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Investigating inequality trends in Africa: ACEIR research and the WIID

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Investigating inequality trends in Africa

ACEIR research and the WIID

Martin Wittenberg and Murray Leibbrandt*

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Abstract: Work done by the African Centre of Excellence for Inequality Research (ACEIR) has documented the many-faceted nature of inequality in Ghana, Kenya, and South Africa. Conventionally measured inequality ranges from moderate (in Ghana) to extremely high (in South Africa). Trying to tell one coherent story about African inequality, however, is difficult. The construction of comparable measures across countries and across time runs into the problem that data quality varies across instruments. International databases of inequality, such as the World Income Inequality Database (WIID), sit on top of this fragile foundation. Institutions, like ACEIR, have focused on interrogating the reliability of inequality estimates in a few specific country contexts and attempted to harmonize the underlying information. As WIID provides very careful documentation detailing data that has been used and the methods applied in deriving their estimates of levels and trends, it has been possible to compare these statistics with those produced by ACEIR in Ghana, Kenya, and South Africa. The underlying country-specific income and expenditure data are subject to quality changes which get smoothed over by the WIID estimates. This brings uncertainty into the WIID estimates that is not reflected in each point estimate. This uncertainty depends on the specific local surveys that are selected as the basis for the WIID estimates.

Key words: inequality measurement, Ghana, Kenya, South Africa, WIID

JEL classification: C8, D31

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1 Introduction

African inequality has not always received the attention it deserves (Zizzamia et al. 2021), although this situation is changing (Chancel et al. 2023). As Zizzamia et al. note, a key problem is that comparable measurements are an issue. One way to make some progress is to interrogate the data in contexts where the information is relatively rich and more reliable. The African Centre of Excellence for Inequality Research (ACEIR) was formed to improve the understanding of the patterns and trends of inequality in the contexts of Ghana, Kenya, and South Africa and against that backdrop to think about inequality in Africa more generally.

Thus far three diagnostic reports have been issued (Atta-Ankomah et al. 2020; Kenya National Bureau of Statistics et al. 2020; Statistics South Africa 2019). These reports have focused not only on inequality as measured in conventional money-metric terms, but also on other dimensions of inequality. The underlying approach is that inequality in lived experiences is dependent on how these different dimensions intersect. Furthermore, to understand how inequality might evolve, one needs to understand what is happening, for instance, to inequality in access to education or to other assets or ‘drivers’ of inequality (Zizzamia et al. 2021).

Nevertheless, conventionally measured income inequality provides, to a first approximation, the big picture of inequality even in these settings. Against this backdrop it is useful to reflect on what ACEIR’s work reveals about the strengths and weaknesses of UNU-WIDER’s WIID, the World Income Inequality Database (UNU-WIDER 2022a), and the attempt to assemble evidence on the evolution of inequality across the globe. We will also examine the WIID Companion (UNU-WIDER 2022c), the preferred series of estimates from the WIID.

Our remarks are organized as follows: In the next section (Section 2), we briefly look at the inequality measurement challenges in Africa. We then sketch out briefly what the WIID and the WIID Companion are and what information they contain about the ACEIR contexts. In Section 4, we interrogate the ‘story’ of inequality as it emerges from the WIID or WIID Companion and how this relates to ACEIR’s work on South Africa, Ghana, and Kenya. Section 5 pulls together the lessons and asks what sort of role the WIID could play in research on African inequality.

2 The measurement of inequality in Africa¹

Little attention has been paid to African inequality dynamics in the grand narratives of changing global inequality. One of the main reasons for this is that the data that are required to measure inequality in sub-Saharan Africa (SSA) have lagged behind that of other regions in the world, both in terms of quantity and quality. Only in recent years have distributional issues become more central in development discourse in Africa, through the push for ‘inclusive growth’ and the inclusion of ‘Reduced Inequalities’ in the Sustainable Development Goals of 2015.

Given this, aside from the WIID data and the work of ACEIR that we focus on in this paper, several other substantial reports on inequality in SSA have been published in recent years. These include reports by the UNDP (Odusola et al. 2017) and the World Bank (Beegle et al. 2016), regular reports from the World Inequality Lab (e.g. *World Inequality Report* by Alvaredo et al.

¹ This section draws on Zizzamia et al. (2021).

2018) and their African specific work (Chancel et al. 2023). Each of these papers have had to confront the same constraints on the availability, quality, and comparability (both over time and space) of data in SSA.

