Counting the Bottom Billion

Measuring the wealth and progress of African economies

Morten Jerven

Introduction

On 5 November 2010, Ghana Statistical Services announced that its GDP for the year 2010 was revised to 44.8 billion cedi (US$29.2 billion)[1] as compared to the previously estimated 25.6 billion cedi (US$16.7 billion). This increase in the national income estimates, of about 60%, meant that Ghana moved from being a low-income country to a middle-income country overnight (Ghana Statistical Service 2010). In response, on the Center of Global Development blog pages, African Development expert Todd Moss exclaimed: 'Boy, we really don't know anything' (Moss 2010). Given this level of error margin in the GDP estimate on Ghana, arguably the most studied country on the continent, what should we think about economic statistics deriving from other African countries? The news was met with equal bewilderment in Ghana. According to the local news, the UN Resident Coordinator for the United Nations Development Programme went as far as dismissing the

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[1] Converted at 1 US$ = 1.5342 GHS.

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new classification as a statistical hypothesis, and emphasising that in terms of its achievements towards the Millennium Development Goals Ghana should still be classified as being among the poorest countries in the world (*Enquirer* 2011).

When the current President, John Atta Mills, was campaigning in the presidential elections in 2008 one of his promises was to take Ghana to middle-income status by 2020. Is this sudden increase in Ghana's GDP a result of pressure to deliver on its electoral promises? This would seemingly fit in well with the phrase usually credited to Benjamin Disraeli, saying that 'There are three kinds of lies: lies, damned lies, and statistics.' According to the World Bank it is not a result of political tampering with the statistics, but it was all done according to global standards of national accounting. The World Bank reports that the rebased national accounts that were published in 2010 followed a review of the underlying statistical methodology by IMF advisors. On 1 July 2011 the World Bank gave the revised national income estimates its official stamp of approval, and Ghana was reclassified as a low middle-income country from its previous status as a low-income country (World Bank 2011a). In the *Guardian* newspaper, development experts Charles Kenny and Andy Sumner rejoiced and went on to speculate as to whether this implied that the deterministic 'poverty traps', as popularised by Paul Collier in the *Bottom Billion*, and the view that development assistance was 'dead aid', as argued by Dambisa Moyo, should be reconsidered (Kenny & Sumner 2011).

Here it is argued that what needs rethinking is the database for development analysis. What do we know about income and growth in sub-Saharan Africa? The answer is: much less than we like to think. The data are unreliable and potentially seriously misleading. The question is of great importance. Economic growth rates or per capita income estimates are commonly used in any statement regarding development in Africa. Sometimes the data are used to buttress a claim and, at other times, as the starting point for defining a problem to be addressed. If income and growth statistics in Africa do not mean anything, a great part of development analysis and policy targets is similarly meaningless.

This is a knowledge problem and a governance problem. The ranking of African economies according to wealth forms the basis of which countries should be targeted for development assistance. How should we rank Ghana as compared to its neighbours such Cote d'Ivoire and

Nigeria, which have not rebased their national accounts recently? What about Ghana's recent progress: 60–70% of GDP was added to the national economy without the development indicators noticing. When and where did this economic growth come from? If this growth in economic activities can pass unnoticed, how certain are we about conclusions in policy papers ranking some countries as strong performers and others as poor performers? In order to get closer to answering those questions we need to know how the wealth and progress of African economies are measured.

How are African economies measured?

In theory there are three distinct ways of aggregating GDP: the income, expenditure and production approach. Again in theory, these are supposed to be reached independently and should be balanced. By the first method you would add up profits, rents, interest, dividends, salaries and wages. This approach has in practice not been suitable for the estimation of GDP for African economies. The main component would be profits earned by farmers and this information is not usually directly available. The components in the expenditure approach are private consumption, investment, government consumption, and the balance of exports and imports. The problematic part here is personal consumption and the part of capital formation that accrues to the rural and small-scale economic activities. A third and final approach is to use the production method. Here, estimates of value added (output minus intermediate consumption) per sector (agriculture, mining, manufacturing, construction and different services) are summed up to equal total value added or GDP. It is this method that has been preferred in official national income accounting in post-colonial Africa.[2] While the system of national accounts prescribes that the three methods should be estimated independently, expenditure on private consumption and on farm profits has typically been derived as residuals.

