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## Article

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# On the accuracy of trade and GDP statistics in Africa: Errors of commission and omission

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## Abstract

African trade statistics suffer from errors of commission and omission. A quarter-century ago, Alexander Yeats (1990) compared receipts of importers and exporters and concluded that the data could not be used to determine the magnitude, direction, or composition of trade. The only fact to be safely deduced from the evidence was that the statistics were plagued by widespread smuggling and/or underreporting. More than two decades later, despite improvement in external economic conditions, trade statistics continue to be lacking in quality.

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*Keywords:* Africa; Trade; Statistics; GDP

## 1. Introduction

Formal statistics depend on correct reporting. In his classic text on the accuracy of economic statistics Morgenstern (1963) warned about the problem of misreporting. With regards to balance of trade and payments, he cautioned that a measure of “the balance of trade is an arbitrary and fearfully vague notion. The correct way of speaking, though more cumbersome, would be to say that there is an *excess of statistically reported ‘visible’ trade* in one or the other direction” (ibid: 137, italics copied from original text). He further cautioned that

*Anyone who sat through meetings (as the author has) in which final balance of payments figures for most invisible items were put together, can only marvel at the naiveté with*

*which these products of fantasy, policy, and imagination, combined with figures diligently arrived at, are gravely used in subsequent publications* (ibid., p. 180).

Of particular interest is that Morgenstern was writing on developed economies at the time. Perhaps less surprising is that the state of affairs is no better for African economies. This article re-poses the important question: Do Sub-Saharan trade statistics mean anything?

The question was the starting point for an article written in 1990 by Alexander Yeats. At that time he was an economist in the International Economics Department of the World Bank. By comparing the receipts of importers and exporters, he concluded that African trade statistics could not be relied upon to indicate trends, nor the magnitude, composition, or direction of trade within the continent. Yeats’ only conclusion from the existing evidence was one of widespread smuggling and/or underreporting within the African continent.

In this research note I revisit the quality of the African trade statistics to determine what the current state of affairs is. The article begins by reviewing the findings of Yeats from 1990. It moves on to investigate the available metadata on African Trade and Balance of Payment statistics since Yeats published his article.

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## 2. Did Sub-Saharan trade statistics mean anything then? Errors of omission and of commission

It is a well-known truism that economic growth in Africa is strongly and positively influenced by cross-border trade (Jerven, 2010). Since the mid-1990s, official statistics has shown a rise in GDP in most African economies. The change in the aggregate growth data is driven primarily by growth in the visible external sector (Jerven, 2013a, 2013b, 2013c). Accordingly, the reliability and validity of the external sector data have important implications for the interpretation of Africa's recent growth.

The actual relationship between trade and growth in these economies is not well reflected in the official statistics, because of well-known biases in recording and data availability. The result is that the impact of trade on growth is likely to be overemphasized in the compilation GDP statistics (Jerven, 2014). This owes to the greater attention that is paid to collecting (and thus, the greater availability of) external trade statistics – relative to statistics on domestic trade, or agricultural production for example. The result is that the direct relationship between trade and growth is being biased upwards. The overall paucity of data dictates that most visible change will come from the sector that has the highest level of data availability – the external sector. With this in mind, the accuracy of trade statistics is of the utmost importance to the measurement of economic growth in Africa.

The usefulness of statistics depends on their availability, precision, and accuracy. Indeed, little can be done if data is not available, if it suffers from a lack of specificity, or if it fails to accurately reflect what is really happening. In his investigation into the available data on African trade statistics, Yeats (1990) found the data to be lacking in all three dimensions.

After completing his investigation into the reliability of African data coming from the United Nations Statistical Office, Yeats summarized the stock of available statistics to be problematic. For developed countries there were continuous time series available – subject to a one year lag. In 1989, the same information for African economies generally extended only until 1983, after which the data was simply unavailable. By comparison the typical lag in Latin America was generally in the two to three year range while the industrializing economies of East Asia were as up-to-date as the developed world. While a half dozen African countries offered statistics past 1983 (extending no further than 1986), the statistics were further undermined by a substantial number of holes in the time-series as well as by three of the thirty-nine cases having no data available whatsoever.<sup>1</sup> Putting this together, policy-makers and analysts in 1989 were typically informed by six year old data; were lucky to have a lag of only three years; and had sporadic or no data in some cases.