Zizzamia et al. (2021) and Cornia and Martorano (2017) discuss some of the broad challenges. For our purposes some of the key issues in thinking through the measurement problems confronting all researchers, not only those using the WIID, are:

- What is the key inequality **concept** that is of interest?

The approach in the WIID is very clear, that income, and particularly net income, is the appropriate metric for interrogating inequality trends. However, this runs up against the problem that in SSA, consumption has typically been preferred as a proxy for welfare. This is due to the problem of measuring income accurately in contexts of informality.

- What is the key welfare concept that should be **measured**?

Given the problems of measuring incomes and given a development agenda for SSA that is focused primarily on poverty reduction, there has been a much stronger emphasis on gathering consumption (expenditure) data rather than income data.

- What measurements do you use?

The WIID has historically had a wide approach, reporting many estimates although giving some guidance to users by rating the quality. Not all surveys are equally reliable. In the WIID Companion there is an explicit hierarchy of sources, with estimates from the Luxembourg Income Study (LIS) rated top. The most recent iteration of the SWIID (Solt 2020) also relies more heavily on the LIS. Chancel et al. (2023) for their work on African inequality rely mainly on PovcalNet, now the Poverty and Inequality Platform (PIP). Interestingly (as we will discuss further below) the South African measures in PIP and in the LIS emanate from different surveys.

- How (if at all) do you ‘convert’ consumption inequality to income inequality?

Different authors have adopted different procedures. Chancel et al. (2023) correct the underlying distributions using ‘income-consumption profiles’ calculated at different quantiles. Solt (2020) and the WIID Companion (2022c) correct the resulting Gini estimates through combinations of cross-country regressions and other adjustment processes (Gradín 2021a, 2021b).

- How (if at all) do you deal with the missing top incomes?

This is acknowledged to be a serious issue, since all sources rely on survey data, which is demonstrably poor at representing top income and wealth levels and therefore inequality. Combining administrative tax data with survey data is a reliable way of overcoming this bias—tax records give a complete and more accurate picture of the distribution of income and wealth among the rich. Only the World Inequality Database² (WID) (and Chancel et al. 2023) gathers such tax data and adjusts the top end. But doing so depends crucially on the availability of a reliable base of income, expenditure, and tax data for the top 10 per cent.

² Available at <https://wid.world>.

This is a demanding requirement in many African countries. Indeed, in the recent *World Inequality Report* (WIR) (Alvaredo et al. 2018) that uses WID, data for SSA on the income share of the top 10 per cent at any point since 1990 is available only for South Africa and Mauritius. Thus, these analyses tell a story of African income inequality and its evolution based on tricky interpolations between expenditures and incomes and then further tricky interpolations from tax data to adjust the top end of the income distribution. The WIID data do not make this last adjustment, although the focus on net income does require explicit assessment of taxes.

The key problem, of course, is that inadequate data bedevils all work on African inequality. Our comments on the WIID and the WIID Companion should be read in that light. A major benefit attached to the WIID is the quality of the documentation. The work is transparent about the choices that have been made and the code allows one to interrogate them. While our comments are directed at the WIID, many of the issues that arise and that we have assessed within and across three country contexts have direct relevance to the non-WIID work on African inequality too.

3 Understanding the WIID and the WIID Companion

The World Income Inequality Database (UNU-WIDER 2022a) has been in existence for over two decades. It emerged as a compendium of inequality estimates, reported in the literature, which could be useful for cross-country regressions in which inequality is either the phenomenon to be explained (e.g. Carter 2006) or the explanatory variable (e.g. Jäntti et al. 2020).

The origin of the WIID is still evident in its built-in referencing. The source of the estimate is documented, as well as information about the nature of the data point: What is the concept being measured—income or consumption? Is the unit of measurement the household or the individual? What sort of equalization process has been applied to the data? When was it measured? Does the survey on which the measure is based have national coverage? And does the data appear to be of reasonable quality? This is all useful to potential users of the information. Besides providing Gini coefficients, the database has more recently also recorded share-based inequality measures.

But the WIID is no longer the domain of purely secondary information. It now also includes inequality measures calculated from the numbers available in other databases, such as PIP and the Luxembourg Income Study (LIS). Indeed, in the current version of the WIID (2022a), 4,789 data points are described as having been obtained by ‘Own construction based on LIS Database through LISSY’.³ Another 4,864 were obtained by ‘Own construction based on microdata’ This evolution away from a record of estimates available in the secondary literature has correspondingly swelled the size of the dataset. The most recent version has 22,758 records.

