

**In This Issue**

**Cover Stories** ..... 1

- The System of National Accounts: Implementation Status and Implications for the ICP
- Construction Components: An Innovative Approach to Comparing Construction Prices and Productivity

**Notes From the Editor** ..... 2

**Program Highlights and Status** ..... 2

**Feature** ..... 3

- Is a Potato a Potato? Ensuring Comparison of Like with Like

**ICP in Pictures** ..... 4

**Regional Spotlight** ..... 10

- Compiling GDP Breakdowns for the ICP: The CIS Experience

**Back Page** ..... 12

- An Independent Evaluation of World Bank Research: High Marks for ICP

**The System of National Accounts: Implementation Status and Implications for the ICP**

By Paul Cheung, Director, United Nations Statistics Division



The System of National Accounts (SNA) is probably the best known of the internationally agreed standards of statistics for measuring the market economy. The 1993 System of National Accounts (1993 SNA) was adopted by the United Nations Statistical Commission at its 27th session. The Commission encouraged countries to implement the 1993 SNA guidelines to enhance international comparability. Today, many countries are participating in the International Comparison Program (ICP), which similarly presents an opportunity to improve and harmonize statistical standards around the world.

The ICP contributes to more accurate comparisons of Gross Domestic Product (GDP) and component levels across countries. Evaluating economic data from different countries and regions allows us to piece together a realistic picture of global living standards and poverty. In this regard, the aim of the 1993 SNA in expanding the scope and availability of quality national accounts goes hand in hand with the ICP's mandate. The 1993 SNA and the ICP therefore fortify international efforts to understand factors that affect economic and social development across countries on an ongoing basis. The ICP cannot be pursued as a stand-alone exercise. It needs to be viewed as an integral part of a country's overall statistical program. >>

... continued on page 6



**Construction Components: An Innovative Approach to Comparing Construction Prices and Productivity**

Kenneth Walsh, San Diego State University  
Anil Sawhney, Arizona State University  
Yonas Biru, World Bank



The International Comparison Program (ICP) is the largest global statistical endeavor established to produce comparable country-specific macroeconomic data for Gross Domestic Product (GDP) and its main components — including household consumption, gross fixed capital formation (construction and equipment goods), and government outlays. This is achieved through price-level comparison that underlines the purchasing power of national currencies. The most commonly used outputs of the ICP are Purchasing Power Parity (PPP) statistics for GDP and its various components. PPPs are calculated as the ratios of actual prices in national currencies. For instance, for the construction sector, a PPP of 3.6 for country A compared to a PPP of 1.0 for country B indicates that a construction project that costs 100,000 units of country B's currency in its domestic market would cost 360,000 units of country A's currency in country A. >>

... continued on page 8

## Notes From the Editor



Dear Readers,

The current round of the ICP marks a watershed in the program's history of four decades. It represents lessons learned, opportunities exploited and important milestones achieved. Challenges both short- and long-term in nature are acknowledged.

The articles in this issue reflect some of the initiatives that built on past practices, and discern outstanding challenges that need to be reckoned with. A common theme running across all articles is the realization that harmonization of concepts and data collection practices, plus coordination of statistical programs, are crucial to secure greater consistency and comparability of economic statistics.

Paul Cheung's cover story presents the 1993 System of National Accounts (SNA) as a conceptual foundation for consistent definitions and classifications of national accounts, and notes that the system also serves as a common organizational framework for implementation. The article discusses the implementation status of the 1993 SNA, the ongoing program to revise it, and its implications for the ICP.

Youri Ivanov's article brings into focus the challenges that National Statistical Offices confront when compiling detailed national accounts data that are used as weights in the Purchasing Power Parities aggregation. It reviews briefly the experiences of CIS countries in meeting the requirements of both the 1993 SNA and the ICP.

Kenneth Walsh, Anil Sawhney and Yonas Biru present the Basket of Construction Components approach, which was introduced in the current round to help address one of the most troublesome areas of the ICP, the construction sector. The article highlights the conceptual underpinnings of the approach, its implementation framework, and its benefits beyond the primary objectives of the ICP.

Sultan Ahmad brings his over thirty years of experience with the ICP to shed light on the challenges associated with a global price data collection, focusing on the difficulty of matching like with like, in terms of quality, size and delivery conditions of the products to be priced. He also highlights remedial actions put in place in this round.

This issue also presents "The ICP in Pictures." Pictures have played a significant role in the current round. They are used in ICP product catalogues to supplement detailed product descriptions. They were particularly helpful in providing clearer images of equipment goods. In Latin America, regional coordinators used pictures of some outlets, such as restaurants and fruit stands, to ensure that prices were collected from similar outlets. In many cases, pictures ensured that product descriptions were not lost in translation!

Please continue to send articles and pictures from the field and your meetings. Your reaction to anything you read will help us to improve the newsletter. Enjoy!

Yonas Biru

## Program Highlights and Status



Several events are underway and some important meetings are coming up, ahead of the fast approaching publication of global Purchasing Power Parities and related indices.

First, when the ICP Executive Board met in October 2006, it established two publication dates for the global results: September and December 2007. Effective individual consumption including the health and education components of government will be published in September 2007. The level of detail to be published in that report remains to be determined. Then the final report showing full GDP will be published in December 2007.

