

# Education Resources and the Quality of Local Governance in Africa

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## Abstract

We investigate the extent to which the quality of educational resources responds to the quality of governance in local government offices in Africa. We distinguish between learning resources that are more related to school enrolment and to drop-out rates, such as school fees and facilities, and those that are more related to quality of learning outcomes, such as textbook availability, teacher absenteeism or quality of teaching. Our subjective indicators of local governance are measured at the regional/provincial level, which is the smallest geographical location in our pooled Afrobarometer dataset. Our findings indicate that the quality of local governance has a similar effect on either type of learning resource, and that corrupt behaviors and ineffectiveness by local government officials

increase the probability of the local inhabitants experiencing poor quality or lack of school resources, even after controlling for government expenditure on education. Our cross-region analysis with instrumental variables reports that a one-point increase in the measure of local government corruption is associated with an increase of about 0.4 to 0.7 points in the proportion of people who face poor quality or low levels of human or physical school resources in their local public schools. These values vary between 0.3 and 0.4 points for a one-point increase in the measure of local government ineffectiveness.

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# Education resources and the quality of local governance in Africa <sup>1</sup>

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## 1 Introduction

Several African governments have increased their investment in education in the last years (UNESCO GEM report 2015, chapter 8). As a result, school enrolment has significantly increased in the region, lowering the existing persistent gap from the rest of the world (UNESCO GEM report 2015, chapter 2). Despite these acknowledged financial efforts, investments on school inputs have not been sufficient enough to eradicate school drop outs and to close the persistent learning-outcome gap between African countries and more advanced economies (Galiani and Perez-Truglia 2014). The lack of adequate learning resources, infrastructures and facilities, coupled with low teacher pay and high teacher absenteeism are real challenges that hamper learning outcomes. The Afrobarometer surveys over the period 2005-2013 highlight that more than 50 percent 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 faced in their public schools.

Recent studies have revealed that better school inputs, good quality of teachers and lesser teacher absenteeism have fueled the quality of school learning in parts of developing countries (Glewwe et al. 2014; Duflo et al. 2012; Muralidharan and Sundararaman 2011).<sup>2</sup> However, policies towards supplying more financial resources for better public service delivery may not necessarily guarantee greater improvement if accompanied by bad governance, corruption, mismanagement, lack of accountability, and transparency at the central and local government levels. Local governments are defined as the set of formal institutions legally established to deliver a set of specified public services to relatively small geographic jurisdictions.

Yet, a significant proportion of interviewed African citizens perceive local councils as weak institutions that rarely perform well and are unresponsive (Bratton 2012). 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 human and physical educational supplies in their local public schools, something that is detrimental to the much needed learning outcomes and quality in African countries.

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<sup>2</sup> In contrast, in the context of developed countries, evidences have supported conflictual arguments on the real impacts of learning inputs on learning outcomes in developed countries (see for instance the seminal work by Hanushek, 2003, for evidence in the USA), casting doubt on the effectiveness of policies that aim at enhancing more investment in school inputs.

Local government officials are closer to their people and thus are expected to better master the most appropriate policies that respond adequately to the needs of their local people. Well-governed localities improve the quality of public service delivery (see Deininger and Mpuga, 2005, for an investigation in Uganda), and reduce the incidence of conflict in sub-Saharan Africa (Wig and Tollefsen 2016). More related to education, thorough evidence in Brazil by Ferraz et al. (2012) has further documented that, students living in municipalities, where missing federal education funds are detected, record lower learning performance and higher drop-out and failure rates.

In the African context, there exist few evidences on the effect of bad local governance on learning outcomes mainly due to the lack of reliable learning assessment surveys, comparable across countries. We will look at the effect of local governance quality on the quality of human and physical learning inputs in African public schools. We distinguish between learning inputs that are more related to school enrolment and drop-out rates, such as school fees and facilities, and those that are more related to learning performance, such as textbooks, teacher absenteeism, and quality of teaching.

To conduct our analysis, we rely on subjective indicators of bad/good governance practices by local government representatives, as perceived by the local citizens. We take the advantage of the series of rich information collected in round 3 (2005-2006) and round 5 (2011-2013) surveys of the Afrobarometer<sup>3</sup>, that include various 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 as well as on their degree of responsiveness to the local population, and how effective they are in fulfilling their jobs.

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

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<sup>3</sup> The Afrobarometer is a series of national surveys on the attitudes of citizens towards 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.

It is worth noting that measuring the perception of local governance at the regional level instead of relying on the single reply of each respondent separately enables us to reduce potential endogeneity that can yield biased estimates. Endogeneity may occur because of a possible causality issue between experiencing poor quality of learning inputs and an individual's own perception of the quality of local governance. On the one hand, an individual who has experienced weak school inputs might be more likely to judge negatively the quality of local governance. On the other hand, an individual who has a negative perception of the quality of local governance might also be more likely to complain about the quality of public school inputs. Hence, using the proportion that takes the assessment of all the interviewees from the same smaller geographical location may reduce such a possible causality bias. In this context, it is then less likely that an individual who experiences input challenges will have a significant effect on the overall assessment of the quality of local governance in her/his region. Furthermore, our data are from repeated surveys across two time periods at the regional and country levels, enabling us to account for regional, country, and time-fixed effects that might influence both individual responses and local governance measures.

To strengthen our efforts to capture causality rather than just association, we also propose a cross-regional analysis in order to be able to run fixed-effect estimations given that the Afro- barometer data are repeated at the regional level, and we propose an instrumental variable strategy using two instruments for each measure of local governance quality. We then regress the proportions of individuals who face a specific school input challenge in a given region on the measures of the quality of local governance in that region. 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. We also propose a dummy variable that indicates whether the measure of local corruption in a region is above the median of the values for corruption in all the regions within a country. Similar instruments are also used for the measure of local government ineffectiveness.

We find that individuals who live in regions with poor quality of local governance are significantly more likely to claim having experienced a lack of good-quality school inputs, such as poor quality of teaching, lack of adequate textbooks, high incidence of teacher absenteeism or poor facilities and teaching conditions. The results are regardless of the type of resources we consider. However, the effect varies across the indicators of local governance used, where the indicator of corruption and the indicator of effectiveness are more robust determinants than is responsiveness, but with corruption having a greater impact. These results are robust to

different specifications and to the inclusion of different individual- and country-level characteristics, such as the level of government expenditure on education. More interestingly, our cross-section analysis results reveal that a one-point increase in the subjective measure of local government corruption is associated with an increase of about 0.4 to 0.7 points in the proportion of people who face poor human or physical school resources in public schools. These values vary between 0.3 and 0.4 points for the measure of local government ineffectiveness.

The rest of the paper is divided as follows. The next section documents some strands of the literature that can be linked to this paper. Section 3 presents the data and some descriptive statistics. Section 4 describes our empirical strategy, while Section 5 discusses the results. Section 6 provides some concluding remarks and discussions.

## **2 Related Literature**

This paper is related to three different strands of the literature. First, it follows the literature on the detrimental effect of corruption and bad governance on public investments and development. Second, we closely follow the literature that has investigated how good governance and good behaviors from local government representatives are associated with high quality of education. Finally, our paper is also linked to the recent and scarce literature on the evaluation of the performance of government representatives, and on the importance of local governance for development in Africa.

### **2.1 Corruption, Governance, and Public Investment**

The literature on the effect of corruption on growth and on development has long been discussed, and yet there is no consensus on whether corruption greases or sands the wheels of growth and investment. Starting with the influential paper by Mauro (1995), corruption has been linked to less public investment, thereby lowering economic growth, and also by deviating public funds into higher investment opportunities that yield high revenues for rent-seekers. Education expenditures (e.g., textbooks, teachers' salaries) are not necessarily the most prominent source of high profits for rent-seekers, unlike large infrastructure projects that yield high bribe payments. As such, corrupt countries might redirect their disposal of resources on education to more profitable rent-seeking activities (Mauro 1998).

More-recent literature has further concluded that whether corruption sands or greases development depends on the quality of governance and institutions settled in a country. For instance, while Meon and Sekkat (2005) found that the negative effect of corruption on economic growth and investment is worse in countries with poor quality of governance, Meon (2010) found that corruption is less detrimental to productivity in countries with good-quality institutions. Looking at the other part of the literature that has supported a positive effect of corruption on investment, Keefer and Knack (2007) have highlighted a higher level of public investment in countries with bad governance, arguing that governments may use public investment to deepen their rent-seeking activities.

Therefore, efforts to increase public investment for enhancing economic outcomes in countries with weak governance should be interpreted with caution. In this paper, we find that, even after controlling for government expenditure on education, the quality of governance at the local level remains an important determinant of the quality of learning resources in African public schools. This casts doubt on whether such investment on education reaches the targeted populations.

## **2.2 Governance and Education**

In their seminal paper, Deininger and Mpuga (2005) have focused on the extent to which accountability determines the quality of public service delivery in Uganda. They have pointed out that greater accountability is harmful for corruption, and in turn, it significantly increases the quality of service delivery in education and health. The cost of getting access to public services through a bribe payment has been argued to depend on individual or household socio-economic characteristics, such as the level of income. Corruption is progressive when richer people or households pay more bribes than their poorer counterparts in exchange for public services.

In the sector of education, Emran et al. (2013) and Choe et al. (2013) have supported the thesis that corruption is regressive, meaning that poor households are more likely to pay school bribes than are rich households. Either way, corruption is harmful for equality and inclusiveness in education, regardless of its nature. When corruption is progressive, available education resources will be disproportionately distributed to richer households who are willing to bear the cost of bribe payments, creating inefficiency in the allocation of available educational resources in the economy. On the other hand, when corruption is regressive, then it increases school expenses for the poor households who might not have enough resources to

send their children to schools or to get access to appropriate learning materials, such as textbooks or good teaching. Our data do not provide information on the individual (or household) level of income, but we control for asset ownership as proxy for poverty.