Thus the level estimate is built up sector by sector. The first step in the aggregation process is to make a baseline estimate or a benchmark year. The basic questions are whether the statistical office has any data, how good they are and what the national accountants are to do when data are missing. The best instrument here is a census. This can be a census of the population, the

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[2] For an attempt to summarise the history of national accounting in sub-Saharan Africa, see Jerven (2011).

agricultural production or the transport sector. If a census is absent, a survey may be available. A survey contains some information about a sample of the total. If there ever was a census, then you can aggregate these results, assuming that the sample is representative. If there is no total to relate the survey to, the statistician will have to make a guesstimate, literally making up the missing information without any official guidelines. Often there is no data. When there is no level data the compilers have to rely on estimation by proxy, or assumed relationships. A classic example is when one has no data on food production and then assumes a per capita calorific intake that is multiplied by a guesstimate of the farming population.[3] The annual data collected from public bodies and private businesses are utilised. These are supplemented by data on exports and imports. Data are usually missing for parts of the service sector, and a commonly applied method is to assume a proportional relationship with production of other physical goods.

When a level estimate for a given year has been reached, the wealth of the nation has been measured. The next step is to measure economic growth, so one can monitor the progress of the nation. One could easily get the impression that one would simply aggregate all available data once more and compare the current year with the previous. The way it is done in practice is quite different. The level estimates for individual sectors are already made and form the basic starting point. In some sectors, such as government expenditures and turnover for larger businesses, one is able to compare the total for one year with that of another, but for large parts of the economy one usually relies on so-called 'performance indicators' or 'proxies'. Typical examples are the use of cement production and/or imports as a proxy for growth in the construction sector, the number of new official licences for transport sectors and the reliance on population growth for sectors where little adequate data are available.

There is a basic distinction between making a level estimate, referred to as a base year, and that of estimating change. One can think of it in terms of a weight. The weight may be inaccurate, and show the entity measured to be too heavy or too light. If the degree of inaccuracy were reliable, it would not matter much for measuring change – that is, even if a weight shows you to be too heavy, if the weight is equally skewed next year you would at least know with accuracy how much weight you have gained or

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[3] Growth in food production is then assumed to be proportional with population growth, adjusted for rainfall.

lost. There is a mathematical caveat to this: since change is measured in percentage terms, you will appear to be gaining weight at a faster rate if the weight showed you to be lighter than you really were.

The base year estimate is of crucial importance. It determines the proportional shares of different sectors of the economy. The issue resulting here is generally referred to as the 'index number problem'. The size of each individual sector determines the impact that the growth in one sector has on the aggregate growth. In order to measure 'real' economic growth, the economy will be accounted for in the base year's prices. This is done by either deflating a sector with a measure of inflation often applied to the service sectors, or by expressing output in the base year prices directly, as in multiplying the physical output in mining or agriculture with the prices obtained in the base year.

When Ghana's income was revised upwards it was as a result of a rebasing of the economy. The previous base year for Ghana's national accounts was 1993 – that is, all new information on economic activity was accounted for using the categories and weights from the early 1990s. The new revised GDP estimate has been reached not only using new methods of accounting. The new base year of 2006 has allowed the accountants to include new statistical material. The most glaring example was that, in 1993, the mobile phone had not yet arrived in Ghana, yet today it is widely accepted that the majority of Ghana's population are mobile phone users. With the 1993 base year this information could not be included as the communications sector was accounted for through the numbers of home phones and receipts from the national telecommunication company. In addition new Value Added Tax records showed other service sectors to be much more important than implied by earlier weights, and the 1993 base year did not allow for the inclusion of private higher education which also has grown in importance since the last base year.

When I visited Ghana Statistical Services in Accra in February 2010 the base year was still 1993. The national accountants were well aware that this meant that the economy was underestimated,[4] and they had been preparing a rebasing in concert with IMF consultants. It was then expected that the revision would be around 40 to 45%. I asked what would happen to the growth estimates when the change was made to 2006 as a new base year.

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[4] I was informed that for some of the service industries the VAT receipts from the business sectors were alone larger than the total in the old sector estimates.

The national accounts division informed me that they had been advised by the IMF to 'splice it in'. The econometricians need consistent time series without breaks to conduct their statistical analysis. In consequence this means that, instead of adding a 60% increase in a single year, the increase is divided in parts, and added to the estimates for earlier years. This does of course mean that on the current available time series of growth not only does Ghana look wealthier than countries that have not undergone a revision, but it also appears to be progressing at a faster rate. Indeed, Ghana is now reported to have the world's highest projected growth rate for 2011 (Presidency Republic of Ghana, official website 2011).