The work plan and timetable to meet these milestones will be reviewed with the Executive Board when it next meets on February 25, 2007. To prepare for this board meeting and to review both regional and Ring data, the regional coordinators and the Global Office met during February 5-9, 2007. Cut-off periods after which countries will be excluded from the global report were established so that those publication dates will not be jeopardized.

To meet the publication timetable, three remaining activities are moving in parallel. Each region is now finalizing data validation and preparing the results for their regional publications. At the same time, the Global Office, with support from regional coordinators, is validating Ring data which form the basis to link regional results. The Global Office is to obtain first results of global PPPs using preliminary regional and Ring results to identify potential problems before the regions publish their data.

The pressure to meet publication dates is also coming from organizations awaiting the results for policy issues. For example, the International Monetary Fund has asked the Global Office to conduct a seminar on ICP methodology and procedures, because the IMF is reviewing its quota formula. One question frequently raised is whether the ICP is a one-off effort or if future rounds are forthcoming.

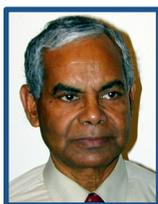
For these reasons, the ICP status report submitted to the United Nations Statistical Commission for its February 27-March 2, 2007 session asks the Commission to consider actions necessary to move the program to a sustainable basis. The report also suggested that the Commission consider a first evaluation of this ICP round by representatives of participating countries — to weigh the usefulness of the data, review issues encountered in meeting the timetables, and recommend whether a complete evaluation of the governance and technical program should take place.

Much remains to be done, but the team spirit among the countries, regions, and Global Office points to a successful conclusion.

Fred Vogel,  
Global Manager

## Is a Potato a Potato? Ensuring Comparison of Like with Like

Sultan Ahmad, *Retired World Bank Staff and Former ICP Manager*



### The Problem

The main ingredient in the computation of Purchasing Power Parity (PPP) is a set of prices of items that are representative and comparable. Yet ensuring comparison of like with like across national boundaries remains the most challenging task in the implementation of the International Comparison Program (ICP).

At the heart of the problem is the question: Is a potato a potato? Sure it satisfies hunger everywhere, so in this sense a potato is a potato, no matter where, when or how it is sold. However, when it comes to paying a price for it, would you pay the same to a roadside vendor as you would to a supermarket? Not really, if you value the numerous services the supermarket provides along with the product. Mere physical identity of a product is not enough to establish equivalence; services associated with the sale and other attributes that together define “quality” should also match in order to make a potato in one country or market comparable with a potato in another. The reliability of PPP estimates depends, among other things, on how the ICP ensures the comparison of goods and services, holding quality constant. This note discusses briefly how the problem was handled in the past, what has been done in the current round to improve the situation, and what outstanding challenges remain for the future.

### ICP in the Rearview Mirror

In earlier rounds, the ICP approached the problem of ensuring comparability by defining a product by its physical characteristics, for instance, rice as short grain or long grain. A series of attributes would then be added, for example unit of purchase such as one kilogram or one hundred kilograms; a reference unit such as one kilogram to which prices are converted; and type of vendor appropriate for the product such as supermarket or small neighborhood shop. Since the product has to be representative (meaning it has high expenditure weight) as well as comparable, countries were asked to submit specifications of their representative products, which were then collated into a list of specifications. As a representative product may not be comparable and a comparable product may not be representative, countries were asked to price their own representative items plus several others that were representative of other countries, and to collect prices according to a sampling frame that would yield a good estimate of the average price paid by the population.

In practice, some countries submitted average prices that were more or less weighted in favor of their own representative items taken from their consumer price index (CPI) database, while some others paid more attention to comparability. The first scenario resulted in average prices that are not comparable. The sec-

ond scenario yielded average prices that are not representative of the economy. The ICP did not have enough resources to subject the data to rigorous checking and validation. As a result, PPP estimates were not always very robust. This is what is highlighted in the Ryten ICP evaluation as a vexing “data-breeding” problem.

### The Current Round

The current round of surveys addressed this issue aggressively. It has developed a system of SPD (Structured Product Description), which defines a product in terms of all relevant price-determining characteristics of the product. Then through a multi-stage process of consultation and feedback, it identifies items that are representative in participating countries, and produces for each region a product list that incorporates in the specifications the product characteristics that are most relevant in the region. Each region prepared and distributed catalogues containing detailed descriptions of the items and color pictures to participating countries. In some regions, pictures of outlets were distributed to make sure that not only the products but also the outlets from which they were collected are comparable.

Regional training workshops were organized to ensure standard data collection, validation and processing practices. Data were collected using software that ensures adherence to specifications, thus preserving comparability. The software also makes the process of validation, computation and transmission both speedy and uniform across all countries. As soon as the data are submitted to the Regional Coordinator (RC), they are subjected to numerous rounds of checking and feedback between the RC and the countries.

One notable and welcome difference in the current round is the number of data validation workshops organized in each region. The previous practice was to organize one such regional meeting. But in this round, three to four regional data validation workshops were organized in each region — immediately after completing each quarterly data collection. Regions would then assess the data quality and put in place corrective actions. For example, after the first-quarter data review, some specifications were revised, and a few specifications were dropped from the list. Based on the findings of the data review, participating countries were given specific and detailed guidelines to incorporate into the subsequent quarterly data collection cycles. The process now in place thus represents a significant leap forward in ensuring comparison of like with like.