Some recent studies have looked at the effect of decentralization on learning outcomes and quality of education (e.g., Galiana et al. 2008; Ferraz et al. 2012; Hanushek et al. 2013). While Galiana et al. (2008) found that decentralization has an overall positive impact on student test scores in Argentina, Hanushek et al. (2013) instead pointed out that school autonomy has a heterogeneous effect on learning outcomes, depending on the level of development. Based on a cross-section data analysis, they find that school autonomy has a positive effect on student performance in developed countries, but this effect turns negative for less advanced countries. Ferraz et al. (2012) on the other hand, incorporated the quality of local governance in the relationship between decentralization and learning outcomes in Brazil, showing that students living in municipalities with detected missing federal education funds record lower learning performance and higher drop-out and failure rates.

As far as we are aware, there are no studies that have investigated the effect of the quality of local governance on learning outcomes in African countries, in particular, in sub-Saharan African countries. Data on learning assessment comparable across African countries are not available, and we therefore propose instead to look at how the quality of local governance affects the quality of educational inputs supplied in African public schools. We believe that some of the educational inputs, such as quality of teaching, teacher absenteeism or availability of textbooks, are important determinants of learning achievement.

### **2.3 Local Governance and Development in Africa**

Finally, the closest literature linked to our paper consists of the limited and recent studies that have been investigating in African countries the determinants of citizens' perception and evaluation of their local officials (Bratton 2012; Jilke 2013), as well as the effect of local government officials on the quality of public service delivery and on the incidence of conflict (Deininger and Mpuga 2005; Wig and Tollefsen 2016). Using a large sample of sub-Saharan African countries, Bratton (2012) indicated that local councils are perceived as weak institutions with limited functions and elected councilors as largely unresponsiveness by African citizens. Citizens' political involvement is an important determinant of the perception of local government responsiveness, where greater involvement is associated with more perceived responsiveness of the local councilors.

In a similar spirit, but focusing on the specific case of the federal republic of Ethiopia, Jilke (2013) provided evidence that local context matters. Indeed, local Ethiopian jurisdictions with more transparency and greater public access to political decision making, record higher perception of accountable local officials. Unlike these two evidences of the determinants of citizens' perception of good/bad practices of their local government officials, Deininger and Mpuga (2005) explored how households' knowledge of bad practices by government officials determine the quality of service delivery in Uganda. Likewise, Wig and Tollefsen (2016) have highlighted that good quality of local government institutions helps to avoid the incidence of conflict in sub-Saharan African countries.

In this paper we will follow the same line of literature by looking at how the quality of local governance perceived by local inhabitants may affect the incidence of poor quality of public goods and service delivery in education experienced by local citizens.

### **3 Data**

For our analysis, we use the Afrobarometer data, which are a collection of nationally representative surveys in 34 African countries, including 30 sub-Saharan African countries and four North African countries. These surveys give information on citizens' opinions regarding democracy, governance, and any other aspects of development. At the time of writing, five different rounds of the Afrobarometer data across different time periods have been released, while a sixth round has been conducted.

In this paper, we will employ rounds 3 and 5, the only available surveys for which we have information on the challenges related to the quality of school inputs that individuals have experienced in their local public schools. In addition, we are informed about the perception that interviewees have of the behaviors and performance of their local government councilors, allowing us to construct subjective measures of quality of local governance. The surveys in round 3 were collected between 2005 and 2006 in 18 sub-Saharan African countries, while the round 5 surveys were collected between 2011 and 2013 from 34 countries and go beyond the sub-Saharan African region to include four North African countries (Algeria, Egypt, Morocco, and Tunisia). For the rest of the paper, we will exclude Egypt in our analysis, due to missing questions related to individuals' perception of the quality of their local government officials. Our analysis will be thus limited to nationally representative surveys in 33 African countries.

### 3.1 Measuring School Input Quality

We rely on a range of questions from the surveys that ask the respondents how often, if ever, they have encountered in their local public schools the following issues in the last twelve months: (1) expensive school fees, (2) lack of textbooks or other supplies, (3) poor teaching, (4) teacher absenteeism, (5) overcrowded classrooms, and (6) poor conditions of facilities. For each of these six categories, we create a dummy variable that takes a value of 0 if the individual has not encountered this specific issue and 1 if she/he encountered this specific issue regardless of the number of times this happened during the last twelve months prior to the interview.

The distribution of the individuals across the *yes* and *no* categories for each of the above categories is shown in Table 1. Overcrowded classrooms is the one that records the highest percentage of individuals who list it as an issue faced in the last twelve months, with a value of 60 percent, followed respectively by the lack of textbooks or other supplies, teacher absenteeism, and poor teaching. School fees and poor facilities are the ones identified by less than half of the respondents in our sample with respective percentages of 46 percent and 47 percent.

It should be noted that these six inputs on which we focus in this paper are not necessarily equal and might affect education differently. Indeed, some of them, such as the lack of adequate textbooks, teacher absenteeism, and poor quality of teaching might be seen as primary necessary inputs for the improvement of learning outcomes, unlike school fees which we believe have a higher impact on the quantitative aspect of education, such as school enrolment. Similarly, the size of classrooms, which is our category overcrowded classrooms, has not been evidenced to be strongly linked to learning outcomes. It is well established that policy towards reducing the number of students per classroom is not necessarily accompanied by better learning outcomes in developing countries as Duflo et al. (2012) illustrated in Kenya.

**Table 1: School input challenges in local public schools**

	<b>Category</b>	<b>No. of observations</b>	<b>Percentage</b>
Too expensive	Yes	23,831	46.06
	No	27,907	53.94
	Total	51,738	100
Lack of textbooks or other	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 distributions of the individuals across the *yes* and *no* categories for each of the six indicators of school inputs. The data section explains the construction of each of the 6 education inputs.

### 3.2 Measuring Quality of Local Governance at the Regional Level

#### 3.2.1 Local-Governance-Related Questions from the Afrobarometer

We consider three different sets of indicators to measure the quality of local governance, all based on the perception of interviewed individuals. These include (a) the pervasiveness of corruption exhibited by the local government officials, capturing the extent to which the local government representatives are involved in corruption; (b) local government effectiveness measured by the job performance of the local government representatives; and (c) local government responsiveness that informs us of the degree to which the local representatives listen to their local people.

Regarding category (a) on the extent to which local government councilors 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 councilors?” The different possible answers given by the respondents include “none of the local officials are involved in corruption”, “some of them...”, “most of them...”, “or all of them are involved in corrupt activities”.

For category (b) 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 twelve months, or haven’t you heard enough about them to say: Local government councilors?” Respondents can “disapprove” or “strongly disapprove”, or they can “approve” or strongly “approve”.

Turning to category (c) on the extent to which local government councilors 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

councilors?” Individuals may reply “never”, “sometimes”, “often”, or “always”. For simplicity we regard as missing values all the replies that include “I don’t know”, “I haven’t heard enough about...” or refusals to answer when coding the three measures of local governance quality.

### **3.2.2 Measuring Local Corruption, Government Effectiveness, and Government Responsiveness at the Regional/Provincial Level**

To get our three measures that assess the quality of local governance at the regional level, we take in each region or province within each country the proportion of respondents who have reported that at least some of the local government councilors are involved in corruption, the proportion of people who disapproved the performance of the local government councilors in filling their jobs in the last twelve months, regardless of the degree of disapproval<sup>4</sup> and last but not least the proportion of individuals who replied that local councilors 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 rounds 3 and 5 together. Though, we assume that the closest local government officials to people are at the regional/provincial level. We believe that taking the proportion at the regional level instead of considering the single reply of each respondent separately is more appropriate to evaluate the overall quality of the local governance in each region. This also enables us to deal with potential endogeneity. Endogeneity may occur because of a possible causality issue between experiencing poor quality of learning inputs and own perception of the quality of local governance.

On the one hand, an individual who has experienced weak school inputs might be more likely to judge negatively the quality of the local governance; on the other hand, an individual who evaluates negatively/positively the local government representatives may be more likely/less likely) to be unhappy/happy with the quality of service delivery in the local schools. In addition, having the indicators of governance at the regional level reduces the number of missing values. In fact, all the individuals who have replied to the questions on school inputs but record missing values for the questions on the quality of the local officials are included in the estimations as long as we have the overall assessment of the local governance in their respective regions/provinces.

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<sup>4</sup> To avoid having very low numbers of observations per category, we just consider two categories: either “approve” or “disapprove”, regardless the degree of approval/disapproval.

### 3.2.3 Descriptive Statistics for the Measures of Local Governance

Table 2 shows some descriptive statistics for our three constructed measures of local governance quality based on the perception of the respondents across regions within different countries. The upper part of the table reports the statistics using the full sample that combines rounds 3 and 5. We observe that, on average, across the different regions for which information is available, 83 percent 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 percent, indicating high heterogeneity across the different regions.

Unlike the measure of local corruption, the one for local government effectiveness shows that only 46 percent of the respondents disapprove of the way the local government councilors have fulfilled their tasks, but with a higher standard deviation and thus higher heterogeneity. Looking at the measure of local government responsiveness, the numbers reveal that, on average, 55 percent of the interviewees acknowledge that the local governments are responsive, with again a high level of heterogeneity. Part of the high heterogeneity might reflect the differences across countries, and therefore we cluster regions within countries (see section 3).

Furthermore, at the bottom of Table 2, we have statistics for rounds 5 and 3 separately. Such an exercise is necessary to check how the figures change across the two time periods. One can note that there is no significant difference in the statistics across the two rounds for the measure of local government corruption and local government effectiveness. In contrast, for the measure of local government responsiveness, the proportion is higher in round 3 than in round 5 with a difference of 21 percent, but with a higher standard deviation in round 5 than in round 3. This seems to indicate that the degree of local government responsiveness has declined over time while remaining more heterogeneous in the latest round. One possible interpretation of such an observed gap between these two rounds is simply that the number of countries and regions has significantly increased in the later round 5.

