          | −0.721***             | −0.989***              | −0.350             | −0.209                | −0.280                 | −0.132             | 0.0485                | −0.00791              |
|                           | (0.242)            | (0.200)               | (0.206)                | (0.228)            | (0.178)               | (0.180)                | (0.241)            | (0.192)               | (0.197)               |
| Number of observations    | 43,968             | 42,863                | 42,150                 | 43,968             | 42,863                | 42,150                 | 43,968             | 42,863                | 42,150                |
| Number of countries       | 32                 | 32                    | 32                     | 32                 | 32                    | 32                     | 32                 | 32                    | 32                     |
| Number of regions         | 408                | 408                   | 408                    | 408                | 408                   | 408                    | 408                | 408                   | 408                    |
| BIC                       | 53,299.2           | 52,297.1              | 52,220.5               | 53,341.8           | 52,321.4              | 52,276                 | 53,350.7           | 52,349.9              | 52,292.8              |
| Rho(region)               | 0.27               | 0.16                  | 0.19                   | 0.28               | 0.16                  | 0.18                   | 0.29               | 0.18                  | 0.2                    |
| Rho(country)              | 0.2                | 0.09                  | 0.1                    | 0.22               | 0.09                  | 0.09                   | 0.23               | 0.11                  | 0.11                   |

| Dependent variable          | (10) Expensive fees | (11) Lack of textbooks | (12) Teacher absenteeism | (13) Poor teaching quality | (14) Overcrowded classroom | (15) Poor facilities |
|----------------------------|---------------------|------------------------|--------------------------|------------------------------|-----------------------------|----------------------|
| Local corruption           | 1.064***            | 1.273***               | 1.196***                 | 1.308***                     | 1.619***                    | 1.356***             |
|                           | (0.149)             | (0.146)                | (0.149)                  | (0.149)                      | (0.152)                     | (0.158)              |
| Local ineffectiveness     | 0.923***            | 1.235***               | 0.704***                 | 0.721***                     | 0.630***                    | 0.496***             |
|                           | (0.121)             | (0.122)                | (0.120)                  | (0.120)                      | (0.122)                     | (0.125)              |
| Dependent variable    | (10) Expensive fees | (11) Lack of textbooks | (12) Teacher absenteeism | (13) Poor teaching quality | (14) Overcrowded classroom | (15) Poor facilities |
|-----------------------|---------------------|------------------------|--------------------------|---------------------------|---------------------------|---------------------|
| Local responsiveness  |                     |                        |                          |                           |                           |                     |
| Country corruption    |                     |                        |                          |                           |                           |                     |
| Country effectiveness | $-0.959^{***}$      | $-0.366^{***}$         | $-0.378^{***}$           | $-0.942^{***}$            | $-0.285^{***}$            | $-0.574^{***}$      |
|                       | (0.0958)            | (0.0970)               | (0.0944)                 | (0.103)                   | (0.105)                   | (0.0994)            |
| Female                | 0.0290              | 0.0124                 | $-0.0805^{***}$          | $-0.105^{***}$           | $-0.0389^*$               | $-0.0390^*$         |
|                       | (0.0206)            | (0.0209)               | (0.0207)                 | (0.0209)                  | (0.0213)                  | (0.0215)            |
| Some primary education| $-0.0577^*$         | 0.0534                 | 0.0809**                 | 0.104***                  | $-0.00848$                | 0.0637*             |
|                       | (0.0346)            | (0.0353)               | (0.0352)                 | (0.0355)                  | (0.0362)                  | (0.0367)            |
| Primary education     | $-0.0811^{**}$      | 0.0533                 | 0.153***                 | 0.243***                  | 0.0553                    | 0.0699**            |
|                       | (0.0331)            | (0.0338)               | (0.0337)                 | (0.0339)                  | (0.0347)                  | (0.0350)            |
| Secondary education   | $-0.219^{***}$      | 0.112***               | 0.300***                 | 0.362***                  | 0.128***                  | 0.225***            |
|                       | (0.0421)            | (0.0427)               | (0.0425)                 | (0.0427)                  | (0.0436)                  | (0.0440)            |
| Postsecondary         | $-0.220^{***}$      | 0.175***               | 0.336***                 | 0.437***                  | 0.223***                  | 0.308***            |
|                       | (0.0458)            | (0.0467)               | (0.0468)                 | (0.0469)                  | (0.0484)                  | (0.0481)            |
| Age (26–35)           | $-0.138^{***}$      | $-0.0671^{**}$         | $-0.116^{***}$           | $-0.0688^{**}$            | $-0.0446$                 | $-0.123^{***}$      |
|                       | (0.0281)            | (0.0285)               | (0.0283)                 | (0.0284)                  | (0.0292)                  | (0.0292)            |
| Age3 (>35)            | $-0.0716^{***}$     | $-0.0747^{**}$         | $-0.154^{***}$           | $-0.0589^{**}$            | $-0.0521^*$               | $-0.206^{***}$      |
|                       | (0.0270)            | (0.0273)               | (0.0272)                 | (0.0273)                  | (0.0280)                  | (0.0281)            |
| Rural                 | 0.200***            | 0.0360                 | 0.0682**                 | 0.0479*                   | 0.115***                  | 0.130***            |
|                       | (0.0264)            | (0.0266)               | (0.0267)                 | (0.0268)                  | (0.0276)                  | (0.0278)            |
| Constant              | $-2.684^{***}$      | $-2.379^{***}$         | $-2.101^{***}$           | $-2.768^{***}$            | $-2.004^{***}$            | $-3.407^{***}$      |
|                       | (0.170)             | (0.161)                | (0.165)                  | (0.175)                   | (0.181)                   | (0.174)             |
### TABLE 4  (Continued)