While reviewing and validating the price data submitted in the current round of surveys, it appeared that some prices in several countries were systematically higher or lower than the rest of the group. The suspicion was that this was, perhaps, due to quality mismatch. Where deemed necessary, cross-country market visits were organized for national experts to each other’s markets to ensure uniform understanding of the specifications. Such visits were organized in Asia and Western Asia. The visits helped to es-

... continued on page 4

*Sultan Ahmad .... continued from page 3*

establish a common practice and resolved quality, quantity and outlet related questions. In addition, the Global Office and Regional Coordinators arranged visits by experts to countries where it was deemed necessary to confirm prices submitted to regional offices. This was done in all regions. The author took part in market visits, as a Global Office Consultant, in Asia and Western Asia.

Obviously, the extent of the problem differs from region to region. In the Latin American comparison, where 10 relatively similar countries are taking part, the problem is less vexing than, for example, in the Asia-Pacific region where the 23 participating countries have significantly different economic structures and consumption patterns. In relatively less developed countries, such as Yemen in Western Asia, reported prices tend to be lower generally due to lower quality. Clothing, for instance, is sold with unknown fabric content, no return facility, modestly appointed stores, limited range of products, and limited opportunity for browsing compared with other more affluent countries in the region, say, Kuwait. Also, Yemen's imports come primarily from Syria, Egypt and China. In contrast, products in Kuwait are generally imported from Europe, sold in well-appointed stores and fetch much higher prices. To address this problem, it was recommended that the more affluent countries in the Western Asian comparison collect prices of imports from Asian countries, especially China. These would be comparable to the quality in countries such as Egypt, Syria and Yemen. It was also recommended to compare European and non-European imports separately rather than comparing an average of them. These actions have helped to improve the quality of the data to the extent possible in the current round. Naturally, much remains to be done in future rounds.

### The Challenges Ahead

Comparison of like with like is an inherent and most incessant problem for the ICP that needs to be addressed in a systematic and persistent manner. It is a continuous process that should be refined, building on lessons learned in each round. The mechanism is already in place to mitigate quality mismatch in future rounds. The SPD process incorporates relevant price-forming characteristics that uniquely define a product. This process should be further refined and fully exploited. For example, an imported shirt is treated as a different product from a domestically produced one. Also, in general an import from China is considered a different item from, say, a French import. The SPD approach systematically captures price-determining characteristics and the ICP Tool Pack has the facility to code this information. Future rounds should capitalize and build on these assets, and use the information to generate quality adjustment factors. In this context, one important area to consider is exploring the benefits of hedonic-type regression where appropriate, when price adjustments are required to reflect quality differences. ■



An Early ICP Meeting (undated), Villa Serbolini in Bellagio, Italy. Included in this picture are Sultan Ahmad, Derek Blades, Youri Ivanov and Peter Hill, who are actively involved in the 2005 round.



ICP Executive Board Meeting (October 2006), Washington D.C. Youri Ivanov stands to the extreme left in this and the above picture.



ICP Regional Coordinators meeting to discuss the preliminary results of the Ring Comparison (February 2007), Washington D.C.



Paul Cheung ... continued from page 1

ICP computations require price information based on well-defined specifications for representative and comparable goods and services, and detailed expenditure weights covering 155 basic expenditure headings. Ever since the 1970 launch of the ICP, there was a somewhat disproportionate emphasis on price collection with limited focus on expenditure weights that are compiled from national accounts. The current efforts to compile and validate such detailed expenditure weights have helped to identify areas where national accounts figures are weak, and where critical gaps exist. From the perspective of the ICP, a vital requirement is that countries take steps to improve their national accounts.

This note brings national accounts into focus and discusses the implementation status of the SNA and its implications for the ICP.

### Progress in 1993 SNA Implementation

The United Nations Statistics Division (UNSD) monitors the implementation status of the 1993 SNA in all regions, in line with an assessment framework described in the Report of the Intersecretariat Working Group on National Accounts (ISWGNA) to the 2004 Statistical Commission. The ISWGNA represents the Statistical Office of the European Communities, International Monetary Fund, Organization for Economic Cooperation and Development, United Nations and World Bank. The assessment is based on information reported by UN member countries to the UNSD through the National Accounts Questionnaire (NAQ). But some countries may not report data at all, or report incomplete data.

**Table 1. Conceptual implementation of 1993 SNA by member countries**

	2004 Assessment		2006 Assessment	
	No. of Countries	Percent of total	No. of Countries	Percent of total
UN Member Countries	192	86	101	53
Developed <sup>1</sup>	28	22	26	93
Transition Economies	28	25	28	100
Developing	136	39	47	35
Africa	53	8	9	17
Caribbean & Latin America	33	14	19	58
Western Asia	15	6	7	47
Eastern, Southeastern, Southern Asia	23	10	10	43
Oceania	12	1	2	17

<sup>1</sup>Western Europe, Northern America, Japan, Australia, New Zealand

Source: UNSD, August 2006

Table 1 summarizes the conceptual implementation of the 1993 SNA by countries. Overall, countries improved their conceptual compliance to the 1993 SNA by 8 percentage points — rising from 45 per cent in the 2004 assessment to 53 per cent in 2006. Developed and transition countries registered the highest rate of compliance at 93 and 100 per cent respectively. The Latin American and Caribbean countries showed a significant

improvement to 58 per cent in 2006. Africa and Oceania lagged behind conspicuously, with a compliance rate of only 17 per cent in the 2006 assessment for both regions, showing very little progress since 2004.

