



## International Comparison Program: PPP Research Agenda

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## I. Introduction

The purpose of this note is to propose a research agenda to improve the methodology and data quality and availability underlying the International Comparison Program (ICP). This research agenda is based on the findings and recommendations of the United Nations Statistical Commission (UNSC) Friends of Chair (FOC) group, who carried out the evaluation of the 2011 ICP round, and the analysis conducted by the Global ICP Unit, Regional Implementing Agencies, and technical experts.

## II. Background

The 2011 ICP was the largest round ever conducted. It included 177 countries and economies<sup>1</sup> participating at the full level of the gross domestic product (GDP) and another 22 for household consumption aggregates (World Bank 2015). This compares to 146 countries providing results at the level of the GDP in ICP 2005. In addition, ICP 2011 was based on a number of changes in methodology resulting from detailed analysis of the 2005 ICP (World Bank 2013). The new methodology implemented for ICP 2011 improved the results; however, it hampered comparisons with previous rounds of the ICP (Vogel 2015).

Moreover, because the ICP has only provided PPPs about every 6 years, the benchmark results have been extrapolated for non-benchmark years. However, the ICP 2011 benchmark PPPs and extrapolated PPPs based on the ICP 2005 differed significantly for many countries. The dilemma is that lengthy extrapolations at the aggregated level combined with the continual improvement of methodology limits the comparisons between benchmarks. Another dilemma is that the growing use of PPPs requires reliable annual PPP time series.

The UNSC established at its 45<sup>th</sup> Session held in 2014 the FOC group to carry out an evaluation of the 2011 ICP. The FOC group presented its preliminary report<sup>2</sup> to the UNSC at the 46<sup>th</sup> Session<sup>3</sup> held in 2015, and its final report<sup>4</sup> at the 47<sup>th</sup> Session<sup>5</sup> held in 2016. The final FOC report provides a review of the technical aspects of the ICP and describes in detail a concept for gradually transforming the ICP into a more frequent process, in order to tackle the issues stemming from infrequent standalone benchmark rounds.

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<sup>1</sup> The words country and economy are referred to collectively as countries.

<sup>2</sup> <http://unstats.un.org/unsd/statcom/doc15/2015-14-ICP-FOC-E.pdf>

<sup>3</sup> <http://unstats.un.org/unsd/statcom/46th-session/documents/statcom-2015-46th-report-E.pdf>

<sup>4</sup> <http://unstats.un.org/unsd/statcom/47th-session/documents/2016-9-FOC-group-on-evaluation-of-2011-round-of-ICP-E.pdf/>

<sup>5</sup> <http://unstats.un.org/unsd/statcom/47th-session/documents/Report-on-the-47th-session-of-the-statistical-commission-E.pdf>

### **III. Final Conclusions and Recommendations of the FOC Group**

The FOC recommended that the previous approach to extrapolate PPPs from the benchmark using price indices would be replaced, mainly because this approach requires long extrapolations which are known to be unreliable. Instead, it is proposed that a mix of survey and extrapolated data would be used to provide more frequent results, starting from the next global benchmark year occurring in 2017. In order to implement this plan, the FOC recommended that a rolling survey concept would be adopted, which is based on spreading the price surveys over a three-year comparison cycle centered on the benchmark year. This approach requires a set of reliable extrapolation indices for detailed GDP categories in order to extrapolate survey data forward and backward to the respective benchmark years.

The FOC also took note of the ongoing interim activities to produce regional PPP updates in most of the ICP regions for the 2012-2016 time-frame. The FOC recommended that options to combine these regional interim PPP updates into a global set of PPPs should be investigated. The FOC further commented that the data from the activities underway in most ICP regions could be integrated into the 2017 global comparison.

The FOC pointed out that the rolling survey approach requires the national implementing agencies to collect the necessary information on a more regular basis than every 6 years, and hence calling for the integration of the ICP activities into their annual work programs. Along the same vein, it also pointed out that the integration of the ICP and CPI activities can lower the overall costs of the ICP, as well as enhance the quality, coverage and reliability of the generated price indices.

