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

Kodila-Tedika, Oasis

University of Kinshasa

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Comments welcome (and form is imperfect)

Oasis Kodila-Tedika

Department of Economics, University of Kinshasa, B.P. 832 KIN XI,
Kinshasa, Democratic Republic of Congo.
Email: oasiskodila@yahoo.fr

Abstract

We analyze the effect of the Statistical Capacity on government effectiveness/efficiency, using a cross-sectional and panel data for a sample of 48 countries African for a period of 2003-2008. The results show that Statistical Capacity positively affects government effectiveness/efficiency. The positive effect of Statistical Capacity is robust to controlling for other determinants of institutional quality and number of estimation techniques. It follows that countries with higher Statistical Capacity levels enjoy institution of better quality than countries with low levels of Statistical Capacity.

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

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

1 Introduction

After the on-line publishing of the article Young (2010), this paper had such an echo, a large part of the press has resumed. The main result of the author: Africa would grow three times more than the usual official data reveal. Sala-i-Martin and Pinkovskiy (2010) is a member of those who also brought good news in this direction there also. So there would be an underestimation of the African reality. Underestimation which is challenged by the study Harttgen et al. (2010), who believes that there would be no African miracle escape us. Per capita income and standard measures of consumption Africa do not underestimate anything. On the other hand, a series of articles Jerven are in the case studies (country by country), which exaggerates the success of some African economies (Jerven, 2010b). This is the case for example in Tanzania (Jerven, 2011a), the Botswana (Jerven, 2010c), Kenya (Jerven, 2011b), Ghana (Jerven, 2011e). The author invites to more cautiously (Jerven, 2010a, 2011c, and 2011d). In his case it is in front of an overestimation of the African reality.

In every case, the truth is imperative: the African data present rather important inadequacies. The scientific literature continues to propose tests or improvements of the statistics (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 the Statistical bias. However, other direct implications of data quality have not been taken into account. For example, what does not live statistics, but the ability of a State to collect statistics? Statistics on African economic growth are widely known to be inaccurate, but the extent and nature of these inaccuracies and their implications for the users of the data have not been rigorously assessed (Jerven, 2011a). Very few studies (e.g. Blades, 1975; 1980; works of Jerven) are concerned about the quality of African data.

The innovation of this study is precisely its willingness to provide the answer to this question. It focuses more on the relationship statistical capacity of a State and its performance in terms of efficiency. He postulates that states with information and statistics available should be better than those who do not or have but bad qualities.

We test our hypothesis on the sample of countries in sub-Saharan Africa, because of inadequacies which characterize in this sample.

The paper is organized in seven sections, including this introduction. We propose, in second section, a simple model for to demonstrate this relation. Next, we discuss hypothesis of Africa's statistical tragedy. This hypothesis justifies more our choice of this sample. The empirical model is discussed and data presented in section 4. The fifthly section focuses on a graphical analysis and on the results from simple regressions of the relationship between each of the government effectiveness and Statistical Capacity. The regressions results are presented and discuss the robustness of the findings in section 6. As last, in section 7, we conclude.

2 A Simple Model

Is a function of social welfare type $W(u_1, \dots, u_n)$ where the index 1 to *n* represents individuals or households forming a society. For 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 a optimal situation or desired.

A government is said to be efficient $\lim_{t \to \infty} \sum_{i=1}^{n} u_i = \sum_{i=1}^{n} \bar{u}_i$ where t is an index of time. The government approach to efficiency when $\text{Min}\left(\sum_{i=1}^{n} \bar{u}_i > \sum_{i=1}^{n} u_i\right)$ at time t, it must therefore $X = (x_1, \dots, x_n)$ where X represents the instruments available to the government.

Formally, we can write $\sum_{i=1}^{n} \bar{u}_i > \sum_{i=1}^{n} u_i = f(X, \theta)$.

Deriving $\frac{d \sum_{i=1}^{n} \bar{u}_i > \sum_{i=1}^{n} u_i}{d\theta} = X$. The implication is that a government is effective based on the instruments at its disposal. We are well aware that our type of aggregation functions well-being is dependent on the information, noted *I*.

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

- $\forall\, I = 1$, the Government has information on the current situation and the optimal situation of the society.

- $\forall I = 0$, the Government has no information on the current situation and the optimal situation of the society.
- $\forall 0 \leq I < 1$, government has a part of the information.

