Synergies in the Production Processes of CPI and PPP

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A. Introduction

The Central Bureau of Statistics in Israel (ICBS) participates in the International Comparison Project (ICP) on a regular basis since 1996[1].

The ICP[2] is a worldwide statistical initiative to collect comparative price data and estimate purchasing power parities (PPPs) of the world's principle economies. Using PPPs instead of market exchange rates to convert currencies makes it possible to compare the output of economies and the welfare of their inhabitants in real terms - that is, controlling for differences in price levels.

The ICP brings together the results of two separate PPP programs. The first is the global ICP program conducted by the ICP Global Office within the World Bank, which provided overall coordination for the collection of data and calculation of PPPs in more than 100 (mostly developing) economies. The program was organized in five geographic areas: Africa, Asia-Pacific, Commonwealth of Independent States, Latin America, and Western Asia. Regional agencies took the lead in coordinating the work in the five regions.

In parallel, the Statistical Office of the European Communities (Eurostat) and the Organization for Economic Co-operation and Development (OECD) conducted its 2005

[1] Israel participated in the early 1980s but was forced to leave the program due to budget difficulties.
[2] This description is from the World Bank ICP website at:
http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/ICPEXT/0,,pagePK:62002243~theSitePK:270065,00.html

PPP program that included 46 countries. Eurostat covered 37 countries - the 25 EU member states, the EFTA countries (Iceland, Norway and Switzerland), Bulgaria, Romania, Turkey, Croatia, Macedonia, Albania, Serbia, Montenegro and Bosnia-Herzegovina. The OECD part of the program included nine other countries – its seven non-European member countries, Russia and **Israel**.

The ICP Global Office combined the results from each of the five regions with those from the OECD/Eurostat PPP Program into an overall global comparison, so that results for all participating countries can be compared directly. Methodology to compare regions, the ring comparison, was developed specifically to link the regional PPPs without changing the relative results within a region.

The global offices in charge of conducting the ICP are introducing new and improved features to the program on a continuous basis. These included in the 2005 round:

- A new **Structured Product Description** (SPD) approach that has improved the scope and quality of regional and global lists of specifications.
- A comprehensive **Handbook** and a set of **operational guidelines** that serve both as reference material and step-by-step guidance for data collection and compilation.
- An integrated software system, the **Tool Pack**, that has been developed for standardized data collection, verification and processing, and capacity building.
- Improvements in **construction and equipment surveys**, **aggregation** of PPPs at the basic heading level, **linking of regional results** to estimate robust global PPPs, and estimation of **poverty-specific PPPs**.

The participating countries like Israel have benefited from some of these changes. However, we remain responsible for the tedious task of price collection, a task performed without receiving special resources as the PPP does not carry the same "clout" as the national CPI. Therefore we seek for synergies in the process and search ways to utilize

the resources already allocated for the routine CPI program in order to keep up to PPP standards.

B. Issues in Price Collection for PPP[3]

Price collection is the responsibility of the participating countries. Before they can begin price collection, they have to complete a number of tasks. These involve: selecting and contacting the outlets to be visited by price collectors; preparing the pricing materials and supplementary documentation for price collectors (including, if necessary, the translation of survey guidelines and product specifications into the national language); identifying which specifications on the final group product list are to be priced and, in the case of generic specifications, which brands are to be priced; and holding a meeting with price collectors to clarify issues such as how many items per basic heading, how many price observations per item, etc.

The selection of outlets is of particular importance because of the effect it will have on the average prices of the products to be surveyed. Different products have different distribution profiles. Some products are sold mostly in supermarkets; other products are sold mainly in specialist shops. Prices for the same product can vary from outlet type to outlet type because it is being sold under varying conditions.

A common starting point for the selection of outlets is the sample of outlets used for the CPI, but it is only a starting point. The product lists for Eurostat and OECD price surveys are larger than CPI lists, specifying products not included in the CPI. The CPI sample may not be ideal to collect reliable prices for these products because the selection of outlets by type is not in proportion to the volume of their sales of the products. In this case, it is necessary to augment the CPI sample with additional outlets. At the same time, because the resources available for the price surveys are limited, the CPI sample may be too large and has to be reduced.

[3] From the Eurostat-OECD PPP methodological manual at http://www.oecd.org/dataoecd/59/52/37984305.pdf

C. The Present Work Process

The Division of Consumer Prices at ICBS assumed responsibility for PPP as of January 2004. In practice we collect prices for the 3,000 goods and services defined in the program that serve as the basis for computing the PPPs and international comparability.

Price collection is conducted via paper questionnaires that are sent to us by OECD. The overall work process that was established at initiation was as follows:

- The dataset is received from OECD and sent to the price coordinator for "deciphering".
- A weekly timetable for price collection is defined.
- Price data are collected: price (standardized to definition), date of collection; also punched into a different dataset are the details of the outlet and specification of any problems encountered in the collection process.
- An editing and logical check process is applied. Data may be supplemented from the Internet or CPI data.
- The PPP coordinator sends the edited data to OECD.
- The Data are sent back from OECD to the PPP coordinator for questions, clarifications, etc.
- Additional checks are conducted in the field, when deemed necessary.