The FOC recommended that Technical Advisory Task Force(s) would be formed to develop, conduct and monitor a research agenda. Because the FOC recommends that no major changes in methodology should be introduced for the immediate 2017 round, it stated that the short term agenda should be limited to fine-tuning methods and procedures covering the following areas:

- Implementing a rolling benchmark approach and building PPP time series;
- Integrating ICP and CPI activities;
- Streamlining the process of establishing item lists and the use of importance indicators;
- Improving the availability and quality of input data for rents, government services, and construction;
- Streamline the use of productivity adjustments for government services;
- Fine tuning global linking procedures; and
- Quality assurance of resulting PPPs and measures of reliability.

The 47<sup>th</sup> session of the UNSC endorsed the findings and recommendations of the FOC Group. The next section provides the research agenda proposed by the World Bank's Global ICP Unit, based on these recommendations.

## **IV. Research Agenda**

The research agenda supports a work plan that will result in benchmark estimates for 2017 that are based on a transition to the rolling survey approach. The 2017 results will be published at the end of 2019. This work plan also takes into consideration the interim regional updates based on surveys conducted ranging from 2012 to 2016. To the extent possible, these will be linked to provide partial or full global PPPs for at least one year in this time period. The goal is also to produce a PPP time series for the years 2012-2016, also to be published in 2018. The following research agenda will provide additional input into a final work plan that integrates the interim surveys and methods for extrapolation/interpolation required to produce a PPP time series and to support the rolling survey approach.

### **Priority Area I. PPP time series**

#### **Agenda Item 1. Moving to a rolling benchmark/survey approach**

The rolling survey approach to be implemented starting in 2017 involves spreading the price data collection over a three-year time period around the reference year PPPs for the basic headings not based on the reference year are to be extrapolated to the reference year. The following needs to be addressed:

- i. Determine the frequency of data collection (annual, biannual, quarterly) for each aggregate of the GDP for the rolling survey.
- ii. Determine how to link PPPs from regions with different timetables for data collection.
- iii. Assess quality of national account deflators/CPIs/other price indices by component to be used in the extrapolation to the benchmark year.
- iv. Assess methods of extrapolating PPPs for the two years between individual benchmarks, before the full rolling benchmark method is implemented (i.e., when PPPs are computed every year). This is also related to Agenda item 3.

#### **Agenda Item 2. Linking interim regional updates into a global comparison**

The ICP regions are conducting interim updates between the global 2011 and 2017 comparisons. These updates need to be linked to be useable. However, the following issues need to be investigated and addressed:

- i. Effect of different timings of regional surveys ranging from 2012 to 2016.
- ii. Impact of different degrees of coverage of the GDP.
- iii. Effect of changing regional composition and of countries not participating in the regional interim updates at all; e.g., several Arab countries from Africa are also participating in the Western Asia comparisons, whereas China is not part of the Asia update.
- iv. Effect of discrepancies in global core list coverage by region on inter-regional linking.
- v. Effect of methodological differences between regions on the linking process.

### **Agenda item 3. Building PPP time series for the interim period**

Before the 2017 ICP round is implemented, there will be a need to produce PPPs for the interim period (2012-2016) in 2018, as the new benchmark results are to be published only in 2019. Thus, the PPP time series will need to be built on the basis of the 2011 benchmark and interim updates (see *Item 2*). The following need to be done:

- i. Assess availability and quality of CPI components and national account deflators (6 main aggregates of the GDP and 12 COICOP categories of household consumption) needed for extrapolation; evaluate their internal consistency.
- ii. Examine consistency of CPI weights and national account weights, assess the weights' effects on PPPs.
- iii. Suggest steps for statistical capacity-building to ensure that CPIs and national account deflators are consistent over time and comparable across countries (important also for *Item 2.iv*).
- iv. Some consistency need to be observed between the 2011 benchmark and interim updates.