The scope of available national accounts data is assessed according to the minimum requirements dataset (MRDS) and Milestone 1 and 2 measures. The MRDS consists of seven tables of the UNSD NAQ and is more rigorous than the milestone measure. The MRDS includes tables on value-added and GDP by industry in current and constant prices, expenditure on GDP in current and constant prices, value-added components in current prices, employment by industry, and accounts of the total economy and the rest of the world account.

**Milestone 1** consists of expenditure on GDP in current and constant prices and value-added by industry in current or constant prices, and is the most relevant for the ICP. **Milestone 2** also includes the rest of the world account.

The scope of available data according to Milestone 1 remained more or less the same at about 73 per cent of countries. But in terms of Milestone 2, the scope of available data improved from 54 per cent in 2004 to 63 per cent in 2006. This means that countries are able to report, at least, gross national income and other primary indicators, besides base indicators of GDP at current and constant prices. Importantly, developed countries have reached almost 100 per cent for Milestone 2 in 2006, followed by Latin America and the Caribbean (91 per cent), and Western Asia (80 per cent). The relatively low score of 56 per cent for developing countries is explained by the limited scope of available national accounts data in, particularly, African countries.

Factors that impede 1993 SNA implementation include inadequate data sources used in national accounts compilation, shortage of staff and inadequate training.

### Update of the 1993 SNA

The origins of the SNA trace back to the 1947 UN Statistical Commission report titled “Definition and Measurement of the National Income and Related Totals.” This resulted in the first SNA published in 1953, which was revised in 1960 and 1964. Then a third revision of the system, issued in 1968, substantially expanded the scope of the accounts. A fourth revision referred to as 1993 SNA updated the system to reflect modern circumstances and improved alignment with the balance of payments.

The 1993 SNA update project was commissioned by the 2003 Statistical Commission, and entrusted to the ISWGNA, with a view to maintain the principles of the current system and ensure continuing consistency with the related manuals — such as the Balance of Payments Manual, Government Finance Statistics Manual 2001, and Monetary and Financial Statistics Manual.

The ISWGNA oversees an unprecedented program of international cooperation and burden-sharing. It was initially created to plan, organize and coordinate the SNA review and revision process and the subsequent publication of the 1993 SNA. After >>

1993, the ISWGNA remained active, to help countries implement the 1993 SNA, interpret SNA recommendations, and coordinate national accounts activities, including the development of handbooks, training materials and workshops. The work of the ISWGNA is facilitated through a rotating annual chairmanship and a permanent secretariat. The secretariat was assigned to UNSD that, among other functions, prepares, monitors and updates directories on: SNA meetings and seminars, training materials, handbooks, studies dealing with SNA concepts and further research into those concepts. Reports to the UN Statistical Commission and minutes of ISWGNA meetings are available on the UNSD national accounts website at:

<http://unstats.un.org/unsd/nationalaccount/nadefault.htm>

### Implementation Issues for 1993 SNA

As the 1993 SNA, Rev. 1, if adopted, will maintain the principles of the current system, countries are strongly encouraged to continue to develop their national accounts over the next few years. This will place them in a much better position to deal with the additional issues arising from the update project.

To assist country implementation of the 1993 SNA, the ISWGNA submitted to the 1994 UN Statistical Commission a program of implementation:

- Publication of a series of manuals and handbooks;
- Research to support the conceptual development of national and satellite accounting;
- Meetings, training seminars, and workshops;
- Technical cooperation in individual countries.

Starting in 2007, the ISWGNA will formulate an implementation strategy for the 1993 SNA Rev.1. It will be considered by the Statistical Commission and is likely to consist of the above four components plus advocacy activities to help national statistical offices generate resources and establish stakeholders consultations.

Future regional seminars can be a catalyst to seek collaboration with regional stakeholders and to mobilize regional institutions like development banks and training institutions. Based on consultations and subsequent regional implementation programs, a comprehensive monitoring process can begin to track the progress of implementation.

### Interrelated Needs of National Accounts Data and the ICP

The ICP's development from a research effort in a few countries to a complex global statistical undertaking requires the cooperation of country statistical offices and regional and international agencies in compiling and processing basic price and expenditure data. The success of the ICP for one country does not only rely on the quality of the basic data for that country, but also on the quality of basic data for other countries.

The problems facing the ICP with regard to data collection, editing and processing and the lack of coordination between statistical offices and regional coordinators are similar to the obstacles facing the implementation of 1993 SNA concepts and methodology. The national accounts and ICP share a common technical language and conceptual framework related to national-level statistical programs that support price statistics and basic economic statistics used as input for compiling national accounts. Therefore, both the national accounts and the ICP could benefit from coordinated implementation strategies. Appropriately conceived and designed, a well coordinated implementation strategy for the ICP and SNA can contribute to overall national capacity building, and accelerate the implementation and revamping of both. In this light, the ICP should not be pursued as a stand-alone

exercise. It needs to be viewed as an integral part of a country's overall statistical program. ICP-related tasks need to be factored into overall statistical priorities in improving national accounts data.

