World Inequality Lab – Technical Note N° 2020/03

2020 DINA update for countries of the Africa region

Anne-Sophie Robilliard

November 2020

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Building on Chancel, Cogneau, Gethin and Myczkowski (2019), this note presents the methodology used to extend the distributional series of pretax national income to 2019 for countries of the Africa region incorporating recent household survey data when available.

Method

The estimation of income inequality in Africa relies on different steps.

We start with country-level survey tabulations from Povcalnet that report the distribution of consumption using data collected through representative household surveys. Consumption is the most often used welfare indicator in low-income countries as it is deemed a better indicator than income for both theoretical and practical reasons. On the theoretical side, current consumption is a better proxy of permanent income than current income, which is subject to shocks, in particular in countries where the vast majority of the population relies on non-wage work. On the practical side, the informal nature of income makes it difficult to measure. Instead, the measurement of consumption, although not immune from errors, is deemed more reliable.

[1] Anne-Sophie Robilliard is the Africa Coordinator at the World Inequality Lab and a Research fellow at the Institut de Recherche pour le Développement (the French National Research Institute for Sustainable Development - Robilliard@dial.prd.fr). The author gratefully acknowledges funding from the European Research Council (ERC Grant 856455) and from the French National Research Agency (EUR Grant ANR-17-EURE-0001).

One difficulty when using survey base data on consumption lies in the construction of comparable measures over time and space. This is made difficult by the important variation there is in sampling and questionnaire design both from one country to another and within a given country over time. The Povcalnet project has been building these aggregates for decades using available survey data in order to monitor poverty at the global level (Chen, Datt and Ravallion, 1994). As we share the same objective of building a global database, we ground our estimates on this important effort of harmonization. Another important reason explains this choice: because of its position, the World Bank has access to microdata that is difficult to access for most users.

Using innovative empirical methods developed at the WIL, we "upgrade" the Povcalnet data in order to estimate the distribution of national income, which is one of the objectives of the WID (Alvaredo et al, 2020). Starting from the Povcalnet information on the distribution of consumption, one has to perform different adjustments to estimate the distribution of national income.

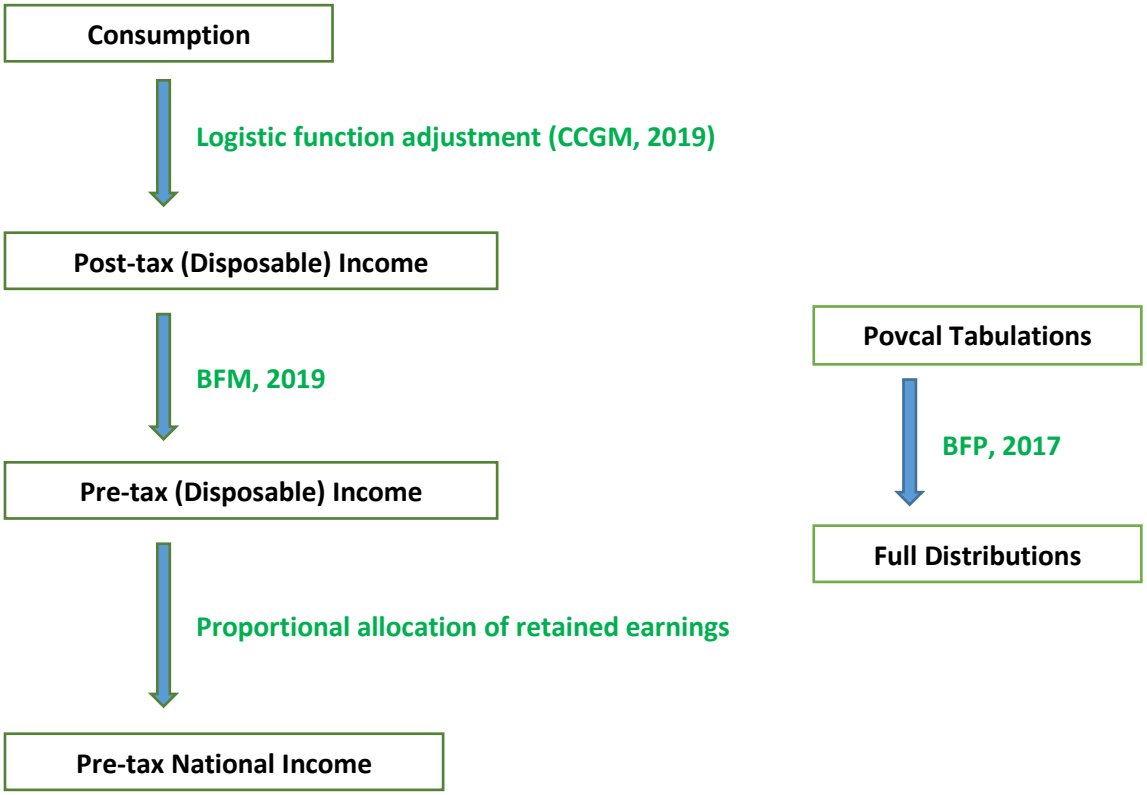
From survey consumption to survey disposable income
The first adjustment is based on estimates of consumption-income profiles, which are obtained using available survey based distributions. The details of the method are described in Chancel, Cogneau, Gethin and Myczkowski (2019).

From disposable income to pre-tax income
The second correction consists in adjusting the average income of top earners to account for two things: first, the fact that top earners are underrepresented in household surveys; second, the fact that survey incomes collected in surveys usually correspond to disposable incomes (i.e. net of taxes) rather than pre-tax incomes. This adjustment is made by combining information on surveys and fiscal tabulations from Côte d'Ivoire and South Africa using the method developed by Blanchet, Flores, and Morgan (2018). This type of adjustment is at par with evidence from other emerging countries (India, Thailand, Lebanon or Brazil). If anything, this method can be seen as conservative as compared to empirical evidence from other emerging countries (India, Thailand, Lebanon or Brazil), where the gap between survey and fiscal income is found to be higher than in our benchmark scenario.