One measure of a statistical office's precision in compiling trade statistics is its adherence to the Standard International Trade Classification (SITC). The SITC is the United Nations' five-level system for classifying traded goods. According to the SITC, the higher the level of classification the more specific it is. Thus, at the broadest level of abstraction (the first level) one would come across Section 0 – the code for “food and live animals”. This can be narrowed down to the fourth level where one can differentiate between, for example, bovine animals (001.1) and swine (001.3). Even more specific is the fifth level where one comes across codes such as 001.11 – “pure-bred breeding animals” and 001.19 – “other than pure-bred breeding animals”.

Yeats' investigation into the level of detail in African trade statistics found nearly full coverage to the three-digit level but that less than a third of the countries for which statistics existed had full coverage at the four-digit SITC level. Thus, for the vast majority of African cases in 1989, one was able to determine that live animals were crossing the border but not what kind of animals they were. This lack of precision was argued to be problematic for studies at the product-specific level (for example, in the context of debating trade barriers on specific commodities).

Even if the relevant data was available and at the appropriate level of precision, policy-makers and analysts were still confronted with the third (and perhaps most serious) statistical dilemma – that the information was simply incorrect (errors of omission and commission). To investigate this point, Yeats started with the basic premise that balance of payment statistics should, at least in theory, balance out. Simply put, the exports from Country A to Country B should match the imports of Country B from Country A.

Unfortunately, this does not work out so perfectly in practice – for poor or for developed countries. Yeats found that African trade statistics suffered from such inconsistency as to render them useless for the purpose of informing policy. Typical of this was the fact that trade between Sub-Saharan Africa and the United States suffered from, on average, a 39% difference between reported imports from the United States and actual recorded exports to sub-Saharan Africa.<sup>2</sup> Data on intra-African trade was even more problematic and, when matching each country to its largest continental trading partner, suffered from an average discrepancy of 64% excluding the Gambia and 109% including it (Yeats, 1990, p. 146). These inaccuracies were attributed to both systematic and systemic causes.

The first group of causes stemmed from the various accounting inconsistencies of importers and exporters. Some of these inconsistencies were as innocuous as exporters reporting “free on board” (f.o.b.) values – only the value of goods – while importers reported “cost, insurance, and freight” (c.i.f.). Thus, if everything else was accurate, imports would have exceeded exports by the value of insurance and freight. Of course, many other systematic challenges (such as rounding; the way that goods

<sup>1</sup> These three were Botswana, Lesotho, and Swaziland – all members of the South African Customs Union.

<sup>2</sup> Calculated as (Imports–Exports)/Exports \* 100, where the United States was the importing country.

forwarded through a third country were reported; how financing was reflected; and the influence of multiple exchange rates) inhibited attempts to equate imports with exports.

More problematic still was the role that micro-level incentives played in distorting macro-level statistics. Yeats cited Bhagwati's finding that the presence of subsidies can encourage exporters to "over-invoice" shipments while tariffs have the opposite effect on the reporting of imports. Additionally, an overvalued domestic currency would have the opposite effect in that exporters would have an incentive to under-report their shipments while importers would want to over-report – both for the purpose of accumulating foreign currency for its sale on the black market (*ibid.*, p. 136).

Furthermore, the existence of trade restrictions (such as export quotas on oil), political factors (embargoes), and the prevalence of smuggling all had the potential to distort official trade statistics in one way or another. Such a problem could be exacerbated when the incentives of exporters and importers align so as to create mutual benefits from an offsetting distortion of the statistics on either side. This would effectively hide all traces of such distorting practices.

Putting this all together, Yeats found that the data that existed with regards to African trade statistics suffered from an overall lack of availability, precision, and accuracy. These issues led to the conclusion that the data were inadequate for the purpose of determining the magnitude and patterns of the direction and composition of trade in Africa. Accordingly, Yeats argued that it was impossible to place any level of confidence in the data that existed and that there was a serious risk of research being biased and policy misinformed (p. 153). This was the state of affairs in the 1980s and 1990s. This paper next investigates if circumstances have changed since then.

