National Accounts Seminar in Latin America and The Caribbean: Presentation of ICP 2017

November 8-10, 2016
ECLAC, Santiago de Chile, Chile

International Comparison Program

Presentation Outline

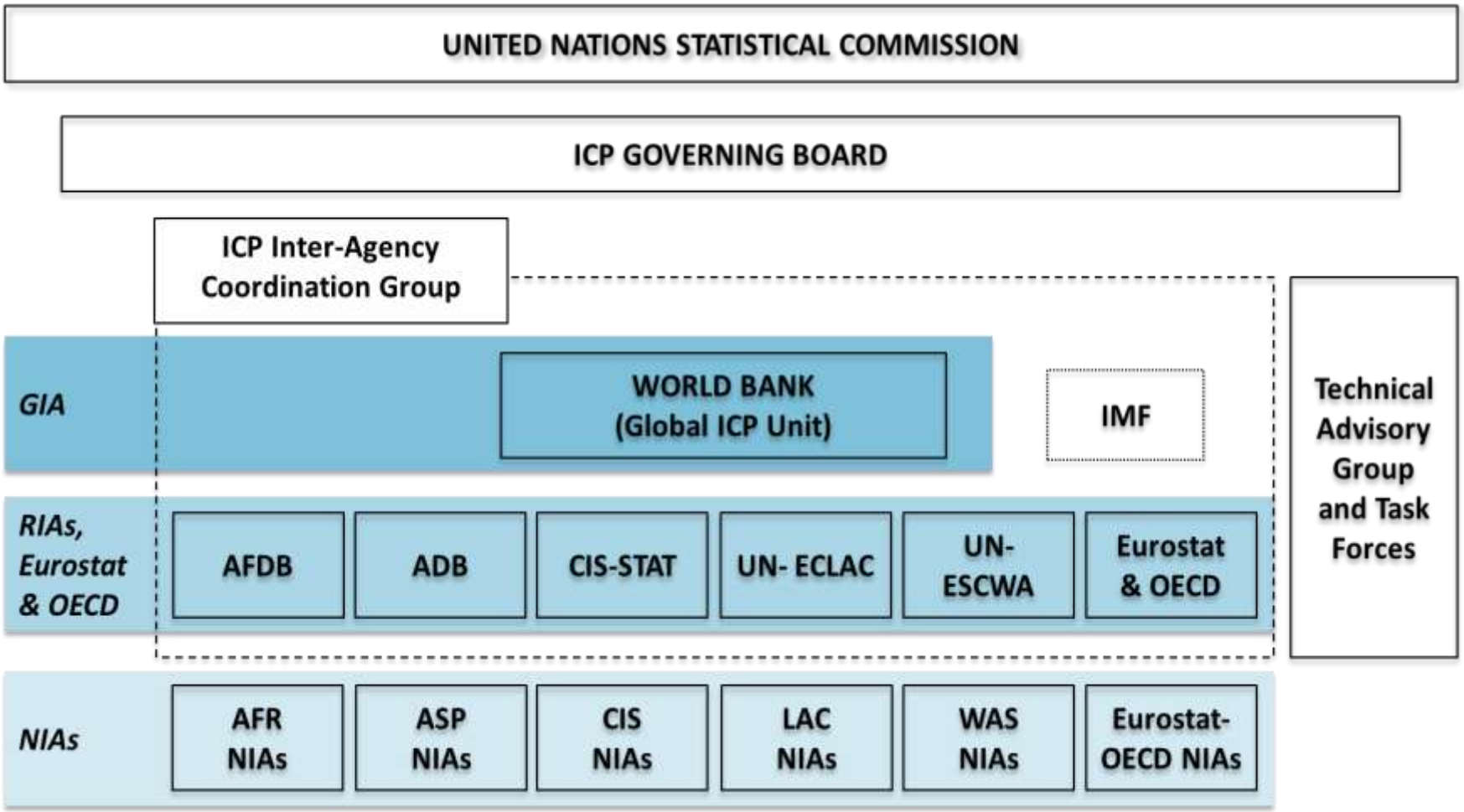
- Governance and organization of ICP 2017
- Methodological aspects
- PPP uses

Governance and Organization of ICP 2017

International Comparison Program (ICP)

- Since its establishment in 1968, the International Comparison Program (ICP), has grown to cover all regions of the world and become the world's largest statistical initiative
- The 2011 round of the ICP covered 199
- The main objective of the ICP is to estimate purchasing power parities (PPPs) that are used to compare the output of economies and material well-being of their inhabitants, by controlling for differences in price levels
- To estimate PPPs, the ICP requires prices of goods and services that are comparable across economies, and a breakdown of the national gross domestic product (GDP) into detailed expenditure categories, as per the ICP classification of final expenditures on the GDP.