Under the Tibergen rule, I = 1 is he ideal situation is as far as $\sum_{i=1}^{n} \bar{u}_i = f(I)$, $\sum_{i=1}^{n} u_i = f(I)$ and $X = f(I)$.

We can deduce a fact stylize simple: a government is effective especially since it has the following information will enable it to cope with the social reality of his country and the available instruments lend themselves well. The capacity to be had information becomes a determinant of government efficiency. It is not simply here about an asymmetry of information. Our postulate goes beyond the simple economic policy, as in the case of Lucas (1976) or Keyland and Prescott (1977).

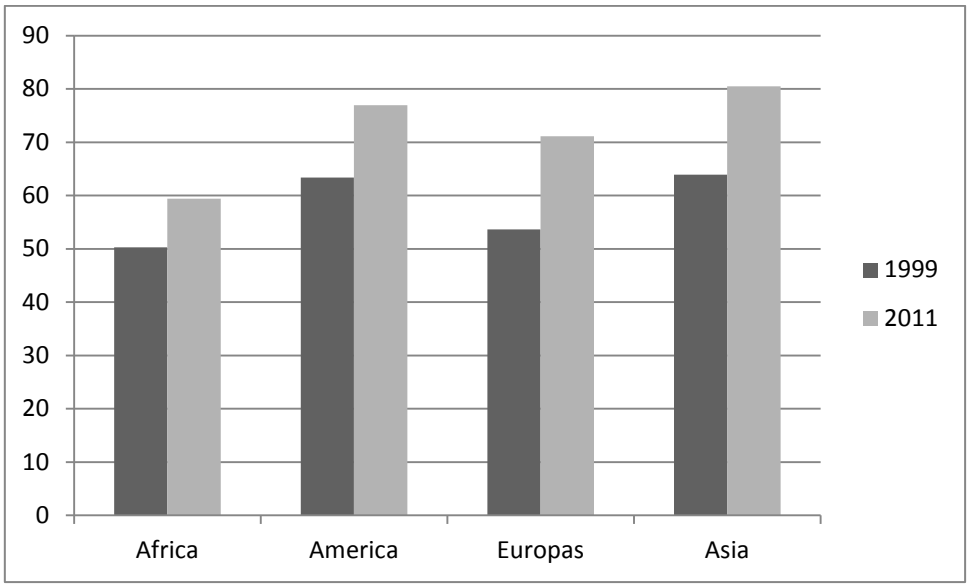
3 Hypothesis of Africa's statistical tragedy

About the Africa's statistical tragedy[1] is not a mere illusion or turn condescending. We offer some evidence to support this thesis.

Figure 1 shows a photograph of 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 was the score of 50 out of 100. More than a decade later, the region gained only 9.15 points, America won 13.57 (from 63.39 to 76.96), Europe won 17.46 (53.64 to 71.09) and Asia won 16.56 (63.92 to 80.49). Europe, for example, which had almost the same situation that 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), there are three African countries (Somalia, Liberia and Libya) and none in the 75% percentile of the higher (including countries with scores ranging from 79 to 86). In 2011, 25% of the lowest percentiles (including countries with scores ranging from 22 to 36) identify Eritrea, Libya and Somalia at the 75% highest percentile (including countries with scores ranging from 93 to 94).

[1] We borrow this concept Shanta Devarajan (available here: http://blogs.worldbank.org/africacan/africa-s-statistical-tragedy accessed 10 août 2012)