This complex process has led to several problems that were defined in order to look for ways to improve the collection and editing stages of the PPP. These problems include:

- Refusal to cooperate – in contrast to the CPI where there is a legal obligation to participate, the PPP program required "lobbying" on our part in order to ensure participation. This may lead to n*on-response errors* that arise from the failure to obtain required information in a full and timely manner from all the units selected

in the sample. If the prices of the nonresponding outlets differ from those of the responding outlets, the results of the price survey will be biased.

- Definition discrepancies – between goods that are defined in the questionnaire that may be irrelevant or non-existent in the local market. The problem is acute in electronic appliances, clothing and footwear.
- Judgmental sampling – as there is no one single sampling frame for a CPI[4], non probability sampling or "second degree judging" in a PPP program is conducted at times by the price collector. Although empirical results of research undertaken by Statistics Netherlands[5] for CPI nevertheless show that non-probability selection methods do not necessarily perform worse, in terms of the mean square error, than probability sampling techniques – one would assume that this is due to the sound methodology of CPI compilation at all stages.
- Sales – the handling of sales prices in our PPP may be dubious due to the sporadic nature of the price collection.
- Seasonality – the problems of seasonality are magnified in a PPP price collection that is not spread throughout the calendar year for all questionnaires.
- Using price indices for adjustment of PPP prices over time – this process assumes a good match between the selected CPI and the good or service from the PPP. At times this may be a strong assumption.
- "Made in China" – the local market is flooded with electronic appliances that are dominant in household purchases and are of different technology and prices than those that are defined in the questionnaire.
- Many prices that are needed for PPP (down to the exact SPD) were already being collected in the CPI program. Furthermore, at times, prices for PPP were collected in stores that were located "next door" to the CPI outlets.
- The price indices computed for adjustment of prices to specific time periods for OECD were done by hand and in non-economical fashion.

[4] CPI outlets are usually sampled from "piecemeal" frames that include on the one hand overcoverage of business frames and on the other possible undercoverage of establishments that consumers tend to purchase goods and services from them although they may not be in the official tax records (open markets, etc.).
[5] De Haan, Opperdoes and Schut, 1997

D. Enhancing the Synergies between CPI and PPP

Many of the problems described in the former section stemmed from the "disconnect" between the two programs. Realizing that the CPI program can be utilized in many ways in favor of PPP we initiated a program in the 2005 round that enhances the synergies between the programs in three areas: (i) price collection, (ii) price methodology and (iii) CPI technology principles.

D1. *Price Collection*: many of the goods and services that are collected in the CPI framework are also required for PPP (especially household expenditure). The following procedures were introduced:

- Using the prices of the following services for PPP: electricity, gas, water, public transportation, health insurance, car insurance, recreation and several other personal services are taken directly from the CPI without requiring additional resources.
- The prices of goods in the CPI can be used for supplemental information and logical checks.
- Fresh fruit and vegetables: average annual prices are computed based on the monthly CPI collection. This alleviates the problem of seasonality mentioned above.
- The selection process of items in the CPI is based on the most popular item as determined by the proprietor. This is also the item required in many cases for the PPP. We now combine between the two.
- Increasing the sample size of PPP based on the CPI outlets. In cases where the PPP sample is not large enough, we can use CPI data to compute an average price with the PPP data.
- Refusals have been brought to the minimum due the fact that collecting the CPI data for purposes of PPP has elevated the legal binding of this data under the statistical ordinance. In addition the PPP price collector has gained experience and established cordial relations with the shopkeepers.

D2. Combining *price methodology* of CPI and PPP in the fieldwork:

- Sampling procedures for CPI have been expanded to allow for inclusion of PPP.
- Use of administrative data for CPI (like housing, health records, etc.) in PPP.
- CPI methodology requires selection of the popular. PPP methodology requires a mix of representativity in local markets and international comparability – two forces that are contradictory at time. We now try to apply this method in CPI in order to be able to serve both programs.
- Collect regular and sales prices for PPP and send this data to the OECD (when required) for their decision.
- Editing and logical checks are performed in the CPI unit under the supervision of the Head of Division and using the same methodology as in CPI.

D3. Similar *technological principles* for PPP:

A system, which automatically classifies PPP and CPI into identical categories, was developed. This enables current updates of the indices needed for the PPP by OECD. The CPI basket is updated every two years and the computer system accordingly; the system was developed in three stages:

- The consumption items that were identical for both programs were selected;
- Special aggregates were built for the requirements of PPP;
- The datasets were classified according to the same international classification

An initiation document for developing a total PPP system within the framework of CPI is now in process.

E. Summary and Future Work

PPPs are currency conversion rates that convert to a common currency and equalize the purchasing power of different countries. The GDP, which is calculated by PPP, is in fixed prices and the differences in GDP levels between countries reflect only differences in the

volume of goods and services purchased. PPPs are calculated as a joint effort between the national statistical offices that collect the price data and the global offices that coordinate the program and calculate the PPPs. Statistical offices do not allocate suitable resources for the PPP since much of their efforts in price collection are tailored for CPI. While the global offices have introduced improvements in methodology in the 2005 round, improving the price collection component is the responsibility of the national statistical office.

The Prices Division of ICBS assumed responsibility for PPP in 2004. After learning many of the problems associated with PPP we realized that enhancing the synergies between the two programs could have mutual benefits. Many of the components of the PPP program have been absorbed into the CPI program and future work includes developing and assimilating a computer system for PPP according to CPI methodology and with user transparent interfaces.