The database for the wealth and progress of African economies

So where do data users go when they want to know the GDP level of a country? There are three major sources of national income data: the World Development Indicators, Penn World Tables and Maddison.[5] They are all based on national account files as prepared by the respective national statistical agencies, but differ in their modifications and according to their currencies and purchasing power parity adjustments. The WDI database is maintained by the World Bank Group, and it is the data source most commonly used in public domains such as politics and media. The second source is from a database maintained by economists at Pennsylvania University. This database has been updated since the first version was published in 1980. The most recent version was published in 2009 as version 6.3. These data are the ones most commonly used by growth economists in cross-country growth regressions. A third source of income data, commonly used by economic historians but also by economists, are the datasets produced by Angus Maddison. These datasets are regularly updated by the Groningen Growth and Development Center at University of Groningen.

In theory, the differences between national or official data and international income and growth data are only that the latter are expressed in international prices. But there are other sources of disagreement. The data series provided by the national statistical agencies are subject to revisions,

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[5] From World Development Indicators (henceforth WDI), GDP per capita (constant 1995 US$) is used. The best equivalent from Penn World Tables (henceforth PWT) is Real GDP per capita (Laspeyres) in 1996 International Geary Dollars. Finally, from Maddison, Per Capita GDP in 1990 International Geary-Khamis Dollars is used.

and there are various official series with different base years covering the same years. The dataset provider has a multitude of national accounts data files to pick from; therefore the process of splicing various series together involves some discretion on the part of the dataset compiler. The actual process of picking and harmonising series is not accounted for in a specific and transparent manner in the data descriptions accompanying the published datasets.

In practice this has major implications. In a recent exercise comparing income estimates for Africa for the year 2000, the three sources agree on the individual relative ranking of only one African economy, and disagree on most – in some cases with a large discrepancy. Let us take two examples. In 2000 in a sample of 42 countries, Guinea was ranked as the seventh poorest economy in Africa according to Maddison, while the PWT had it one place behind the ten richest African countries. Meanwhile Mozambique was ranked the eighth poorest country according to the WDI, but it was among the 12 richest economies in the Maddison dataset. The most recent version was published in 2011 as version 7.0. The average variation in ranking of the economies in the whole sample was seven places.[6] In my 2010 article I discussed the different rankings of African economies. I put forward that, if one would not think of these individual country estimates as point observations, but rather as a +/– estimate of 30% it would render any comparison based on per capita income meaningless. With the exception of some resource-rich enclaves, a few island states and South Africa, the income of one African economy is not meaningfully different from another, and it was found that the majority of African countries should for all practical purposes be considered to have the same income level. In view of the recent upward revision in Ghana, the validity of this conclusion seems to have been strengthened.

What about statistics on growth over time? The picture that emerged from a comparison of the average growth rates from the 1960s until the 1990s for Botswana, Kenya, Tanzania and Zambia confirmed the problem of comparing economic growth across time. There was a large discrepancy

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[6] This section relies heavily on Jerven (2010a, 2010b).

between the three international database sources and the official time series. To take a specific example, did Botswana and Tanzania share similarly high growth rates in the first five years after independence, as suggested by the PWT? Or was there a huge gap between the performances of the two, as shown in Maddison's growth series for the same country? The take-away from that paper was that, if one is interested in the *episodic* nature of African growth, which arguably remains its main feature, the conclusions one reaches depends on the data source used. The recently published journal *The Political Economic of Growth in Africa 1960–2000* is an excellent example of research that ignores the problems of the quality of the economic growth data. These two volumes are dedicated to the quantitatively based study of growth episodes; meanwhile the issue of data quality is not touched upon, leaving the validity of the analysis shrouded in uncertainty.