### **Agenda item 4. Fine tuning the global linking procedures**

The global linking based on the global core concept and CAR procedure is rather straightforward. However, the actual linking had many exceptions: dual regional participation of some countries (Russia, Egypt and Sudan); singleton countries, Cuba, the Caribbean and Pacific islands linked indirectly (and not as a part of global linking) to the global comparison via other regions and individual countries; and the CIS countries linked to OECD-Eurostat via Russia. Thus, the following issues need to be investigated:

- i. Conduct an in-depth review of the global core list by item for frequency and price variability. Refine definitions of problematic items.
- ii. Assess impact of individual countries on global and regional results. Investigate if reliability of the global comparison can be improved with a two-stage linking: the core countries are linked first, then the rest is linked to them without disturbing the core.
- iii. Review global core prices collected by the CIS and relink the CIS to other regions directly.
- iv. Develop a strategy for special participation cases.

## **Priority Area II. Comparison-resistant areas**

### **Agenda Item 5. Improving housing estimates**

ICP uses rents and dwelling stock data to estimate housing expenditures. In some instances, using these data did not lead to satisfactory results (e.g., in Asia where housing was imputed). Particularly, it was felt that housing quality was not properly taken into account. Given the importance of housing, the following needs to be done:

- i. Investigate quality of existing housing input data; investigate possibility to collect additional housing quality indicators.

- ii. Investigate imputation techniques in cases of missing housing data.
- iii. Investigate modifications to the existing methods for housing estimates to better account for quality differences.
- iv. Investigate the use of new methods for estimating housing expenditures, such as the user cost approach.

#### **Agenda Item 6. Improving construction estimates**

The Eurostat-OECD obtained construction PPPs using Bills of Quantities, while the CIS region is using a modified version of this method. Other regions used estimates based on input prices for a set of materials, labor, and equipment hire. Input data quality remain an issue, and methodologies need to be investigated as well, as some 2011 results were not fully plausible. Given the importance of construction in many countries (29% of GDP in China, for example), the following needs to be done:

- i. Investigate input prices for construction, including frequency and variability.
- ii. Identify data gaps and design gap-filling methods.
- iii. Look into methodological improvements, in particular evaluate the use of productivity adjustments for labor (see also *Item 7*).
- iv. Investigate the possibility to improve the resource mixes [weights], in particular estimate mixes by individual country.
- v. With construction experts, review the availability and quality of other construction-related information, such as mark-ups and professional fees.

#### **Agenda item 7. Improving estimates for government services**

Government services PPPs are based on the employee compensation adjusted for productivity. A review of the compensation data revealed their uneven quality and data gaps. The productivity adjustment factors need to be improved as well. Thus, the following needs to be done:

- i. Review the employee compensation data, examine data gaps, provide advice on filling them, and review gap-filling procedures.
- ii. Review the source data for the capital stocks portion of the productivity adjustment and evaluate them for consistency across countries.
- iii. Review the source data for the labor inputs into the productivity adjustment for consistency across countries.
- iv. Examine effects of the adjustment factors not being used in some regions on the global results.

#### **Priority Area III. PPP reliability and quality**

#### **Agenda item 8. Assessing reliability of PPPs**

The FOC report pointed out limited feedback between regions and the global ICP unit to address data problems found in the global aggregation that could originate at the regional level. Thus, an

investigation is needed into the sources of data variability at each level of estimation to assess the overall quality of the results and where data quality can be improved.

- i. Define what constitutes a “minimum set of data” a country must submit to be a part of the global comparison.
- ii. Examine variability in basic heading PPPs before and after linking and identify countries and basic headings appearing as outliers before and after linking.
- iii. Examine variability in basic heading expenditure shares.
- iv. Analyze effect of the countries with high variability in expenditure shares and prices on regional and global results.
- v. Suggest a scheme of interactions between regions and global ICP unit to address discovered issues.