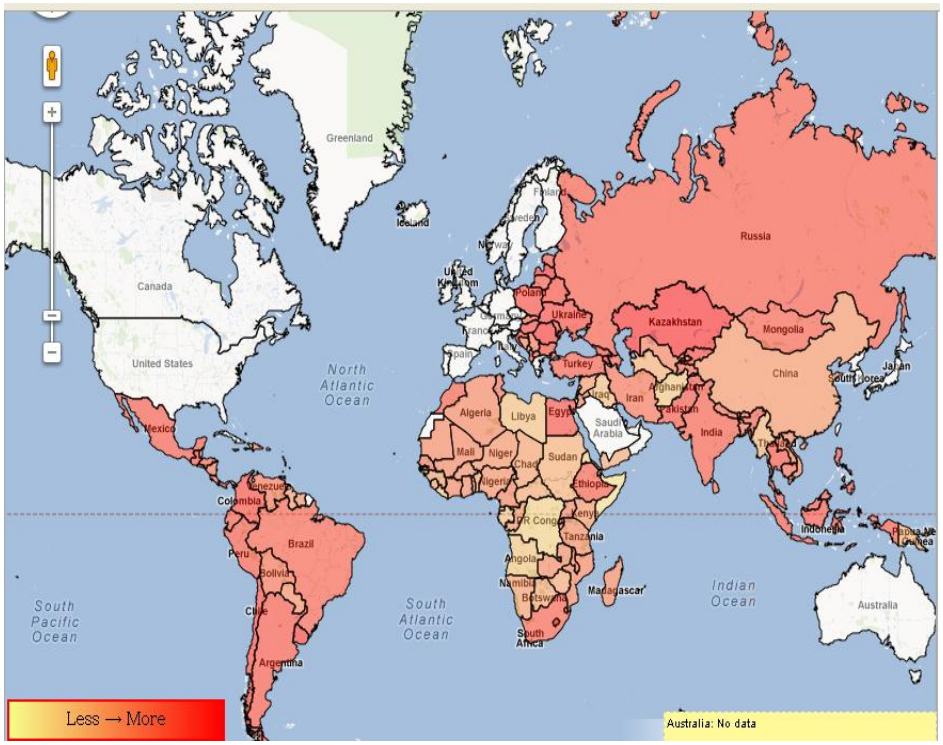
Figure 1. Evolution of statistical capacity in continents



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

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

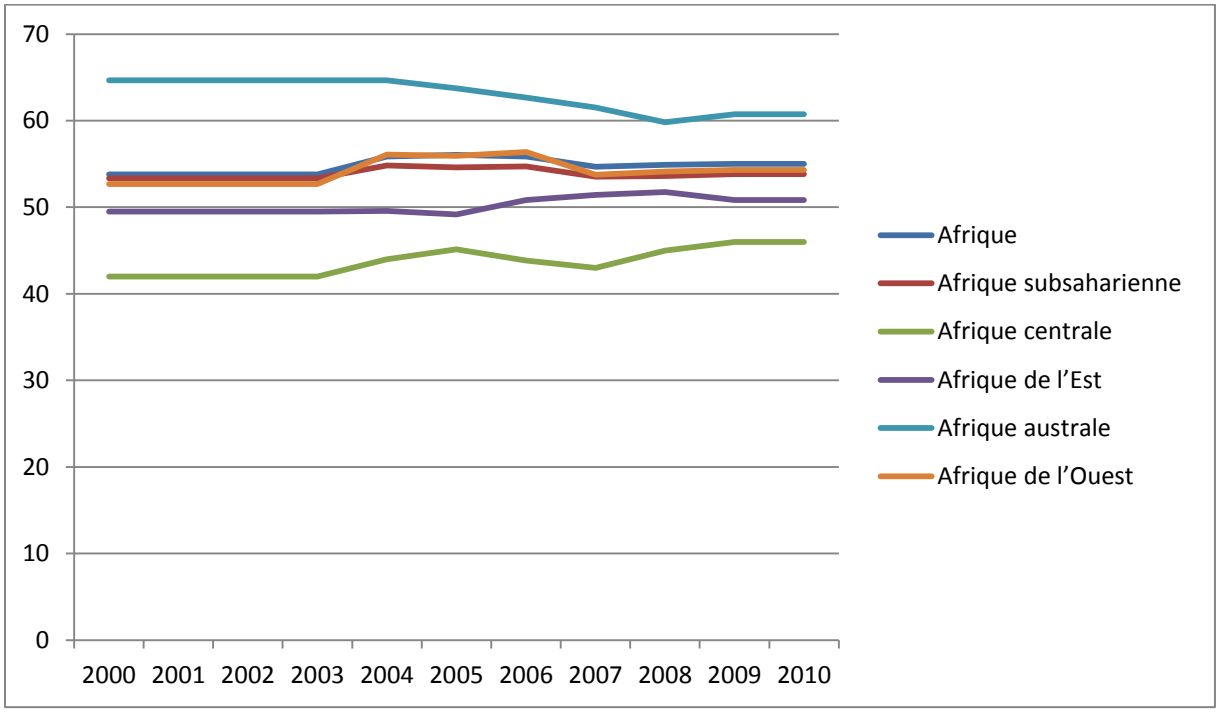
Figure 2. Mapping of the countries concerned



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

Figure 3. is constructed with the averages of every country within each region. We notice that generally the trend is for the reduction, except for Central Africa more or less. When we consider all Africa, it is clear that this decline is not caused to the situation: a decline can not be explained by the recent international crisis. Another characteristic which appears to this level is that the average sub-Saharan Africa and other sub-regions have scores lower than 60.