Alwyn Young noted the problem of incomplete data when attempting to build up and revise a database for African measures of living standards. He argued that the underlying data supporting estimates for living standards are minimal or non-existent (Young 2009, p. 1). Young reports that, for 24 of the 45 countries for which the PWT provides international price data, there are in fact no benchmark studies of prices. Although the UN reports constant data prices for 47 sub-Saharan African countries between 1991 and 2004, it has received data only for less than half of these 1,410 observations, and for 15 of the countries no underlying data has been received at all (Young 2009, p. 1). It is further explained in the *World Bank Statistics Manual* that, when the data are missing, the Bank uses 'a method for filling the data gap, which is based on the assumption that the growth of the variable from a period for which data exists has been the same as the average growth for those other countries in the same regional or income grouping, where data exists for both periods'. Possibly to reassure data users, it is reported that 'these gap-filling procedures are run automatically, with no human intervention' (World Bank 2011b). It is therefore of some interest to uncover which part of the data are actually produced by the statistical offices and which are simply imputations, created with 'no human intervention'.

Among users in academic and policy circles there has been a decisive shift in preferred use of data sources. Journal articles and monographs published on African economies in the 1960s, 1970s and 1980s would invariably refer extensively to official documents and make use of national accounts, economic surveys and data from statistical abstracts to support

their analysis. In recent decades these data sources have gone missing entirely. In part this is due to availability and accessibility. Major competitors such as the PWT and WDI have become the preferred source of social and economic statistics. The product remains the same: the World Bank is reporting the official data as submitted to it by national statistical offices, with only minor modifications. Undoubtedly, the brand name of 'World Bank' is better than the 'National Bureau of Statistics' but the ingredients in the final 'product' remain the same.

A lack of metadata

The problem is that the data users are not well informed. Many data users have no *a priori* reasons to judge which of the datasets are better than the others. Only seasoned country experts are reasonably able to judge the data quality in a country. A data user would like to know to what extent the dataset one is using coheres with what is otherwise known about the country, and should therefore be able to judge whether a large fluctuation is economic information or just statistical errors. A data user could also be interested to know how the data quality in one country compares with the data from another country. To be specific: perhaps the data user, having seen that Ghana just revised its income upwards by 60%, may feel cautious about comparing the income of Ghana with that of Cote D'Ivoire or Nigeria. How should the data user navigate the databases?

The term for this information is metadata. This information should ideally accompany the statistical series. It should contain definitions, sources and all other information that the data user needs to be a confident user of the data. The World Bank and other international organisations offer very little help here. The only metadata downloadable in the databank from the World Bank is its textbook definition, and it is then noted that data are in constant or current local or international currency, and that the base period 'varies by country'.[7] The data manual, which we referred to earlier, contains only the generic mathematical formulas and definitions that are used to compile the data.

I contacted the Development Data Group at the World Bank to enquire about the availability of metadata and the raw data underlying the

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[7] Retrieved from http://data.worldbank.org/ (accessed August 2011).

calculation of the time series of national accounts. In response I was told by the Data Group that 'Raw data provided by the National Statistics Agencies are not available for external users and only handful of people [*sic*] at the World Bank have access to it'.[8] On a second query I was referred to the data files available through the United Nations data division.[9] The data series in this database go back to 1970, and there is better metadata available for some indicators; however, for national accounts the source and method listed has very little information. It merely describes whether the data are 'official data', i.e. supplied directly from the National Statistical Office, or whether they are derived from WDI. In other words, a circular reference. A third query requesting the underlying national account files and the sources and methods received a similar response: 'At the Data Group, we do not have the information you've requested. National account data we receive are electronic files either from the Country offices or from the IMF. May we suggest you to contact the National Statistics Offices directly?'[10]

When I have contacted the national statistical offices directly in person, I have been able to gather far more detailed information, but it has not always been possible to retrace the history of national accounting for all the countries.[11] There are crucial gaps, both in the data series and in the metadata. I had conversations about this lack of transparency and meta-data with data consultants in Zambia and Tanzania.[12] One issue that was agreed upon easily was that it was difficult to get a sense of the relative quality of the different country estimates and to what extent the national income of certain countries was more or less underestimated than another. I was advised to get in touch with the East AFRITAC: the IMF Regional Technical Assistance Center. This institution provides technical assistance

