Africa's statistical tragedy: best statistics, best government effectiveness

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Abstract

We analyze the effect of statistical capacity on government effectiveness/efficiency using cross-sectional and panel data from a sample of 48 African countries for the period 2003-2008. The results show that statistical capacity positively affects government effectiveness/efficiency. The positive effect of statistical capacity is robust after controlling for other determinants of institutional quality and usage of alternative estimation techniques. It follows that countries with higher statistical capacity levels enjoy institutions of better quality than countries with low levels of statistical capacity. As a policy implication, if Africa does not have effective governments, it is partly because it has a very weak statistical capacity. In such an environment, access to information for effective governance is compromised.

Keys words: Sub-Saharan Africa, Institution, Statistical Capacity, Information

JEL Code: C43, D8, D73, O17, O15, P48, N17

1 Introduction

The Young (2010) findings have had an important influence on policy debates in both academic and media circles. The main result of the author is that Africa could be growing three times more than what official data reveal. Sala-i-Martin and Pinkovskiy (2010) are among those who have sided with this growth tendency. So there could be an underestimation of the African reality. An underestimation which is challenged by the study of Harttgen et al. (2010) which has concluded that there is no African miracle escaping our attention. Accordingly, per capita income and standard measures of African consumption do not underestimate anything. On the other hand, a series of country-specific articles by Jerven suggest that some African success stories are exaggerated (Jerven, 2010b). Cases in point are Tanzania (Jerven, 2011a), Botswana (Jerven, 2010c), Kenya (Jerven, 2011b) and Ghana (Jerven, 2011e). Hence, the author recommends more caution (Jerven, 2010a, 2011c, and 2011d). Within the framework of Jerven, there is an exaggeration of the African reality.

All the same, the truth is imperative: African data reflect significant inadequacies. The literature has consistently recommended improvements of data (e.g. Sahn and Stifel, 2003, Stifel and Christiaensen 2007, Johnson et al., 2009, Deaton and Heston, 2010, Henderson et al., 2012) and statistics (e.g. An Instrumental Variables Approach, GMM) to correct statistical bias[1]. However, other direct implications of data quality have not been taken into account. For instance, what is the consequence of the capacity of a State to first collect statistics instead of simply observing them? African statistics on economic growth are widely known to be inaccurate[2]. However, the extent and nature of these inadequacies and their implications for data users have not been rigorously studied (Jerven, 2011a). Very few studies (e.g. Blades, 1975; 1980; works of Jerven) are concerned with the quality of African data.

The innovation of this study is precisely its willingness to assess the above concern. It focuses more on the relationship between the statistical capacity of a State and its performance in terms of efficiency. We postulate that, states with information and

[1] This issue has been substantially documented in African institutional literature where good governance indicators maybe subject of bias owing to media propaganda (Asongu, 2012ab, 2013ab).
[2] Ghana is an eloquent case in point (Jerven and Ebo Duncan, 2012).

statistics should be better-off than their counterparts who either do not have or have data of poor quality. Our hypothesis is verified on a sample of sub-Saharan African (SSA) countries.

The paper is organized in seven sections, including this introduction. In the second section, we propose a simple model to demonstrate the hypothetical relation. Next, we discuss the hypothesis of the African statistical tragedy. This hypothesis is justified by our positioning of the paper on SSA countries. The empirical model and data are discussed and presented respectively in Section 4. Section 5 underlines a graphical analysis as well as the results of simple regressions between government effectiveness and statistical capacity. The empirical results are presented and discussed in Section 6. We conclude with Section 7.

2 A Simple Model

Let us consider the following wellbeing social function of the type $W(u_1, \dots, u_n)$ where the subscript 1 to *n* represent individuals and households making-up a society. For more subtlety and simplicity, we define $W(u_1, \dots, u_n) = \sum_{i=1}^{n} u_i$ and $W(u_1, \dots, u_n) = \sum_{i=1}^{n} \bar{u}_i$ as the desired optimal situation. A government is said to be effective or efficient if $\lim_{t \to \infty} \sum_{i=1}^{n} u_i = \sum_{i=1}^{n} \bar{u}_i$, where the t subscript is an index of time. Accordingly, the government becomes effective or increases its effectiveness at time t if $\text{Min}\left(\sum_{i=1}^{n} \bar{u}_i > \sum_{i=1}^{n} u_i\right)$. For this purpose, it has to use $X = (x_1, \dots, x_n)$ where X represents the instruments at its disposal. From a formal standpoint, if $\frac{d \sum_{i=1}^{n} \bar{u}_i > \sum_{i=1}^{n} u_i}{d\theta} = X$, then the following can be written as $\sum_{i=1}^{n} \bar{u}_i > \sum_{i=1}^{n} u_i = f(X, \theta)$. It follows that the effectiveness of government is contingent on its instruments. We assume that our aggregate wellbeing function depends on available information, denoted *I*.