**Table 2: Measures of local governance quality**

<b>Full sample (Round 5 and Round 3)</b>	<b>Local corruption</b>	<b>Local ineffectiveness</b>	<b>Local responsiveness</b>
Number of regions	645	644	645
Mean	0.829	0.460	0.549
Std. Dev.	0.165	0.216	0.237
Min.	0.115	0	0
Max.	1	1	1
<b>Round 5</b>			
Number of regions	443	442	443
Mean	0.851	0.467	0.483
Std. Dev.	0.155	0.212	0.235
Min.	0.1154	0	0
Max.	1	1	1
<b>Round 3</b>			
Number of regions	202	202	202
Mean	0.783	0.447	0.694
Std. Dev.	0.175	0.224	0.168
Min.	0.278	0	0.189
Max.	1	0.952	1

Note: This table shows the descriptive statistics for our three measures of local governance quality for the full sample, and then for each of the rounds separately. The data section explains the construction of these three indicators.

Next, Table 3 shows the coefficients of correlations between the three measures of local governance quality. We find a positive correlation between local government corruption and local government effectiveness measures. Such a result is expected, since corruption is often accompanied with rent-seeking activities and thus may yield inefficient use of public funds, crowding out the potential public service delivery, and less effectiveness from the local government representatives. However, the correlation between local government responsiveness and the two other measures are negative, indicating that higher responsiveness tends to reduce the level of corruption and to provide greater effectiveness by the local councilors in the execution of their jobs. This is in line with one of the arguments supporting decentralization, claiming that local governments are closer to their local people and, hence,

better master 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.

**Table 3: Correlations between the measures of local governance quality**

	Local corruption	Local ineffectiveness	Local responsiveness
Local corruption	1		
Local ineffectiveness	0.491	1	
Local responsiveness	-0.234	-0.464	1

Note: This table presents the coefficients of correlation between our three measures of local governance quality.

### 3.3 Additional Individual and Country-Context Characteristics

In addition to the indicators of local governance quality for which we control in our estimations, we also take into account variables at the country level as well as individual socio-economic characteristics. For the country-level variables, we mainly control for the indicators of governance, using data on control of corruption and government effectiveness, both from the Worldwide Governance Indicators. The indicator of control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests. The index varies between -2.5 and 2.5, where a higher level of corruption is associated with a lower value. The indicator of government effectiveness captures perceptions of the quality of public services, the quality of the civil service, and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies. It ranges from -2.5 to 2.5, where a higher value indicates higher government effectiveness.

We also control for the share of government expenditure on education on total GDP, taken from the World Development Indicators. Expenditures on education might affect both the dependent variable and the measures of local governance quality, in particular, the level of corruption. As stated by Keefer and Knack (2007), the level of public investment, such as expenditure on education, may be correlated with bad governance, arguing that weak governments use public investments as a tool to increase their rent-seeking activities. Therefore, higher expenditure on education might also increase the number of local government officials involved in corrupt activities for the sake of reaching high potential rent from such income resources. Also, we may argue that countries with low available investment

on education are countries where people are more likely to face education input challenges, such as poor facilities, poor teaching or teacher absenteeism, due to low payment or to delays in the payment of teacher salaries.

For the country-level variables, we use the years that coincide with the starting point of the interview, meaning 2005 for round 3 and 2011 for round 5. Table 4 shows the descriptive statistics for these country-level variables. Let us note that data on public expenditure on education as a percentage of GDP are missing for Nigeria in both years 2005 and 2011, while data are missing for Zambia in 2011 and for Malawi and Zimbabwe in 2005.<sup>5</sup> Table 4 shows that, in our sample of African countries, the level of good governance is quite moderate, given that the maximum value recorded in the sample is 1.14 for the control of corruption and only 0.86 for the measure of government effectiveness, while these indicators may go up to 2.5 by construction. Public investment on education is, on average, 5 percent of the GDP, and it varies quite significantly across time and countries, with a standard deviation of 2.5 percent.

**Table 4: Country-level characteristics**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>
Corruption Control	-0.463	0.596	-1.380	1.140
Government Effectiveness	-0.501	0.539	-1.390	0.860
Education Expenditure	5.405	2.497	1.736	14.791

Note: This table shows the descriptive statistics of the country-level variables that are included in some of our specifications.

Turning to the other control variables at the individual level, we consider the gender, the level of education, the age and the geographical location (rural versus urban) of the respondents. Access to information and involvement in public affairs might also be important for people to be better informed about the quality of their local governance. Therefore, we also consider information on whether the respondents have access to news from different sources including radio, TV, and newspapers, and we also include the extent to which the respondents are involved in political affairs. The Afrobarometer surveys lack information on income, and thus, to capture the level of poverty of the respondents, we refer to the exiting questions that ask whether respondents have been in a situation without food, water, medicine, or cash in the last twelve months. It is indeed worth noting that the previous information on access to media

<sup>5</sup> Although we have recorded missing data on public expenditure on education for Liberia, Niger, Algeria, and Morocco in 2005, this does not affect our number of observations given that interviews in round 3 had not been conducted in those countries.

through radio and TV may, to some extent, be additional information on the level of poverty by informing us about the asset ownership of the respondents.

Table 5 presents these different individual socio-economic characteristics with the distribution of individuals across the different categories. We can observe that in terms of gender, our data are quite proportionally distributed across men and women, ensuring equal representation of the two genders. For education, 20 percent of the individuals do not have a formal education and, looking at the geographical location, more than 60 percent of the interviewees come from rural areas.

**Table 5: Individual-level characteristics**

Variable	Category	Percentage	Defined in the estimations as
Gender	Female	50.03	female
	Male*	49.97	
Education	Some Primary	18.57	educ1
	Primary	35.68	educ2
	Secondary	14.86	educ3
	Post-secondary	11.89	educ4
	No Formal*	20.00	
Age	<36	29.63	age1
	>35	44.77	age2
	<26*	25.60	
Location	Urban	38.45	urban
	Rural*	61.55	
Access Media through radio	Yes	84.88	radio
	No*	15.12	
Access Media through TV	Yes	58.09	tv
	No*	41.91	
Access Media through newspaper	Yes	40.97	paper
	No*	59.03	
Have ever gone without food	Yes	50.80	food
	No*	49.20	
Have ever gone without water	Yes	48.60	water
	No*	51.40	
Have ever gone without medicine	Yes	54.59	medicine
	No*	45.41	
Have ever gone without cash	Yes	76.63	cash
	No*	23.37	
	Very	31.58	

Variable	Category	Percentage	Defined in the estimations as
Interest in political affairs	A little bit	50.08	publicinterest2
	No*	18.34	

Note: This table shows for each of the individual characteristics variable, the distribution of the individuals across the different categories associated with the variable. \* indicates the reference group in the estimations.

#### 4 Empirical Strategy

We have data for more than 50,000 individuals interviewed from more than 600 different regions across 33<sup>6</sup> sub-Saharan African countries. We denote by  $nc$  the number of observations interviewed in a given country  $c$ , and its value varies between 1,200 and 2,400. We first estimate a multilevel logit model, where our dependent variables are the six different dummies on school inputs, which take each either a value of 1, if the individual has experienced the problem associated with the specific school input  $j$ , and 0 otherwise. Recall that these six school inputs on which we focus on are: high school expenses, lack of textbooks or other supplies, poor teaching, teacher absenteeism, overcrowded classrooms and poor facilities or conditions.

We denote by  $Z_j$  the dummy associated with the school input  $j$ . Our model of estimation will have three levels: the individual level, the regional level, and the country level. Individuals are nested within regions that are, in turn, nested within countries. Taking into account such clustering effect is important, because individuals who live in the same region are very likely to face similar issues and behave similarly, while regions from the same countries are very likely to have similar issues. The multilevel method has the advantage that it takes into account such clustering effects in the estimations that might yield bias estimates if ignored (see Hox 2010).

We estimate the probability that a given individual  $i$ , living in region  $r$  of country  $c$  interviewed in round  $t$ , has experienced the problem associated with the given school input  $j$  in the last twelve months prior the interview. Thus, our estimation model takes the following form:

$$Prob(Z_{jirct} = 1, \omega_{irct}) = \frac{1}{1 + \exp(-\omega_{irct})} \quad (1)$$

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<sup>6</sup> Egypt is dropped due to the lack of available information on the quality of local governance.

where,

$$\begin{cases} \text{Level 1: } \omega_{irct} = \beta_{0rc} + \beta_1 \text{localgovernance}_{rct} + \beta_2 X_{irc} + \beta_3 W_{ct} + t + \varepsilon_{irc}, & \varepsilon_{irc} \sim N(0, \sigma^2) \\ \text{Level 2:} & \beta_{0rc} = \beta_{00c} + \mu_{rc}, \quad \mu_{rc} \sim N(0, \delta^2), \quad \varepsilon_{irc} \perp \mu_{rc} \\ \text{Level 3:} & \beta_{0c} = \beta_{00} + \mu_c, \quad \mu_c \sim N(0, \gamma^2), \quad \varepsilon_{irc} \perp \mu_c, \quad \mu_{rc} \perp \mu_c \end{cases} \quad (2)$$

Though, the general expression for  $\omega_{irct}$  can be written as follows:

$$\omega_{irct} = \beta_0 + \beta_1 \text{localgovernance}_{rct} + \beta_2 X_{irc} + \beta_3 W_{ct} + t + \varepsilon_{irc} + \mu_{rc} + \mu_c \quad (3)$$

where, the component  $\varepsilon_{irc} + \mu_{rc} + \mu_c$  in equation 3 is the random part of the model, such that  $\varepsilon_{irc}$  is the individual-level error term,  $\mu_{rc}$  is the region-/province-specific effect, and  $\mu_c$  is the country-specific effect. The vector  $X$  contains the individual socio-economic characteristics, and  $W$  the country-context variables that vary across time, and  $t$  is a round dummy.

Our parameter of interest is  $\beta_1$ , and its sign will indicate whether the measure of the local governance considered has a positive or a negative effect on the probability that an individual encounters the school issue  $Z_j$ . We expect the level of corruption at the local government level to have a positive effect on the incidence of experiencing any of the six school inputs. Corruption has been argued to impede the potential desirable outcome of any government investment, thereby deviating public funds from its targeted purposes to more rent-seeking-oriented activities.