The ICP and the SNA implementation program should play an active role in raising awareness of the advantages of a common but flexible statisti-

cal infrastructure in defining units, applying classifications and defining variables to be collected. Consistency in concepts and methods will enhance comparability of data across different program elements. It will also spur more efficient use of resources, integration of multiple surveys and better quality of survey and administrative data. Such an approach could redress data gaps, such as those identified in detailed categories of final consumption expenditures collected through household expenditure surveys. It will improve the data quality for the compilation of national accounts, which also benefits the ICP.

### Conclusion

The parallel implementation of the concepts and methodology of the 1993 SNA and the ICP presents an opportunity to improve and harmonize statistical methodology around the world. Both might benefit from the proposed program, endorsed by the 2006 Statistical Commission, on an integrated approach to economic statistics. The benefits of coordinating activities in economic statistics are evident and will ultimately result in resource-efficient data collection activities for the national accounts and ICP. ■

*“A well coordinated implementation strategy for the ICP and SNA can contribute to overall national capacity building, and accelerate the implementation and revamping of both. In this light, the ICP should not be pursued as a stand-alone exercise. It needs to be viewed as an integral part of a country's overall statistical program. ICP-related tasks need to be factored into overall statistical priorities in improving national accounts data.”*

Walsh, Sawhney & Biru .... continued from page 1

### The Construction Sector

The construction sector is a significant component of the global economy accounting for 10–15% of GDP. The contribution of the construction sector to overall GDP — especially and more vitally to capital formation — is dramatically higher in developing countries.

In spite of its importance, the construction sector has been notoriously difficult to fit into national and international comparison schemes. The sector is described as “comparison resistant” in ICP literature. In general, the ICP requires that items included in a comparison should be commonly found in the country’s domestic market and should be comparable with those observed in the other participating countries. The first characteristic is referred to as representativity, and the second as comparability. A common problem is that what is representative in a given country may not be comparable across countries and furthermore what is comparable across countries may not be representative of the respective economies. Construction comparison is particularly vexing, because almost every construction project is unique so establishing a list of items which is both reasonably representative and suitably comparable is difficult.

### 8 Construction Comparison in Previous ICP Rounds

The ICP uses three construction categories — residential, non-residential and civil engineering. In previous ICP rounds, a standard-projects-based method (SPM) was used for construction comparisons. The SPM prices a selected set of standard hypothetical model construction projects. The prices reflect full market (purchaser) prices and so are consistent with the prices used in national accounts — a notable advantage. The disadvantage is that since the model projects are the same for all countries, representativity is sacrificed in favor of comparability. The models may be atypical in some countries and, as such, the resulting prices may not be representative of the domestic industry.

The SPM has been discussed widely over two decades. The general consensus was that methods other than the SPM should be considered due to the expense, difficulty and limited accuracy of the resulting PPP estimates. The SPM was particularly difficult to implement in developing countries due to its detailed and comprehensive data needs, and the related high survey costs.

Recognizing that changes in ICP design and implementation are essential to achieve a cost-effective, reliable and sustainable program, the World Bank commissioned three independent studies to address outstanding methodological issues of construction surveys and index aggregation. The Basket of Construction Components (BOCC) approach was proposed by Walsh and Sawhney in 2005 as an alternative (their papers can be accessed from the ICP website under “research and methodology”). Their study and field visits were financed by the ICP Global Office and the African Development Bank. The approach was presented to the ICP Technical Advisory Group and was endorsed as a preferred method for the 2005 ICP round of surveys.

### BOCC Approach: Conceptual Underpinnings

The BOCC approach divides construction projects into several systems, which are in turn broken down into well-defined building blocks or construction components. The BOCC taxonomy of projects, systems and components, and the measurement of the materials, labor and equipment use within the chosen components, allows countries to price uniform blocks which form the basis for comparison. It strikes a delicate balance between representativity and comparability, while simplifying the survey procedure and holding the cost of the endeavor affordable.

The approach identifies major cost-contributing systems in typical construction projects under residential, non-residential or civil engineering headings. For instance, under a residential project, eight systems are identified — site work, substructure, superstructure, exterior shell, interior partitions, interior/exterior finishes, mechanical and plumbing, and electrical. A construction component is defined as a production unit which can be fully defined as a basic building block of a complete construction project. Examples of construction components include a reinforced concrete column or the painting of 100 square meters of a building’s exterior surface. The approach entails pricing a set of standard components. Because the labor, equipment, and material needed to accomplish a consistent scope of work are directly included in the price, the method reflects the importance of the various elements. It also allows identification of productivity differentials, labor equipment tradeoff, and differences in means and methods of construction.

While the BOCC is an improvement over past practices, one shortcoming of the approach is that it is based on input cost. No profit margins are included. Hence the prices are not fully consistent with the actual estimation method used to produce national accounts totals. In contrast, the SPM includes profit margins though these are generally estimated as a standard mark-up and may be quite different from actual profits. Margins are highly variable as they are a function of the contractor’s work history with the client and the backlog of work available. It is also possible that margins are under- or over-estimated for a component as a cash-flow enhancement or bidding strategy. For all these reasons, the BOCC developers believe it is unlikely that meaningful prices are obtained by including margins in a hypothetical pricing exercise.