If $I \in \{0, 1\}$,

- $\forall\, I = 1$, the government has information on the actual state or the optimal state of the country.
- $\forall\, I = 0$, the government has no information on the state of the country.
- $\forall\, 0 \leq I < 1$, the government has part of the information.

By virtue of the Tinbergen rule, I=1 is the ideal situation since, $\sum_{i=1}^{n} \bar{u}_i = f(I)$, $\sum_{i=1}^{n} u_i = f(I)$ and $X = f(I)$. We can deduce a simple stylized fact: a government is particularly effective when it has the information enabling it to confront the social reality of the country and when the instruments are feasible. Hence, the ability to acquire the information becomes a determining factor for the effectiveness of government. This is not a simple case of information asymmetry. Consistent with Lucas (1976) or Keyland and Prescott (1977), our postulation goes beyond simple economic policy.

3 Hypothesis of Africa's statistical tragedy

Accordingly, Africa's statistical tragedy[3] is neither a mere illusion nor a simple perspective. We offer some evidence to support this thesis.

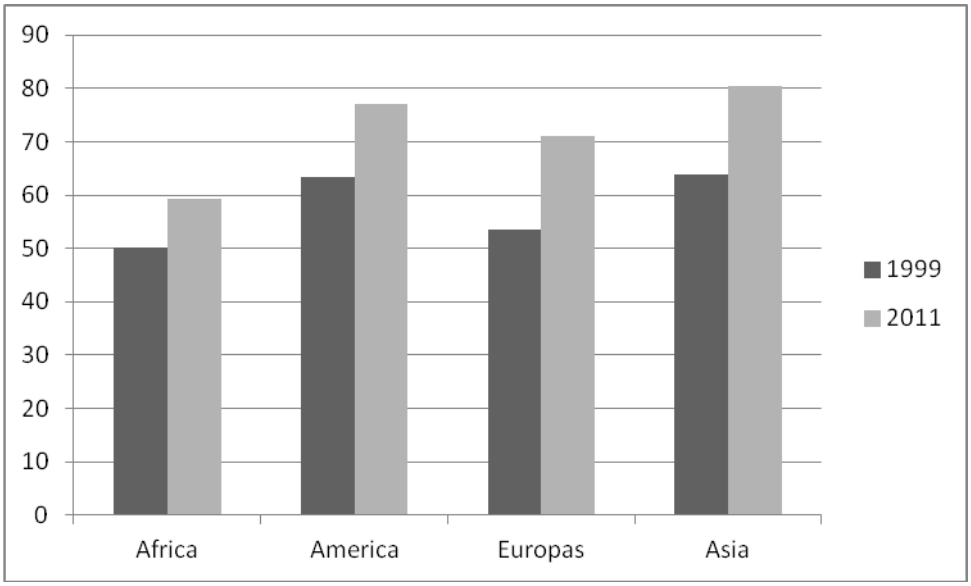
Figure 1 illustrates two periods of statistical capacity in four regions of the world. In all cases, the African region is one that is misplaced. In 1999, she had the score of 50 out of 100. More than a decade later, the region gained only 9.15 points, America gained 13.57 (from 63.39 to 76.96), Europe edged by 17.46 (53.64 to 71.09) and Asia also improved 16.56 (63.92 to 80.49). Europe, for example which was in the same situation as Africa has widened the gap with 8 points.

