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Dwayne Woods

The Use, Abuse and Omertà on the "Noise" in the Data: African Democratization, Development and Growth

> Today, the continent suffers from a different tragedy, Africa's Statistical Tragedy. This may not sound as serious as the growth tragedy, but it too exerts a toll on Africa's poor. I just said that growth has picked up since the mid-1990s and, thanks to that growth, poverty is declining. The "statistical tragedy" is that we cannot be sure of either of these phenomena.[1]

The main objective of this article is to explore and provide an explanation of how data is used by political scientists regarding Sub-Saharan Africa (SSA).[2] At its core, the article examines why the "noise" in much, if not all, of the data is either downplayed or ignored - often justified with the proverbial comment that data is inherently "noisy." This study looks at the array of data from national governments to international organizations used by political scientists researching and publishing on SSA. The article focuses on the epistemological framing that justifies the use of and, at times, abuse of very "noisy" data. Obviously, epistemological framing in the social sciences is linked to methodology and ontological assumptions about the nature of reality.[3] In the positivistic logic that prevails in the social sciences, theory dictates methodology and methodology is the instrument that ties theoretical postulations about the facts to their underlying causal structure.[4]

My survey of a few articles and their use of various data sets is not an explicit critique of their empirical findings or of their theoretical claims and tested hypotheses. It is, however, a critical questioning of the failure by many working on SSA to not more openly recognize problems with the "noise" in the data that they use. It is argued in this context that "noise" is not just some randomly distributed errors that can be easily set aside with certain statistical assumptions and controls. The "noise" is actually indicative of the data and, to some extent, its underlying functional form. Without fully taking this aspect of the data into consideration, many studies are introducing systematic bias into their analyses at the inception. Treier and Jackman capture this point nicely in their observation that:

> There are no adverse effects when the dependent variable is measured with error (the additional error is subsumed in the regression error), yet quite consequential effects when one of the independent variables is measured imperfectly. Estimated slopes are biased and inconsistent. With only one poorly measured variable (e.g., the democracy index) the coefficient on that variable is attenuated, while the others are biased and inconsistent in unknown direction and magnitude.[5]

However, even before getting to the level of measurement, "noise" in the data should be treated as part and parcel of conceptualization. The proverbial statement that there will always be "noise" in the data is self-evidently true; thus, the question is: what is the nature and sources of the "noise"? In responding to this question, Schedler makes a good point that judgment regarding the conceptual basis and ontological assumptions of the data we use should always be at the forefront.[6] Schedler's contention overlaps with Peter Hall's injunction that everything of interest to social scientists cannot be measured

in the same way.[7] To some extent, the nature and quality of data determines the kind of methods and required epistemological framework. Inconsistent, large missing values in data sets, and unknown information about certain things such as the actual level of poverty, economic growth rates, or population size in many Sub-Saharan African countries strongly suggest that the incorporation of "noisy" data of this nature is an illustration of a failure of conceptual judgment.

While the issue of the source and quality of data is not limited to Sub-Saharan Africa,[8] Morten Jerven has shown that validity, quality, and reliability issues are acute.[9] In other words, the "noise" in the data is not random and easily dismissed with robustness checks. Lemke illustrated this in his study on inclusion and omission of data concerning SSA. He summarizes the affect of "noise":

> Even when data are present, however, the problems of data quality could generate a significant African Coefficient. There is evidence that data quality varies with the wealth of a country. James Dawson and co-authors report a strong negative correlation between GDP per capita and the extent of measurement errors in the Penn World Tables. . . . Dawson et al. document some inferential mistakes caused by not correcting for the fact that data quality correlates with variables of economic interests. Well-established variables about growth, the permanent income hypothesis change when they adjust for the systematic bias in Penn World Tables data quality. It would be astonishing if similar systematic variation in data quality did not characterize the correlates of war datasets, the Polity compilations, and so on.[10]

In line with this observation, the main focus in this article is on whether or not different studies on democratization, economic development and growth in SSA acknowledge the "noise" inherent in the datasets. In other words, do these articles treat it as a serious issue that a priori indicates that whatever their empirical results might

be, they are in some ways biased because of the "noise" in the data? Or do they attempt to minimize the "noise" with different statistical techniques and/or claim that the "noise" is likely to be randomly distributed in such a way that it does not bias anything systematically? If there is a core argument in this study, it is that whether the "noise" and problems with the data are recognized or simply ignored, the fact that the data is so "noisy" implies that the epistemological framing of data used should always be constructed around this fact. In this respect, my contribution is to bring these critical aspects of data use and abuse by political scientists to the forefront in African studies.