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[8] Email correspondence with Development Data Group at the World Bank, 8 September 2009.
[9] Retrieved from http://data.un.org/ (accessed August 2011).
[10] Email correspondence with Development Data Group at the World Bank, 10 September 2009. I contacted the IMF, which replied in similar vein: 'We do not have statistical bulletins or any national source publications. Country authorities send data to us electronically in files that we do not share with the public.' In a last attempt to break the circle I contacted the compilers of the PWT for access to the underlying data series, but to no avail. I was informed that, 'For African countries, we got the national account data from the UN.' I was thus referred back to the same source as the World Bank had sent me on my first query. Since the UN database holds data only from 1970 onwards, I asked what sources were used before this date and was told that, 'For the data before 1970, we applied the growth rate of the variable from our old national data to the new data of 1970 to extrapolate the missing data. For e.g., in the case of Tanzania we used the national account for PWT6.2., which had been extrapolated by using the national account data for PWT6.1. Before PWT6.1, we lost the track of the original source of the data.'
[11] This problem is expanded upon further in Jerven (2011).
[12] Personal communication with representatives from DFID and the World Bank, Dar es Salaam, November 2010, and Lusaka, 2010.

to statistical offices in East Africa, and I consulted with its Macroeconomic Statistics Advisor, whom I contacted to get an insider's view of the relative state of affairs at statistical offices in East Africa.

The technical advisor was unfortunately away travelling when I was visiting, but I sent an email query for additional information to write my report on the national account divisions in East Africa. I was told that: 'I cannot add anything to the official responses given to you by the relevant statistics offices. As I currently provide technical assistance to these countries and have access to information provided to me on a confidential basis, I am not in a position to answer your request.'[13] I countered that I had already been able to get some information from the World Bank, DFID, NORAD and IMF on these issues, and explained that 'one of the central aims of this study is to demystify the process of producing income and growth statistics in the region. Taking the position that the IMF's role in this process is "confidential" raises more problems than it solves.'[14] In response, the IMF representative replied: 'You need to understand that I work for the Statistics Department of the Fund and provide Technical Assistance directly to the national compilers. I am allowed access to information on the basis of non-disclosure so that I can help them. If I or any other Technical Assistance provider in the same position then provides the information to a totally unrelated third party, it is a breach of that trust and future Technical Assistance offers would never be accepted.'[15]

On a third request, the same IMF representative was able to provide some general advice:

> In general terms, applying to all East African countries you mention, there is a need to strengthen source data for national accounts. However, these countries are poor with inadequate revenue to fund regular ongoing data collections for NAS purposes. In general, there is a need to strengthen data collection for agriculture, fishing, informal sector and services activities. There is also scope to improve prices collections (agriculture, producer prices). Compilation staff and resources are also constrained, due to budget, limiting the range and quality of the statistics produced. Existing staff need further training and development. The constraints in compilation are reflected in the limited dissemination.[16]

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[13] Email correspondence with Macroeconomic Statistics Advisor IMF East AFRITAC, 22 November 2010.
[14] Email correspondence with Macroeconomic Statistics Advisor IMF East AFRITAC, 7 December 2010.
[15] Email correspondence with Macroeconomic Statistics Advisor IMF East AFRITAC, 13 December 2010.
[16] Email correspondence with Macroeconomic Statistics Advisor IMF East AFRITAC, 13 December 2010.

Table 1 summarises the information gathered through the national statistical offices website, email and telephone queries, and through personal visits to the statistical offices in Ghana, Nigeria, Uganda, Kenya, Tanzania, Zambia and Malawi. These data were collected as a part of a survey of methods and sources in use at national statistical offices in African economies. It is therefore of some interest to uncover which parts of the data are actually produced by the statistical offices and which are simply imputations, created with 'no human intervention'. The table also summarises the information gathered through the national statistical offices' websites. Where possible, the data have been confirmed or gathered via personal communication and emails as a part of a survey of methods and sources in use at national statistical offices in African economies.

Table 1: Availability of national income data at statistical offices in Africa (local currency, billions)

Country	Estimate	Base year	GDP	WDI	Difference (%)
Angola	–	–	–	5,988.7	
Benin	2005	–	2,309.1	2,261.5	2
Botswana	2009	1993/94	83.2	83.3	0
Burkina Faso	2005	1999	2,881.4	2,862.8	1
^Burundi*	2007	2006	1,403.0	1,060.0	32
Cameroon*	2009	2000	11,040.3	8,895.0	24
^Cape Verde*	2007	1980	107.3	88.6	21
^Central African Republic	2003	1985	670.1	712.1	–6
^Chad	2009	–	3,622.0	2,796.6	30
^Comoros	–	–	–	153.1	
^Congo, Democratic Republic	–	–	–	3,366.4	
^Congo, Republic	2009	1990	3,869.8	4,523.4	–14
Cote d'Ivoire	2008	1996	–	8,631.2	
^Djibouti	2000	–	91.2	–	
^Equatorial Guinea	2004	1985	2,389.5	2,768.7	–14
^Eritrea	–	–	–	18.0	
^Ethiopia	2004/5	–	83.292	86.66	4
^Gabon	2008	2001	7,032.9	6,508.8	8
^Gambia	2008	2004	23.0	18.2	26
Ghana*	2010	2006	36.9	36.9	0
^Guinea*	2008	2003	20,982.0	20,778.0	1
^Guinea-Bissau	2006	1986	172.3	312.1	–45
Kenya*	2008	2001	2,099.8	2,077.4	1