In addition, in 1999, 25% in the lowest percentile (including countries with scores ranging from 10 to 17) entailed three African countries (Somalia, Liberia and Libya) and none in the 75% percentile of the higher (countries with scores ranging from 79 to 86). In 2011, 25% of the lowest percentiles (countries with scores ranging from 22 to

[3] We borrow this concept from Shanta Devarajan (http://blogs.worldbank.org/africacan/africa-s-statistical-tragedy. Accessed on the 10th of August 2012)

36) included Eritrea, Libya and Somalia; and no African country still features in the 75% highest percentile (countries with scores ranging from 93 to 94).

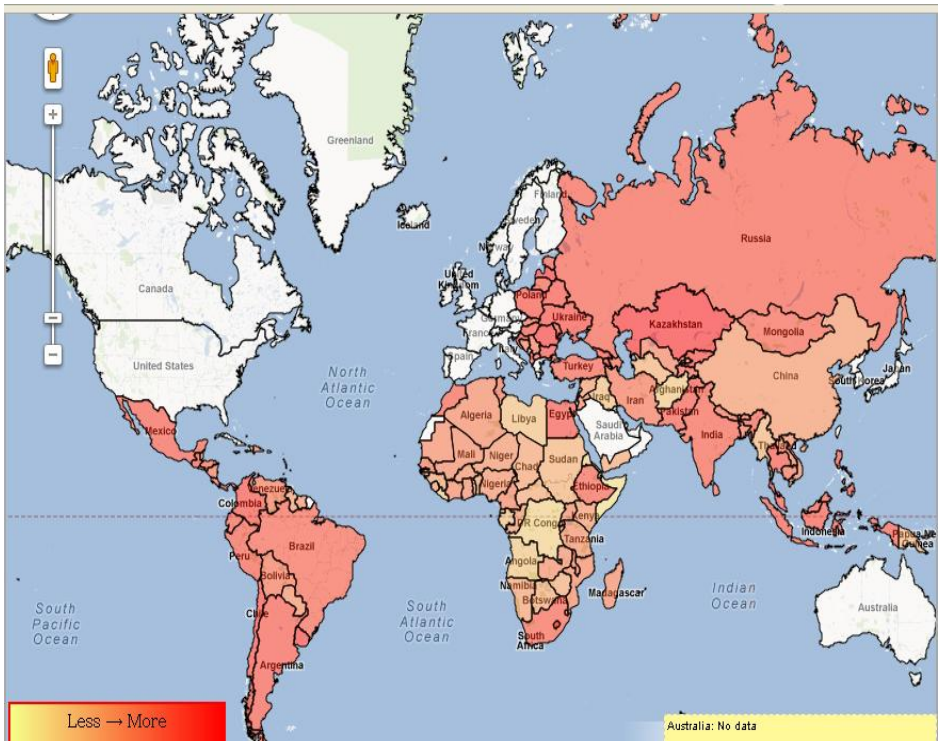
Figure 1. Evolution of statistical capacity in continents



Source: Author, based on data of Bulletin Board on Statistical Capacity

This figure 1 does not include one very developed country, as can be seen in the following chart. Countries covered by the white color are generally not covered by this index.