Conceptual Issues with the Use of Data

Political scientists accept the idea that data does not speak for itself. They understand that the collection of data, its coding, and measurements are inherently problematic.[11] Moreover, even before directly the handling of data, political scientists recognize that some degree of conceptualization of data is required.[12] Conceptualization gets at a variety of issues: operationalization of data, validity, quality, reliability and equivalence.[13] Unfortunately, while these elements are understood as essential to good data use, they generally fade into the background, or are simply ignored, in the actual use of data. Overall, issues of validity, operationalization, reliability, and equivalence are not invoked enough by political scientists working on Sub-Saharan Africa. This is despite the fact that political scientists focusing on the continent are the first to highlight institutional weaknesses and other "pathologies" that undermine the quality and reliability of information.

Such "critical" observations are rarely extended to national income, population, agriculture, trade, and poverty data because political scientists rely primarily on International agencies for their data on Africa. They turn to the World Bank, the International Monetary Fund, UNESCO, and the Penn World Tables. This degree of reliance on these bodies for data is somewhat ironic since there is a general consensus that bad and "noisy" data exists everywhere and these international bodies are often nothing more than aggregators of national data. Moreover, the quality and reliability of data correlates strongly with a country's level of development and its overall infrastructural capacity in the collection and dissemination of data.[14] As Dawson and his co-authors note about the Penn World Tables dataset, "error measurement . . . is highly correlated with many variables of economic interests. It generally is least for countries with high levels and economic growth rates of output per capita and greatest at the other end of the spectrum."[15] "Thus, data is bad and particularly "noisy" in many developing countries, but it is particularly acute in Africa.[16] The heterogeneity in the quality of the data is more than likely to manifest itself in biased assessment of any co-variation. As Dawson and coauthors note, "this systematic variation in the quality of data tends to bias test of relationships between levels of growth rates of income on the one hand and other economic variables – such as volatility of growth rates and consumption – on the other."[17]

Yet, discussions of data use in relationship to SSA have not reflected the extent of the problem.[18] In fact, far too many studies exploit various sources of political, social and economic data without bothering to reflect on the "problematics" of validity, reliability

and equivalence. At best, the problem of missing values, sometimes in large amounts, will be mentioned and various statistical techniques will be employed to deal with the problem; however, the quality and reliability of the non-missing data is rarely addressed. In the following paragraphs, I will briefly summarize analyses of conceptualization of data use around issues of validity, quality, and reliability. To some extent, these topics have been covered; however, they have not been examined specifically in regards to Sub-Saharan Africa until recently.[19]

Issues of quality and equivalence have received less attention. Plain bad data, i.e., too many missing values and shaky sources for original data, has not gotten the level of attention that it deserves. In addition to the relative lack of attention to bad data, the subject of equivalence has been largely ignored. It is assumed much too easily that aggregated data on national income, trade, and domestic taxation imply more or less the same thing across units of analysis. Despite a long tradition in Comparative Politics of the necessity of thinking about equivalence at both the conceptual and actual data level,[20] too little of it transpires in studies on Sub-Saharan Africa.[21]

Validity and Reliability

Validity goes to the heart of the data issue because, as Herrera and Kapur point out, it "refers to the relationship between theoretical concepts and collected information." In principle, political scientists are sensitive to validity and data because "the objective of information collection in ... research is to enable one to draw inferences and test theories."[22] In other words, data is just the means through the conceptualized relationship between cause and effect is measured. Thus, "if the connection between

what is actually measured and what is purported to have been measured is tenuous (or absent altogether, in some cases), “then the inferential relationship between cause and effect makes little sense.”[23] Implicit in this inferential relationship to data is a logical positivist assumption that concepts (ideas) correspond to facts, i.e., real things.[24] Theory and conceptual development helps specify what the relationship is and hypotheses are generated to test what theory and conceptualization have identified as the "real" causal dynamics hidden (embedded) in the facts. As is well understood, getting at the exact causal dynamic is a difficult task, in part, because how we conceptualize determines how we measure.[25]

