# Statistics and IQ in Developing Countries: A Note

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## Statistics and IQ in Developing Countries: A Note

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**Abstract**

The purpose of this study is to assess the nexus between intelligence (or human capital) and statistical capacity in developing countries. The line of inquiry is motivated essentially by: (i) the scarce literature devoted to elucidating poor statistics in developing countries and (ii) an evolving stream of literature on knowledge economy. We have established a positive association between intelligence quotient (IQ) and statistical capacity. The relationship is: (i) consistent with the employment of alternative specifications based on varying conditioning information sets and (ii) robust to the control of outliers. Policy implications are discussed.

*JEL Classification*: D02, D73, I20
*Keywords*: Statistics; Intelligence; Developing countries

## 1. Introduction

Incorrect national statistics negatively bears on government effectiveness (Kodila-Tedika, 2014a) and potentially creates debates in policy circles. This debate which has been articulated with fundamental growth issues in Africa, coincided with the publication of some notable works on data revision, inter alia: Jerven (2013a), Devarajan (2013), Harttgen, Klasen and Vollmer (2013). While Jerven (2013b) has clearly outlined the issues in a new book, Young (2012) has established that some indicators on Africa's development are growing about 4 times what is indicated by international datasets. This has motivated a growing stream

of literature on the subject, notably a recent book premised on whether Africa's recent growth resurgence is a reality or a myth (Fosu, 2015ab).

In light of the above, it is important to elucidate why good statistics may be present in some countries and not others. To the best of our knowledge, very little has been covered on this stream of literature, essentially owing to the relatively new stream of debate. As far as we have reviewed, only Kodila-Tedika (2013) has attempted to elucidate this concern of statistical quality in African countries. The present line of inquiry aims to extend this stream of the literature from a human capital angle, notably: on the role of intelligence or intelligence quotient (IO) in statistical capacity.

The positioning of the line of inquiry on human capital aligns well with an evolving stream of African development literature, articulating the imperative for African countries to catch-up with the rest of the world by enhancing their transition from product-based economies to knowledge-based economies (Anyanwu, 2012; Asongu, 2014a; Oluwatobi et al., 2014; Andrés et al., 2014; Asongu, 2015a)[1].

Our theoretical hypothesis is founded on the following arguments. Indeed, educated persons tend to be good and well informed citizens (Reynal-Querol and Besley, 2011;Besley et al., 2011). A high degree of citizenship and information should include being more reliable and indebted (Botero et al., 2012). Lynn et al. (2007) and Lynn and Milk (2007) have shown that the IQ is highly correlated with education. Accordingly, people with high IQs can easily use their education for various purposes. Within the framework of this line of inquiry, societies enjoying relatively high IQ should be associated with a higher demand for accurate information, collected as statistics. This theoretical postulation broadly aligns with recommendations for better statistics from Young (2012) and Henderson et al. (2012). Based

[1]It is important to note that these recommendations have been emphasised based on the knowledge that, it is more feasible for African countries to engage in reverse engineering because their current technologies are more imitative and adaptive in nature (Asongu, 2014b, 2015b, p. 578; Tchamyou, 2014; Asongu, 2014c).

on the above theoretical postulations, our testable hypothesis is as follows: on average, countries with high IQ present better statistics, relative to their low IQ counterparts.

The rest of the paper is structured as follows. Section 2 discusses the data and methodology. Empirical results are presented Section 3 while Section 4 concludes with implications.

## 2. Data and Methodology

The indicator of the Bulletin Board on Statistical Capacity (BBSC), developed by the Development Data Group of the World Bank, which focuses on improving the monitoring and measuring of statistical capacity of the International Development Association (IDA) countries in close collaboration with users and countries. The database embodies information from a plethora of aspects of national statistical systems and entails a country-level statistical capacity indicator which is based on a set of criteria that are consistent with international recommendations.

The BBSC discloses information on various dimensions of national statistical systems of developing nations, embodying a statistical capacity indicator at the country-level. This indicator examines the capacity of statistical systems with the help of a diagnostic framework which entails three investigative areas, notably: data sources; methodology and periodicity and timeliness (institutional framework is excluded). The rating ranges from 0 to 100, with higher values denoting better capacity.