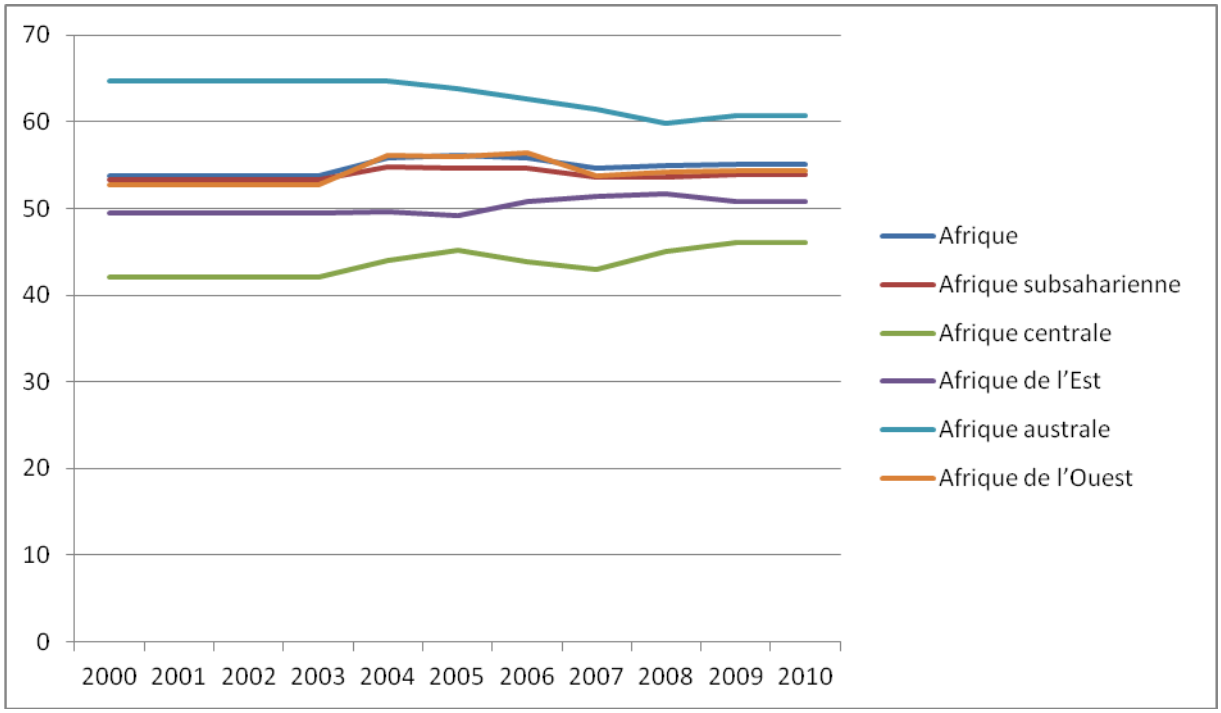
Figure 2. Mapping of countries concerned



Source: Encyclopedia of the Nations, available at http://www.nationsencyclopedia.com/WorldStats/Bulletin-Board-Stats-Overall-Score.html (accessed: 10th of August 2012)

Figure 3 below is constructed with the averages of every country within each region. We notice that (more or less) with the exception of Africa, there is a decreasing general tendency. When the whole of Africa is further considered, it is clear that this decreasing tendency is not due to crises. Another interesting characteristic arising at this level is that on average SSA countries and other sub-regions have a score of below 60.

Figure 3. Evolution trends of African sub-regions



After this cross-regional analysis, it is worthwhile to analyze the situation in detail. Between 2000[4] and 2010, two African countries experienced the highest rating downgrade: Côte d'Ivoire (-25 points) and Zimbabwe (-21 points). After this class, there is another. In it, we rank Botswana (-15), Burkina Faso (-12) and Guinea (-10 points). In the list of countries that have made significant progress are Sierra Leone (25) and Liberia (23). Then there are those who have jumped by 10 points: Cameroon (17 points), Ethiopia (16 points), Nigeria (15 points), Congo (15 points), Libya (13 points), Ghana (13 points) and Sudan (12 points).

[4] In the official data, the indicator is not available for the period 2000-2002. We have used estimations from the Foundation Ibrahim for these years.

For the period 2000-2010: only two African countries (South Africa and Egypt) have an average score around the horizon of 80; five (Côte d'Ivoire, Senegal, Mauritius, Morocco, Ethiopia) have an average score in the neighborhood of 70; thirteen (Botswana, Burkina Faso, Gambia, Lesotho, Mali, Madagascar, Malawi, Mozambique, Swaziland, Tanzania, Tunisia, Uganda, Zambia) have a rating of less than 60, fifteen (Zambia, Togo, Seychelles, Rwanda, Namibia, Nigeria, Niger , Mauritania, Kenya, Ghana, Chad, Comoros, Cameroon, Benin) have an average score around 50; six (Central African Republic, Congo, Djibouti, Gabon, Sao Tome, Sierra Leone) have an average score in the region of 40; five (Libya, Guinea-Bissau, Equatorial Guinea, Eritrea, DRC) have an average score in the horizon of 30 and, two (Liberia, Somalia) have an average score around the threshold of 20.