Depending on our definition of concepts, different dimensions of the data are included or excluded in our measurements. Rarely do scholars agree on a single or uniformed conceptual definition of what is being measured; therefore, this aspect of data validity is always open to question. Since this aspect of validity is always opened to question, it is somewhat surprising that measurement validity as it relates to conceptual dimensions of the data and collected data are not always at the center in any data usage. As Herrera and Kapur emphasize, "despite the fact that measurement validity is a basic lesson in any introductory data analysis course in political science, the use of imprecise or concept-inappropriate indicators remains widespread in the field."[26]

Herrera and Kapur provide some telling examples.

> For example, caste data were last collected in India on the 1931 census, but, as the most current data available, these 1931 data continue to be used to explain contemporary phenomena. ... Demographic data older than 20 years, such as the size and growth

> rate of the population, cannot be unambiguously determined in more than a few African countries, with the margin of error often near 20 percent.[27]

Furthermore, in regards to Sub-Saharan Africa, outdated and questionable conceptualizations of ethnicity have been used in a wide range of studies often resulting in bold claims as to how ethnic fractionalization has hampered democracy or is a key factor in weak economic growth and development on the continent.[28] Obviously, such bold inferences of this kind are conditioned on the validity and reliability of the data.[29]

Closely tied to the subject of validity is reliability. Although there is a general trend among political scientists to turn to international, national, and local sources for official data and then rework the data - in terms of cleaning it up and re-dimensioning measurements to correspond more closely to concepts – the problem of reliability is not really addressed with this undertaking.[30] It is not uncommon "for sources of data to have contradictory information. For example, "the IMF's primary statistical publication, International Financial Statistics, provides many instances where the data of the same year in books from different years do not match." Or, "the World Bank offers data on GNP per capita growth rates for countries where underlying GNP data do not exist; they also report the share of agriculture in GDP for countries with non-existent GDP estimates."[31]

Another example is educational data reported to UNESCO. This data Africa suffers from huge gaps between years. Even in years in which educational information has been provided, it is sometimes inconsistent with information from previous years. In

a detailed analysis of cross-national differences in educational attainment Nardulli, Peyton and Bajalieh note that:

> Data quality issues in the UNESCO archive are compounded by the fact that countries are not obligated to complete the questionnaire. Consequently, there is a considerable amount of missing data, though it varies by year, country, and region of the world. This is troubling because some of the missing data are systematic (i.e., non-random); they disproportionately affect poor countries or politically isolated entities that lack either the resources or the will to complete the survey. There is also a geographical bias; most of the countries lacking data are African, Asian, Middle Eastern or Southeast Asian; after the break-up of the Soviet Union much data are missing for the post-Soviet States.[32]

As the above statement makes clear, the lack of reliability in the data is not random. There is a systematic bias in missing data from certain regions and within regions from specific countries.

Despite the potential bias effect of "missing data (i.e., non-random)," David Stasavage argued that democratic regimes in SSA spent more on primary education than non-democracies.[33] Although he acknowledged the problem of missing data, he asserted that the use of imputation software for missing values sufficed in dealing with the problem. This, however, is not the case since in some instances, the number of missing values outnumbered the number of reported values substantially and the "systematic bias" aspect was not solved with statistical imputation techniques. The problem of the reliability of the data provided by many African governments and the numerous missing values in some cases makes it difficult to believe that there was not systematic bias in his regression of education on regime type.