The data on intelligence is from Meisenberg and Lynn (2011) and its previous versions can be found in Lynn and Vanhanen (2002, 2006). This dataset is a compilation of hundreds of average national IQ tests observed over the 20$^{th}$ and the 21$^{st}$ centuries using best practice methods. Average IQ is a measure of general-purpose human capital as well as a measure of

nation's labor quality (Hanushek & Kimko, 2000; Hanushek & Woessmann, 2008; Jones & Schneider, 2006).

The choice of the statistical indicator and intelligence measurement are broadly consistent with recent economic development and intelligence literature (Weede & Kämpf, 2002; Jones & Schneider, 2006; Ram, 2007; Potrafke, 2012; Kodila-Tedika & Kanyama-Kalonda, 2014; Kodila-Tedika, 2014b; Rindermann et al., 2014; Kodila-Tedika & Mustacu, 2014; Kodila-Tedika & Bolito-Losembe, 2014; Kodila-Tedika and Asongu, 2015ab). It is interesting to note that data from Hanushek on the one hand and from Lynn and Vanhanen on the other hand are continuously being improved (Meisenberg & Lynn, 2011; 2012).

In accordance with recent literature on statistical capacity (Kodila-Tedika, 2013, 2014a), we control for GDP per capita, trade openness (openness), state fragility, ethnic fractionalization and government effectiveness. While data on GDP per capita and trade is sourced from Pen World Tables, ethnic fractionalization is from Alesina et al. (2003). The state fragility variable is from the International Monetary Fund (IMF, 2011) based on the World Bank classification while the government effectiveness measurement is provided by Kaufmann et al. (2010). The expected signs of the control variables are engaged concurrently with the discussion of empirical results.

Consistent with recent human capital or intelligence (Kodila-Tedika & Asongu, 2015ab) and development (Asongu, 2013) literature, the specification in Eq. (1) below assesses the correlation between human capital and statistical capacity.

$$SC_i = \alpha_1 + \alpha_2 HC_i + \alpha_3 C_i + \varepsilon_i \qquad (1)$$

Where: $SC_i$ ($HC_i$) represents a Statistical capacity (Human Capital) indicator for country $i$, $\alpha_1$ is a constant, $C$ is the vector of control variables, and $\varepsilon_i$ the error term. *HC* is the *Human Capital* variable while *C* entails: *GDP per capita*, *trade openness* (openness), *state fragility*, *ethnic fractionalization* and *government effectiveness*. In harmony with the engaged human

capital literature, the objective of Eq. (1) is to estimate if intelligence affects statistical capacity by Ordinary Least Squares (OLS) using standard errors that are corrected for heteroscedasticity.

### 3. Empirical results

The first Column shows univariate regressions confirms the expected positive correlation between intelligence and Statistical Capacity. Hence, intelligence is positively correlated with Statistical Capacity. Columns 2 to Column 7 assess the relationship conditional on other covariates (control variables). From the results, the positive correlation is broadly confirmed across specifications in terms of the significance of the estimated human capital (or intelligence) coefficient. Accordingly, the estimated coefficients varies between 0.8 and 0.3 and the degree of adjustment (or explanatory power) of estimated coefficients also varies between 26.5 % and 59.3%. It is logical to expect an increasing $R^2$ with more control variables into the specifications. Hence, we could infer from the baseline estimations that countries with high IQ are associated with higher degrees of Statistical Capacity.