Assuming that the mean is not a robust parameter, we notice a fairly significant change in the classifications. To do this, we consider only the ratings of 2011. Two countries (Egypt and South Africa) have ratings in the horizon of 80, nine (Ethiopia, Malawi, Mauritius, Morocco, Niger, Nigeria, Tanzania, Tunisia, Uganda) were swimming around 70, thirteen (Algeria, Burkina Faso Cameroon, Côte d'Ivoire, Gambia, Ghana, Lesotho, Madagascar, Mali, Rwanda, Senegal, Swaziland, Zambia) in the neighborhood of 60; twelve (Benin, Botswana, Burundi, Central African Republic, Chad, Congo, Kenya Guinea, Togo, Mauritania, Namibia, Sierra Leone) around the threshold of 50, five around the 40 rating (Angola, DRC, Gabon, Guinea-Buiseau, Sudan, Zimbabwe), three (Eritrea, Liberia, Libya) in the region of 30 and only Somalia with a rating around the height of 20.

4 Estimation Strategy and Data

We estimate a plethora of models and specifications. Our first approach is to regress a model that incorporates several variables. The model is the following:

$$GE_i = \alpha + \beta \text{Statistical Capacity}_i + \delta X_i + \varepsilon_i \quad (1)$$

where GE is government effectiveness/efficiency. Data on government effectiveness/efficiency sources from the dataset compiled by Daniel Kaufmann, Art Kraay and Massimo Mastruzzi at the World Bank. The indicator is based on 30

underlying data sources reporting the perceptions of governance of a large number of survey respondents and expert assessments worldwide. Government effectiveness/efficiency is distributed between −2.5 and 2.5 (best). X = (x_1; …; x_n) is the vector of control variables, and ε_i is the error term. X is a vector of the following variables: education, log of GDP per capita and log of trade. The data on GDP per capita and trade are from Pen World Tables. Education (Tertiary Enrolment) is obtained from the World Development Indicators of the World Bank (2010).

Statistical Capacity is our variable of interest and our parameter of interest is thus β. This indicator of the Bulletin Board on Statistical Capacity (BBSC), developed by the Development Data Group (DECDG) of The World Bank, aims to improve measuring and monitoring of statistical capacity of IDA countries in close collaboration with countries and users. The database contains information on various aspects of national statistical systems and includes a country-level statistical capacity indicator based on a set of criteria consistent with international recommendations.

The BBSC provides information on various aspects of national statistical systems of developing countries, including a country-level statistical capacity indicator. This indicator assesses the capacity of statistical systems using a diagnostic framework which consists of three assessment areas: methodology; data sources; and periodicity and timeliness (institutional framework is not included). With a rating ranging from 0-100, higher values denote better capacity.

Eq. (1) is first estimated in cross-section, using averages of the period 2003-2009. Next, we estimate using panel data for this same period.

Accordingly, institutions can create an environment that improves Statistical Capacity. Some factors for this include: an excellent education, competent human resources and adequate financial resources. Hence, the estimation approach should take the feedback effect (from institutions to statistical capacity) into account.

In order to account for the issue of endogeneity, we estimate Eq. (2) below:

$$\left.\begin{aligned} GE &= f(\text{Statistical Capacity}, \text{Open}, \text{Education}, \text{GPD per capita}) \\ \text{Statistical Capacity} &= f(GE, \text{Education}, \text{GPD per capita}) \end{aligned}\right\} \quad (2)$$

Table 1 below provides a summary statistics for the variables used in our analysis. We notice that the variable of interest is on average negative for this part of Africa. While Somalia has the lowest rating, the Mauritius Island has the highest.

Table 1. Summary statistics (2003-2008 averages)

Variables	Obs	Mean	Std. Dev.	Min	Max
Statistical Capacity	48	54.170	13.365	22	84
Statistical Capacity 1999	42	49.087	14.751	14.444	72.222
Log GDP per capita	48	7.207	1.046	5.171	9.983
Log Open	48	4.180	0.702	0.627	5.203
Education	45	5.049	4.342	0.468	21.182
Government effectiveness	48	-0.778	0.6102	-2.2423	.6735

These regressors are available for the following countries: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic (CAR), Chad, Comoros, Congo Democratic Republic (CDR), Congo Republic, Côte d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

5 A graphical Analysis

Figure 4. Linear relationship between government effectiveness and statistical capacity