Missing, incomplete or absent data obviously compound problems of validity. In many cross-national comparisons in which Africa is included, “data on key variables of interest to scholars and governments are either incomplete or simply not collected at all.”[34] The use of proxies does not really help matters. Lemke underscores the difficulties that arise when there is widespread missing, incomplete or absent data in his assessment of its effect on international relations and Africa’s place in it. He highlights several studies that have used data on Africa that is beset with problems and consequently have produced supposedly “robust” results that are suspect. For instance, instances on the dyadic probability of war literature has produced results that are statistically significant and their estimated effects are consistent with theory. However, Lemke notes, there is something amiss. The estimated variable for the Africa dyads suggest that countries on the continent are less likely to experience war than non-African countries. Prima facie there is something wrong in the data.[35] Even if the popular perception of Africa as a continent mired in war and conflict is wrong, it is not skewed so far as to explain why a peaceful region would be viewed otherwise. Clearly, missing and incomplete data were driving the results. The fact that these studies did not reflect on this type of systematic bias is surprising.

The source of systematic bias starts at the point of origin of the data and not just in problems of its aggregation and dissemination. Quite frankly, many developing countries lack the ability to provide quality data due to weak institutional capacity. For instance, civil conflicts and major changes in political regimes often result in the state's ability and interest in collecting data. Angola, for example, went nearly a decade without

providing any data to UNESCO on primary and secondary schooling. As Jerven and others have pointed out, "the quality of data produced by such states' statistical institutions might suffer from the same limited institutional capacity as the states themselves."[36] More significantly, as Herrera and Kapur underscore, "the weak capacity of statistical agencies raises problems of endogeneity."[37]

The literature on governance and the rule of law has particularly suffered from issues of endogeneity in the data. Kurtz and Schrank highlight this problem with the data that many use to measure institutional capacity and democratic accountability developed by the World Bank.[38] While this data does not suffer from missing values per se, the data is "far too frequently … treated as exogenous to the problem being studied: “in their work on 'governance’ indicators and institutional quality,' Kaufmann et al do not consider that where governance and institutional quality are weak, the quality of data is also likely to be weak — hence affecting their results."[39] Overall, Kurtz and Schrank argue that the governance measures rely on subjective surveys about the quality of institutions that are inherently biased and unable to capture the objective basis of institutional capacity and processes.[40] While the quality of data and even the issue of reliability are not central to the World Bank governance data, problems of sample selection bias is real and, more importantly, the source of the data, based on aggregation of survey samples, raises key issues about using it as an objective measurement of institutional capacity.[41]

In an article using the World Bank’s Country Policy and Institutional Assessments (CPIA), Bates and Humphreys test the logic of accountability and how it correlates with

bad governance and lack of overall economic development in Africa.[42] The authors make clear that they are aware of the limitations of CPIA as a data source. In particular, they understood criticisms about the composite measures of validity and reliability. They claim to resolve these issues "by combining a Barro-like growth regression (which includes the policy ratings) with an empirical model of policy choice (which includes a measure of growth and other controls . . .) into a single system of equations using three-stage least squares. In doing so, they say they are able "to generate coefficients that provide measures of the relationship of policy to growth that partially account for endogeneity." More importantly, these "results indicate that variation in our measures of policy choices are associated with large differences in growth rates: a one standard deviation shift in QUALITY and CPIA is associated with a shift of approximately 1.2 and 1.3 percentage points in growth rates, respectively."[43] Underlying problems of what is being measured and how well the concepts of institutional quality map onto empirics, however, are not really addressed with this technique. Problems of endogeneity still remain.

In this regard, Kurtz and Shrank's strong criticism of this type of data is pertinent:

> Our results suggest that the data and conclusions found on the World Bank site—at least with respect to government effectiveness—are at best partial and at worst misleading, however, for we are at the beginning—rather than the end—of our efforts to unpack the complicated relationship between growth and governance. As a next step, we believe, we need better measures of governance, particularly ones that feature a much wider historical sweep and do not rely on surveys that embed perceptual and policy biases.[44]

Equivalence

The primary motive behind the use of poor and incomplete data is the drive by social scientists to establish causal equivalence.[45] Regression or logistic models are employed to tease out the relationship specified by some theory. Quantitative models need data. Data, however, is secondary to the agenda.[46] To use an analogy, data is the fuel that is needed to make the models run. Much too often the quality consistency and ontological basis for the use of a certain type of data is not taken into account. Statistical models rely on some key assumptions. One of them is that the "noise" in the data is, more or less, randomly distributed or not systematic to the data itself. The evidence on data and Africa indicate that this is not true.