### Developing “Building Blocks”: From Concept to Implementation

The first implementation step is developing a list of specifications of construction components that meet the representativity and comparability criteria. Basic and composite components were designed so that pricing could be performed across all three construction sub-sectors. A basic component consists of an individual material (cement, reinforcing steel, etc), labor hour (unskilled and skilled labor), or equipment hour (backhoe, vibratory plate compactor, etc). These items are relatively easy to price, but do not capture productivity and equipment usage differences between countries. In contrast, a composite component includes labor, equipment and material. The composite components take into account productivity differentials and the >>

labor-equipment tradeoff because they capture differences in the level and mix of labor, equipment and materials required to install a given component in each country.

The BOCC approach includes 11 basic components and 23 composite components. Walsh and Sawhney developed the components after field visits to investigate the means, practices and materials of construction in 12 countries in Africa, Asia, and Western Asia. Photographs of construction sites were taken for reference and comparison. Also, discussions with architects, engineers or construction managers in private and public sectors were conducted regarding standard construction details in several systems. The experience of the authors with the construction cultures and industries of Canada, USA and Mexico also informed the design and development process.

### Data Requirements and Collection Guidelines

The first prerequisite for calculating PPPs is that reliable price information is collected for a standardized basket of construction components for all countries. A second prerequisite is that expenditure estimates are compiled to establish the weight of each component as a proportion of the total cost. The BOCC approach uses three types of expenditure weights: weights for aggregation of residential, non-residential and civil engineering baskets (W1); weights for aggregation of systems (W2); and weights at the component level (W3).

For each construction component, a structured data collection form was produced using the ICP standard product description (SPD) format. The SPDs for each component provide details needed by construction estimators for the pricing of the component, including (as appropriate) dimensional information, material specifications, testing requirements, inclusions and exclusions, and other data commonly found in a construction specification. The price collection is performed by estimating labor and equipment hours and material quantities, applying appropriate unit rates, and summing to a total price for the component.

Similar data collection forms were prepared for compiling weights and sent to National Statistical Offices (NSO). W1 weights are compiled from National Accounts. W3 are inherently designed into each component and need not be identified explicitly. W2 weights represent the importance of a given system as a share of the total project cost. Two broad strategies are recommended for compiling W2. Under the first strategy, the NSO asks a construction expert to determine the values of W2. The NSO provides the expert with a list of systems for the residential, non-residential, and civil engineering sub-sectors. The expert reviews pricing information from ongoing projects and tabulates the percentage contributions of each system for the three sub-sectors. Under the second strategy, W2 weights are aggregated from Bills of Quantity information from past projects for the three baskets. Compilation of W2 data is considered the most challenging aspect of the BOCC approach. However, preliminary W2 weights submitted to the Global Office from Asia, Latin America and OECD/Eurostat offer encouraging results.

### Data Collection and Validation Practices

In the current round, the countries relied primarily on government civil engineers from the Central Public Works Department or Ministry of Construction. This is the case in Asia and Western Asia. In Latin America, a consultant was hired as a principal investigator, who in turn hired sub-consultants from each participating country to collect data. In Africa, national construction experts are collecting the data with technical assistance by AfDB experts and consultants. Similarly, OECD and Eurostat utilized the services of a consultant for their ring countries.

Once the data are collected, validation becomes critical. Validation is carried out at national, regional and global levels. The first level of validation is at the country level and involves checking the consistency of the data. Validated data are sent to the respective regional offices. Regional validations are supported by the Data Validation Module (DVM) developed at the Global Office. This software provides diagnostic ratios and diagnostic statistics (standard deviation and coefficient of variance) for validation. For each composite component, the percentage of the total price (from material, labor and equipment) was also calculated and compared across countries as well as across components.

A broad conceptual validation is also possible. One would expect to find identifiable patterns in the underlying implicit data leading to the explicit results. For example, labor productivity trends should be identifiable as functions of development, education and training. Figure 1 shows an example of such a plot for a group of countries, in this case using the Bridge Spread Footing component. The trend of these data matches the pattern for several development indicators, lending credibility to the overall process and also providing an additional data validation tool.

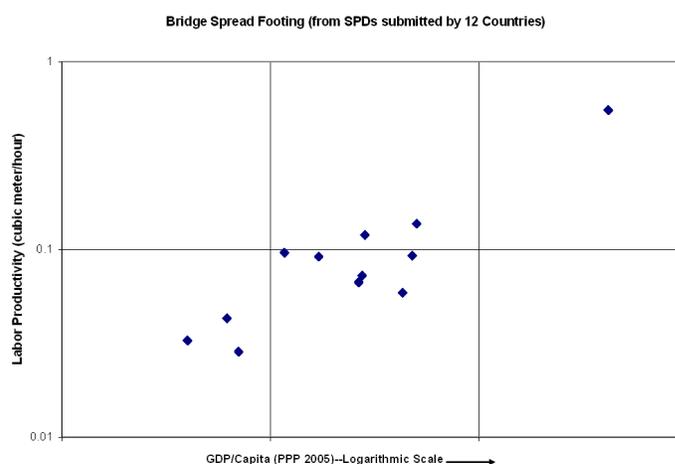


Figure 1: Labor Productivity

### PPP Calculation

PPP calculations require an aggregation of component prices through the use of expenditure weights. For the BOCC approach, three steps are required to calculate PPP: The estimation of el-

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*Walsh, Sambhey & Biru .... continued from page 9*

elementary PPPs for construction components is purely based on price observations. The second level of aggregation will occur at the system level where predetermined W2 weights are used. Using the residential sector as an example, first aggregation of components will occur system by system, and then systems will be aggregated based on their relative weights. The final step involves calculating construction-sector PPPs by aggregating PPPs for residential, non-residential, and civil engineering works using W1 weights obtained from National Account sources.