Turning to the measure that captures the effectiveness of local governments in fulfilling their jobs, we might also expect it to have a positive effect on the probability of experiencing challenges on the quality of school inputs when local government representatives do not perform well, i.e., provide poor public service delivery. 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 poor, or a lack of, school inputs. However, we do not 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 effect of the local government responsiveness on the probability of reporting poor quality of educational inputs might not be as significant as we would expect it to be.

In addition, we propose a cross-region analysis where we regress the proportion of individuals in a given region that claimed to have experienced poor quality school input  $j$ , on the measures of local governance quality. The following is the model we will estimate:

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

where,  $q_{jrt}$  is the proportion of individuals who face the school challenge  $j$ , in region  $r$ , at time  $t$ , and  $\gamma_r$  represents the region fixed effects. To move beyond the fixed-effect strategy that helps to deal with possible unobserved heterogeneity, 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  $AverageCorruption_{rct} = \sum_{s=1, s \neq r}^S localgovernance_{sct}$ . We also propose a dummy variable *DistanceCorruption* that indicates whether the measure of corruption in a given region  $rc$  at time  $t$  is above the median value of all the measures of corruption across all the regions within the same country.

Intuitively, we argue that, when the average level of corruption in the other regions of the same country is high, this may incite local government officials from a different region to be more active in corrupt activities since corruption can be seen as something 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 more and more officials involved in corrupt activities competing for higher rents compared to regions that are below the median. Similar instruments are also computed for the other measures of local governance quality.

## **5 Results and Discussions**

### **5.1 Individual Level Analysis**

#### **5.1.1 Results Without Additional Individual Socio-economic Characteristics**

This section presents the results derived from the different estimations we have run at the individual level, using the six school input dummies previously defined, to test whether local government corruption, ineffectiveness and responsiveness affect the probability of facing any of the learning input challenges. We start first with Table 6, using the perception of local corruption as our measure of local governance, with no additional control variables. For each of the columns, we use one of the education input dummies. Reported results across the columns show that the higher the level of the perceived local corruption is, the higher the probability that an individual claims having experienced challenges on school inputs. This finding is regardless of the indicator of school input used. We have also controlled for a round

dummy, having round 3 as reference. Estimates on the round dummy highlight that people interviewed in round 5 are less likely to experience challenges associated with the first five school inputs, but they are more likely to experience challenges associated with poor facilities.

**Table 6: Local corruption and learning inputs in Africa (I)**

	(1) <b>Exp</b>	(2) <b>Text</b>	(3) <b>Teach</b>	(4) <b>Abs</b>	(5) <b>Class</b>	(6) <b>Facil</b>
L.Corruption	1.444*** (0.137)	1.915*** (0.133)	1.745*** (0.137)	1.680*** (0.137)	2.025*** (0.14)	1.725*** (0.146)
round.5	-0.241*** (0.026)	-0.218*** (0.0264)	-0.133*** (0.0265)	-0.125*** (0.0264)	-0.235*** (0.0271)	1.095*** (0.0274)
Constant	-1.213*** (0.169)	-1.128*** (0.159)	-1.322*** (0.154)	-1.126*** (0.147)	-1.002*** (0.174)	-2.341*** (0.167)
Obs	51,133	49,721	48,691	48,841	49,266	49,278
Regions	459	459	459	459	459	459
Countries	33	33	33	33	33	33
AIC	64,419.3	62,784.89	61,798.2	62,110.21	59,368.63	58,884.37
BIC	64,463.51	62,828.96	61,842.17	62,154.2	52,412.65	58,928.4

Note: This table reports the estimation results on the effect of local government corruption (L.Corruption) on the probability to experience learning input problems in local public schools. Each of the columns has a different dependent variable. **Exp** is a dummy for school fees being expensive; **Text** is a dummy for lack of textbooks; **Teach** is a dummy for poor quality of teaching; **Abs** is a dummy for teacher absenteeism; **Class** is a dummy for overcrowded classrooms; and **Facil** is a dummy for poor facilities. Standard errors are in parentheses. \*\*\* Significant at 1%. \*\* Significant at 5%, \* significant at 10%.

We now turn to Table 7, where we also control for indicators of governance at the country level, using mainly a measure of control of corruption and a measure of government effectiveness, both from the worldwide calculation. Controlling for this country quality of governance allows us to make sure that our measures of local governance do not simply capture the quality of the governance at the country level, and then turn insignificant once we take into account the quality of governance at the country level. Our previous results remain unchanged, where a higher level of local government corruption is associated with a higher probability of experiencing any of the six school input challenges.

**Table 7: Local corruption and learning inputs in Africa (II)**

	(1) <b>Exp</b>	(2) <b>Text</b>	(3) <b>Teach</b>	(4) <b>Abs</b>	(5) <b>Class</b>	(6) <b>Facil</b>	(7) <b>Exp</b>	(8) <b>Text</b>	(9) <b>Teach</b>	(10) <b>Abs</b>	(11) <b>Class</b>	(12) <b>Facil</b>
L.Corruption	1.752*** (0.140)	2.067*** (0.136)	2.063*** (0.139)	1.890*** (0.139)	2.113*** (0.142)	1.932*** (0.146)	1.536*** (0.137)	1.942*** (0.133)	1.819*** (0.138)	1.721*** (0.137)	2.046*** (0.140)	1.781*** (0.146)
C.Corruption	-0.997*** (0.0758)	-0.515*** (0.0739)	-1.074*** (0.0788)	-0.685*** (0.0742)	-0.30*** (0.0797)	-0.815*** (0.0810)						
round.5	-0.247*** (0.0260)	-0.224*** (0.0264)	-0.147*** (0.0267)	-0.137*** (0.0265)	-0.24*** (0.0271)	1.096*** (0.0274)	-0.280*** (0.0261)	-0.240*** (0.0265)	-0.17*** (0.0268)	-0.15*** (0.0266)	-0.25*** (0.0273)	1.074*** (0.0275)
C.Effectiveness							-1.218*** (0.0974)	-0.689*** (0.0928)	-1.20*** (0.107)	-0.59*** (0.0955)	-0.47*** (0.103)	-0.85*** (0.101)
Constant	-1.947*** (0.168)	-1.500*** (0.152)	-2.094*** (0.161)	-1.622*** (0.152)	-1.21*** (0.170)	-2.909*** (0.160)	-1.948*** (0.164)	-1.524*** (0.145)	-2.03*** (0.170)	-1.47*** (0.155)	-1.27*** (0.167)	-2.85*** (0.165)
Observations	51,133	49,721	48,691	48,841	49,266	49,278	51,133	49,721	48,691	48,841	49,266	49,278
Number of groups	33	33	33	33	33	33	33	33	33	33	33	33

Note: This table reports the estimation results on the effect of local government corruption (L.Corruption) on the probability to experience learning input problems in local public schools. Country corruption (C.Corruption) as well as country government effectiveness (C.Effectiveness) are controlled for. Each of the columns has a different dependent variable. **Exp** is a dummy for school fees being expensive; **Text** is a dummy for lack of textbooks; **Teach** is a dummy for poor quality of teaching; **Abs** is a dummy for teacher absenteeism; **Class** is a dummy for overcrowded classrooms; and **Facil** is a dummy for poor facilities. Standard errors are in parentheses. \*\*\* Significant at 1%. \*\* Significant at 5%, \* significant at 10%.

Looking at the governance indicators at the country level, we find that better quality of governance decreases significantly the probability that an individual highlights having experienced school input issues in the last twelve months. Indeed, good governance has been argued to be an effective tool to manage efficiently the provision of public goods and services, such as the provision of education and health services. As such, it is well expected that individuals who live in countries with a good governance climate are less likely to face poor education input quality, but it should be noted that the level of corruption experienced by individuals from the same country varies across regions.

We report in Table 8 additional estimations where we control for the share of government expenditure on education on total GDP to take into account the effect of the available funds for the provision of educational inputs in a country. We find that more government expenditure on education at the country level tends to decrease the likelihood that people experience any challenges linked to the education inputs. Despite this expected result, our previous results on the negative estimates of local corruption are still valid.

**Table 8: Local corruption and learning inputs in Africa (III)**

	(1) <b>Exp</b>	(2) <b>Text</b>	(3) <b>Teach</b>	(4) <b>Abs</b>	(5) <b>Class</b>	(6) <b>Facil</b>
<i>L. Corruption</i>	1.732*** (0.154)	1.629*** (0.147)	2.098*** (0.156)	1.584*** (0.152)	1.832*** (0.154)	1.857*** (0.101)
<i>C. Corruption</i>	-0.860*** (0.0875)	-0.554*** (0.0847)	-1.080*** (0.0931)	-0.580*** (0.0871)	-0.294*** (0.0835)	-0.686*** (0.0923)
<i>Educ/GDP</i>	-0.304*** (0.0183)	-0.262*** (0.0182)	-0.311*** (0.0195)	-0.211*** (0.0183)	-0.199*** (0.0181)	-0.280*** (0.0194)
round.5	-0.133*** (0.0308)	-0.0666** (0.0310)	-0.0479 (0.0321)	0.0280 (0.0315)	-0.133*** (0.0323)	1.130*** (0.0295)
Constant	-0.365 (0.235)	0.110 (0.199)	-0.569** (0.235)	-0.330* (0.193)	-0.0205 (0.190)	-1.354*** (0.191)
Obs	45,772	44,639	43,668	43,825	44,219	44,254
Regions	415	415	415	415	415	415
Countries	32	32	32	32	32	32
AIC	57,074.58	56,041.18	54,547.99	55,087.76	52,691.93	53,176.19
BIC	57,135.7	56,102.13	54,608.78	55,148.57	52,752.81	53,228.38

Note: This table reports the estimation results on the effect of local government corruption on the probability of experiencing learning input problems in local public schools. Country levels of corruption, of government effectiveness, and of public expenditure on total GDP are controlled for. Each of the columns has a different dependent variable. **Exp** is a dummy for school fees being expensive; **Text** is a dummy for lack of textbooks; **Teach** is a dummy for poor quality of teaching; **Abs** is a dummy for teacher absenteeism; **Class** is a dummy for overcrowded classrooms; and **Facil** is a dummy for poor facilities. \*\*\* Significant at 1%. Standard errors are in parentheses. \*\* Significant at 5%, \* significant at 10%.