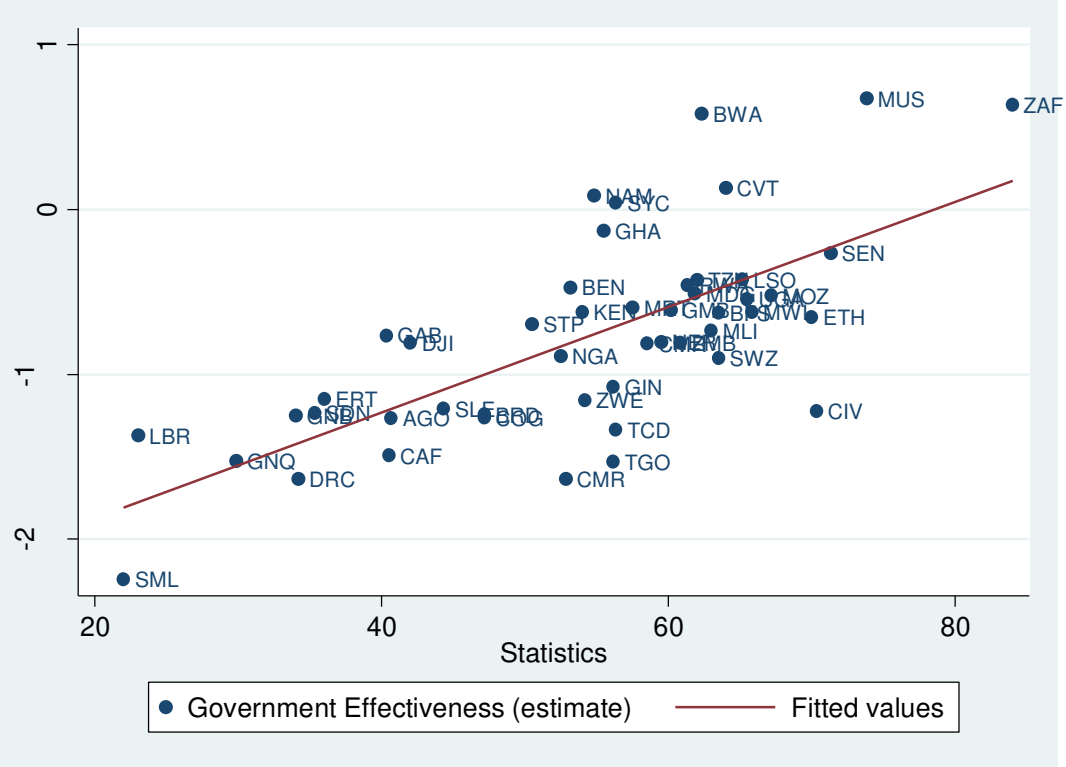


Figure 4 portray the relationship between each of the measures of institutional quality (y-axis) and Statistical Capacity (x-axis) for the countries included in our sample (average data from 2003-2008) of 48 countries. In Figure 4, government effectiveness/efficiency is plotted against Statistical Capacity. It follows that countries with higher Statistical Capacity enjoy higher government effectiveness. We also represent the fitted line for the simple regression model $GE_i = \alpha + \beta Statistical\ Capacity_i + \varepsilon_i$ where GE is government efficiency. The estimated coefficient for β is positive (+0.032) and strongly significant (p-value = 0.000), indicating that high Statistical Capacity improve government efficiency/effectiveness.

If the conclusion of the above exploratory analysis confirms the intuition developed in the section 2, it worthwhile to test its solidity with an empirical assessment. This is the objective of the following section.

6 Estimation results

We present the regression results in three tables. Table 2 reports the results of Eq. (1). In the first table, we present the basics results of our estimations, using the cross-sectional averages for the 2003 to 2008. We notice from Columns 1-3 that our coefficient of interest β, is positive and significant at the 1% level in the regressions. This coefficient is strongly significant. In the case of fourth column (4), its reliability level falls slightly but the variable remains significant. In columns (3) and (4), we have used a variable of interest lagged by the index of 1999. It is a way for us to test the robustness of our results. We comment on the control variable later.

In the same direction, columns (2) and (4) present estimations with Clusters. We thus find that the positive effect of Statistical Capacity remains significant after accounting for other determinants of institutional quality. This finding suggests that countries with higher Statistical Capacity enjoy better Government effectiveness.

