Outline

1. **Extension of non-benchmark imputation to include Actual Individual Consumption**

2. **Application of imputation, retro/extrapolation, or interpolation to economies with varying participation status**

Actual Individual Consumption (AIC)

- Actual Individual Consumption (AIC) covers all consumption expenditures directly benefiting households irrespective of the purchaser of the goods and services

- Following TAG's recommendation, ICP uses AIC as the primary consumption concept to make cross-country comparisons of material living standards

- For benchmark countries, AIC-level PPPs are estimated along with hierarchical headings covering GDP

- However, no estimation for non-benchmark countries has been released so far

- There are demands for PPP estimation for countries that do not participate in ICP benchmarks

ICP Approach to PPP Imputation for Non-benchmark Economies

- Price level indexes (PLIs) are predicted with a regression model, utilizing benchmark results of participating countries and other macroeconomic and social indicators

- The prediction model of the imputation for country i is:

$$PLI_i\text{-}PLI_{USA} = b*(X_i\text{-}X_{USA}) + e_i$$ where X is vector of the below explanatory variables

  [Explanatory variables: GDP per capita in US$, age dependency ratio, share of imports and exports (for GDP)]

  [Dummy variables: Sub-Saharan Africa, OECD, islands, and landlocked developing countries]

- Regressions for GDP and HHC are run together using Seemingly Unrelated Regression (SUR) method

- No change in the regression model from the previous cycles

Inclusion of Actual Individual Consumption (AIC) (1)

- ICP Global Office tested an extension of non-benchmark imputation to include AIC

  - The same regression model as HHC

  - Inclusion of AIC in the SUR method, in addition to GDP and HHC

- Results exhibit:

  - The model returns results in line with GDP and HHC estimation

  - Degree of differences between benchmark and imputed AIC PPPs is similar as those for GDP

Benchmark PPPs (x-axis) vs Imputed PPPs (y-axis), plotted with GDP/AIC per capita
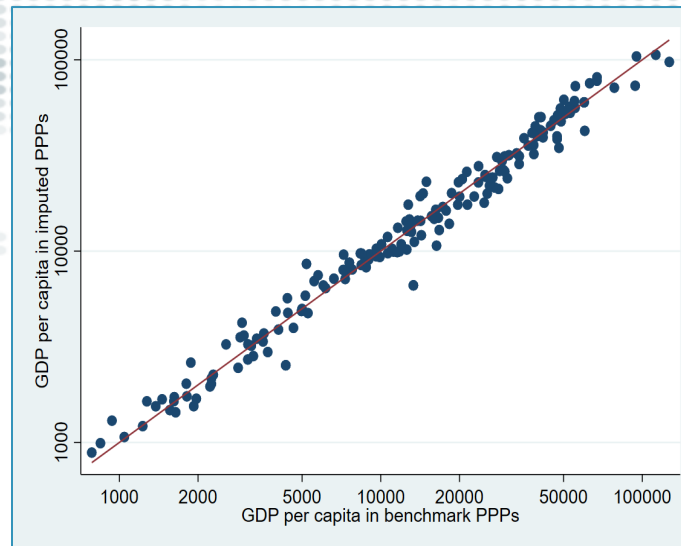

GDP
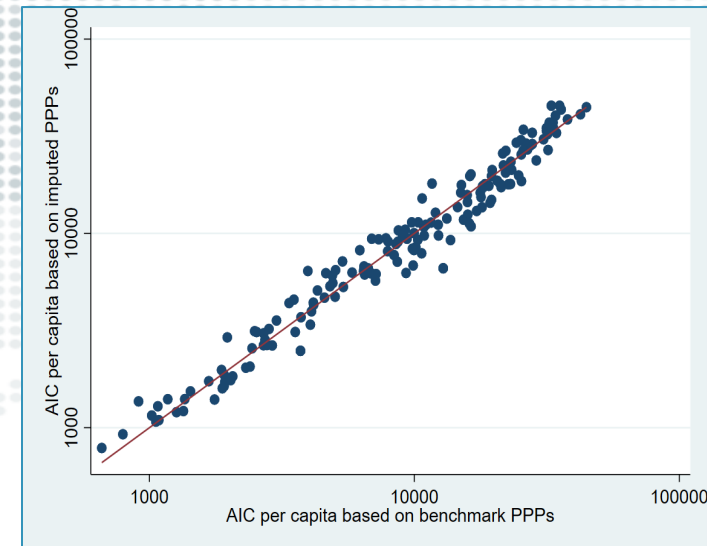
AIC

Inclusion of Actual Individual Consumption (AIC) (2)