It should come as no surprise that some things have changed since the 1990s. For example, the typical African economy of the 1990s was either in stagnation or decline. Making matters worse, such economies tended to suffer from large current account deficits and trade volumes that were suspected to have been in a prolonged decline – since the 1970s in some cases. This period of economic decline was combined with a general discontinuity in many functions of the state (*Van de Walle, 2001*). These included responsibilities such as statistical reporting, both from administrative units in the government ministries as well as the statistical offices themselves. These problems stemmed from dearth in funding; staffing; and incentives to provide timely and accurate data on the inflows and outflows of goods, services and payments across national borders. These problems persist today (*Jerven, 2013a, 2013b, 2013c*).

While Yeats found that these conditions were conducive to the smuggling of goods and the misreporting of information, it is likely that incentives will have changed since then. So while the 1970s and early 1980s were characterized by state interventions designed to control and tax cross-border trade, the next two decades were characterized by efforts to liberalize those same interventions. In the 1970s many marketing boards for export crops (such as cocoa and coffee) fixed commodity prices well below world market prices and created incentives for producers and traders to circumvent official channels. Furthermore, subsidized prices for domestically consumed goods such as

petroleum created arbitrage opportunities. In this context, profits could be made by smuggling and/or re-exporting such goods to markets where their prices were higher. Finally, controlled access to foreign exchange and the overvaluation of domestic currencies created potentially high rewards for those who could access foreign exchange through dubious means (*Azam, 2007*).

Overall, these transactions could be characterized as being prone to errors of commission where trade was purposefully withheld from the official records. Surprisingly, while the ensuing liberalization of trading regimes decreased the potential rents associated with errors of commission, the liberalization has not been necessarily accompanied by more accurate statistics. Rather, where errors of commission once existed, errors of omission have been quick to fill the void.

Most statistics, including those related to trade, are collected because the state has an interest in doing so. Exemplifying this problem is the observation that if a state (versus an independent contractor) does not collect customs, then there are usually no records of their collection. To this point, *Hibou* cites the examples of Mozambique and Cameroon and notes that the collection of customs has been privatized and that correspondingly "the national accounts do not record either the volume or the value of the exports, nor the tax and customs revenue" (*2004, p. 7*).

This problem is especially pronounced in the context of intra-African trade. Highlighting this is *Cooper's (2002)* description of African states as 'gatekeeper states'. He describes the gatekeeper states as states that employ their revenues and authority for the purpose of controlling "the interface of national and world economies" (*ibid.*, p. 141). Furthermore, that historically there have been higher returns to controlling trade between Kampala and London than between Kampala and Juba or Kampala and Kigali means that it continues to be paid far less attention to intra-African trade.

### 3. Do Sub-Saharan trade statistics mean anything today?

The preceding section will undoubtedly lead one to wonder how far we have come in the last quarter century. This section responds to these questions as it investigates the quality of data on balance of payment statistics. Rather than comparing the receipts of trading partners, this paper makes use of the metadata reported on trade statistics by the International Monetary Fund (IMF) and World Bank.

The IMF reports on the prevalence of the use of the Balance of Payments Manual (BPM) in Sub-Saharan Africa while also publishing reports on statistical practices in countries. The BPM, currently in its sixth edition, embodies the IMF's interest in "developing and promulgating guidelines for the compilation of consistent, sound, and timely balance of payments statistics" (*International Monetary Fund, 2006, p. ix*). It serves as a guide in the compilation of national balance of payments statistics with four principal objectives in mind. These are:

- i. *To provide and explain concepts, definitions, classifications, and conventions for balance of payments and international investment position statistics*



Table 1  
Prevalence of the Balance of Payments Manual (version 5 or 6) in Sub-Saharan Africa.