(continued)

Table 1: Availability of national income data at statistical offices in Africa (local currency, billions) (continued)

Country	Estimate	Base year	GDP	WDI	Difference (%)
^Lesotho*	2009	2004	14.6	13.8	6
^Liberia	–	–	–	59,839.9	
Madagascar	2009	1984	16,802.0	16,803.0	0
^Malawi*	2007	2006	510.5	484.0	5
^Mali*	2008	1997	–	3,067.3	
^Mauritania*	2007	2005	914.7	854.8	7
^Mauritius*	2010	2009	299.5	274.5	9
Mozambique*	2009	2003	269.3	263.3	2
Namibia	2008	2004	72.9	74.0	–1
^Niger*	2010	2006	2,748.2	2,542.0	8
^Nigeria*	2009	1990	24,794.2	25,760.6	–4
^Rwanda	2010	2006	3,282.0	2,964.1	11
Sao Tome and Principe	2006	2001	1,444.6	1,550.2	–7
Senegal*	2009	1999	6,023.0	6,037.9	0
^Seychelles*	2009	2006	10.7	10.4	3
^Sierra Leone*	2009	2001	7,868.8	6,442.2	22
^Somalia	–	–	–	1,347,900.0	
South Africa*	2010	2005	2662.8	2,407.7	11
^Sudan	2006	1981/82	93.22	79.05	–15
^Swaziland	–	–	–	12,770.6	
^Togo	–	–	–	28,212.7	
Tanzania*	2010	2001	32293.5	30,556.8	6
^Uganda*	2009	2002	34166.0	30,556.8	12
Zambia*	2008	1994	55210.6	52,869.6	4
^Zimbabwe	–	–	–	5,625.0	

* Information obtained from the statistical office personally.
^The base year used by the World Bank is different than that reported by the national government (or information not available). For Sudan the WDI reported GDP in Sudanese pounds (9871.88) while the official data are reported in Sudanese dinars. The WDI data have been adjusted using the exchange rates reported for the year 2006.
Sources: World Development Indicators and National Statistical Office websites

Table 1 shows the availability of estimates. The list shows great variation. Only 18 of the 48 countries have prepared estimates for the year 2009 or 2010. Still, the World Bank provides data in both constant and current prices for all of these countries until and including year 2009. This means that, when we have contemporary rankings of African economies, more than half of the entries are pure guesswork. It also implies that when we are presented with continent-wide growth statistics, about

half of the underlying data are actually missing, and are created with 'no human intervention'. The prevailing sentiment seems to be that data availability is more important than the quality of the data that are supplied.

The base year is of crucial importance. For 13 countries the official information has not been obtainable; 19 of these countries have a base year that is within the last decade (i.e. 2001 or more recent). According to the IMF Statistics Department, advisors remind authorities that international best practice is to rebase five-yearly,[17] but only seven countries (Burundi, Ghana, Malawi, Mauritius, Niger, Rwanda and Seychelles) have been able to follow up on this recommendation. As explained previously, the base year determines the year for which the prices used for accounting are held constant. As in the case of Kenya, with a base year of 2001 one would account for the coffee output for year 2008 as it would be valued in 2001. This is done in order to distinguish economic growth from price increases. But the choice of the base year has further implications. The index problem applies. This means that the weight of each sector is still determined from its 2001 value, thus a small sector in 2001 will still contribute less to aggregate growth in 2008. A relevant example for Kenya would be the horticulture sector, which is larger today than it was in 2001. When the GDP is revised and the base year changed, it allows the statistician to reweight the relative importance of the different sectors, and further to change or reconsider the methods and data sources.

