World Inequality Lab – Technical Note N° 2022/06

2022 DINA update for countries of the Africa region

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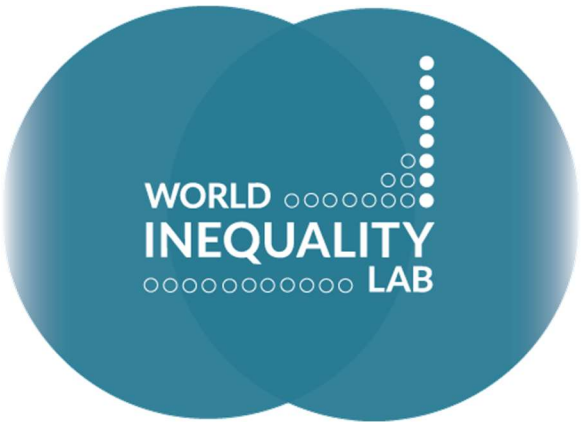

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This note presents the methodology used to extend the pre-tax national income distribution series to year 2021 for countries in the Africa region by incorporating the most recent household survey data available.

Method

The estimation of income inequality in Africa is based on different steps.

We begin with country-level survey tabulations from Povcalnet-PIP[2] that capture the distribution of consumption using data collected through nationally representative household surveys. Consumption is the most commonly used welfare indicator in low-income countries as it is considered a better indicator than income for both theoretical and practical reasons. From a theoretical point of view, current consumption is a better approximation of permanent income than current income at the lower end of the distribution. This is particularly true in countries where the vast majority of the population depends on self-employment and agricultural activities with incomes subject to shocks. On a practical level, the informal and seasonal nature of income in low-income countries makes it difficult to measure accurately. In this context, the measurement of consumption, although not error-proof, is deemed to be more reliable.

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[2] In spring 2022, the World Bank Povcalnet portal was replaced by the Poverty and Inequality Platform (PIP). More details are provided below.

A difficulty when using consumption survey data lies in constructing measures that are comparable over time and space. This is made difficult by the wide variation that exists in sampling and questionnaire design both from country to country and within a given country over time. In an effort to monitor global poverty, the World Bank has provided poverty statistics using available survey data through the Povcalnet project since the early 90s (Chen, Datt and Ravallion, 1994). As we share the same goal of building a global database, we base our estimates on this important harmonization effort. Another important reason explains this choice: because of its position, the World Bank has access to microdata that are difficult for most users to access.

Using innovative empirical methods developed at WIL, we "upgrade" Povcalnet-PIP data to estimate national income distribution, which is one of the objectives of WID (Alvaredo et al, 2020). Using the information from Povcalnet-PIP on the distribution of consumption, various adjustments are made 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, Myczkowski and Robilliard (2022).

From disposable income to pre-tax income

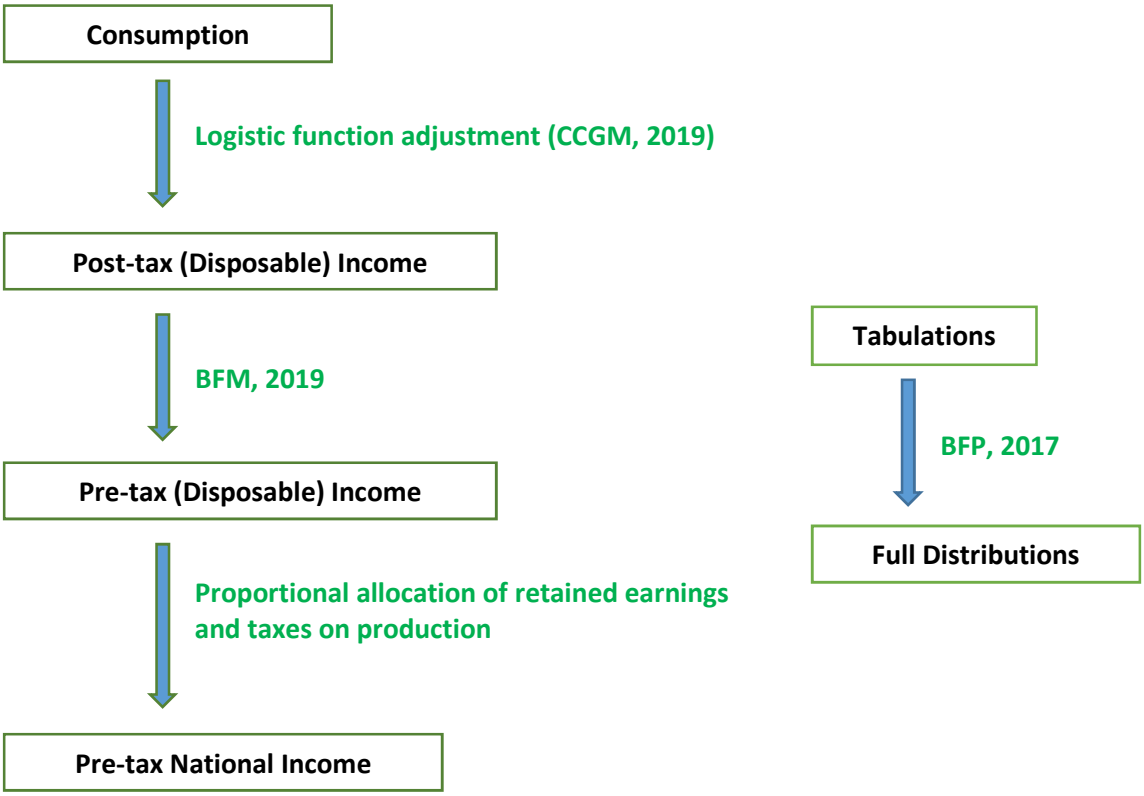
The second correction is to adjust the average income of high earners to account for two things: first, the fact that high earners are underrepresented in household surveys; second, the fact that the survey income collected in the surveys generally corresponds to disposable (i.e. net of tax) income rather than pre-tax income. This adjustment is made by combining information from surveys and tax tabulations from Côte d'Ivoire and South Africa using the method developed by Blanchet, Flores and Morgan (2018).