We run similar exercises on Tables 9 and 10, using the measure of local government effectiveness as our measure of the quality of local governance. Our estimation results go in the same direction as the ones previously discussed, by pointing out that a lower level of local government effectiveness increases the probability of experiencing education input challenges. Likewise, better control of corruption and more government effectiveness at the country level, as well as more government expenditure on education, decrease significantly the probability of facing a lack of good-quality education inputs.

**Table 9: Local government effectiveness and school inputs in Africa (I)**

	(1) Exp	(2) Text	(3) Teach	(4) Abs	(5) Class	(6) Facil
L.Ineffectiveness	1.407*** (0.112)	1.811*** (0.113)	1.314*** (0.111)	1.196*** (0.111)	1.187*** (0.113)	1.030*** (0.116)
round.5	-0.112*** (0.0229)	-0.0410* (0.0232)	0.0361 (0.0233)	0.0367 (0.0231)	-0.0414* (0.0238)	1.259*** (0.0247)
Constant	-0.752*** (0.144)	-0.495*** (0.139)	-0.597*** (0.128)	-0.398*** (0.118)	-0.00670 (0.148)	-1.502*** (0.138)
Obs	51,092	49,690	48,660	48,810	49,235	49,247
Regions	459	459	459	459	459	459
Countries	33	33	33	33	33	33
AIC	64,316.05	62,682.17	61,776.88	62,100.64	59,424.98	58,895.5
BIC	64,360.26	62,726.24	61,820.84	62,144.62	59,469	58,939.53

Note: This table reports the estimation results on the effect of local government effectiveness on the probability of experiencing learning input problems in local public schools. Each of the columns has a different dependent variable. Exp is a dummy for school fees being expensive; Text is a dummy for lack of textbooks; Teach is a dummy for poor quality of teaching; Abs is a dummy for teacher absenteeism; Class is a dummy for overcrowded classrooms; and Facil: is a dummy for poor facilities. Standard errors are in parentheses. \*\*\* Significant at 1%. \*\* Significant at 5%, \* significant at 10%.

**Table 10: Local government effectiveness and school inputs in Africa (II)**

	(1) Exp	(2) Text	(3) Teach	(4) Abs	(5) Class	(6) Facil
L.Ineffectiveness	0.455*** (0.140)	0.814*** (0.136)	0.799*** (0.0825)	0.591*** (0.0817)	0.944*** (0.146)	0.897*** (0.154)
<i>C.Effectiveness</i>	-1.357*** (0.141)	-1.040*** (0.137)	-1.314*** (0.132)	-0.456*** (0.113)	-0.805*** (0.123)	-1.959*** (0.180)
Educ/GDP	-0.300*** (0.0186)	-0.253*** (0.0187)	-0.280*** (0.0183)	-0.206*** (0.0170)	-0.185*** (0.0183)	-0.310*** (0.0207)
round.5	-0.0415 (0.0279)	0.0218 (0.0280)	0.0545** (0.0277)	0.160*** (0.0268)	-0.0299 (0.0294)	1.240*** (0.0308)
Constant	0.421* (0.224)	0.657*** (0.183)	0.380* (0.210)	0.643*** (0.155)	0.617*** (0.166)	-0.946*** (0.269)

Obs	45,772	44,639	43,668	43,825	44,219	44,254
Regions	415	415	415	415	415	415
Countries	32	32	32	32	32	32
AIC	57,146.63	56,075.76	56,038.31	56,741.8	52,745.84	52,002.43
BIC	57,207.75	56,136.71	56,090.41	56,793.93	52,806.72	52,063.31

Note: This table reports the estimation results on the effect of local government effectiveness on the probability of experiencing learning input problems in local public schools. Country levels of government effectiveness (*C.Effectiveness*) and of public expenditure on total GDP are controlled for. Each of the columns has a different dependent variable. **Exp** is a dummy for school fees being expensive; **Text** is a dummy for lack of textbooks; **Teach** is a dummy for poor quality of teaching; **Abs** is a dummy for teacher absenteeism; **Class** is a dummy for overcrowded classrooms; and **Facil** is a dummy for poor facilities. Standard errors are in parentheses. \*\*\* Significant at 1%. \*\* Significant at 5%, \* significant at 10%.

Finally, our last measure of local governance is the degree of responsiveness, and the estimation results are reported in Table 11. Unlike the measures of local government corruption and local government ineffectiveness, estimates on local government responsiveness are less significant. Exceptions are in the last two columns, where the coefficients are negative and significant, meaning that, in regions where local government officials are responsive to the local populations, individuals are less likely to report overcrowded classrooms and poor facilities as challenges faced in their public schools.

**Table 11: Local Government responsiveness and school inputs in Africa**

	(1) <b>Exp</b>	(2) <b>Text</b>	(3) <b>Teach</b>	(4) <b>Abs</b>	(5) <b>Class</b>	(6) <b>Facil</b>
L.Responsiveness	-0.0821 (0.117)	0.0334 (0.116)	0.120 (0.0741)	0.0649 (0.0733)	-0.379*** (0.125)	-0.457*** (0.132)
C.Effectiveness	-1.406*** (0.141)	-1.122*** (0.140)	-1.393*** (0.132)	-0.505*** (0.115)	-0.855*** (0.128)	-2.115*** (0.182)
Educ/GDP	-0.306*** (0.0186)	-0.261*** (0.0188)	-0.283*** (0.0183)	-0.209*** (0.0171)	-0.194*** (0.0185)	-0.326*** (0.0207)
round.5	-0.0395 (0.0327)	0.0575* (0.0326)	0.0977*** (0.0296)	0.190*** (0.0288)	-0.0462 (0.0340)	1.199*** (0.0363)
Constant	0.669*** (0.237)	0.975*** (0.198)	0.612*** (0.224)	0.837*** (0.167)	1.271*** (0.179)	-0.276 (0.296)
Obs	45,772	44,639	43,668	43,825	44,219	44,254
Regions	415	415	415	415	415	415
Countries	32	32	32	32	32	32
AIC	57,156.73	56,111.99	56,129.79	56,793.3	52,778.02	52,023.67
BIC	57,217.85	56,172.94	56,181.89	56,845.42	52,838.89	52,084.55

Note: This table reports the estimation results on the effect of local government responsiveness on the probability to experience learning input problems in local public schools. Country levels of government effectiveness (*C.Effectiveness*) and of public expenditure on total GDP are controlled for. Each of the

columns has a different dependent variable. **Exp** is a dummy for school fees being expensive; **Text** is a dummy for lack of textbooks; **Teach** is a dummy for poor quality of teaching; **Abs** is a dummy for teacher absenteeism; **Class** is a dummy for overcrowded classrooms; and **Facil** is a dummy for poor facilities. Standard errors are in parentheses. \*\*\* Significant at 1%. \*\* Significant at 5%, \* significant at 10%.

### **5.1.2 Accounting for Individual Socio-economic Characteristics**

In Table 12, we add a number of individual socio-economic characteristics to test whether our previous findings are sensitive to the omission of such variables. Once controlling for these characteristics, we lose quite a number of observations, due to missing values on some questions. We have run various specifications, interchanging the measure of local government corruption and local government ineffectiveness, dropping the measure of local government responsiveness, which has been hardly robust in the previous estimations.

**Table 12: Local governance and learning inputs with individual characteristics**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Exp	Text	Teach	Abs	Class	Facil	Exp	Text	Teach	Abs	Class	Facil	Text	Teach	Abs
L.Corruption	1.602***	1.850***	1.811***	1.627***	1.913***	1.680***							1.343***	1.494***	1.334***
	(0.144)	(0.139)	(0.144)	(0.143)	(0.146)	(0.151)							(0.148)	(0.151)	(0.150)
L.Ineffectiveness							1.207***	1.584***	1.071***	1.024***	1.045***	0.840***	1.261***	0.770***	0.704***
							(0.115)	(0.115)	(0.114)	(0.113)	(0.116)	(0.119)	(0.121)	(0.120)	(0.119)
C.Corruption	-0.906***	-0.377***	-0.976***	-0.593***	-0.209**	-0.664***							-0.331***	-0.947***	-0.56***
	(0.0787)	(0.0750)	(0.0812)	(0.0768)	(0.0820)	(0.0825)							(0.0768)	(0.0811)	(0.0766)
C.Effectiveness							-0.914***	-0.339***	-0.928***	-0.327***	-0.213*	-0.585***			
							(0.0983)	(0.101)	(0.107)	(0.0979)	(0.110)	(0.104)			
round.5	-0.191***	-0.167***	-0.088***	-0.073***	-0.192***	1.183***	-0.093***	-0.0155	0.0453*	0.0642***	-0.0216	1.312***	-0.124***	-0.0549*	-0.0431
	(0.0272)	(0.0276)	(0.0277)	(0.0274)	(0.0281)	(0.0286)	(0.0243)	(0.0247)	(0.0247)	(0.0244)	(0.0252)	(0.0261)	(0.0281)	(0.0281)	(0.0279)
gender	0.0288	0.0122	-0.105***	-0.080***	-0.0390*	-0.0383*	0.0296	0.0133	-0.104***	-0.079***	-0.0379*	-0.0381*	0.0125	-0.105***	-0.08***
	(0.0206)	(0.0208)	(0.0209)	(0.0207)	(0.0213)	(0.0215)	(0.0206)	(0.0209)	(0.0208)	(0.0207)	(0.0213)	(0.0215)	(0.0209)	(0.0209)	(0.0207)
educ1	-0.0549	0.0558	0.106***	0.0844**	-0.00726	0.0655*	-0.0569*	0.0545	0.106***	0.0819**	-0.00694	0.0658*	0.0537	0.105***	0.0829**
	(0.0346)	(0.0352)	(0.0355)	(0.0352)	(0.0362)	(0.0367)	(0.0346)	(0.0353)	(0.0355)	(0.0352)	(0.0362)	(0.0366)	(0.0353)	(0.0355)	(0.0352)
educ2	-0.0777**	0.0570*	0.244***	0.155***	0.0576*	0.0696**	-0.0752**	0.0605*	0.250***	0.159***	0.0649*	0.0779**	0.0534	0.242***	0.153***
	(0.0331)	(0.0337)	(0.0339)	(0.0337)	(0.0347)	(0.0350)	(0.0331)	(0.0338)	(0.0339)	(0.0337)	(0.0347)	(0.0350)	(0.0338)	(0.0339)	(0.0337)
educ3	-0.209***	0.121***	0.369***	0.306***	0.133***	0.229***	-0.211***	0.122***	0.372***	0.308***	0.140***	0.235***	0.113***	0.365***	0.301***
	(0.0420)	(0.0426)	(0.0427)	(0.0425)	(0.0436)	(0.0440)	(0.0420)	(0.0426)	(0.0427)	(0.0425)	(0.0436)	(0.0439)	(0.0427)	(0.0427)	(0.0426)
educ4	-0.209***	0.186***	0.448***	0.347***	0.231***	0.314***	-0.210***	0.188***	0.449***	0.347***	0.239***	0.321***	0.177***	0.440***	0.338***