### **Agenda Item 9. Explaining PPP changes between benchmarks**

Significant changes in PPPs that occurred between 2005 and 2011, compounded by changes in methodology make it difficult to compare the benchmarks directly. This, for example, created difficulties in adopting the 2011 results into the latest poverty estimates, as 2011 PPPs deviated from those extrapolated from 2005. Understanding the changes will help in PPP extrapolation as well. In order to explain the changes in PPPs and decompose them into factors the following needs to be done:

- i. Investigate the PPP changes first at the regional level, where methodological changes were minimal, contrasting them to the behavior of CPI components/ GDP deflators.
- ii. For countries with more complete CPI and national accounts data, remove the effect of index numbers (i.e., Laspeyeres index [mostly] in CPI vs. the multilateral methods in ICP).
- iii. Remove methodological differences in linking as much as possible; including re-running the 2005 results with CAR procedure, and negating effect of using 18 countries in linking in 2005.
- iv. Investigate which components of GDP are most consistent with the deflators/CPIs, in terms of PPPs, and which ones contribute most to the PPP inconsistencies.

### **Priority Area IV. PPP/CPI integration**

#### **Agenda Item 10. Harmonizing ICP and CPI activities**

Harmonizing ICP and CPI activities will reduce the data collection burden resulting from the implementation of the rolling ICP benchmark method while making the CPI and ICP prices more consistent and comparable, which would help improve extrapolations. The integration of the CPI and ICP activities will enhance their application for additional uses at the national and sub-national levels.

- i. Assess areas where harmonizing CPI and ICP processes will create synergies.
- ii. Conduct a case study of selected countries (say, Southern and East African states) to evaluate the use of Structured Product Descriptions to better define their national CPI

item specifications, which would be used not only for the CPI but also for the inter-country comparison.

- iii. Review ICP classification of importance based on each product's weight in the CPI list.

### **Agenda Item 11. Estimation of sub-national PPPs using CPI information**

A considerable effort is underway to estimate price levels at the sub-national level using available CPI information (World Bank jointly with Asian Development Bank and African Development Bank). Using the CPI to produce sub-national PPPs contributes both to the sustainability of the ICP in countries and to closer alignment of the ICP and CPI processes. Sub-national PPPs can also be extended to cover estimation of subnational poverty levels. The following needs to be done:

- i. Analyze Asian and African experience with sub-national PPPs and provide guidelines on the use of the CPI to compute within country sub-national PPPs.
- ii. Analyze temporal consistency of CPI and sub-national and poverty PPPs.
- iii. Expand work on sub-national and poverty PPPs to more countries.

### **Priority Area V. PPP applications and innovations**

#### **Agenda item 12. PPPs for international poverty lines**

By construction, ICP produces PPPs relevant for the entire economy. The international poverty line used by the World Bank is the mean of poverty lines of the 15 poorest countries in national currencies converted by the household consumption PPPs. It is important to investigate if PPPs can be made more pertinent for poverty estimates. The research topics are proposed to answer the following questions:

- i. Should there be a separate basket of consumption goods and services to be priced for poverty purposes?
- ii. Should weights to aggregate basic heading PPPs be based on expenditure patterns of the poor?

#### **Agenda item 13. Exploring alternative sources of price data**

The World Bank has initiated a pilot project to capture price data using smart phones. The basic concept is to have a network of price collectors across each country collecting prices, and recording observation place and date, along with some additional information. The pilot project is currently covering 15 countries spanning Africa, Asia, and Latin America. The following findings need to be investigated:

- i. Assess the quality of the prices from alternative sources using standard ICP data validation methods.
- ii. Compare price levels and dynamics between CPI and ICP price collections with the alternative sources.

## V. Conclusions

The research agenda presented in this note focuses on improving the methodology and approaches underlying the ICP. However, given that the ICP is becoming a permanent statistical exercise, it is essential to separate the “statistical production” function from the “methodological development” function, as stressed at the ICP Next Steps meeting held after the 47<sup>th</sup> Session of the UNSC<sup>6</sup>. In addition to methodological improvements, it is also critical that the quality and availability of the CPI and national account deflators are improved.

## References

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<sup>6</sup> [http://siteresources.worldbank.org/ICPINT/Resources/ICP\\_Next\\_Steps\\_Meeting\\_Minutes\\_Draft.pdf](http://siteresources.worldbank.org/ICPINT/Resources/ICP_Next_Steps_Meeting_Minutes_Draft.pdf)