- Results exhibit (cont'd):
  - The inclusion of the third equation for AIC in the SUR method has negligible impacts on the estimation of GDP and HHC

- Therefore, <u>it is recommended to impute AIC PPPs for non-benchmark economies along with GDP and HHC PPPs</u>

GDP PPPs from SUR 2 (GDP + HHC) method (x-axis) vs GDP PPPs from SUR 3 (GDP + HHC + AIC) (y-axis), plotted with GDP per capita
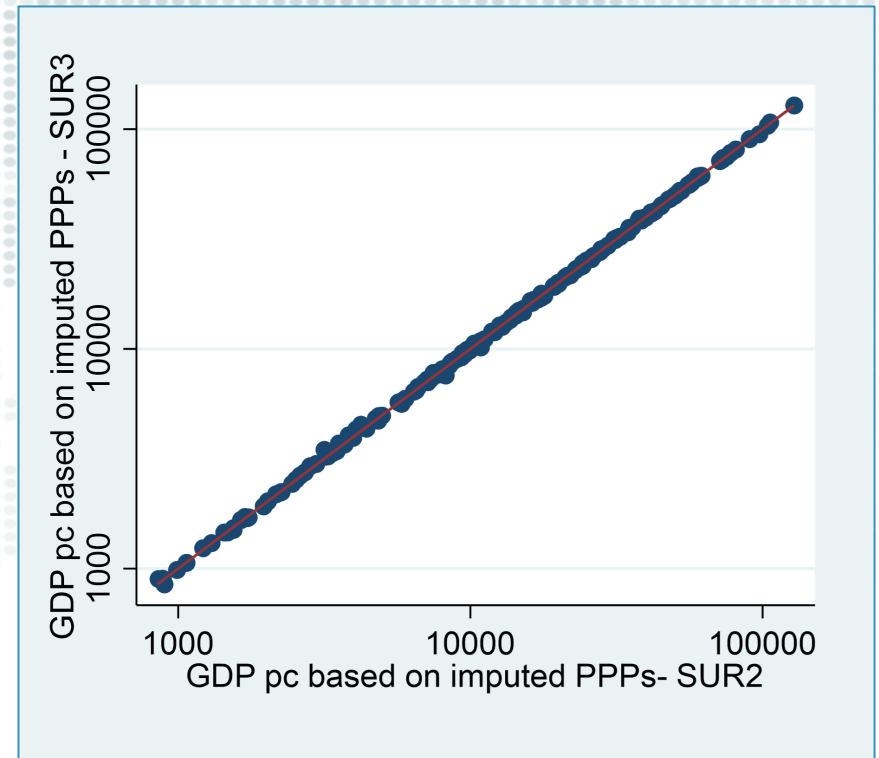
Economies with Varying Participation Status over ICP Cycles

- **Long-term Extrapolations vs Imputation**

  - If a country joined either of the two most recent cycles, TAG recommended using benchmark data (extrapolation or retropolation) and <u>not</u> using imputation by the regression model

  - The status of participation of some countries varies across cycles, and treatment of results for three subsequent ICP benchmarks would require additional consideration

Interpolation, extrapolation, and retropolation

- Different scenarios may need to be reviewed:

2011	2017	2021	Revised 2017	2021	Countries
P	P	N	Benchmark	Extrapolation	Myanmar, Haiti, Bahamas, Barbados, Sint Maarten, Iran
P	N	P	Retropolation or interpolation?	Benchmark	Guatemala
P	N	N	Imputation or Extrapolation?	Imputation or Extrapolation?	Pacific Islands (20), Macao,
P	N*	N	Imputation or Extrapolation?	Imputation or Extrapolation?	Cuba, Venezuela, Yemen
N	P	N	Benchmark	Extrapolation	--
N	N	P	Retropolation	Benchmark	South Sudan, Somalia, Uzbekistan, Lebanon, Syria

P = Participating; N = Non-participating;
N* = Non-participating and no imputation or extrapolation were made in ICP 2017 due to data availability or data reliability issues

THANK YOU