From pre-tax disposable income to pre-tax national income.
After the adjustments described above are made, the distribution obtained corresponds to the distribution of household pre-tax income – that is, the sum of compensation of employees, mixed income and property income received by the household sector in national accounts. To obtain the distribution of pre-tax national income, estimates of unearned income components are required. These include taxes on production received by the government, and the retained earnings of corporations. Since data on unreported income is missing in Africa, the gap between surveys and the national income is distributed proportionally to individual income by simply rescaling all incomes to match the national income average. A number of case studies show that this method of allocation is likely to underestimate real inequality significantly since retained earnings should be attributed to capital owners that belong to the top of the income distribution. More realistic allocation methods are currently under study.

From tabulations to full distributions

Finally, in order to recover the full distribution, we apply a non-parametric method to produce smooth and realistic shapes of generalized Pareto curves (Blanchet, Fournier and Piketty, 2017).



Two countries, Côte d'Ivoire and Egypt, benefited from specific and more in-depth work by WID Research Fellows in the past years. The DINA series for Côte d'Ivoire where estimated by Czajka (2017) using a combination of household survey data and first-hand income tax files. In the case of Egypt, the DINA series where estimated by Alvaredo, Assouad and Piketty (2019) who combine household surveys, national accounts, income tax data and wealth data in order to estimate income concentration in the Middle East for the period 1990–2016.

Povcal Data

As of September 2020, Povcalnet provided survey tabulations for 234 economy-years for 50 countries in the Africa region. Between September 2018 and September 2020, 18 new economy-points were added in the Povcalnet database and are now included in the WID.world 2020 Update for Africa. These are the following:

- March 2019: Botswana 2015, Djibouti 2017, Ghana 2016, Liberia 2016, Malawi 2016, Rwanda 2016, Sudan 2014, Tunisia 2015
- March 2020: Angola 2018, Cape Verde 2015, Egypt 2017, Lesotho 2017, Mauritius 2017, Sierra Leone 2018, Swaziland 2016, Tanzania 2017, Zimbabwe 2017
- Sept 2020: Nigeria 2017

Unlike macro data, household surveys are not available on an annual basis. Because surveys are costly to carry out, household survey data is in general collected every 5 to 6 years. In the Povcalnet database, the average number of surveys by country is slightly less than 5. In the WID.world database, estimates of distribution in non-survey years are imputed using interpolation between survey data points. Beyond the last survey data point, inequality is supposed to remain unchanged until 2019 (see Appendix A for information on the last year of survey data available in each country).

A few countries do not have any available survey tabulation, either because these countries did not collect any household survey data or because the data is not yet accessible: this is the case for Eritrea, Equatorial Guinea, Libya, Somalia, and Western Sahara. Following the default rules adopted by the WID, we use regional distributional averages for these countries in the absence of better estimates so far. That is, we compute regional averages for normalized quantiles (i.e. thresholds and levels divided by average income) using countries of the sub region of each country and multiply these normalized quantiles by average income of each country in each year. These estimates will be updated as soon as we obtain and process better survey, tax or national accounts data. These estimates should be interpreted with care but provide a useful and transparent starting point to compare income levels across the distribution of country X vs. that of other countries in the world. More specifically, the distribution of national income is imputed using the average distribution in neighboring countries.

- Eritrea (ER): extrapolated using Ethiopian inequality
- Equatorial Guinea (GQ): extrapolated using average Middle Africa inequality
- Libya (LY): extrapolated using average Northern Africa inequality
- Somalia (SO): extrapolated using average Eastern Africa inequality

Outlook

In the future, the applied methodology and data sources will be extended, and results crosschecked for robustness to different data sources and methods. A significant research effort by Leo Czajka and Amory Gethin is currently underway to update the work by Alvaredo and Atkinson (2010) and produce more recent DINA series for South Africa. Results from this project will be uploaded in the near future. In Senegal, tax data is also being collected and will be integrated in the WID database. Other country-level projects currently underway will try to find and make use of tax data. For countries for which no tax data can be made available in the near future, we will try and improve the adjustments described above by estimating models that include country characteristics likely to be related to inequality.

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Appendix A – Last year of available survey data

Algeria	2011	Libya	No survey data
Angola	2018	Madagascar	2012
Benin	2015	Malawi	2016
Botswana	2015	Mali	2009
Burkina Faso	2014	Mauritania	2014
Burundi	2013	Mauritius	2017
Cabo Verde	2015	Morocco	2013
Cameroon	2014	Mozambique	2014
Central African Republic	2008	Namibia	2015
Chad	2011	Niger	2014
Comoros	2014	Nigeria	2018
Congo	2011	Rwanda	2016
Cote d'Ivoire	2015	Sao Tome and Principe	2017
DR Congo	2012	Senegal	2011
Djibouti	2017	Seychelles	2006
Egypt	2017	Sierra Leone	2018
Equatorial Guine	No survey data	Somalia	No survey data
Eritrea	No survey data	South Africa	2014
Ethiopia	2015	South Sudan	2009
Gabon	2017	Sudan	2014
Gambia	2015	Swaziland	2016
Ghana	2016	Tanzania	2017
Guinea	2012	Togo	2015
Guinea-Bissau	2010	Tunisia	2015
Kenya	2015	Uganda	2016
Lesotho	2017	Zambia	2015
Liberia	2016	Zimbabwe	2017