**Table 12: Local governance and learning inputs with individual characteristics**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Exp	Text	Teach	Abs	Class	Facil	Exp	Text	Teach	Abs	Class	Facil	Text	Teach	Abs
age2	(0.0458)	(0.0465)	(0.0469)	(0.0468)	(0.0483)	(0.0481)	(0.0458)	(0.0466)	(0.0469)	(0.0468)	(0.0483)	(0.0481)	(0.0467)	(0.0469)	(0.0468)
	-0.141***	-0.0674**	-0.0702**	-0.117***	-0.0453	-0.124***	-0.139***	-0.0682**	-0.0697**	-0.117***	-0.0450	-0.123***	-0.0673**	-0.0695**	-0.11***
	(0.0281)	(0.0285)	(0.0284)	(0.0283)	(0.0292)	(0.0292)	(0.0281)	(0.0285)	(0.0284)	(0.0283)	(0.0291)	(0.0291)	(0.0285)	(0.0284)	(0.0283)
age3	-0.072***	-0.073***	-0.0596**	-0.153***	-0.0521*	-0.208***	-0.072***	-0.075***	-0.0599**	-0.155***	-0.0526*	-0.206***	-0.074***	-0.0597**	-0.15***
	(0.0269)	(0.0273)	(0.0273)	(0.0272)	(0.0280)	(0.0281)	(0.0269)	(0.0273)	(0.0272)	(0.0271)	(0.0280)	(0.0281)	(0.0273)	(0.0273)	(0.0272)
rural	0.199***	0.0354	0.0431	0.0649**	0.114***	0.127***	0.200***	0.0342	0.0460*	0.0654**	0.112***	0.128***	0.0346	0.0441	0.0662**
	(0.0263)	(0.0265)	(0.0268)	(0.0267)	(0.0276)	(0.0278)	(0.0264)	(0.0266)	(0.0268)	(0.0267)	(0.0276)	(0.0277)	(0.0266)	(0.0269)	(0.0267)
paper	0.0907***	0.0796***	0.194***	0.199***	0.139***	0.170***	0.0907***	0.0767***	0.196***	0.200***	0.136***	0.171***	0.0776***	0.194***	0.199***
	(0.0264)	(0.0267)	(0.0268)	(0.0267)	(0.0276)	(0.0277)	(0.0264)	(0.0268)	(0.0268)	(0.0267)	(0.0276)	(0.0277)	(0.0268)	(0.0268)	(0.0267)
radio	0.0540*	0.0497	0.0711**	0.120***	0.0673**	0.0422	0.0614*	0.0595*	0.0787**	0.127***	0.0745**	0.0485	0.0568*	0.0759**	0.125***
	(0.0316)	(0.0317)	(0.0319)	(0.0316)	(0.0323)	(0.0326)	(0.0316)	(0.0317)	(0.0319)	(0.0316)	(0.0323)	(0.0326)	(0.0317)	(0.0319)	(0.0316)
tv	-0.0169	0.0188	0.0704**	0.0298	0.0832** *	0.0728**	-0.0120	0.0254	0.0740***	0.0350	0.0946***	0.0787***	0.0180	0.0696**	0.0302
	(0.0271)	(0.0275)	(0.0275)	(0.0273)	(0.0282)	(0.0284)	(0.0271)	(0.0274)	(0.0274)	(0.0272)	(0.0282)	(0.0284)	(0.0275)	(0.0275)	(0.0273)
food	0.413***	0.278***	0.142***	0.193***	0.0904** *	0.170***	0.405***	0.270***	0.133***	0.189***	0.0849***	0.166***	0.273***	0.138***	0.190***
	(0.0236)	(0.0240)	(0.0243)	(0.0241)	(0.0249)	(0.0251)	(0.0237)	(0.0240)	(0.0243)	(0.0241)	(0.0249)	(0.0251)	(0.0241)	(0.0243)	(0.0242)
water	0.193***	0.209***	0.214***	0.183***	0.208***	0.247***	0.189***	0.202***	0.208***	0.179***	0.199***	0.242***	0.208***	0.214***	0.182***
	(0.0229)	(0.0232)	(0.0233)	(0.0232)	(0.0239)	(0.0240)	(0.0229)	(0.0232)	(0.0233)	(0.0232)	(0.0239)	(0.0240)	(0.0232)	(0.0233)	(0.0232)
medicine	0.438***	0.595***	0.470***	0.414***	0.387***	0.459***	0.444***	0.600***	0.476***	0.419***	0.395***	0.466***	0.592***	0.468***	0.412***
	(0.0243)	(0.0243)	(0.0248)	(0.0247)	(0.0253)	(0.0258)	(0.0243)	(0.0243)	(0.0248)	(0.0247)	(0.0253)	(0.0258)	(0.0244)	(0.0248)	(0.0247)

**Table 12: Local governance and learning inputs with individual characteristics**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Exp	Text	Teach	Abs	Class	Facil	Exp	Text	Teach	Abs	Class	Facil	Text	Teach	Abs
cash	0.254*** (0.0303)	0.294*** (0.0292)	0.182*** (0.0299)	0.160*** (0.0297)	0.245*** (0.0301)	0.159*** (0.0317)	0.261*** (0.0303)	0.299*** (0.0293)	0.189*** (0.0299)	0.167*** (0.0297)	0.249*** (0.0301)	0.161*** (0.0317)	0.295*** (0.0293)	0.182*** (0.0300)	0.160*** (0.0297)
publicinterest1	0.0293 (0.0289)	0.0645** (0.0292)	0.0425 (0.0293)	0.0500* (0.0291)	0.131*** (0.0300)	0.0293 (0.0301)	0.0386 (0.0289)	0.0751** (0.0292)	0.0500* (0.0293)	0.0573** (0.0291)	0.138*** (0.0300)	0.0353 (0.0301)	0.0709** (0.0292)	0.0454 (0.0294)	0.0531* (0.0291)
publicinterest2	0.00138 (0.0312)	-0.0112 (0.0315)	-0.0198 (0.0317)	-0.0351 (0.0315)	0.0809** (0.0323)	-0.0264 (0.0326)	0.00584 (0.0312)	-0.00297 (0.0316)	-0.0170 (0.0317)	-0.0315 (0.0314)	0.0831** (0.0323)	-0.0279 (0.0326)	-0.00272 (0.0316)	-0.0151 (0.0317)	-0.0305 (0.0315)
Constant	-2.594*** (0.174)	-2.243*** (0.157)	-2.776*** (0.172)	-2.185*** (0.166)	-1.883*** (0.180)	-3.431*** (0.171)	-1.983*** (0.137)	-1.568*** (0.130)	-1.931*** (0.147)	-1.321*** (0.136)	-0.938*** (0.153)	-2.543*** (0.142)	-2.406*** (0.164)	-2.876*** (0.173)	-2.27*** (0.165)
Obs	49,154	47,777	46,874	47,009	47,389	47,407	49,115	47,749	46,846	46,981	47,361	47,379	47,749	46,846	46,981
Regions	459	459	459	459	459	459	459	459	459	459	459	459	459	459	459
Countries	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
AIC	59,828	58,276	57,961	58,586.4	56,154	55,388.6	59,781.2	58,208.34	58,011	58,619	56,200	55,427	58,130.1	57,884	58,516.9
BIC	60,030	58,478	58,163	58,787.8	56,356	55,590.3	59,983.6	58,410.13	58,212	58,820.4	56,401	55,628	58,340.6	58,094	58,727.1

**Note:** This table reports the estimation results on the effect of local governance quality on the probability to experience learning input problems in local public schools. Country levels of corruption and of government effectiveness, as well as individual socio-economic characteristics are controlled for. Each of the columns has a different dependent variable. **Exp** is a dummy for school fees being expensive; **Text** is a dummy for lack of textbooks; **Teach** is a dummy for poor quality of teaching; **Abs** is a dummy for teacher absenteeism; **Class** is a dummy for overcrowded classrooms; and **Facil** is a dummy for poor facilities. Standard errors are in parentheses. \*\*\* Significant at 1%. \*\* Significant at 5%, \* Significant at 10%.

Columns (1)-(6) confirm our previous findings that a high level of local corruption is associated with a higher probability to experience education input challenges. Similar results are also shown when replacing the measure of local corruption by the measure of local government ineffectiveness across columns (7)-(12). In the last columns, (13)-(15), we control simultaneously for both, the measure of local government corruption and the measure of local government ineffectiveness, using as dependent variables the lack of textbooks, quality of teaching and finally, teacher absenteeism. Both remain very significant with a positive sign in line with the previous findings.