| Dependent variable | (10) Expensive fees | (11) Lack of textbooks | (13) Teacher absenteeism | (12) Poor teaching quality | (14) Overcrowded classroom | (15) Poor facilities |
|--------------------|---------------------|------------------------|--------------------------|---------------------------|---------------------------|-------------------|
| Number of observations | 49,115 | 47,749 | 46,981 | 46,846 | 47,361 | 47,379 |
| Number of countries | 33 | 33 | 33 | 33 | 33 | 33 |
| Number of regions | 446 | 446 | 446 | 446 | 446 | 446 |
| BIC | 59,928.03 | 58,330.9 | 58,752.1 | 58,134.1 | 56,282.1 | 55,559.6 |
| Rho(region) | 0.15 | 0.13 | 0.16 | 0.17 | 0.19 | 0.15 |
| Rho(country) | 0.08 | 0.06 | 0.07 | 0.09 | 0.1 | 0.07 |

Notes: This table reports the estimation results on the determinants of the probability to experience challenges at public schools in Africa, using the multilevel logit model. Each of the columns has a different dependent variable that is one of the six school challenges. All the estimations include variables that capture access to information through radio, television, or newspapers and deprivation of basic needs such as food, water, medicine, and cash and interest in public affairs. The survey, country, and region fixed effects are accounted in the estimations. Clustered standard errors at the region and country levels are in parentheses. **Significant at 1%, *significant at 5%, and *significant at 10%.** Rho(region) indicates the fraction of the variance explained by factors at the regional level, while Rho(country) indicates the fraction of the variance explained by factors at the country level. GDP = gross domestic product.
4.2 | Cross-sectional analysis (ordinary least squares and instrumental variables)

This section presents the cross-sectional results where we have regressed the proportion of people who claim having experienced education resource challenges on the three local governance measures. In the different specifications, we have controlled for the round (or time) dummy and region fixed effects. We also clustered regions within countries. The results are presented in Table 5. We can see that local government corruption and local government ineffectiveness have positive and significant effects on the proportion of people who report poor educational resources quality.

These results show that a one-point increase in the percentage of people who perceived local government councillors as corrupt increases the percentage of people who have experienced expensive school fees in their public schools by 0.37 and the percentage of people who lacked textbooks and learning materials by 0.46. These values are 0.43 for teaching quality, 0.35 for teacher absenteeism, 0.52 for overcrowded classrooms, and 0.46 for poor facilities.

The estimated coefficients on the measure of local government ineffectiveness are lower than those obtained on local government corruption, taking differences in mean values. We also do not find a significant effect of local government ineffectiveness on poor quality of facilities. In contrast, local government responsiveness remains hardly insignificant regardless of the indicator of learning.