Figure 3. Evolution trend of African sub-regions



Based on this analysis between regions, dissect the situation in Africa. Between 2000[2] and 2010, two African countries experienced the highest rating downgrade. It is the Côte d'Ivoire (-25 points) and Zimbabwe (-21 points). After this class, there is another. In it, we ranked Botswana (-15), Burkina Faso (-12) Guinea (-10 points). In the list of those who have made significant progress, there has been Sierra Leone (25) and Liberia (23). Then there are those who have jumped 10 points: Cameroon (17 points) Ethiopia (16 points), Nigeria (15 points), Congo (15 points), Libya (13 points), Ghana (13 points) and Sudan (12 points).

[2] In the official data, the indicator is not available for period going from 2000 till 2002. We used the estimations of the Foundation Ibrahim for these four years.

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

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

4 Estimation strategical and Data

We estimate a number of models and specifications. Our first approach is to regress a model that considers 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 come from the dataset compile 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 measure between −2.5 and 2.5 (best). $X = (x_1; \ldots; x_n)$ is the vector of control variables, and ε_i is the error term. X is a vector of variables education, log GPD per capita, log trade. The data on GPD per capita and trade come from Pen World Tables. Education (Tertiary Enrolment) is obtained World Development Indicators, 2010.

Statistical Capacity is our variable of interest and Our parameter of interest is thus β. This indicator is 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). 0-100 Higher value is better.

(1) is first estimated in cross-sectional, using a average of the period enter 2003-2009. Next, we estimate in panel data for this period.

We mention that institutions can create an environment that can allow Statistical Capacity strong, such as an excellent educational system, a human and financial resource. As result, model estimation could take into account the feedback effect from institutions to statistical capacity.

To take into account the problem of endogeneity, we estimate an equation of the type:

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

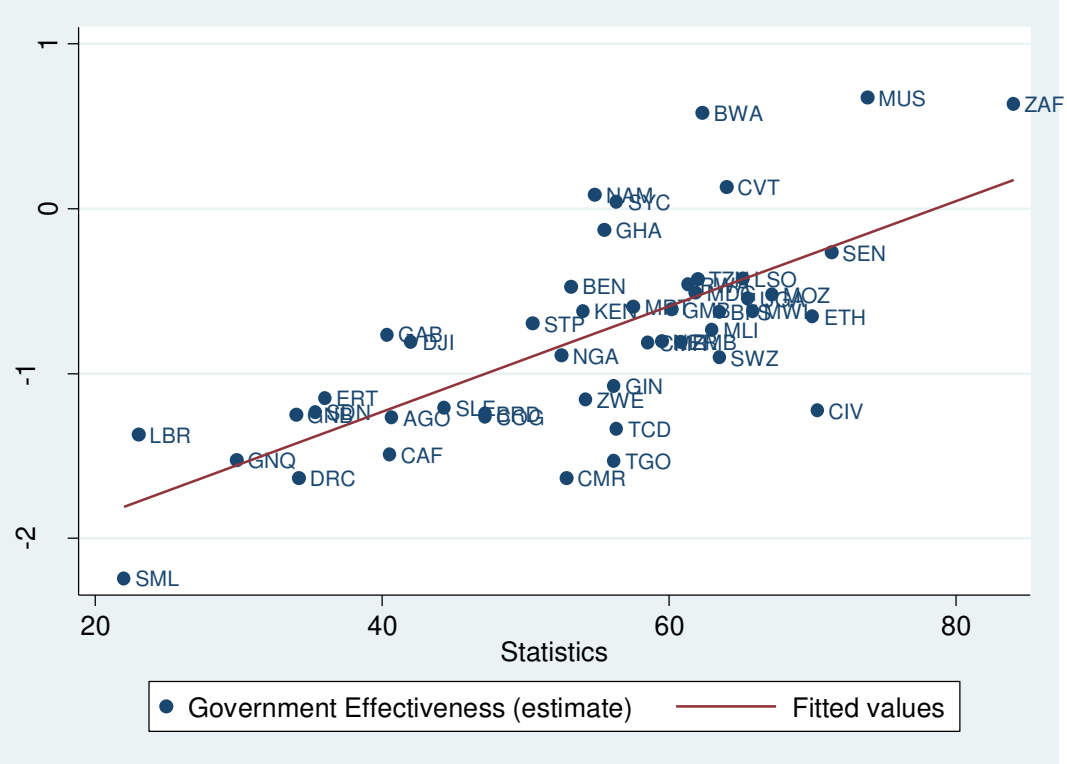
Table 1 gives summary statistics for the variables involved in our analysis.