In any case, the dominant epistemological interest is to assume at the theoretical and conceptual level a degree of equivalency across that which is measured. The logic of equivalence is premised on the assumption that contextual effects can be minimized as long as one taps into the right co-variational relationship between variables. This logic is illustrated in Przeworski and Teune's classic statement on equivalence:

> In formal terms, cross-national analysis is an operation by which a relationship between two or more variables is stated for a defined population of countries. In analysis, no proper names of societies or cultures are mentioned. The goal is not to "understand" Ghana or Cuba, not to describe Hitler, Stalin, Roosevelt, or Churchill, but to see to what extent external crises and internal control, military prowess and economic frustration, nationalism and persecutions, are related, and to know the generality of each relationship. Whether variables are related depends on the observations of Ghana, or Hitler. But these are the observations that are means to an end-the end of testing relationships between variables, even at the cost of obscuring some differences between specific units.[47]

The hegemonic discourse of the 1980s and 1990s on the bloated African state is a good illustration of type of prior equivalence that often shapes the facts. The prevailing view was that the African state was over-sized and excessively bureaucratic. Its purported Leviathan characteristics were indicated in many empirical studies as the primary reason for the continent's lack of development, and corruption. Tellingly, Goldsmith in a critical analysis of the African state and its over-sized dimensions informed us that we actually had very little hard data on the actual size and extent of most Africana bureaucracies. The data that did exist failed to support the over-sized Leviathan argument. In fact, Goldsmith stated that in relationship to land mass and populations many African states appeared to be under-sized.[48] Whether or not this claim is correct is secondary. What is primary is that a plethora of studies and policy proscriptions had been developed based on limited and weak data. The conceptual equivalence that Weberian-like bureaucracies have something to do with development was simply assumed and the conceptual baggage was transported to the continent with few asking the pertinent empirical question, what is the actual size and extent of the African state? And moreover in light of the absence of good statistics on the topic, what is it that is needed to get better data?

Developing theories and testing hypotheses that show some "real" effect is the main objective. This drive to test theories leads political scientists to identify cases that they think are ideal for such purposes. While some effort is made at the theoretical level to identify the equivalencies of what is being measured across heterogeneous cases, the connection between the conceptual equivalence and the proxy data used is often

underdeveloped or poorly conceptualized. Take for instance the effort to test political business cycles theory. Since Nordhaus's seminal article on political business cycles (PBC) theory was published in 1975, a rather large literature has emerged within which various academics have attempted to put to the empirical test Nordhaus's core assertion that governments spend more during election cycles.[49] In a nutshell, the model assumes "the electorate is backward looking and evaluates the government on the basis of its past track record."[50] Consequently, as a result, "governments, regardless of ideological orientation, adopt expansionary fiscal policies in the late year(s) of their term in office in order to stimulate the economy."[51]

The overall result after numerous studies testing this model is one of ambiguity. In short, no definitive evidence has emerged to support the core proposition. Nor has any definitive evidence been identified to categorically reject it. As result, the literature has engaged in a kind of ratcheting up effect of statistical techniques of sophistication. Increasingly complex econometric models have been used to slice and dice the data, with the end result still being that of ambiguity. It is generally accepted in the literature that part of the problem arises from the "noise" in the data. Most studies of PBC have been limited to industrialized democracies, with the OECD being the primary source for data.