| Table 5 | Cross-regional analysis on the determinants of educational resource challenges (ordinary least squares) |
|---------|------------------------------------------------------------------------------------------------|
|         | (1) Expensive school fees | (2) Lack of textbooks | (3) Poor teaching quality | (4) Teacher absenteeism | (5) Overcrowded classroom | (6) Poor facilities |
| Local corruption | 0.373** (0.166) | 0.455*** (0.150) | 0.428** (0.167) | 0.351* (0.179) | 0.521*** (0.163) | 0.461** (0.211) |
| Local ineffectiveness | 0.332*** (0.107) | 0.435*** (0.108) | 0.324*** (0.0961) | 0.289** (0.109) | 0.268** (0.123) | 0.161 (0.201) |
| Local responsiveness | 0.0961 (0.173) | 0.0726 (0.188) | 0.193 (0.126) | 0.103 (0.0882) | 0.152 (0.119) | 0.246 (0.201) |
| Constant | 0.0309 (0.209) | −0.0297 (0.188) | −0.262 (0.209) | −0.0476 (0.157) | −0.1 (0.139) | −0.165 (0.261) |
| Region and round fixed effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Cluster | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 642 | 642 | 642 | 642 | 642 | 642 |
| $R^2$ | 0.842 | 0.843 | 0.827 | 0.846 | 0.862 | 0.752 |

Notes: This table reports the estimation results on the effects of local governance quality on the proportion of individuals in a region who claim to experience poor school resources. In column 1 the dependent variable is the proportion of people in a given region who experienced expensive school fees. In column 2 the dependent variable is the proportion of people in a given region who experienced a lack of textbooks and/or teaching materials. In column 3 the dependent variable is the proportion of people in a given region who experienced poor teaching quality. In column 4 the dependent variable is the proportion of people in a given region who experienced teacher absenteeism. In column 5 the dependent variable is the proportion of people in a given region who experienced overcrowded classrooms. In column 6 the dependent variable is the proportion of people in a given region who experienced poor school facilities. Standard errors in parentheses are clustered at the country level. ***Significant at 1%, **significant at 5%, and *significant at 10%.
resources used as the dependent variable. Therefore, we do not include the measure of local government responsiveness in the rest of the analysis.

To correct for possible endogeneity, we run additional estimations using our proposed instruments for the measures of local governance quality. Recall that as instruments we use for each region the average value of local government corruption in the other regions of the country and a dummy variable that indicates whether the level of local government corruption in a region is higher than the median across all the regions within the same country. We also compute similar instruments for the measure of local government ineffectiveness. Table 6 presents the first step of the instrumental variable results where the measures of local governance quality are regressed on the instruments. It is shown that the instruments are significant determinants of the quality of local governance indicators. Both an increase in the average values of local government and local government ineffectiveness in the other regions increase the measure of local government corruption and local government ineffectiveness in a given region, respectively. Also, the dummies on whether a region records government corruption or ineffectiveness measures above the median values have positive effects on local governance quality measures.

Table 7 reports the second-step estimation results. The coefficients on the two measures of local governance quality remain positive and significant, and they are slightly higher than those in Table 5. In terms of marginal effects, we find that a one-point percentage increase in the measure of local government corruption increases the percentage of people who claim to have high school expenses in their local public schools by 0.42%. This value is 0.6% for the lack of textbooks, 0.7% for teaching quality, 0.6% for teacher absenteeism, and 0.9% for overcrowded classrooms and poor facilities. The effects of a one-point percentage increase in the measure of local government ineffectiveness are lower. For instance, an increase in the measure of local government ineffectiveness by 1% is associated with an

| Dependent variable          | Local corruption | Local ineffectiveness |
|----------------------------|------------------|----------------------|
| Other regions corruption    | 0.661***         | 0.081                |
|                            | (0.109)          | (0.116)              |
| Other regions ineffectiveness | 0.084           | 0.757***             |
|                            | (0.07)           | (0.075)              |
| Gap.median-corruption       | 0.141***         | 0.03**               |
|                            | (0.012)          | (0.012)              |
| Gap.median-ineffectiveness  | 0.006            | 0.177***             |
|                            | (0.013)          | (0.013)              |
| Constant                   | 0.103            | −0.191*              |
|                            | (0.108)          | (0.115)              |
| $R^2$                      | 0.76             | 0.84                 |
| Number of observations      | 642              | 642                  |

Notes: This table reports the estimation results for the first step of our instrumental variable specification. The instruments for the measure of local corruption are the average value of corruption in the other regions of the country and a dummy that takes a value of 1 if the value of corruption for a given region is above the median value across all the regions from the same country at time $t$ and 0 otherwise. Similarly, the instruments for the measure of local government effectiveness are the average value of effectiveness in the other regions of the country and a dummy that takes a value of 1 if the value of effectiveness for a given region is above the median value across all the regions from the same country in time $t$ and 0 otherwise. The survey fixed-effects are included. Standard errors are in parentheses. ***Significant at 1%, **significant at 5%, and *significant at 10%.
increase in the percentage of people who experience poor teaching quality by 0.2% against 0.7% in the former. Similarly, the effect on “overcrowded classroom” is 0.2% against 0.9% for corruption.