ICP Governance Framework



*GIA = Global Implementing Agency, RIA = Regional Implementing Agency, NIA = National Implementing Agency

Approach for ICP 2017

- The United Nations Statistical Commission (UNSC) at its 47th Session (March 2016) agreed that the International Comparison Program (ICP) should
  - become a permanent element of the global statistical program
  - and that comparisons should be made at more frequent intervals
- To promote these aims, the UNSC supported the adoption of the rolling benchmark/survey approach
- The rolling survey approach was developed by Eurostat and the OECD in the early 1990s
- This approach spreads the price data collection over a period of time, in order to ease the burden on countries for any given calendar year (i.e. consistent surveying, but spread over 3 years), while allowing regions the flexibility to conduct surveys according to their specific circumstances
- The approach is designed to make comparisons using a mix of actual and extrapolated data that have been collected over three years

General rolling survey scheme for a given year t

	Rolling survey cycle for: benchmark year t			
	Year t-1	Year t	Year t+1	Year t+2
Household consumption price survey 01: **Food, drinks and tobacco**	X =>			PUBLICATION
Household consumption price survey 02 **: Personal appearance**	X =>			
Household consumption price survey 03: **House and garden**		X		
Household consumption price survey 04: **Transport, restaurants and hotels**		X		
Household consumption price survey 05: **Services**			<= X	
Household consumption price survey 06: **Furniture and health**			<= X	
Housing volumes and rentals survey		X		
Government compensation survey		X		
Machinery and equipment price survey		X		
Construction and civil engineering price survey		X		
CPIs, PPIs and national account deflators	X	X	X	
National account expenditures		X		

ICP 2017: suggested survey scheme

	ICP 2017 comparison (suggested)			
	2016	2017	2018	2019
Household consumption price surveys	X =>	X	< = X	PUBLICATION
Housing volumes and rentals survey		X	< = X	
Government compensation survey		X	< = X	
Machinery and equipment price survey		X	< = X	
Construction and civil engineering price survey		X	< = X	
CPIs, PPIs and national account deflators	X	X	X	
National account expenditures	X	X	X	

If price surveys are only for the benchmark year, *then* these would only be needed for building the PPP time-series and *not* to estimate benchmark year PPPs

ICP 2017: new operational approach

- For the ICP 2017 comparison, it is possible to extrapolate price data collected in 2016 to 2017.
- Data from surveys conducted in 2018 can be retrapolated back to 2017
- The challenge will be to link the various regions in a global comparison
- Production of inter-regional linking factors requires sufficient overlap between regional product lists and the global core (product) list
- The ICP global core lists for 2017 is currently being prepared.

ICP 2017: time series and interim regional results

- Given that most ICP regions are conducting interim comparisons (i.e. regional comparisons between global benchmark years), the ICP 2017 comparison will most likely incorporate data collected during these interim comparisons, while taking steps to move towards making three-year comparisons, like the OECD

- ICP 2017 results should be available in late 2019. In the interim, global PPP time series for the years 2012-2016 can be produced by the end of 2018 based on interim regional comparisons conducted during throughout this period.

- Production of PPP time series between 2012-2016 will require detail CPI, NA deflators, PPI and expenditure information. This information will continue to be crucial in future years, once a rolling *annual benchmark* approach is adopted for the ICP.

Suggested scheme for future comparisons

	ICP 2020 comparison				ICP 2023 comparison			
	2019	2020	2021	2022	2022	2023	2024	2025
Household consumption price survey	X=>	X	<=X	PUBLICATION OF 2020 RESULTS	X=>	X	<=X	PUBLICATION OF 2023 RESULTS
Housing volumes and rentals survey		X				X		
Government compensation survey		X				X		
Machinery and equipment price survey		X				X		
Construction and civil engineering price survey		X				X		
CPIs, PPIs and national account deflators	X	X	X		X	X	X	
National account expenditures	X	X	X		X	X	X	