This, of course, raises the burden of responsible use of this information. In many cases there are multiple measures for the same country-year combination. And different data points could correspond to different concepts, modes of equalization or coverage. With the latest version of the WIID, the team at UNU-WIDER has tried to provide stronger guidance, in the form of the

³ Field “source_comments” in the WIID database.

WIID Companion (UNU-WIDER 2022c). This provides only one estimate for each country per year and standardizes the estimates to a per capita net income basis.

The accompanying documentation—for the WIID overall (UNU-WIDER 2022b) as well as for the Companion (Gradín 2021a, 2021b)—is very useful in highlighting the conceptual as well as the technical issues that had to be confronted in producing the information. The process of constructing the Companion series involved:

- Selecting higher quality data points from the overall WIID;
- Identifying ‘series’ of related measurements;
- Linking and adjusting the series around the highest quality data points from each country, thought to be those (where available) emanating from the Luxembourg Income Study;
- Where necessary, converting series measured for other concepts (e.g. consumption) or using other methods of equivalization (e.g. the OECD equivalence scale) to a per capita net income basis, using the coefficients from cross-country regressions.

The strengths and weaknesses of the WIID and the WIID Companion are best examined in specific contexts. We turn to the cases of South Africa, Ghana, and Kenya.

4 Lessons from South Africa, Ghana, and Kenya

The full WIID has 97 data points for South Africa, 12 for Ghana, and 32 for Kenya. These numbers get trimmed in the Companion to 23 for South Africa, 7 for Ghana, and 9 for Kenya. The time range for the South African information is 1960 to 2017; it is 1988 to 2017 for Ghana; while in Kenya the information ranges from 1914 to 2016 in the WIID, although this is trimmed to 1961 to 2016 in the Companion. These summary snapshots already indicate that there is considerable heterogeneity in the coverage and its quality, and that it is unlikely that a single narrative will encompass even these three countries.

Zizzamia et al. (2021), in their overview of African inequality research, make the point about heterogeneity, noting that ‘the continent is not usefully characterized as having a homogenous inequality level or a homogenous trend in inequality over recent years’ (p. 9). They point to measurement problems as major obstacles to getting a better understanding of inequality dynamics. Measurement issues also get addressed in the country studies by Shifa et al. (2023), Attah-Ankomah et al. (2023), and Manda et al. (2023).

4.1 The case of South Africa

South Africa has consistently rated at or near the top of the inequality scales internationally. Zizzamia et al. (2021) point out that several other sub-Saharan African countries also have very high levels of inequality, so an examination of the South African case might be illuminating more broadly.

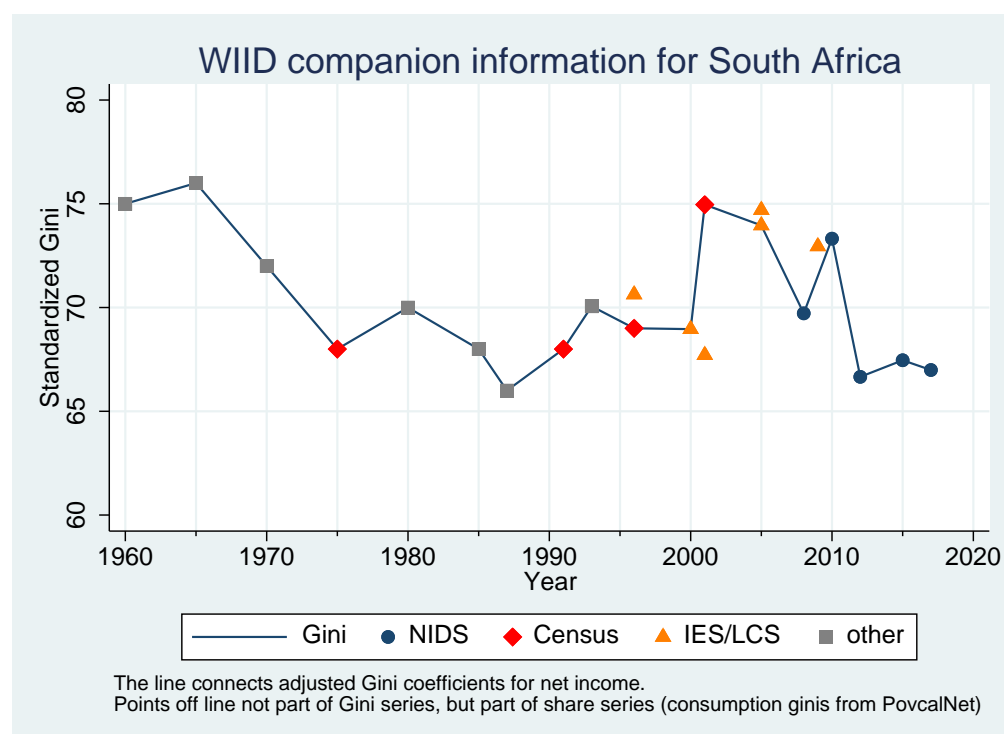
Shifa et al. (2023) consider South African inequality from several perspectives. They point out that wealth inequality may even be higher than consumption or income inequality. They suggest that inequality probably fell in the late apartheid period, it may have increased in the decade after the end of the apartheid and may have decreased more recently. But the levels are still incredibly high, although inequalities in access to services has declined markedly since the end of apartheid.