In the perennial quest to test theory against the data, Ferree and her co-authors have argued that Sub-Saharan Africa was ideal for such purposes. They claimed that recent democratization in Africa and the relative weakness of non-executive powers made the continent an appropriate place to test the model. They implicitly recognized in

their study of elections and political business cycles that there were some serious issues with the economic data regarding Sub-Saharan Africa budget reporting information to the IMF. The authors recognized for example that "difficulties in properly measuring automatic stabilizers and policy formulation and implementation capacity in SSA prevented . . . them . . . from looking at technical, structural, and administrative factors."[52] They did not, however, believe that data issues outweighed their main objective which was too test their theory that developing regions with weak institutions but strong executives were likely to engage in politicized spending in periods just before national elections. In the article, the authors stated that "the data used to test our hypothesis includes annual observations (1980-95) for 44 Sub-Saharan African countries (listed in Table 2), creating a panel of 704 country-year observations. Macroeconomic data are drawn from the IMF's International Financial Statistics."[53]

The theoretical specification of the relationship between elections and budgetary expenditures and its empirical testing trumped any potential "noise" in the data. The authors concluded emphatically that:

> Our findings demonstrate the existence of election-year increases in public expenditure, net claims on government, and post-election year surges in seignorage in multiparty electoral systems, and post-election nominal devaluations. Only in the case of seignorage is there any evidence of such effect in countries with single party elections. Moreover, our evidence strongly supports the conclusion that founding elections magnify incumbents' incentives to create political business cycles. Thus, it appears that competition between political parties (inter-party competition) is a crucial institutional driver of rational opportunistic models of political business cycles.[54]

This strong inferential statement is questionable if one takes into consideration the

source and quality of the data.

Little attention was given to the source of the data by the authors, besides a footnote noting that it was based on budget reports given to the IMF by national governments. However, there are indications that the quality and consistency of data on African government budget expenditures have some serious issues. In a detailed study of budget institutions and fiscal performance Gollwitzer pointed out that African budgets suffer from serious problems in terms of quality of information about the budgets. Moreover, she added that it “is found that there are indeed big differences in the quality of budgetary institutions on the continent."[55]

It is not reasonable to assume that such wide variation in institutional quality did not affect the type of information sent to the IMF. In addition, the author argues that the budget process in Africa is characterized by the following pathologies:

> These include unrealistic budgeting, where the approved budget is commonly accepted as a farce; hidden budgeting, where the real budget is known only to a selected few; escapist budgeting, where the government authorizes expenditures knowing that they will never occur; repetitive budgeting, where the budget is revised frequently during the fiscal years to adjust to the current needs and restraints; short-term budgeting, where budgets are made for one year without considering the medium- or longer term implications; and corruption which arises ‘when formal rules are unworkable and government operates through extra-legal means.’[56]

It does not matter if the pathologies described above are characteristic of all African states or only a minority of them. Only a few cases would suffice to distort the purported relationship between elections and budget cycles. Thus, an uncritical use of reported annual budget data to the IMF is clearly questionable. The conceptual

equivalence established in political business cycle studies is that budget expenditures correspond to political choices tied to elections; however, the budget process itself suffers from opaqueness and instability. It is far from clear that the relationship specified by the authors' model holds in the data. Based on the criteria established by Gollwitzer to assess budget transparency and credibility, there is a great deal of variation that only partially corresponds to democracy and elections. For example, Gollwitzer states that Niger and Togo performed well on her criteria, which suggests some confidence in their reported budget numbers, while Botswana, one of Africa's oldest democracies, did less well.[57]

Ironically, a study by some economists at the International Monetary Fund (IMF) found little in the way of support for the PBC thesis. What is particularly insightful from the study is the fact that it focuses on the many confounding factors that affect political institutions, elections and budgetary expenditures. As the authors state:

> Several studies suggest that better political institutions such as more constraints on the executive or additional checks and balances should lead to fewer pro-cyclical fiscal policies. We find no evidence that political institutions have any effect on the cyclical behavior of fiscal policy. This may be because institutional quality in sub-Saharan Africa is too low for any variation in political institutions to have much effect on fiscal decision-making or because those political variables do not vary much over time. Restricting the sample to the years after 1990, during which there has arguably been considerable political change in sub-Saharan Africa, does not affect the results. Neither does using other measures of institutional quality, such as those compiled by the International Country Risk Group.[58]

Making the Case for Democracy and Development

The main use of institutional and national income data in the context of Sub-Saharan

Africa has largely been used in studies that attempt to test how democratization has shaped economic and social developments. Several studies have been undertaken to examine whether the transition to democratic regimes in some Sub-Saharan African countries have made a "measurable" difference.[59] These studies are designed to capture temporal changes as well as engage cross-national comparisons. By temporal changes, I mean these studies focus on pre-and-post-democratization and try to see whether or not economic growth has been better under those countries that have become democracies. What is noteworthy about many of these studies is that they depend on national income data as their primary source for economic growth or the lack thereof. Most of these studies on the relationship between political change and economic performance rely on the Penn World Tables. Few, if any, spend any time questioning the validity and reliability of this data.