How important is this variation? It is extremely likely that the income of the countries with an outdated base year is severely underestimated. Ghana is one of the countries with an up-to-date base year: 2006. It is also worth noting the disagreement between the official statistics and those provided by the World Bank. In the last column in the table the most recent estimate in local currency at current prices is compared with the same data from the World Bank. Often the discrepancy is accounted for by the fact that the national statistical office and the World Bank are not using the same base years for their accounts – this shows how the index problem applies. Burundi is one of the countries that has updated its base year to 2006, while the World Bank series still uses 1980 as its base year.

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[17] Personal communication, Macroeconomic Statistics Advisor, IMF East AFRITAC, December 2010.

The result is that the World Bank reports a much lower GDP for Burundi, to the dismay of the national accounts division.[18] In conclusion, a ranking of African economies should not be taken at face value. The information is in large part automatic data permutations, and the level differences are as likely to reflect statistical methods as they are to be informative of economic realities.

Data for development: knowledge and governance

This paper has shown that a general distrust of national income and economic growth data is warranted. Some have called them 'random numbers', but some systematic variation in errors and biases has been pinpointed. The general problem of knowledge remains: we are uncertain about how well the numerals match up with the reality. Since the standard to which the validity of the data should be measured against remains immeasurable in practice, the extent of the inaccuracy of the aggregate economic observations remains obscure. It seems that Paul Collier got it wrong when he answered his own question regarding the 1980–2000 economic growth record in *The Bottom Billion*: 'Is this dismal performance just an artefact of the data? I

> Data gathering problems have, by all evidence gathered so far … caused an underestimate of income.

think that, on the contrary, the genuine problems that afflict gathering of economic data in the poorest countries are likely overall to have caused an underestimate of their decline' (Collier 2000, p. 9).

On the contrary: data gathering problems have, by all evidence gathered so far and summarised here, caused an underestimate of income. I have not come across one single instance of a revision of national income that caused a downward revision. A careful reading of descriptions of data collection methods and an examination of the growth evidence presented in this paper would suggest a different interpretation. Data collected by state agencies in the late 1970s and early 1980s, reflecting the declining performance and capacity of parastatals, captured a falling proportion of agricultural output, largely because less of the crop output was marketed through official channels. This resulted in a

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[18] Personal communication, Institut de Statistiques et d'Études Économiques, Burundi, February 2011.

growing underestimation of GDP because there was inadequate allowance for subsistence production and consumption and/or unrecorded trade and transport in African countries where these were a major share of economic activity. The cases for which Collier's general statement may apply are when data are missing entirely, and the GDP estimates are reached using the 'filling the gap method'.

The change in economic structure with liberalisation temporarily worsened the accounting and record-keeping problem as comprehensive data were no longer available from state agencies. It was not until new GDP series were constructed in the 1990s that new allowances for informal trading based on informal market surveys were introduced. For example, in the case of Tanzania the series connecting the 1980s with the 1990s are not continuous, and incorporating informal sector estimates in the 1990s gives a sudden upward growth effect. Thus, decline in the 1980s is likely to have been overestimated, and the (post-structural adjustment) growth in 1990 may be similarly overestimated. In studying economic growth throughout this period it is indeed problematic that no source of growth data can be accepted at face value as being inherently accurate. The structural changes in the economy and the subsequent changes in the definition and method of measuring GDP were so radical that the series should be regarded as disconnected.

In retrospect it may be puzzling that the IMF and the World Bank – the latter recently fashioning itself as the 'Knowledge Bank' – embarked upon growth-orientated reforms without ensuring that there were reasonable baseline estimates that could plausibly establish whether the economies were growing or stagnating. For the statistical offices, structural adjustment meant having to account for more with less; informal and unrecorded markets were growing, while public spending was curtailed. As a result, our knowledge regarding the economic effects of structural adjustment is limited.

The information furthered here should make it clear that the problem remains with us today. Some of the country-level data are more meaningful than others; the problem is that, without proper metadata, the database for development is hard to navigate. It is not only a knowledge problem. For those interested in development governance the issue is pressing. Despite the increasing importance of other development

indicators,[19] income per capita and economic growth are still powerful signals that make commentators, donors and governments sit up and listen. Because most actors do depend on these very data, the data quality issues are often ignored, sidestepped as a matter of convenience or to avoid embarrassment. It is time to acknowledge the problem and initiate a discussion on the future database for African development.

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[19] Which others have argued is problematic, too (see Vandemortele 2011).

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