From pre-tax disposable income to pre-tax national income.

After the two adjustments described above, the distribution obtained corresponds to the distribution of pre-tax household income, i.e. the sum of compensation of employees, mixed income and property income received by the households in the national accounts. To obtain the distribution of national income before tax, estimates of the components of capital income are needed. These include taxes on production collected by the government and retained earnings of corporations. Since data on unreported income is lacking in Africa, the gap between surveys and national income is distributed in proportion to individual income by simply rescaling all incomes to match the average national income. A number of case studies show that this method of allocation is likely to significantly underestimate real inequality since retained earnings should be allocated to capital holders who 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 nonparametric method to produce smooth and realistic forms of generalized Pareto curves (Blanchet, Fournier and Piketty, 2017).



Two countries, Côte d'Ivoire and Egypt, have benefited from specific and more in-depth work by WID research fellows in recent years. The DINA series for Côte d'Ivoire was 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 was estimated by Alvaredo, Assouad and Piketty (2019) who combine household surveys, national accounts, income tax data and wealth data to estimate the concentration of income in the Middle East for the period 1990-2016. .

Tabulated Survey Data: From Povcal to PIP

In spring 2022, the PIP Poverty and Inequality Platform (https://pip.worldbank.org) replaced the Poverty and Equity Portal (PovcalNet) as the main poverty and inequality data portal operated by the World Bank. While PovcalNet provided survey-based consumption shares for each percentile of the distribution, PIP only provides this information at the decile level. A comparison of the inequality indicators produced from these two different sources of information shows, however, that the results are not significantly different.

In September 2022, the PIP provided survey-based decile tabulations for 234 economic years for 50 countries in the Africa region. Compared to the March 2021 Povcal update, the PIP data contains 16 new data points for Africa. Instead, 13 data points were removed due to quality issues (World Bank, 2022). These changes are included in the WID.world 2022 update for Africa.

The updated database includes data from the first round of household surveys supported by the Harmonized Household Living Conditions Surveys program

(https://phmecv.uemoa.int/nada/index.php/catalog) collected in 2018/2019. This program was launched in 2016 to improve the measurement of well-being in WAEMU countries. It includes 8 UEMOA countries (Benin, Burkina Faso, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo) plus Guinea and Chad. The harmonized framework provides a consistent estimate of well-being across countries and the measurement is expected to be enhanced by several key features of the questionnaire (7-day recall period for the food consumption questionnaire; inclusion of imputed rent; individual recording of spending on education and health).

In general, unlike macro data, household surveys are not available on an annual basis. Because surveys are costly to implement, surveys are typically collected every 5 to 6 years. As a result, coverage is sparse and irregular. In the Povcalnet-PIP database, the average number of surveys available by country is equal to 4.7 over the time span covered by the series (1980-2021). In the WID.world database, estimates of income distribution in non-survey years are imputed using linear interpolation between survey data points. Beyond the last survey-based data point, inequality is supposed to remain unchanged until 2021 (see Appendix A for information on the last year of survey data available in each country). Likewise, before the *first* survey-based data point, inequality is supposed to have remained unchanged and extrapolated backward to the year 1980.