5 | CONCLUSIONS

The role of education in the process of development has been acknowledged in various sectors, as a better-educated population is associated with a healthier population, greater productivity, more equality, and stronger legitimacy of democratic values. In line with the education for all agenda, many African governments have significantly increased their investment in education in the past years.
Such financial efforts have been followed by a significant increase in school enrollment, particularly in primary schools, where the gap between boys and girls has also been remarkably reduced. Yet school dropout rates, low level of secondary attendance, and, more important, poor quality of learning outcome, which remained way below the international standard, are serious challenges faced in many African public schools. As discussed in this paper, alarming statistics from the Afrobarometer surveys reveal that, when asked about education challenges experienced in local public schools, more than 40% of the respondents identified school fees as being very expensive, and more than 50% reported the lack of textbooks and learning supplies, poor quality of teaching, and teacher absenteeism. This raises the question of what the drivers of poor educational resources and services in public schools in Africa are.

Good management of education resources, accountability, and transparency are desired in any governments to ensure the success of policies toward a better quality of public services, such as better learning outcome. Absence of corruption, accountability, effectiveness, and responsiveness are good values needed at all levels, including within local governments, defined as the set of formal institutions legally established to deliver specific public services to relatively small geographic jurisdictions. Yet African citizens massively perceived their local governments as weak institutions with high level of corruption.

This paper investigated the extent to which pervasive corruption, ineffectiveness, and unresponsiveness among local government officials in Africa affect the incidence that local inhabitants report poor quality of human and physical learning resources in their local public schools. We took advantage of the series of rich information collected in the Afrobarometer surveys that include information on citizens' perception of the behaviors and performance of their local government representatives. The data also provide information on school challenges that citizens face in their local public schools. Our findings indicate that local government officials' corrupt behaviors and ineffectiveness increase the probability of experiencing poor school resources by the local inhabitants, even after controlling for government expenditure on education. This paper did not directly assess the association between local governance quality and schools' performances because of the lack of data. But the different educational resource challenges explored in this paper, such as lack of access to textbooks, poor teaching quality, or teacher absenteeism, affect school performances directly. Therefore, this paper's findings have significant implications for the policy debate about improving education quality in Africa by 2030.

Success in many of the Sustainable Development Goals relies strongly on improving education in many parts of the world (UNESCO, 2016). For that to happen, more investment in education is indeed required, but good management of funds and resources for education is the only way to guarantee that such financial resources reach the populations in need of these resources. Strong actions toward combating corruption and any other misbehaviors by all the parties participating in the delivery of education, including local public officials, will guarantee the efficient use of education funds. As shown in this paper, bad governance at the local level reflected by local government councillors' misbehavior tends to impede both education resources needed to increase enrollment and eradicate early school dropout rates and educational resources that are necessary to improve the quality of learning. Bad quality of local governance also has a negative effect on teachers by increasing teachers’ absenteeism and undermining their accountability to students and parents. Unfortunately, the 2019 Transparency International reveals that there are no signs that corruption is declining in Africa. In addition, the same source informs that in the past few years, more than 130 million citizens across 35 African countries paid bribes to access basic public services, including services in the education sector.
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DATA AVAILABILITY STATEMENT
The data that support the findings of this study were derived from the following resources available in the public domain: Afrobarometer. https://www.afrobarometer.org.

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ENDNOTES
1 See UNESCO GEMR (2015, chaps. 2 and 8).
2 In contrast, in the context of developed countries, evidences have supported conflictual arguments on the real impacts of learning resources on learning outcome in developed countries (see, for instance, the seminal work by Hanushek, 2003, for evidence in the United States), casting doubt on the effectiveness of policies that aim at enhancing more investment in learning resources.
3 The Afrobarometer is a series of national surveys on the attitudes of citizens toward democracy, markets, civil society, and other aspects of development in more African countries. Due to lack of information on learning inputs in public schools in round 4, our studies will focus on rounds 3 and 5.
4 It is important to note that the surveys do not provide any information on whether these are primary, secondary, or tertiary schools.
5 https://images.transparencycdn.org/images/Full-Report-Global-Corruption-Barometer-Africa-2019.pdf

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