Table 2. Main Regression (Cross-sectional)

	Government effectiveness			
Variables	**(1)**	**(2)**	**(3)**	**(4)**
Statistical Capacity	.027***	.027***		
	(.003)	(.005)		
Statistical Capacity 1999			.020***	.020**
			(.004)	(0.008)
Log GDP per capita	.186***	.186*	.304***	.304***
	(.068)	(.071)	(.065)	(.060)
Log Open	-.100	-.100	-.161	-.161*
	(.118)	(.083)	(.127)	(.069)
Education	.032***	.031**	.0309***	.0309*
	(.009)	(.010)	(.0110)	(.014)
Constant	-3.333***	-3.334***	-3.354***	-3.354***
	(.574)	(.512)	(.587)	(.628)
Clusters	No	Yes	No	Yes
Observations	45	45	41	41
R^2	0.64	0.64	0.62	0,62

Robust p-values in parentheses
* p<0.05; ** p<0.01; *** p<0.1

With the exception of the openness indicator (that has the unexpected sign), other determinants included in these regressions as control variables have the expected signs

and are statistically significant. The results are broadly consistent with those of Kanyama-Kalonda and Kodila-Tedika (2012).

We also employ a panel data analysis in order to account for more specifics. From the resulting findings presented in Table 3 below, we notice that the variable of interest is highly significant in statistical terms. Hence, Statisitcal capactity has a positive nexus with government effectiveness. We also notice that (with respect to results in the preceding table) GDP per capita loses its significance while openness loses both its blur significance and sign. While the constant term significantly remains negative, education negatively affects government effectiveness.

Table 3. Main Regression (with Panel data)

	Government effectiveness
Variables	**Fixed-effects regression**
Statistical Capacity	.007***
	(.002)
Log GDP per capita	.136
	(.084)
Log Open	.101
	(.060)
Education	-.017*
	(.010)
Constant	-2.326***
	(.854)
Observations	269
R^2between	0.34
R^2overall	0.32
R^2 within	0.08
Prob>F	0.001
Prob> F	0.000

Robust p-values in parentheses
* p<0.05; ** p<0.01; *** p<0.1

The model in Eq. (2) is estimated by Seemingly Unrelated Regressions (SUR), to account for possible endogeneity that result from the inclusion of government effectiveness in Table 4. This table compares panel-based and cross-sectional results. Simultaneity bias is corrected with the method of Zellner. Even after correcting for this bias, the result is robust. The statistical capacity of a nation remains a highly significant determinant, after consideration of the other determinants susceptible of

influencing the quality of government efficiency in a nation. By comparing the GDP per capita variable across regressions, we find some contradiction in the results which could be an interesting future research direction. While the openness measure is not significant in both regressions, education consistently has a positive nexus with government effectiveness. Note should be taken of the fact that the above discussion is relevant only to the upper part of Table 4.

Table 4. Main Regression (with Cross-Sectional and Panel data SUR)

	Cross-sectional	**Panel data**
Regressors	**Dependant variable: Government effectiveness**	
Statistical Capacity	.037***	.0354***
	(.003)	(.001)
Log GDP per capita	.160***	-.034***
	(.060)	(.039)
Log Open	-.034	-.034
	(.089)	(.039)
Education	.030**	.028***
	(.013)	(.006)
Constant	-3.930 ***	-3.863***
	(.510)	(.226)
R^2	0.60	0.53
	Dependant variable: Statistical Capacity	
Government effectiveness	24.293***	24.078***
	(2.200)	(.981)
Log GDP per capita	-3.581**	-3.495***
	(1.589)	(.717)
Education	-.710**	-.661***
	(.348)	(.154)
Constant	102.776***	101.811***
	(11.654)	(5.252)
R^2	0.46	0.40

Robust p-values in parentheses
* p<0.05; ** p<0.01; *** p<0.1

7 Conclusion

This paper has mainly been concerned with the effect of national statistical capacity on institutional quality using African data. The main finding is that statistical capacity positively affects each of the measures of the quality of government that we have considered. Therefore, countries with higher statistical capacity enjoy better government institutions, particularly government effectiveness.

These results are robust to alternative econometric approaches. We have used several econometric methods to validate the conclusion of this study. As a policy implication, if Africa does not have effective governments, it is partly because it has a very weak statistical capacity. In such an environment, access to information for effective governance is compromised. It is indeed a statistical tragedy.

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