Some countries do not have any available survey tabulation, either because these countries have not collected any household survey data, or because the data are not yet accessible: this is the case of Eritrea, Equatorial Guinea, Libya and Western Sahara. In accordance with the default rules adopted by the WID, we use regional distribution averages for these countries in the absence of better estimates so far. That is, we calculate the regional averages for the normalized quantiles (i.e. the thresholds and levels divided by the average income) using the countries in each country's subregion and multiply these normalized quantiles by the average income of each country each year. More precisely, the distribution of national income is imputed from 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
- Western Sahara (EH): extrapolated using Mauritania inequality

These estimates should be interpreted with caution but provide a useful and transparent starting point for comparing income distributions around the world. These estimates will be updated as we obtain and process better survey, tax or national accounts data.

Outlook

In the future, the applied methodology and data sources will be extended, and the results will be cross-checked to ensure their robustness against different data sources and methods. A major research effort by Leo Czajka and Amory Gethin is currently underway to update the work of Alvaredo and Atkinson (2010) and produce more recent DINA series for South Africa. The results of this project will be uploaded in the near future. In Senegal, tax data is also collected and will be integrated into the WID database. Other national projects currently underway will attempt to find and use tax data. For countries for which no tax data may be available in the near future, we will try to improve the fits described above by estimating models that include country characteristics that may be linked to inequality.

R**eferences**

Alvaredo, F. et al. (2020). Distributional National Accounts Guidelines. Methods and Concepts Used in the World Inequality Database. Updated Version of WID.world Working Paper 2016/02.

Alvaredo, F., Assouad, L., & Piketty, T. (2019). Measuring Inequality in the Middle East 1990–2016: The World's Most Unequal Region?. *Review of Income and Wealth*, 65(4), 685-711.

Arayavechkit, T., Atamanov, A., Barreto Herrera, K. Y., Belghith, N. B. H., Castaneda Aguilar, R. A., Fujs, T. H., ... & Wu, H. (2021). March 2021 PovcalNet Update.

Blanchet, T., Flores, I., & Morgan, M. (2018). The weight of the rich: Improving surveys using tax data. WID.world Working Paper 2018/12.

Blanchet, T., Fournier, J., & Piketty, T. (2017). Generalized Pareto Curves: Theory and Applications, WID.world Working Paper 2017/03.

Chancel, L., Cogneau, D., Gethin, A., Myczkowski A. & Robilliard, A.-S. (2022). Income Inequality in Africa, 1990-2019, Measurement, Patterns, Determinants, mimeo, WIL Paris.

Chen, S., Datt, G., & Ravallion, M. (1994). Is poverty increasing in the developing world?. *Review of Income and Wealth*, 40(4), 359-376.

Czajka, L. (2017). Income inequality in Côte d'Ivoire: 1985-2014", WID.world Working Paper 2017/08.

World Bank (2022). April 2022 Update to the Poverty and Inequality Platform (PIP): What's New (English). Global Poverty Monitoring Technical Note Washington, D.C.: World Bank Group.

Appendix A – Last year of available survey data

Algeria	2011	Madagascar	2012
Angola	2018	Malawi	2019 (new)
Benin	2018 (new)	Mali	2018 (new)
Botswana	2015	Mauritania	2014
Burkina Faso	2018 (new)	Mauritius	2017
Burundi	2013	Morocco	2013
Cabo Verde	2015	Mozambique	2014
Cameroon	2014	Namibia	2015
Central African Republic	2008	Niger	2018 (new)
Chad	2018 (new)	Nigeria	2018 (new)
Comoros	2014	Rwanda	2016
Congo	2011	Sao Tome and Principe	2010
Cote d'Ivoire	2018 (new)	Senegal	2018 (new)
DR Congo	2012	Seychelles	2006
Djibouti	2017	Sierra Leone	2018
Egypt	2017	Somalia	2017
Equatorial Guinea	NSDA*	South Africa	2014
Eritrea	NSDA*	South Sudan	2016
Ethiopia	2015	Sudan	2014
Gabon	2017	Swaziland	2016
Gambia	2015	Tanzania	2017 (new)
Ghana	2016	Togo	2018 (new)
Guinea	2018 (new)	Tunisia	2015
Guinea-Bissau	2018 (new)	Uganda	2019 (new)
Kenya	2015	Western Sahara	NSDA*
Lesotho	2017	Zambia	2015
Liberia	2016	Zimbabwe	2019
Libya	NSDA*		

Notes: NSDA = No Survey Data Available. Values are imputed using neighboring countries (see text). In the case of Nigeria, 3 more data points are added.