	2004	2005	2006	2006	2008	2009	2010	2011	2012	2013
Countries covered	42	47	47	47	47	47	47	47	47	48
Countries using BPM	33	35	35	35	36	37	37	38	41	43
%	78.6	74.5	74.5	74.5	76.6	78.7	78.7	80.9	87.2	89.6

- ii. *To enhance international comparability of data through the promotion of guidelines adopted internationally*
- iii. *To show the links of balance of payments and international investment position statistics to other macroeconomic statistics and promote consistency between different data sets*
- iv. *To provide a brief introduction to uses of data on balance of payments, other changes in financial assets and liabilities, and international investment position, as the international accounts of an economy*

It is a testament to the efforts of the IMF and its member countries that the BPM has been adopted by an overwhelming majority of developing countries. According to the World Bank's Development Data Group (DECDG, 2013), the BPM is in use in 141 out of 149 developing countries. This equates to 94.6% of the population and is up from 88% nine years ago. With this said, five of the eight countries that have yet to adopt the BPM are from Sub-Saharan Africa (with the remaining three coming from East-Asia and the Pacific).<sup>3</sup> The region's adherence to the BPM is highlighted in Table 1.

Obviously, a country's adherence to the BPM is only one aspect of the overall quality of its balance of payments statistics. Alternatively, the IMF – at the request of any member country – will publish a Report on the Observance of Standards and Codes (ROSC) for the requesting country. Data dissemination is one of the twelve areas in which ROSC are produced and balance of payments is one of the six fields traditionally covered by an ROSC on data dissemination.

ROSCs on data dissemination rely on the IMF's Data Quality Assessment Framework (DQAF). The DQAF assesses six fields – a set of prerequisites and five dimensions of data quality. Each dimension is composed of three to five elements each with their own set of relevant indicators (see Appendix 1). Based on a country's adherence to these indicators, one of four scores is given for each element. The possible scores are “practice observed” (O); “practice largely observed” (LO); “practice largely not observed” (LNO); and “practice not observed” (NO).

Sixteen such reports are available for countries in Sub-Saharan Africa. The remainder of this section summarizes the findings of these reports with the intention of gaining greater insight into the current state of statistical practices in Sub-Saharan Africa. Regrettably, the aforementioned problem of data availability also plagues metadata on trade statistics. The sixteen reports represent only a third of Sub-Saharan African countries.<sup>4</sup> Further,

<sup>3</sup> Thus, while only 3 of 101 (<3%) countries outside of SSA do not adhere to the BPM, that number is 5 out of 48 (10.4%) within SSA.

<sup>4</sup> This number is reduced to fifteen as the format of Cameroon's 2001 report made it incompatible with the rest of the collection and thus necessitated its removal from this stage of analysis.

most of the ROSCs for Sub-Saharan Africa are at least ten years old at the time of writing with none being less than eight years removed from publication. Accordingly, there is no way of knowing if circumstances have improved, remained static, or regressed in the years that have followed each ROSC's publication.

Additionally, that an ROSC is produced at the request of a member country makes it likely that some form of self-selection bias exists. One might assume that countries that are more attentive to following agreed upon statistical practices would be more likely to request an ROSC. Accordingly, the findings that follow might be assumed to constitute an upper bound for the quality of balance of payment statistics or, at the very least, be understood to be positively biased in the sense that they overstate the quality of trade statistics in Sub-Saharan Africa.

For the purpose of quantitative comparison, I code ROSC scores on a zero (NO) to one (O) scale. Intermediate scores are placed at equal points between these two poles. Thus, a score of LNO is coded as one-third and a score of LO two-thirds. Scores for each of the six DQAF fields are calculated by summing up the scores for their respective elements and then dividing them by the number of elements that are assessed. In the event that more than one report was produced for a specific country, the scores for each DQAF field are then averaged out.<sup>5</sup> While this is not a very sophisticated way of quantifying metrics on statistical capacity it should be understood as useful for its purpose.<sup>6</sup> This purpose is in highlighting that significant departures from best practices exist in the calculation of balance of payment statistics in Sub-Saharan Africa. The results of these calculations are reflected in Table 2.

A cursory overview of these figures suggests that scores generally fall in the largely observed category – meaning that the best practices set out by the IMF fall short of being followed within the offices that produce balance of payment statistics. Of course, variation exists across the fifteen cases with the Gambia receiving the lowest average score (0.472) while no country exceeded the 0.884 that Senegal achieved. If the aforementioned assumption that these scores represent an upper bound for the region, then the data suggests that countries within Sub-Saharan Africa are less than diligent with regards to their collection of balance of payment statistics.

Compared to Africa, the rest of the world was far more successful in adhering to DQAF standards. In total, sixty-two other countries representing five other continents and every World Bank income category were evaluated by the IMF.