**Table 1. Main results**

| | **OLS** | **OLS** | **OLS** | **OLS** | **OLS** | **OLS** | **IWLS** |
|---|---|---|---|---|---|---|---|
| Intelligence Quotient(IQ) | 0.800*** | 0.530*** | 0.572*** | 0.430*** | 0.515*** | 0.420** | 0.262* |
| | (0.115) | (0.112) | (0.134) | (0.160) | (0.166) | (0.183) | (0.144) |
| Fragile | | -17.783*** | -17.207*** | -9.504** | -9.552** | -9.465** | -14.701*** |
| | | (3.595) | (3.734) | (4.344) | (4.518) | (4.476) | (3.224) |
| Fragmentation | | | 3.654 | -0.760 | -0.813 | -0.482 | 2.503 |
| | | | (5.258) | (4.530) | (4.714) | (4.782) | (4.083) |
| Governmenteffectiveness | | | | 5.446** | 4.824** | 3.345 | 1.539 |
| | | | | (2.527) | (2.374) | (2.806) | (2.299) |
| Openess | | | | | -0.046* | -0.049** | -0.048* |
| | | | | | (0.025) | (0.024) | (0.028) |
| GDP per capita (log) | | | | | | 2.483 | 4.492** |
| | | | | | | (2.077) | (1.773) |
| Constant | 3.746 | 29.901*** | 24.485* | 40.599*** | 37.697** | 24.393 | 19.474 |
| | (9.703) | (9.375) | (12.729) | (14.722) | (15.038) | (18.674) | (15.027) |
| Observations | 115 | 110 | 107 | 91 | 90 | 90 | 90 |
| $R^2$ | 0.265 | 0.469 | 0.461 | 0.502 | 0.530 | 0.539 | 0.593 |

Notes: .01 - ***; .05 - **; .1 - *; ( ) : standard errors in parentheses. GDP: Gross Domestic Product. OLS: Ordinary Least Squares. IWLS: Iterated Reweighted Least Squares. Log: logarithm;

Given that the estimations by the OLS technique may be weak in the presence of outliers, we verify the robustness of corresponding estimates by employing an estimation technique that controls for the presence of such outliers. For this purpose of robustness we use Iteratively weighted least squares (IWLS). The process of robustness checks is consistent with Asongu and Kodila-Tedika (2015c) in the intelligence literature. The findings presented in the last column are consistent in sign and significance with OLS results, though with a relatively lower magnitude. The corresponding lower magnitude implies that outliers influence the investigated nexus between statistical capacity and intelligence. Hence, further justify the engaged robustness check.

Most of the significant control variables have the expected signs. (i) State fragility should intuitively be negatively related with the ability of governments to collect good data because some regions in a given country may be affected by political strife, civil conflicts and wars, hence, rendering data collection very difficult. (ii) Government effectiveness has been documented to be positively associated with statistical capacity (Kodila-Tedika, 2014a). (iii) Trade openness may decrease the ability to collect good data in inherently corrupt developing countries because underlying trading activities are very likely to be associated with misinvoicing, bribery and unfair lobbying. (iv) The positive nexus of the dependent variable with GDP per capita essentially builds on the intuition that, wealthier countries are endowed with more financial resources for good data collection, relative to their less-wealthy counterparts.

## 4. Concluding implications

The purpose of this note has been to assess the nexus between intelligence or human capital and a nation's statistical capacity. The line of inquiry has been essentially motivated by: (i) the scarce literature devoted to elucidating availability of poor statistics in developing countries and (ii) an evolving literature on knowledge economy. We have established a

positive association between intelligence quotient (IQ) and statistical capacity. The relationship is: (i) consistent with the employment of alternative specifications based on varying conditioning information sets and (ii) robust to the control of outliers.

The above findings imply that as average levels of IQ in developing countries increase, we should expect to see countries revising their national statistics substantially. This has been the recent experiences of Nigeria and Kenya in Africa. Given the leading roles of these countries on the continent in education, innovation and information and communication technology (ICT) (Tchamyou, 2014), the intuition for associating the higher IQs with better statistical capacity is sound. This is essentially because the highlighted variables are three of the four dimensions of the World Bank's knowledge economy index: the fourth being, 'economic incentives and institutional regime'. Accordingly, for better statistics to be collected, broad-based ICTs are essential to facilitate exchanges and accuracies between the data collector and data provider (institutions and civil societies). Moreover, with improvement in the levels of education, more skilled researchers would be available to refine and improve techniques of data collection, simulation, aggregation and computation, inter alia.

Future lines of inquiry devoted to improving the extant literature on the subject could focus on understanding: (i) the channels via which the IQ improves statistical capacity and (ii) which dimensions of knowledge economy drive the IQ on the one hand and a nation's statistical capacity, on the other hand.

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