The PPPs for the Benchmark ICP will be calculated from the composite components. But PPPs can also be generated from the elementary components by applying the average labor to total, equipment to total, and material to total cost ratios as weights. For this purpose, the required weights can be generated from the composite components. PPPs can then be obtained by calculating weighted average prices, and then expressing them as price indexes, using a base country.

PPPs calculated from elementary components serve three purposes. First, they will come in handy to validate PPPs from composite components. Second, since elementary components are easy to collect, the PPPs so generated can be used to extrapolate benchmark PPPs to non-benchmark years. They will also help to develop, strengthen and sustain national construction indexes. Third, countries with limited resources and capacities can simply price the 11 elementary components that can then be used to estimate construction PPPs, using W2 weights obtained from a regional average or from a comparable country.

### Beyond International Cost Comparison

The BOCC approach shows promise as a temporal index method. For example, several countries including Indonesia and Cameroon have adapted the BOCC approach to develop temporal indices for their construction sectors. Statistical capacity building for developing countries can gain significantly from such efforts. Both the resource requirement reduction and this overlap are desirable in furthering the cause of the ICP's future sustainability.

The BOCC method also allows the capture of broad indicators such as labor productivity, contribution of the infrastructure sub-sector to the overall construction sector output, and use of technology and equipment in the construction sector. These outputs, when analyzed by region and by economic condition, can act as a potential indicator of growth and development. This represents an exciting new research area especially given the importance of infrastructure developing economies. ■

## Compiling GDP Breakdowns for the ICP: The CIS Experience

*Youri Ivanov, Deputy Chairman, Interstate Statistical Committee of Commonwealth of Independent States*



The pressing need to improve the coverage, quality and timeliness of GDP and its detailed components is among many challenges facing the System of National Accounts (SNA) and, by implication, the International Comparison Program (ICP). Typically, the ICP's breakdowns of the major components are very detailed. The

four major aggregates of GDP are classified under 40 or so summary categories. Summary categories are analytical categories for which ICP estimates are being published in the various ICP reports. These summary categories are further divided into similar homogeneous groups of goods and services called "basic headings," which constitute the smallest components of GDP for which expenditure data can be generated from SNA sources or estimated from other surveys. Since country groupings differ in the amount of expenditure detail that is available, the number of basic headings in the ICP surveys varies between 155 and 226 for different regions and country groups within the ICP.

A study conducted by the ICP Global Office in 2002 indicates that of the 190 countries reporting National Accounts data to the United Nations only about 70 percent report GDP by expenditure. The study notes that only about 22 percent of the countries report private final consumption expenditure by purpose (COICOP), of which the majority are OECD members. More importantly, the detailed breakdown in the UN database refers to the two-digit COICOP level, representing 12 purposes, while the ICP requires a seven-digit level covering in excess of 100 purposes. To meet ICP needs, national statistical offices depend on detailed supply-use tables and other survey sources. The challenge is not less for government consumption and capital formation expenditures.

This note is intended to review briefly the experience of the CIS countries in meeting these challenges. It focuses on the areas where special efforts are needed to obtain estimates of GDP. In principle, all CIS countries produce their official GDP estimates on the basis of SNA 93 provisions and therefore they are broadly internationally comparable. However, as the discussion below will show, there are areas that leave much to be desired.

**Household Consumption:** Ideally, detailed data for household consumption data are compiled from household surveys which include expenditure by all the members of the household on consumption goods and services, the value of goods and services received as income in kind, the imputed values of goods and services produced for own consumption and the imputed value of owner-occupied housing. The reality for many developing countries is that although household surveys are available, >>

their limited scope and coverage prove inadequate to provide reliable expenditure estimates at the detailed basic heading expenditure level.

The problems associated with computation of household final consumption expenditure — the major component of GDP — are largely linked with collecting and processing primary data from various sources such as sample surveys and statistics of retail trade turnover, imports and agriculture. In the CIS region, special attention is paid to computation and valuation of own consumption of agricultural goods which continues to account for a considerable share of total consumption of fruits, vegetables and animal products. Balances of individual agricultural commodities which contain data on output and its disposition, including consumption by households, are used as a source of data for this purpose. Dwelling services produced by owner-occupiers are estimated with the help of the cost approach and the data on individual elements of costs are collected from a variety of sources. There is a general understanding that the quality of estimates of these services needs to be improved.

**Government Consumption:** Implementing the SNA 93 requires harmonization between the national accounts and some other systems of macroeconomic statistics which supply data needed to compile key national accounts. This refers in the first place to government finance statistics (GFS) and the balance of payments (BOP). It appears that at present, CIS countries and possibly some other countries in different regions do not fully implement the IMF Manual on GFS (2001) which is harmonized with the SNA 93. As a result, they experience considerable difficulties in obtaining reliable and comparable estimates of government final consumption expenditure.

Estimation of government output is in turn not an easy procedure; in fact it requires isolation of costs associated with production of non-market services from the costs associated with other types of output. Adoption of some conventions and assumptions may be needed to carry out this isolation.