<sup>5</sup> Countries with multiple reports were: Chile, Costa Rica, Georgia, Italy, Jordan, Kazakhstan, Mauritius, Mexico, Russia, South Korea, and Turkey.

<sup>6</sup> And the method is surely not much less advanced than the one used to measure Statistical Capacity by the World Bank.

Table 2  
Average scores for countries in Sub-Saharan Africa, by ROSC field.

	Year	Prerequisites of quality	Assurances of integrity	Methodological soundness	Accuracy and reliability	Serviceability	Accessibility	Average*
Botswana	2003	0.750	0.889	0.917	0.667	0.667	0.778	0.778
Burkina Faso	2003	0.667	0.889	1.000	0.867	0.750	0.667	0.806
Chad	2003	0.583	0.889	0.917	0.867	0.444	0.556	0.709
Gambia, The	2003	0.417	0.778	0.417	0.333	0.556	0.333	0.472
Kenya	2003	0.583	0.778	0.833	0.600	0.778	0.556	0.688
Malawi	2003	0.556	0.778	0.583	0.533	0.583	0.556	0.598
Mauritius	2002/2008	0.778	0.833	0.625	0.533	0.528	0.667	0.661
Mozambique	2002	0.667	0.889	0.667	0.533	0.583	0.556	0.649
Namibia	2002	0.778	0.889	0.917	0.467	0.750	0.556	0.726
Niger	2003	0.750	0.889	0.917	0.733	0.667	0.556	0.752
Senegal	2002	1.000	0.889	1.000	1.000	0.750	0.667	0.884
South Africa	2001	1.000	1.000	0.667	0.667	1.000	0.889	0.870
Tanzania	2004	0.778	0.889	0.667	0.533	0.667	0.667	0.700
Uganda	2006	0.833	1.000	0.667	0.867	0.667	1.000	0.839
Zambia	2005	0.750	0.889	0.583	0.533	0.778	0.556	0.681
Average		0.726	0.878	0.758	0.649	0.678	0.637	0.721

\* Averages were calculated first for specific DQAF fields, and then as an overall.

Summary statistics for the resulting ROSCs are reflected in Table 3.

The average difference (between Sub-Saharan African scores and those of the rest of the world) of 0.139 falls more than 1.5 standard deviations away from the latter's mean. In fact, in all six DQAF fields the African statistics lag behind those of the rest of the world and nowhere more is this the case than in "Accuracy and Reliability" – a category that reflects the adequacy of source data, the soundness of statistical techniques, and the regularity of assessment. Putting this all together, Yeats' critique of African trade statistics seems as relevant now as it was in the 1980s.

#### 4. Errors of omission and informal trade

Adherence to international codes and accuracy in reporting statistics is an important issue. With this said, significant issues can also exist in the blind spots of an economy or in the activities that are simply omitted from its records. This section reviews some of the literature on informal trade in Sub-Saharan Africa and concludes that the problem is one of considerable magnitude.

The issue of informality is linked to the strength of formal institutions and specifically to a state's ability to monitor, tax,

and control trade. Azam highlights that a lack of capacity to collect tax revenues from production and income leads to revenues often being generated in the form of tariffs on imports and exports. This practice was much lamented as leading to an "anti-export bias" and it can have a distorting effect on prices in the domestic market (2007, p. 11–13). Such a distortion creates an opportunity for entrepreneurs to benefit at the expense of statistical accuracy. Azam finds that "for many goods, the fraction that is actually declared at the customs [sic] is less than 10% of the actual traded flow" (ibid., p. 19).

Of course – by its very nature – the magnitude of trade that takes place in illegal, black, parallel or informal markets is difficult to evaluate. MacGaffey (1987, p. 112) summarizes this challenge by concluding that informal trade is, by definition, unrecorded. Accordingly, much of the evidence that exists is either anecdotal, inferred from outside sources, or based on surveys. With this said, the evidence that does exist suggests that the issue warrants further investigation.