Methodological Aspects

ICP/PPP data requirements

- **Price data**
  - National annual average prices for household consumption items
  - Price data for *special* surveys covering other GDP components: Housing; private education; government compensation; machinery and equipment; and construction

- **National accounts expenditure data**

  -National accounts expenditures for 155 “basic headings” (i.e. item groups)

Summary of PPP calculation: regional steps

Regional STEP 1 | **Computation of PPPs for each basic heading**

- Below basic heading: average prices for each product (regional + global), but no expenditure/quantity data.
- Product price relatives are "averaged" to form basic heading PPPs using the CPD (country product dummy) regression method
- CPD: $\mathbf{Ln\ p^h_{ii} = \alpha_0 + \Sigma\alpha_i C_i + \Sigma\beta_i P_i + \varepsilon}$
  - i = 1,…m products; j = 2,...n countries.
  - C_1 is dropped because country 1 is the base country,
  - h= 1,… H basic headings
  - Ln p^h_{ij} is the natural logarithm of price for product i in country j
  - C_j is country dummy which takes the value of 1 when the price is of country j otherwise zero
  - P_i is product dummy which takes the value of 1 for product 1 otherwise zero
- $PPP^h_j = Exp(\alpha_j)$
  - i.e. country effects provide PPP estimates and commodity-specific effects provide international price estimates
  - Equivalent to ratio of geo means of detailed prices for each BH for country n and the reference country if there are no missing values.
  - Result expressed in reference currency for the region

Summary of PPP calculation: regional steps (cont.)

Regional STEP 2 | **Aggregation of basic heading PPPs**

For any two countries j and k, the binary Fisher price index is computed as:

$$P_{F\ j,k} = \left(\left(\frac{\sum_i p_j^i q_k^i}{\sum_i p_k^i q_k^i} \right) \left(\frac{\sum_i p_j^i q_j^i}{\sum_i p_k^i q_j^i} \right) \right)^{1/2}$$

The Gini Eltetö Köves Szulc (GEKS) method is computed as:

$$P_{GEKS\ j,k} = \left(\prod_l P_{F\ j,l} \Big/ P_{F\ k,l} \right)^{1/K}$$

- The Laspeyres part of the formula is transformed as a weighted arithmetic average of price ratios, i.e. basic heading PPPs (**PPP^h_j** derived from Step 1), weighted by expenditures of the country k;
- Likewise, the Paasche part of the formula can be transformed as a harmonic average of price ratios, i.e. basic heading PPPs (**PPP^h_j** derived from Step 1), weighted by expenditures of country j;
- The Fisher index is not transitive, transitivity is imposed with the GEKS
- Results expressed in reference currency for the region

Summary of PPP calculation: global steps

Global STEP 1 — Calculation of global basic heading PPPs

- Global core prices collected in all countries are used to estimate regional linking factors
- At the basic heading level, calculate global (i.e. linked) PPP estimates (in $US) by linking the regional estimates

Global STEP 2 — Aggregation of global basic heading PPPs

- Estimate aggregate PPPs using the GEKS method, with an adjustment to retain "fixity" of regional results
- Fixity ensures that price and volume relativities between a group of countries of, say, a given region remain unchanged when these countries are included in comparisons with countries from other regions.

Technical Research Agenda to Inform the Future

OBJECTIVES

- Support a work plan resulting in benchmark estimates for 2017, based on a transition to the rolling survey approach, published in 2019.
- Take into consideration interim regional updates, and produce a global annual time series for 2012-2016 by 2018.
- Provide input for a final work plan that integrates interim surveys and methods for extrapolation/interpolation to produce a PPP time series and support rolling survey methodology.
- Improve data quality while maintaining comparability.

Research Agenda Overview

PRIORITY AREAS

- **Priority Area I. PPP time series**: Moving to a rolling benchmark/survey approach; Linking interim regional updates into a global comparison; Building PPP time series for the interim period; Fine tuning the global linking procedures
- **Priority Area II. Comparison-resistant areas**: Improving housing estimates; Improving construction estimates; Improving estimates for government services;
- **Priority Area III. PPP reliability and quality**: PPP reliability and quality; Assessing reliability of PPPs; Explaining PPP changes between benchmarks
- **Priority Area IV. PPP/CPI integration**: Harmonizing ICP and CPI activities; Estimation of sub-national PPPs using CPI information
- **Priority Area V. PPP applications and innovations**: PPPs for international poverty lines; Exploring alternative sources of price data