They note that there are measurement problems in some of the surveys that underpin the inequality numbers. They compare the data available in the WIID Companion to their own estimates from the corresponding surveys and generally find them to be very close.

However, as Machemedze and Wittenberg (2023) point out, a major question with respect to the WIID Companion is the selection of the data. The WIID and its Companion rely on secondary sources, either published research papers or international databases. In the case of South Africa, it means that income measures from Statistics South Africa Income and Expenditure Surveys (including the Living Conditions Surveys) are under-represented when compared to data from the National Income Dynamics Study, as shown in Figure 1. Only two data points (2000 and 2005) make it into the official Gini series. The 2014/15 survey has disappeared completely. This, of course, is not a deliberate snub on the part of WIID—it is a function of the fact that the LIS includes only the National Income Dynamics Study,⁴ and that the PIP chooses not to use the income information.

Furthermore, disagreements in the data are ‘reconciled’ by a process of shifting series up and down. This approach can be seen as sensible in the context of the production of estimates for use in cross-country comparisons. However, it does not allow these disagreements to act as signals of potential non-sampling errors in the measurements. This ‘smoothing over’ of data problems may make the final series appear more authoritative than it should, but it does not prevent implausibly large swings in inequality over time, as can also be seen in Figure 1. For instance, the Gini coefficient in 2000 is 68 (in the Companion), increasing to 75 in 2001. This is undoubtedly an artefact of different base sources (an Income and Expenditure Survey in 2000 versus Census data in 2001)

Figure 1: The WIID Companion series for South Africa, with the underlying sources of the data



Source: authors' elaboration based on the WIID Companion (UNU-WIDER 2022c).

⁴ The reasons for that are not clear to us. It is probably due to the terms on which LIS could get access to data from the national statistics office.

4.2 The case of Ghana

While South Africa represents the high end of inequality in Africa and globally, Ghanaian inequality, as measured by consumption per capita, is much more moderate. However, when these figures are converted using the WIID Companion methods, the level apparently increases substantially (see Attah-Ankomah et al. 2023). The conversion process resembles a shift in levels,⁵ so the trend in the WIID Companion series is parallel to that in the original data. Both suggest a gradual upward drift in inequality over time.

Attah-Ankomah et al. (2023) discuss whether the much higher levels of inequality recorded in the WIID Companion are plausible. They note that the Ghana Living Standards Surveys, on which the per capita consumption inequality numbers are based, also has income information. This has not been used as often because of questions about its quality. However, when one calculates inequality measures using these data one gets inequality estimates close to those in the WIID Companion, except for the year 2013, where the GLSS income inequality numbers are even higher. Attah-Ankomah et al. (2023) speculate that changes in the economy, particularly the discovery of oil, may have driven up income inequality more so than consumption inequality in this period.

Nevertheless, there are several caveats to this finding. In the first place, as noted by Attah-Ankomah et al. (2023), there are good reasons to be cautious about the quality of the income information. Informal incomes make up a large part of the distribution and these are hard to measure. One might therefore expect measurement error to be a bigger problem in the GLSS income data than in the consumption data. The WIID Companion conversion, however, is intended to produce inequality estimates for income inequality that are comparable to the baseline information. If one believes the WIID Companion conversion procedure, one might conclude that the GLSS income information does not contain appreciably more noise than is true of the expenditure data. Alternatively, one might treat the WIID Companion numbers as noisy estimates of the true values. Indeed, one might expect this, given that the regression procedure is subject to error. Machemedze and Wittenberg (2023) produce rough estimates of the prediction error and suggest that the width of the confidence interval is likely to be at least ten basis points.