One such investigation, published by the World Bank (2011), analyzed the trade in food staples in the Great Lakes region of Africa. For the three economies surveyed, informal trade in food staples was found to be no lower than 20% of overall trade (formal plus informal). The share of informal trade in total trade was as high as 80% in the case of the Democratic Republic of the Congo and averaged roughly 42% across the economies (see Table 4). While these figures varied drastically from case to case, even on the lower end they suggest that the formal official statistics are suffering from errors of omission.

Table 3  
ROSC scores for non-Sub-Saharan African countries.

	Median	Mean	St. dev.	Difference*
Prerequisites of quality	0.910	0.874	0.142	0.148
Assurances of integrity	1.000	0.955	0.059	0.077
Methodological soundness	0.833	0.798	0.123	0.040
Accuracy and reliability	0.867	0.841	0.142	0.192
Serviceability	0.840	0.837	0.101	0.159
Accessibility	0.889	0.855	0.154	0.218
Average	0.889	0.860	0.091	0.139

\* Simply the difference between the mean scores for Sub-Saharan Africa countries and the rest of the world. A positive value indicates that the Sub-Saharan Africa score was lower.

Table 4  
Estimated trade in food staples in the Great Lakes Region of Africa (tonnes).

	Congo DR	Kenya	Rwanda
Formal trade	3276	22,728	8286
Informal trade	16,078	9116	2177
Informal trade % share in total trade	83.07	28.63	20.81

Of course, informal trade can take many forms – both legitimate (legal) and illegitimate. The aforementioned World Bank report emphasized that informal trade in food stuffs still qualifies as legitimate commerce “in the sense that traders go through official border posts, pay a crossing fee to the immigration office, and if processed appropriately pay a duty on imports” (p. 2). Such transactions are informal in that they are not officially recorded because of the small amount of goods associated with each transaction (Yoshino et al., 2011).

This type of informal trade can be contrasted against the problem of illicit goods smuggling within the African continent.<sup>7</sup> Regrettably, while this trade in illicit goods poses a large problem (economically, socially, and politically) for Sub-Saharan Africa, such discussions go beyond the scope of this paper. With this in mind, the remainder of this section focuses on informal legitimate trade within the region.

On the topic of informal legitimate trade, the World Bank’s report goes on to highlight that at many border crossings “there is no traceability, audit trail, or even way to verify what was imported, by whom, and how much was paid.” (p. 13). This problem exists regardless of whether the importer declared their goods and how well customs procedures were followed. While each one of these individual transactions is of a relatively low-scale, added together they make up a significant portion of overall trade across the borders of Sub-Saharan Africa. On the macro-level, this means that official statistics have no way of capturing the volume and composition of trade that crosses a border in this manner.

Further distorting the statistics is trade of a large enough scale so as to be recorded, but in which the trader takes advantage of relaxed border controls in order to avoid paying associated duties. Leopold (2009) finds that ambitious traders might further exacerbate the problem as they find ways to take advantage of poor recording practices and border controls in order to avoid paying an import duty. This further distorts the official records as goods are recorded as leaving one country but not as entering another. Illustrative of this is Leopold’s description of *Magendo* trade in Uganda.

*The main way this worked was that a fuel tanker (say) would enter Uganda from Kenya with papers stating the load was for transshipment to Zaire. Therefore no Ugandan duties would be levied. The truck is driven through Uganda to (perhaps) the Aru border post where, for a consideration, the driver obtains stamps from his weigh-bill from the Ugandan border post showing the fuel has left Uganda and from the Zairean customs post to show it has entered Zaire. The truck may even actually cross the border. Either way, its untaxed contents are siphoned out and taken back to Arua for distribution throughout Uganda (p. 473).*

Such practices may help to explain Yeats’ finding that f.o.b. statistics often exceeded their corresponding c.i.f. values.

<sup>7</sup> See Ndumbe and Cole (2005) for an illustrative example of this problem. Alternatively, Ellis (2009) highlights Guinea-Bissau as a country that has been infiltrated by drug interests.

An additional complication emerges under conditions wherein exporters have an incentive to under-report the volume of their exports. Yeats provides one circumstance under which such an incentive might emerge – the presence of export quotas (p. 136–137). Further, while trading regimes have been liberalized, incentives to underreport trade statistics are still strong enough to undermine official accounts.<sup>8</sup>

A USAID report summarizes the broader implications of all types of informal trade. In highlighting that this kind of trade is excluded from national accounts; the report warns about the threat of inaccurate policy recommendations when they are based on a country’s GDP or balance of payment figures (Ackello-Ogutu and Echessah, 1998, p. xi). Accordingly, it seems that Yeats’ concerns from a quarter-century ago are not quite a relic of the past.