Table 1. Summary statistics (average 2003-2008)

Variables	Obs	Mean	Std. Dev.	Min	Max
Statistical Capacity	48	54.170	13.365	22	84
Statistical Capacity 1999	48	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	48	5.049	4.342	0.468	21.182
Government effectiveness	48	-0.778	0.6102	-2.2423	.6735

5 A graphical Analysis

Figure 4. Linear relationship between government effectiveness and statistical capacity



Figures 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 $GE_i = \alpha + \beta \text{Statistical Capacity}_i + \varepsilon_i$ where GE is government efficiency. The estimated coefficient for β is positive (+0.032) and strongly significant (p-value = 0.000), showing that high Statistical Capacity improve government efficiency/effectiveness.

If this conclusion confirms the intuition developed in the section 2, it remains however clearly that it is necessary to try to test its solidity of the empirical point of view. It is what we make in the following section.

6 Estimation results

We present the regression results in three tables. Table 2 reports the results of equation (1). In the first table, we present the basics results of our estimations, using the cross-sectional average of the period covering 2003 to 2008. It should be noted first that we do not really comment on the control variables. Moreover, we note that in all columns (1-3), 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 the column (4), its reliable level falls slightly but the variable remains significant. In columns (3) and (4), we used a variable of interest delayed the index of 1999. It is a way for us to test the robustness of our results.

In the same direction, columns (2) and (4) resume 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 (with 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

Other determinants included in these regressions as control variables have expected signs and are statistically significant, except the opening. Openness to trade has an unexpected sign. This result joins that of Kanyama-Kalonda and Kodila-Tedika (2012). It is maybe the sense of the relation that is problematic.

To take more into account the specificities of each country, we chose to use panel data. It is also a way to test the robustness of our results. Again, according to Table 3, we find that the variable of interest is highly significant in statistical terms. But the variable GDP per capita loses its significance and openness, whatever not significant, changes sign for positively affect government efficiency. It's almost the same conclusion that emerges for the education variable. It affects negatively the dependent variable and significantly.

Table 3. Main Regression (with Panal data)

	Government effectiveness
Variables	**Fixed-effects regression**
Statistical Capacity	.007***
	(.002)
Log GDP per capita	.136
	(.084)
Log Open	.066
	(.050)
	-.161
	(.069)
Education	-.017*
	(.010)
Constant	-2.326***
	(.639)
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 equation (2) is estimated by SUR, to account for possible endogeneity that result from the inclusion of government effectiveness in table 4. This table crosses the results panel and cross-sectional. Simultaneity bias is corrected by 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 from the statistical point of view, after consideration of the other determinants susceptible to influence the quality of the governmental efficiency of a nation. By comparing the variable GDP per capita in the forms of regression, we are in the presence of the contradictory results which deserve to draw the attention of the other studies. The opening is not significant in the cases of regression and the education has the expected sign with considerable significance. Let us specify that we are interested only the upper part of Table 4.

Table 4. Main Regression (with Cross-Sectional and Panal 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 was mainly concerned with the effect of national level of Statistical Capacity on aspects of institutional quality in sample African data. The main finding is that Statistical Capacity positively affects each of the measure of the quality of government institutions that we considered. It is government effectiveness. Therefore, countries with higher average Statistical Capacity enjoy better government institutions, particularly the Government effectiveness.

These results seem robust to changes in econometric approaches. We used several econometric methods to validate the conclusion of this study. And this conclusion is robust. 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 necessary to make effective government is compromised. It is indeed a statistical tragedy.

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