Turning to the other included variables, we have found that the significance of the coefficients on gender is not robust across the different columns. In fact, when we have school expenses or textbooks as our variables of interest, the coefficients on gender are positive but never significant, meaning that men are as likely as women to have experienced challenges with these education inputs in the last twelve months. However, in all the other cases, where the dependent variable is either the quality of teaching, teacher absenteeism, classroom size or poor facilities, the coefficients on gender are negative and statistically significant, indicating that women are less likely to report these educational issues as compared to men. Such an observation may raise the question: are women less concerned about the importance of school inputs, due to their lack of a sufficient level of education? Our answer seems to be no, since we have also controlled for the respondents' level of education, and yet the findings remain unchanged.

Focusing on education, where our control group includes respondents with no formal education, we find that people who have not completed primary schooling are more likely to complain about some of the education inputs. In contrast, educated people who have at least completed primary schooling are less likely to point out school fees as an obstacle, but they are more likely to complain about all the remaining measures of quality of education inputs. This finding is stronger with the level of education.

The age of the respondent matters, and youths seem to be more likely to complain about any of the six education issues as 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 close ties, such as children or family members. Unfortunately, the questions asked in the surveys do not allow us to indicate whether respondents are still in school or not.

All the proxies of poverty, such as having been without food, water, medicine, or cash, and asset ownership, such as radio and TV, indicate that poverty increases the likelihood of experiencing low quality of education inputs. Indeed, poor people are more likely to send their children to the most backward schools, which have hardly decent facilities and resources or good teaching quality. Also, school fees may be a burden for poor households for whom education expenditure may represent a significant share of their total income, as compared to richer households.

We finally show in columns (13)-(15) of Table 12 estimation results where we have considered the measures of local government corruption and of local government effectiveness simultaneously in the same model, in addition to all the individual socio-economic characteristics and the level of corruption at the country level. Even though these two measures are correlated, they are both significant determinants of the probability of experiencing a low quality of learning inputs.

### **5.1.3 Additional robustness checking**

We have run additional robustness checks. First, in Table 13, we have restricted our sample to sub-Saharan countries, dropping the three North African countries: Algeria, Tunisia, and Morocco. Second, we run our estimations for each round separately in Table 14. Due to lack of space, we decide to run these additional estimations using three of our preferred measures of school inputs, which we believe are more relevant for the improvement of learning outcomes. These are the lack of textbooks, the quality of teaching and teacher absenteeism.

Overall, the estimates in Table 13 confirm the robustness of our results, showing the negative effect that corruption and lack of effectiveness at the local government level have on the incidence that local people are served with poor quality of learning inputs.

**Table 13: Local governance and learning inputs dropping North African countries**

	(1) Text	(2) Teach	(3) Abs
L.Corruption	1.437*** (0.150)	1.463*** (0.152)	1.268*** (0.152)
L.Ineffectiveness	1.390*** (0.126)	0.672*** (0.124)	0.569*** (0.123)
C .C orruption	-0.335*** (0.0773)	-0.935*** (0.0807)	-0.552*** (0.0747)
5.round	-0.132*** (0.0282)	-0.0539* (0.0282)	-0.0396 (0.0279)
female	0.0209 (0.0213)	-0.110*** (0.0213)	-0.0841*** (0.0211)
educ1	0.0470 (0.0362)	0.108*** (0.0363)	0.0803** (0.0359)
educ2	0.0612* (0.0345)	0.256*** (0.0345)	0.159*** (0.0343)
educ3	0.131*** (0.0435)	0.387*** (0.0434)	0.311*** (0.0432)
educ4	0.227*** (0.0483)	0.462*** (0.0483)	0.354*** (0.0481)
age1	-0.0677** (0.0291)	-0.0633** (0.0289)	-0.112*** (0.0287)
age2	-0.0761*** (0.0279)	-0.0565** (0.0278)	-0.156*** (0.0276)
urban	0.0486* (0.0273)	0.0545** (0.0275)	0.0600** (0.0273)
paper	0.0870*** (0.0276)	0.191*** (0.0275)	0.203*** (0.0273)
radio	0.0699** (0.0329)	0.0812** (0.0329)	0.132*** (0.0326)
tv	0.00261 (0.0278)	0.0661** (0.0277)	0.0312 (0.0275)
food	0.271*** (0.0244)	0.131*** (0.0245)	0.191*** (0.0243)
water	0.202*** (0.0236)	0.220*** (0.0236)	0.185*** (0.0235)
medicine	0.596*** (0.0248)	0.479*** (0.0252)	0.416*** (0.0250)
cash	0.285*** (0.0303)	0.202*** (0.0308)	0.167*** (0.0305)
publicinterest1	0.0705** (0.0299)	0.0353 (0.0299)	0.0282 (0.0297)
publicinterest2	-0.00831 (0.0321)	-0.0287 (0.0321)	-0.0601* (0.0319)
Constant	-2.509*** (0.171)	-2.879*** (0.172)	-2.243*** (0.161)
Obs	45,755	44,892	45,002
Regions	370	370	370
Countries	30	30	30
AIC	55,574.52	55,637.04	56,374.69
BIC	55,784.07	55,846.13	56,583.83

Note: Table 13 reports the obtained estimated coefficients on local government corruption (L.Corrption) and local government effectiveness, dropping non-sub-Saharan African countries (Algeria, Tunisia, and Morocco). Country levels of corruption (C.Corrption) and of government effectiveness (L.Effectiveness), as well as individual socio-economic characteristics are controlled for. All the variables included in Table 12 are also controlled for in this table but are not reported. Each column has a different dependent variable. **Text** is a dummy for lack of textbooks; **Teach** is a dummy for poor quality of teaching; **Abs** is a dummy for teacher absenteeism. Standard errors are in parentheses. \*\*\* Significant at 1%, \*\* Significant at 5%, \* Significant at 10%.

Lastly, the results in Table 14 show the estimations using the two rounds separately, and they indicate that local government effectiveness is less significant in round 3 than in round 5, but the estimations on the variable local government corruption remain very significant in both rounds, with a greater impact on the former round. Let us note that the number of observations in round 3 is lower than the total number of observations in round 5 mainly explained by the difference of the number of countries and regions across these two rounds. Running the estimations by round reduces not only the total number of observations, but it also ignores the time effect. However, as a robustness exercise, it is worth exploring such estimations in order to check how different is the effect of local governance quality on the quality of school inputs across the two time periods.

## **5.2 Instrumental Variable Estimations using Cross-Section Analysis**

In Table 15 we have reported the estimation results where we have regressed the proportion of people who claim having experienced education resources challenges on our three measures of quality of local governance. We focus here on four of the education resources: school expenses, lack of textbooks, poor quality of teaching, and teacher absenteeism. We have controlled for time dummy and region fixed effect across the different specifications. Furthermore, in the last four columns we have clustered at the country level. We can see that the measures of local government corruption and of local government ineffectiveness have positive and significant effects on the proportion of people who report poor quality of education resources. In contrast, local government responsiveness remains hardly significant.

**Table 14: Cross-regional study**

	(1) <b>Exp</b>	(2) <b>Text</b>	(3) <b>Teach</b>	(4) <b>Abs</b>	(5) <b>Exp</b>	(6) <b>Text</b>	(7) <b>Teach</b>	(8) <b>Abs</b>
L.Corruption	0.373*** (0.0974)	0.455*** (0.0987)	0.428*** (0.101)	0.351*** (0.0924)	0.373** (0.166)	0.455*** (0.150)	0.428** (0.167)	0.351* (0.179)
L.Effectiveness	0.332*** (0.0819)	0.435*** (0.0830)	0.324*** (0.0849)	0.289*** (0.0777)	0.332*** (0.107)	0.435*** (0.108)	0.324*** (0.0961)	0.289** (0.109)
L.Responsiveness	0.0961 (0.0696)	0.0726 (0.0706)	0.193*** (0.0721)	0.103 (0.0660)	0.0961 (0.173)	0.0726 (0.188)	0.193 (0.126)	0.103 (0.0882)
Constant	0.0309 (0.141)	-0.0297 (0.143)	-0.262* (0.146)	-0.0476 (0.133)	0.0309 (0.209)	-0.0297 (0.188)	-0.262 (0.209)	-0.0476 (0.157)
Round dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country cluster	No	No	No	No	Yes	Yes	Yes	Yes
Observations	642	642	642	642	642	642	642	642
R-squared	0.842	0.843	0.827	0.846	0.842	0.843	0.827	0.846

Note: This table reports the estimation results on the effect of local governance quality on the proportion of individuals who claim experiencing poor quality school resources. **Exp** refers to school fees being expensive, **Text** to the lack of textbooks, **Teach** to the poor quality of teaching and **Abs** to teacher absenteeism. Standard errors are in parentheses. \*\*\* Significant at 1%. \*\* Significant at 5%, \* Significant at 10%.

These results show that an increase of one point in the measure of corruption increases by 0.37 points the proportion of people who have faced expensive school fees in their public schools, by 0.46 for the lack of textbooks, by 0.43 for the quality of teaching and 0.4 for teacher absenteeism. When we consider the measure of local government ineffectiveness, these values are almost of the same order but remain slightly lower compared to the previous ones.

To correct for possible endogeneity, we run additional estimations using our proposed instruments for the measures of local governance quality. As instruments, we use for each region the average value of local government corruption in the other regions of the country as well as 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 15 shows 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. An increase in the average value of local government corruption in the other regions increases the measure of local government corruption in a given region, as does an increase in the average value of local government ineffectiveness in the other regions increase the measure of local government ineffectiveness in a given region. Also, the dummies on whether a region records a measure of local government corruption or a measure local government ineffectiveness above the median

values have positive effects on the measures of local governance quality. The R-squared reported are quite high and the reported F-statistics exceed the critical value 10, indicating that our instruments are not weak.