A second caveat is that there is some doubt whether the income inequality figures released were for net income or gross income. Attah-Ankomah et al. (2023) note that tax levels were not so high that this might have introduced a big distortion in the data, but it is unlikely to be the case that inequality in net income per capita will be exactly the same as that for gross income per capita.

A third issue is raised by the case of the 2013 data point. Attah-Ankomah et al. (2023) speculate that the discovery of oil and other structural changes in the Ghanaian economy may have changed the relationship between the income distribution and that of consumption. This might be true if, for example, incomes became more volatile but that the levels of permanent income did not change as much. This would imply that a fixed conversion procedure from consumption inequality to income inequality is not appropriate.

⁵ This is not surprising, given that it is based on a regression which rescales the original Gini coefficient and then adds shifts (coefficients on dummy variables) dependent on the region and income group of the country. For more details, see Machemedze and Wittenberg (2023) and Gradín (2021a, 2021b).

A fourth point to note is that if the Ghanaian income figures are to be trusted, then the increase in income inequality was steeper than it was for consumption inequality, i.e. the series would no longer be broadly parallel to each other. As Machemedze and Wittenberg (2023) note, the confidence intervals around the WIID Companion estimates are likely to be big enough that discussion about trends in the data would have to be handled cautiously.

4.3 The case of Kenya

Some of these issues also pertain to Kenya. Manda et al. (2023) review the income information in some of the surveys used to measure consumption inequality. They note many difficulties, including the absence of information on income taxes paid. It was impossible to obtain information on home production, which would underestimate incomes for large sections of the rural population. They also suggest (p.6) that the level of detail on incomes changed in different surveys, so that comparisons over time would be more contaminated by measurement error than would be the case for consumption.

As in the case of Ghana, the consumption inequality measures obtained from PIP were adjusted considerably upwards. Manda et al. (2023) note that one would expect income inequality to be higher than for consumption, although it is unclear whether one would expect the shift upwards to be as large as suggested by the WIID Companion. In the absence of defensible income data for Kenya, it is hard to say whether the WIID Companion adjustments make sense. However, as for Ghana, it is clear that the conversion process will introduce noise. Machemedze and Wittenberg (2023) produce estimates of the size of the confidence intervals and suggest that these are likely to be big. They also point out that there seems to be a big drop in inequality between 1992 and 1994, bigger than one might think is plausible over such a relatively short time.

4.4 Some technical issues

A key issue is that the regression conversion relies on cases observed in the ‘high quality’ data on which those coefficients were estimated. Those data are largely from the Luxembourg Income Study in which African countries are under-represented. Indeed, of the countries that we studied, only South Africa is represented in the data. Other African countries that are in the LIS include Côte d'Ivoire, Mali, Somalia, and Sudan.

Even in the case of South Africa, which is in the LIS, there are some curious issues. The South African data in the LIS are only from the National Income Dynamics Study. This is a panel dataset which, by the end of the period, produces estimates which are somewhat different from those obtained by the official Statistics South Africa datasets, as noted by Shifa et al. (2023). Why the different surveys should give different measures is not clear. But the implication is that the estimates obtained from sample surveys are subject not only to sampling errors, but also to non-sampling ones. And those errors are likely to be larger than one might expect.

Unfortunately, there are no measures of uncertainty attached to any of the numbers in the WIID, not even conventionally estimated sampling standard errors. When these baseline numbers are converted or adjusted by the WIID Companion procedures, there will be additional noise. The Machemedze and Wittenberg (2023) calculations suggest that this is probably large enough to make it difficult to determine whether inequality has increased or decreased over the last two decades in Ghana or Kenya using the WIID Companion figures.

5 Thinking about the WIID and research on African inequality

The core question, of course, is what international databases, such as the WIID and the WIID Companion, are good for and how they should be used.

5.1 A database of numbers to be used in regressions

This is the predominant way in which the WIID has been used thus far. The country studies suggest that the numbers probably reflect the broad patterns, although the detailed shifts are likely to be contaminated by considerable measurement error. For instance, it is clear that South Africa has been a high inequality society for a long time; it is very unlikely to be the case that there was a dramatic upward shift in inequality between 2000 and 2001. Similarly, it is unlikely that there was a big drop in inequality in Kenya between 1992 and 1994.