Recent research on the illicit flows of capital via mispricing highlights that the quality of statistics on trade matters. Reuter (2012) noted that falsification of invoices is a potential vehicle for the unrecorded capita exports from a country. Cobham et al (2014) looks at discrepancies in trade statistics, and uses mismatches in bilateral trade to measure illicit flows of capital. Thus high quality statistics and better transparency on trade and capital flows may benefit countries if it can reduce illegal flows. However, it has also been pointed out that too arduous demands on traceability of minerals, such as those posed by section 1502 of the Dodd–Frank Wall Street Reform and Consumer Protection Act, may also have negative effects on legitimate traders that are not able fulfill information requirements (Seay, 2012).

## 5. Concluding remarks

*World Economic Outlook 2012* gave cause for optimism regarding current and future economic growth – particularly for areas in Africa. Using data from the IMF publication, the *Business Insider* identified the twenty countries with the highest projected compounded annual growth rates from 2013 through 2017, based on the IMF’s estimates. Ten out of these twenty were in Sub-Saharan Africa with two more coming from Northern Africa.

According to aggregate statistics for Sub-Saharan Africa from the World Bank, trade (imports plus exports) as a share of the region’s GDP hovered around 50% between the 1950s and the 1990s. Since the 1990s GDP for Sub-Saharan Africa has about doubled. Meanwhile, the rate of growth in external trade since the 1990s is high – reaching 75% in 2008 and rebounding to roughly 70% today (World Bank, 2014). Though these statistics are rough, they indicate that the region is becoming increasingly dependent on trade for its sustained economic growth. Accordingly, it will become increasingly important to identify the origin, destination, level, direction, and composition of this trade. The existing statistics are not readily supplying this information.

The inaccuracy of trade statistics is a problem for scholars investigating both long and short term fluctuations in trade patterns. This paucity of raw data availability and reliability

<sup>8</sup> See Samuel (2014) for the contemporary case of Mauritania.

inhibits our analyses. Deaton and Miller summarize this problem in their lament that

*“Data from Africa are typically incomplete, error ridden and inconsistent across authorities [...] The results presented here use data from several different international sources, and the numbers are sometimes contradictory or otherwise suspect. In consequence, the results should be treated with even more than the usual degree of caution”* (Deaton and Miller, 1995, p. 36).

Regrettably, such findings are usually re-reported with less caution than might be warranted. Worse still, particularly in the

case of economic governance, caution might not be exercised at all as decision-makers (be it high-level government officials, technocrats or entrepreneurs) use the data to inform future decisions, plans, and negotiations.

This review shows that, while some improvements are being made with regards to reporting procedures, inaccuracies in trade statistics still exist. While liberalization in trading regimes might have reduced the potential for errors of commission, the lack of statistical capacity to cover African borders suggests that errors of omission will remain a problem. Insofar as these statistics are relied upon for their accuracy, decreasing this prevalence should be prioritized by the offices that produce them.