In a recent article, Bates and his coauthors feel so confident in the data that they concluded that "the results of our analysis confirm the existence of a positive relationship between the level of democracy and income in Sub-Saharan Africa."[60] Overall, they find that "while the sign and significance of the coefficients on the measures of global trends remind us that the performance of Africa's economies are shaped by international forces, the sign and significance of the coefficient on income lends support to what the Granger causality test implies that in Africa domestic political institutions affect the performance of economies."[61]

In the article, Bates and his colleagues discuss how democratization in the early 1990s brought about renewed economic growth and development after lost decades.

They make assertive claims that democratization via competitive elections has led to a shift away from an urban bias towards policies more favorable to Africa's rural population. Their statement about what has happened in the African countryside is interesting because there is little solid statistical data on it. In fact, it is not clear whether African rural production, population and terms of trade increased or decreased in the previous three decades. Therefore, outside of stylized facts, it is not clear on what premise their inferences about a favorable shift from urban bias to the rural sector are based. Only recently have international development agencies undertaken an effort to improve the collection, storage and dissemination of statistics on the African countryside.[62]

By employing a panoply of sophisticated statistical methods, the authors feel confident that the causal relationship they have identified is robust. At no point, do they ask whether the "noise" in the data might distort their results. The only statement made about data is the following:

> We use the Penn World Tables' (PWT 6.3) chain-weighted real GDP per capita series and the Polity IV democracy index, which covers a range spanning the interval between perfect autocracies (score of –10) and perfect democracies (score of 10). Our sample includes 105 countries, 42 of which are in Sub-Saharan Africa. Figure 1 shows that on average incomes and polity scores have risen over time. While incomes have grown relatively smoothly, in the late 1980s, the polity index jumped discontinuously from –0.4 in 1989 to 1.9 in 1992. As seen in Figure 2, there are important regional differences in the movement toward democracy. Latin America democratized prior to the fall of Communism. Africa and the Middle East both democratized after 1990. The polity scores then diverged, with those in Sub-Saharan improving more rapidly.
>
> The income data is used to confirm the major changes in institutional capacity

and accountability that democratization has brought about in many African countries. In a nutshell, Africans who live under Democratic regimes are wealthier. The institutional effect is dramatic, they argue, because of the policy distortions of non-democratic regimes in the past.[63] Whether or not democratization has had the kind of impact they assert is an interesting finding, but it is undermined by the failure on the part of the authors to even mention the problematic status of democratization measures.[64] Quoting Ndulu et al's extensive study of the endogenous policy shifts that have occurred in some African countries because of democratization, they note:

> Given that manufacturing received offsetting protection from foreign products, the last of these measures further tilted relative prices in favour of the urban sector. Taken together, the policies were therefore biased against agriculture – the largest single industry in most of Africa's economies in Africa. One result was slow growth. The estimates reported in Ndulu et al. (2008) suggest that governments that adopted this mixture of policies lowered their country's rate of growth by nearly two percentage points per annum during 1960–2000.[65]

The problem with their robust conclusions is that they are based on data that is shaky. A number of studies have highlighted the problems with the Penn database; thus, it is inexcusable that Bates and his coauthors spend no time on the subject.[66] As stated earlier, any errors that arise from bad data are not likely to be just random; they are likely to be systematic. In fact, the systematic errors arise from the endogenous characteristics of how the data is collected and aggregated.