**Table 15: Instrumental variable estimations – first-step results**

	(1)	(2)
Dependent variable	L.corruption	L.Effectiveness
Average-Localcorruption	1.008*** (0.0326)	
Distance to median corruption	0.159*** (0.00755)	
Average-Localeffectiveness		0.937*** (0.0262)
Distance to median ineffectiveness		0.229*** (0.00849)
round.5	0.00719 (0.00831)	0.0397*** (0.00917)
Constant	-0.0816*** (0.0271)	-0.122*** (0.0156)
Observations	645	644
R-squared	0.673	0.753
F-statistics	621.575	968.159

Note: 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 in 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. Standard errors are in parentheses. \*\*\* Significant at 1%. \*\* Significant at 5%, \* Significant at 10%.

In Table 16, we report the second-step estimations, having local government corruption and local government ineffectiveness separately as regressors. Both are very significant with positive signs that confirm the previous results without instrumental variables in Table 15. The Durbin and the Wu-Hausman tests of endogeneity of the measures of local government corruption and of local government effectiveness reject the hypothesis that these two measures are exogenous except when we use school expenses as dependent variables in columns (1) and (5). The Sargan and Basman tests do not reject the validity of over-identifying restrictions except in few cases.

**Table 16: Instrumental variable estimations – second-step results (I)**

	(1) <b>Exp</b>	(2) <b>Text</b>	(3) <b>Teach</b>	(4) <b>Abs</b>	(5) <b>Exp</b>	(6) <b>Text</b>	(7) <b>Teach</b>	(8) <b>Abs</b>
<i>L.Corruption</i>	0.253*** (0.0574)	0.313*** (0.0561)	0.471*** (0.0535)	0.388*** (0.0532)				
<i>L.Effectiveness</i>					0.153*** (0.0409)	0.125*** (0.0401)	0.218*** (0.0389)	0.198*** (0.0383)
round.5	-0.184*** (0.0168)	-0.231*** (0.0164)	-0.223*** (0.0156)	-0.205*** (0.0155)	-0.170*** (0.0166)	-0.211*** (0.0162)	-0.194*** (0.0157)	-0.182*** (0.0155)
Constant	0.259*** (0.047)	0.319*** (0.0458)	0.135*** (0.0437)	0.216*** (0.0434)	0.388*** (0.0229)	0.508*** (0.0224)	0.407*** (0.0218)	0.431*** (0.0214)
<i>Test of endogeneity</i>								
Durbin statistics	0.1556	4.949	8.112	4.397	5.575	6.271	4.958	6.349
Durbin test P-Value	0.69	0.026	0.004	0.036	0.018	0.012	0.026	0.012
Wu-Hausman statistics	1.546	4.957	8.164	4.399	5.588	6.293	4.966	6.372
Wu-Hausman test P-value	0.6943	0.026	0.004	0.036	0.018	0.012	0.026	0.012
<i>Tests of over-identifying restrictions</i>								
Sargan statistics	0.977	3.526	8.341	6.583	2.134	0.879	1.264	0.53
Sargan P-value	0.323	0.06	0.004	0.01	0.14	0.35	0.26	0.47
Basman statistics	0.973	3.524	8.399	6.61	2.128	0.875	1.258	0.528
Basman P-value	0.324	0.06	0.004	0.01	0.14	0.35	0.26	0.47
Observations	643	643	643	643	642	642	642	642
R-squared	0.17	0.236	0.264	0.232	0.145	0.209	0.211	0.19

Notes: This table reports the second-step estimation results of the instrumental variable specifications, including *Local corruption (L.Corruption)* and *Local effectiveness (L.Effectiveness)* separately. **Exp** refers to school fees being expensive, **Text** to the lack of textbooks, **Teach** to the poor quality of teaching and **Abs** to teacher absenteeism. Standard errors are in parentheses. \*\*\* Significant at 1%. \*\* Significant at 5%, \* significant at 10%.

Finally, in Table 17 we have our extended instrumental variable specifications, controlling for our two measures of local governance quality simultaneously, adding the region dummies, and clustering at the country level in the last four columns. The coefficients on the two measures of local governance quality remain positive and significant and they turn slightly higher than in the previous Table 17. The R-squared reported in this table are also very high. In terms of marginal effects, we have that a one-point increase in the measure of local government corruption increases the proportion of people who claim about high expenses in their local public schools by 0.42. This value is 0.6 for the lack of textbooks, 0.7 for the quality of teaching and 0.6 for teacher absenteeism. Regarding the measure of local government ineffectiveness, we find that a one-point increase in the measure of local government ineffectiveness is associated with an increase of 0.4 in the proportion of people who report

expensive school fees, against 0.5 for the lack of textbooks, 0.2 for the quality of teaching and 0.3 for teacher absenteeism.

**Table 17: Instrumental variable estimations – second-step results (II)**

	(1) Exp	(2) Text	(3) Teach	(4) Abs	(5) Exp	(6) Text	(7) Teach	(8) Abs
<i>L.Corruption</i>	0.416*** (0.0816)	0.600*** (0.0830)	0.749*** (0.0875)	0.552*** (0.0787)	0.416* (0.227)	0.600*** (0.182)	0.749*** (0.210)	0.552*** (0.173)
<i>L.Effectiveness</i>	0.372*** (0.0611)	0.467*** (0.0621)	0.236*** (0.0655)	0.326*** (0.0589)	0.372*** (0.124)	0.467*** (0.114)	0.236** (0.101)	0.326*** (0.0922)
round.5	-0.190*** (0.0110)	-0.243*** (0.0112)	-0.235*** (0.0118)	-0.229*** (0.0106)	-0.190*** (0.0313)	-0.243*** (0.0266)	-0.235*** (0.0402)	-0.229*** (0.0354)
Constant	0.0353 (0.102)	-0.256** (0.103)	-0.258** (0.109)	-0.124 (0.0981)	0.0353 (0.167)	-0.256* (0.137)	-0.258 (0.165)	-0.124 (0.118)
Region dummy	Yes							
Country clusters	No	No	No	No	Yes	Yes	Yes	Yes
Observations	642	642	642	642	642	642	642	642
R-squared	0.839	0.840	0.811	0.839	0.839	0.840	0.811	0.839

**Note:** This table reports the second-step estimation results of the instrumental variable specifications, including *Local corruption* and *Local effectiveness* simultaneously. Unlike the previous Table 16, this table includes region dummies as well. **Exp** refers to school fees being expensive, **Text** to the lack of textbooks, **Teach** to the poor quality of teaching and **Abs** to teacher absenteeism. Standard errors are in parentheses. \*\*\* Significant at 1%. \*\* Significant at 5%, \* Significant at 10%.

## 6 Concluding Remarks

The role of education in the process of development has been acknowledged in various sectors, as a better-educated population is associated with greater health, 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 last years. Such financial efforts have been followed by a significant increase in school enrolment, particularly in primary schools, where the gap between boys and girls has also been remarkably reduced. Yet, school drop-out rates, low levels of secondary school attendance and, more importantly, poor quality of learning outcomes – which have remained way below the international standard – are serious challenges faced in many African public schools. Alarming statistics from the Afrobarometer surveys reveal that, when asked about education challenges experienced in local public schools, more than 40 percent of the respondents identified school fees as being very expensive, and more than 50 percent reported the lack of textbooks and learning supplies, poor quality of teaching, and teacher absenteeism.

Good management of education resources, accountability, and transparency are desired in any government in order to ensure the success of policies towards better quality of public service, such as better learning outcomes. Responsiveness, effectiveness, accountability, and absence of corruption are much appreciated values at all levels, including within local governments, defined as the set of formal institutions legally established to deliver a set of specific public services to relatively small geographic jurisdictions. Yet, African citizens massively perceive local councilors as weak institutions that rarely perform well and are unresponsive.

This paper investigated the extent to which pervasive corruption, ineffectiveness, and unresponsiveness within local government officials in Africa affect the incidence of reporting by local inhabitants of poor quality of human and physical learning resources in their local public schools.

We distinguished learning inputs that are more related to school enrolment, such as school fees and facilities, from those that are more related to learning outcomes, such as textbooks, teacher absenteeism or quality of teaching. To perform our analysis, we relied on subjective indicators of bad/good governance practices by local government representatives, perceived by the local citizens. We took the advantage of the series of rich information collected in the round 3 (2005-2006) and round 5 (2011-2013) surveys of the Afrobarometer, which include various information on the perception that citizens have on the behaviors and performance of their local government representatives. They also provide information on school challenges that respondents face in their local public schools. Our indicators of local governance are measured at the regional/provincial level which is the smallest geographical location in the Afrobarometer surveys.

Our findings indicate that the quality of local governance has similar effect on either type of learning inputs, and that corrupt behaviors and ineffectiveness by local government officials increase the probability of experiencing poor school resources by the local inhabitants, even after controlling for government expenditure on education. Our cross-region analysis with instrumental variables report that a one-point increase in the measure of local government corruption is associated with an increase of about 0.4 to 0.7 points in the proportion of people who face poor human or physical school resources in public schools. These values vary between 0.3 and 0.4 points for the measure of local government ineffectiveness.

Success in many of the Sustainable Development Goals relies strongly on the improvement of 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 towards combating corruption and any other misbehaviors by public officials will ensure efficient use of education funds. As shown in this paper, poor governance at the local level reflected by misbehaviors of local government councilors tends to impede both the education resources needed to increase enrolment and to eradicate early school drop-out rates, and the education resources that are necessary to improve the quality of learning.

The Millennium Development Goal number 2 has been successful in terms of increasing the quantitative aspect of education in Africa, but it has not been sufficient enough to lower the gap in terms of learning outcomes between African and more advanced countries. While our measures of learning inputs distinguish between those that tend to be more relevant for school enrolment, such as school fees, and those that are very important for the quality of learning outcomes, further studies are needed to investigate the effect of local governance on learning outcomes performance. Unfortunately, surveys on learning outcomes, comparable across African countries similar to the ones in the Programme for International Student Assessment (PISA), are not yet publicly available.

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