## Appendix 1. Data quality assessment framework

Element 0 Prerequisites of quality	0.1 Legal and institutional environment	0.1.1 The responsibility for collecting, processing, and disseminating the statistics is clearly specified. 0.1.2 Data sharing and coordination among data-producing agencies are adequate. 0.1.3 Individual reporters' data are to be kept confidential and used for statistical purposes only. 0.1.4 Statistical reporting is ensured through legal mandate and/or measures to encourage response.
	0.2 Resources	0.2.1 Staff, facilities, computing resources, and financing are commensurate with statistical programs. 0.2.2 Measures to ensure efficient use of resources are implemented.
	0.3 Relevance	0.3.1 The relevance and practical utility of existing statistics in meeting users' needs are monitored.
	0.4 Other quality management	0.4.1 Processes are in place to focus on quality. 0.4.2 Processes are in place to monitor the quality of the statistical program. 0.4.3 Processes are in place to deal with quality considerations in planning the statistical program.
Element 1 Assurances of integrity	1.1 Professionalism	1.1.1 Statistics are produced on an impartial basis. 1.1.2 Choices of sources and statistical techniques as well as decisions about dissemination are informed solely by statistical considerations. 1.1.3 The appropriate statistical entity is entitled to comment on erroneous interpretation and misuse of statistics.
	1.2 Transparency	1.2.1 The terms and conditions under which statistics are collected, processed, and disseminated are available to the public. 1.2.2 Internal governmental access to statistics prior to their release is publicly identified. 1.2.3 Products of statistical agencies/units are clearly identified as such. 1.2.4 Advance notice is given of major changes in methodology, source data, and statistical techniques.
	1.3 Ethical standards	1.3.1 Guidelines for staff behavior are in place and are well known to the staff.
Element 2 Methodological soundness	2.1 Concepts and definitions	2.1.1 The overall structure in terms of concepts and definitions follows internationally accepted standards, guidelines, or good practices.
	2.2 Scope	2.2.1 The scope is broadly consistent with internationally accepted standards, guidelines, or good practices.
	2.3 Classification/sectorization	2.3.1 Classification/sectorization systems used are broadly consistent with internationally accepted standards, guidelines, or good practices.
	2.4 Basis for recording	2.4.1 Market prices are used to value flows and stocks. 2.4.2 Recording is done on an accrual basis. 2.4.3 Grossing/netting procedures are broadly consistent with internationally accepted standards, guidelines, or good practices.
Element 3 Accuracy and reliability	3.1 Source data	3.1.1 Source data are obtained from comprehensive data collection programs that take into account country-specific conditions. 3.1.2 Source data reasonably approximate the definitions, scope, classifications, valuation, and time of recording required. 3.1.3 Source data are timely.
	3.2 Assessment of source data	3.2.1 Source data—including censuses, sample surveys, and administrative records—are routinely assessed, e.g., for coverage, sample error, response error, and nonsampling error; the results of the assessments are monitored and made available to guide statistical processes.
	3.3 Statistical techniques	3.3.1 Data compilation employs sound statistical techniques to deal with data sources. 3.3.2 Other statistical procedures (e.g., data adjustments and transformations, and statistical analysis) employ sound statistical techniques.

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	3.4 Assessment and validation of intermediate data and statistical outputs	3.4.1 Intermediate results are validated against other information where applicable. 3.4.2 Statistical discrepancies in intermediate data are assessed and investigated. 3.4.3 Statistical discrepancies and other potential indicators or problems in statistical outputs are investigated.
	3.5 Revision studies	3.5.1 Studies and analyses of revisions are carried out routinely and used internally to inform statistical processes (see also 4.3.3).
Element 4 Serviceability	4.1 Periodicity and timeliness	4.1.1 Periodicity follows dissemination standards. 4.1.2 Timeliness follows dissemination standards.
	4.2 Consistency	4.2.1 Statistics are consistent within the dataset. 4.2.2 Statistics are consistent or reconcilable over a reasonable period of time. 4.2.3 Statistics are consistent or reconcilable with those obtained through other data sources and/or statistical frameworks.
	4.3 Revision policy and practice	4.3.1 Revisions follow a regular and transparent schedule. 4.3.2 Preliminary and/or revised data are clearly identified. 4.3.3 Studies and analyses of revisions are made public (see also 3.5.1).
Element 5 Accessibility	5.1 Data accessibility	5.1.1 Statistics are presented in a way that facilitates proper interpretation and meaningful comparisons (layout and clarity of text, tables, and charts). 5.1.2 Dissemination media and format are adequate. 5.1.3 Statistics are released on a preannounced schedule. 5.1.4 Statistics are made available to all users at the same time. 5.1.5 Statistics not routinely disseminated are made available upon request.
	5.2 Metadata accessibility	5.2.1 Documentation on concepts, scope, classifications, basis of recording, data sources, and statistical techniques is available, and differences from internationally accepted standards, guidelines, or good practices are annotated. 5.2.2 Levels of detail are adapted to the needs of the intended audience.
	5.3 Assistance to users	5.3.1 Contact points for each subject field are publicized. 5.3.2 Catalogs of publications, documents, and other services, including information on any changes, are widely available.

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