If these data get used as ‘controls’ in regressions, the results will depend on whether the regression also contains country fixed effects—because then the within-country changes become crucial while the level information gets lost. The within-country changes, however, are a complex combination of real shifts, the juxtaposition of different measurement instruments (e.g. census income vs consumption expenditure from surveys), breaks in a particular series (e.g. changes from recall to diary) and, in the case of the WIID Companion, shifts due to the desire to align series or due to conversion processes. The noise attached to any point in the series will be different, depending on its provenance. And unfortunately, one cannot assume that the measurement error attached to any one data point will be classical. Although we are sceptical about whether the data in the WIID Companion is ‘fit for use’ in this sense, we have little doubt that it will be used in this way.

5.2 A guide to the literature

The original WIID emerged as a compendium of estimates from the literature, and the extensive referencing which is still in the WIID enables one to use it as a ‘first cut’ at what the literature suggests the level of inequality in country X was in year Y. If there are competing estimates, the data quality measures are useful to make some rough guesses as to what one might prefer to believe.

This approach to summarizing the literature can be usefully contrasted with the systematic reviews conducted in the medical literature. A systematic review also attempts to be comprehensive (indeed, the search process for estimates must be documented as part of the write-up) and will also apply a quality filter to the numbers that turn up in the search. However, each ‘study’ (experiment) will be identified separately as part of the review. In the case of the WIID, however, the same underlying measurement process (e.g. the 2008 wave 1 data of the National Income Dynamics Study, NIDS, in the case of South Africa) may appear in separate research reports or in one of the centralized databases (in this case the LIS one). The WIID (unlike some other databases) has a field identifying the source survey, although in several cases (e.g. with data extracted from the OECD database) the source is unknown.

One of the key questions addressed in a systematic review, is what the accumulated evidence shows about the central research question, e.g. the effectiveness of a particular vaccine. The analogous question in the case of inequality might be ‘What is the level of consumption inequality in South Africa in 2008?’ For this particular question there would be at least two different independent measures (NIDS wave 1 or the Living Conditions Survey). The point of a systematic review is to a) address why the point estimates might be different or b) to note the

range of legitimate estimates and to build these into our understanding of the uncertainty surrounding our information. Instead of this approach, the WIID Companion privileges the LIS estimates (effectively discounting alternative evidence) and then ‘standardizes’ all the other evidence around that. That procedure makes sense for users who want a definitive answer—but it ends up masking the uncertainty.

5.3 Describing changes in inequality over time

Implicit in inequality databases is the idea that inequality should not only be measured at particular points in time, but that its evolution be monitored. This requires information about potential breaks in the series. For instance, the WIID ‘high quality’ inequality measures for South Africa are based on the income instrument of NIDS, which has undergone a series of changes. Whether or not that has had an impact on the measurement of inequality is unknown. But there is currently no information in the WIID (or indeed in any of the other databases) that would even flag this as a potential issue.

6 Ways forward

The measurement of inequality is not easy. Measuring changes in inequality is even harder. Furthermore, measurement is probably more difficult in high inequality countries. The super-rich are adept at avoiding being measured. Consequently, increases in inequality may be accompanied by worse measurement of that inequality. So, it is important to focus energy on improving the measurement process.

The WIID could be very useful in this regard—identifying gaps and puzzles. However, attempts to ‘harmonize’ the inequality numbers prior to dealing with these measurement problems are likely to distract from this by smoothing over some of the rough edges and presenting point estimates for ‘per capita net income inequality’ that seem spuriously accurate.⁶ Econometrics has to carry more weight than it can bear in solving measurement deficits.

Highlighting the gaps, the uncertainties, and the puzzles is an important step in the process to improving our understanding of what is happening to poverty and inequality in our societies. Improving the measurement process must begin here. It also requires building strong and robust institutions. This is why the African Centre of Excellence for Inequality Research has built partnerships with the National Statistics Offices in each of the countries in which it works. The diagnostic reports referenced earlier (Attah-Ankomah et al. 2020; Kenya National Bureau of Statistics et al. 2020; Statistics South Africa 2019) were important in starting that work.

Reflecting on this in the light of the WIID, a crucial next step is to work on the harmonization of the measures across these countries. That, however, will require an interrogation of the baseline data and not just assembling and aligning the top-level estimates. That would also throw a helpful light on how to think about changes in African inequality more broadly.

⁶ Exercises like the SWIID (Solt 2020) are worse, because they interpolate figures for years for which there are no data.

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