Morten Jerven has systematically shown that national income data on Sub-Saharan Africa is unreliable. He has made the case against the data in several distinct ways. First, as he states, "we don't really know how big (or small) many African

economies are. In about half of them, the system of "national accounts" dates back to the 1960s (1968, to be precise); in the other half, it is from 1993. This means that measuring things like how much is produced, consumed, or invested is done with methods from the times when computers were rare, the Internet did not exist and nobody spoke about "globalization." Secondly, “the latest poverty counts for Africa are, on average, five years old. So we only have guesstimates of how the global financial, food and fuel crises have impacted the distribution of income, wealth and opportunities in the region.” Thirdly, "industrial" surveys are even more infrequent than household surveys -- only a handful of African countries have done at least one in the last ten years.”[67]

Bates and his co-authors simply ignore well-established observations concerning problems with national income data. Young begins his article on the “African Growth Miracle” with the following statement:

> Much of our current understanding of the factors behind growth and development, and our continuing attempts to deepen that understanding, are based on cross-national estimates of levels and growth rates of real standards of living. Unfortunately, for many of the poorest regions of the world the underlying data supporting existing estimates of living standards are minimal or, in fact, nonexistent. Thus, for example, while the popular Penn World Tables purchasing power parity data set version 6.1 provided real income estimates for 45 sub-Saharan African countries, in 24 of those countries it did not have any benchmark study of prices. In a similar vein, although the online United Nations National Accounts database provides GDP data in current and constant prices for 47 sub-Saharan countries for each year from 1991 to 2004, the UN Statistical Office, which publishes these figures, had, as of mid-2006, actually received data for only just under half of these 1,410 observations and had, in fact, received no constant price data whatsoever on any year for 15 of the countries for which the complete 1991–2004 online time series are published.[68]

Interestingly, Young's main objective in his article is to argue that Africa has experienced more growth than has been previously accounted for; however, he makes a strong case that traditional sources of data are not reliable enough to make this case one way or another. The fact that studies like Bates' fail to acknowledge analyses that have shown problems with the data suggest that these authors are more interested in supporting their theoretical claims than really engaging with the facts.

It is noteworthy that Bates and his co-authors cite extensively the multi-volume study on the African economy done by Ndulu et al. The volumes were published in 2008. Since then, Morten Jerven has highlighted some of the problems in data use in those studies.[69] Also, he makes a good case as to why aggregate data on African incomes is likely to be misleading.[70] He notes:

> To conclude: to read the available income statistics as if there were 45 different income levels among African economies is meaningless and potentially misleading. Based on the exercise above it is more accurate to analyze the relative poverty and income of African economies as if there were three different levels: relatively poor African economies, middle-income African economies, and relatively rich African economies.[71]

For reasons that only the authors can explain, they fail to cite anything that undermines their confidence in the data. The fact that there are issues with both institutional and national income measurements makes it all the more surprising that they assert that there is a strong causal relationship between the onset of democratization and economic growth.[72] Moreover, they claim that this spurt in growth due to democratization has occurred in a limited time-frame, since they believe that

much of the growth of the late 2000s has been driven by China's demand for commodities.[73] And this observation is made as if Deaton had not already shown the confounding effect that cyclical commodity prices have on economic growth and institutional dynamics.[74] Nor do they cite or factor into their analysis significant critiques of placing too much causal "oomph" onto institutions.[75] Establishing causality is difficult under the best of circumstances, but it is impossible with very "noisy" and bad data.[76] Claims to have statistically parsed out the "noise" from the "signal" are not very convincing. The constant revision and updating of data in rich countries should be enough of a warning that the use of data from poor developing countries to make blanketed and bold claims such as "Africa's lost decade" or "rural stagnation" is problematic.

Concluding Observations

"Noise" in the data that we use as social scientists cannot be dismissed as just random or assumed away, with all things being equal, as a minor nuisance. Instead it requires a deeper epistemological reflection on the source of the data and how its use is tied into empirical efforts to establish causal complexity.[77] Most social scientists will claim that they are interested in testing hypotheses against the background of some theory; however, "the cult of statistical significance" and assertions about the robustness of their models suggest that establishing causality is what is really at play.[78]

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