PPP Uses

Main Users

- International organizations
- Policymakers
- Researchers and Academia
- The Private Sector

United Nations Uses of PPPs

- **Sustainable Development Goals (SDGs)**
  - Goal 1: End poverty in all its forms everywhere.
    - Proportion of population below the international poverty line of $1.25 (PPP) per day
  - Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all.
    - The compound annual growth rate (CAGR) of energy intensity of GDP, measured in purchasing power parity (PPP) terms
- **Millennium Development Goals (MDGs)**
  - Goal 1: Eradicate extreme poverty and hunger.
    - Proportion of population below $1.25 (PPP) per day
    - Proportion of employed people living below $1.25 (PPP) per day
  - Goal 7: Ensure environmental sustainability.
    - CO2 emissions, total, per capita and per $1 GDP (PPP)

United Nations Uses of PPPs (Cont.)

- **Human Development Report**
  - Human Development Index (HDI)
    - A composite indicator calculated from life expectancy, education, and income per capita (PPP) indicators
  - Inequality-adjusted Human Development Index (IHDI)
    - Inequality adjusted HDI
  - Gender Development Index (GDI)
    - Gender based HDI
- **UN Educational, Scientific and Cultural Organization (UNESCO)**
  - The relative value of funding provided annually for education is compared across countries using the Government expenditure per student in PPPs indicator.
- **The UN Children's Fund**
  - Measures, among many indicators, the number of children living in poverty using international and national poverty lines calculated using PPPs.

The World Bank Uses of PPPs

- **World Development Indicators**
  - Size of the economy.
    - GNI and GNI per capita estimates converted into international dollars using purchasing power parity (PPP) rates
  - Poverty rates at international poverty lines.
    - The international poverty line is converted to LCU using PPPs
  - Shared prosperity.
    - The mean income or consumption per capita from household surveys used in calculating the welfare growth rate, expressed in purchasing power parity (PPP)–adjusted dollars per day for the bottom 40 percent of a country's population and for the total population of a country.
  - Health systems.
    - Health expenditure per capita, PPP $
  - Energy dependency, efficiency and carbon dioxide emissions.
    - Carbon dioxide emissions, kilograms per 2011 PPP $ of GDP
  - Price levels.
    - Ratio of PPP conversion factor to market exchange rate

International Monetary Fund Uses of PPPs

- **World Economic Outlook (WEO)**
  - Economic indicators, such as estimations of output and growth, of composite groups of economies are weighted by country GDP shares valued at PPP.
- **Quota subscription of member countries**
  - A measure of the financial obligation to the IMF, access limit, share of SDRs and voting power of a member country calculated as a weighted average of GDP (market exchange rate and PPP), openness, variability and international reserves.

European Commission and OECD Uses of PPPs

- **The European Commission**
  - Investment for growth and jobs goal
    - **The Structural Funds** targeting investment for growth and jobs are allocated to three main regions, which are classified based on GDP per capita for each region measured in PPPs.
    - **The Cohesion Fund** is allocated based on GNI per capita measured in PPPs.
- **Organization for Economic Cooperation and Development (OECD)**
  - The real GDP and its components for the OECD are aggregated using PPPs. In order to calculate economic indicators, such as growth, the country shares are used as weights.
  - OECD uses PPPs in research and policy analysis to compare cross-country macroeconomic aggregates.

Policymaking uses

- PPPs are used in a wide variety of topics that involve national, bilateral, regional and global comparisons. The analysis is valuable for policymakers.

- Following is a sample of different topics:
  - **REAL GDP AND HHC comparisons:** Real GDP comparisons are the basis for a true understanding of the relationships between economies and impact of major events on the world economy. Using PPPs to calculate GDP per capita and HHC per capita is also an important tool for evaluating standards of living and relative material wellbeing
  - **GLOBAL POVERTY**: Global poverty measurements rely heavily on PPPs. Continuous production of PPP data is important for updating global poverty measures and monitoring SDG progress

Policymaking uses (cont.)

- INTERNATIONAL INCOME INEQUALITY
- FOOD CONSUMPTION
- HEALTH AND EDUCATION
- PRODUCTIVITY AND COMPETITIVENESS
- TRADE
- INVESTMENT
- ENERGY EFFICIENCY
- COST OF LIVING COMPARISON

Thank You