One element of production costs of the non-market services rendered by government units is consumption of fixed capital. This data, as a rule, is not immediately available in the national GFS. In the CIS region, the estimation of this item is carried out on the basis of data on mid-year stocks of fixed assets owned by the government units and also average depreciation rates. Unfortunately, the coverage of the fixed assets stocks and the mode of their valuation are not entirely consistent with SNA requirements.

**Capital Formation:** The major problems associated with estimation of fixed capital formation consist in securing the data needed to include in this flow a number of new items recommended in the SNA 93 such as mineral exploration, software for computers, databases, originals of artistic and literary works, and some military durables used for civilian purposes. Mention should also be made of the problem arising in making a distinction between outlays on current and capital repair, since only capital repair has

to be included in fixed capital formation. Most of these items are included in the GDP of the CIS countries. However, data on some items are not immediately available (e.g. military durables used for civilian purposes) and some crude estimates had to be used; some countries allocated all military expenditure to intermediate consumption of government, which results in some distortion of the structure of the GDP.

Some problems may arise in the context of computing the change in inventories. One problem is connected with the valuation of this flow and, in particular, with the need to estimate and remove holding gains/losses. While definition of this item is clear, the data needed to estimate it are not immediately available and certain assumptions and conventions have to be adopted to derive some plausible figures. Some other problems with computation of this item are linked with the SNA 93 recommendation to enlarge this flow by including change in inventories held by the government units.

**Net Exports:** Net exports are an important component of the GDP and the cooperation of statistical offices with central banks, which compile BOP, is essential for securing reliable figures. Consistency in estimation of exports and imports of the country partners in external trade requires special attention in this context; in the CIS region, in some cases, mirror statistics are used for this purpose. In some cases, the central banks in the CIS make estimates of external trade transactions carried out by so-called shuttle traders which are not recorded in custom declarations. It is important to make sure that these estimates in the BOP are consistent with some corresponding entries in national accounts, for example, consumption of goods by the households.

Special attention has to be paid to the estimates of the non-observed economy, the major components of which include the underground economy, illegal economy, informal economy, and production of goods by the households for own consumption. The definitions of these components and their measurement methods are described in *Measuring the Non-Observed Economy: A Handbook* (OECD, 2002). But it is essential to make sure that in practice, coverage of the non-observed economy is the same in all countries. For example, the CIS and many other countries do not include the illegal economy estimates in their official GDP, whereas some countries do include such estimates, and this disparity affects comparability of GDP.

**Conclusion:** It is essential that countries use international classifications such as COICOP and COFOG on a regular basis as a part of their annual compilation of national accounts. Unfortunately in some CIS countries, these classifications are compiled on an ad-hoc basis in the context of data preparation for the ICP. These classifications provide a starting-point for a more detailed classification of GDP expenditure by basic headings in the context of the ICP, and therefore continuity in compiling COICOP and COFOG is essential to secure reliable estimates of expenditure weights. The ICP can serve both as an impetus and a platform for strengthening the information base on which it depends. ■

## An Independent Evaluation of World Bank Research: High Marks for ICP

An independent evaluation of the World Bank's role in knowledge creation that draws on information about the full range of research, publications and databases highlighted the ICP as "a global public good of the first magnitude and an undertaking of the greatest importance for any and all attempts to measure economic growth, living standards, and poverty around the world."

The independent evaluation was commissioned by the Bank's Chief Economist and Senior Vice President, François Bourguignon, and undertaken by a panel chaired by Princeton Professor Angus Deaton and composed of Kenneth Rogoff (Harvard), Abhijit Banerjee (M.I.T) and Nora Lustig (UNDP). The panel was assisted by 25 world-class specialists and thematic evaluators. The evaluation covered a "universe" in excess of 4,000 journal articles, books and databases produced by the World Bank between 1998 and 2005.

The evaluation addressed a wide area of strategic issues along with a number of recommendations for the Bank to consider. Stressing the importance of data as a cornerstone of the development community's knowledge base, the report took note of the Bank's significant contribution in the collection of new data. The report identified as an example the long-established Living Standards Measurement Surveys. Also highlighted were the more recent Business Environment and Economic Performance surveys in the transition countries, and the Investment Climate and Doing Business surveys. In particular, it identified the World Development Indicators "as the most important single database for development research," and the ICP "as central for the measurement of economic growth, for poverty, and comparative measures of development around the world." The report mentioned the ICP governance arrangement that includes an independent Technical Advisory Group as a good practice and stressed that other programs should benefit from similar external review panels when drawing up priorities and assessing their impacts.

The report has prompted a commentary by the Economist magazine, which devises its own mini-version of Purchasing Power Parities with a "Big Mac Index." The magazine, in a January 17, 2007 article titled "What the World Bank Knows," favorably cited the ICP as an essential data source to measure purchasing power of currencies around the globe. The report highlighted the ICP as "the world's biggest statistical initiative" and noted that "economists could say little authoritatively about world growth or poverty without it." ■

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The International Comparison Program (ICP) is the world's largest statistical initiative, involving 107 countries. It produces internationally comparable price levels, economic aggregates in real terms, and Purchasing Power Parity (PPP) estimates that inform users about the relative sizes of markets, the size and structure of economies, and the relative purchasing power of currencies. An ICP Global Office, housed in the World Bank, manages the global program. National Statistical Offices implement the program on the ground, under the general guidance and coordination of regional agencies. The Global Office works in close collaboration with the OECD/Eurostat's program for 43 countries, and publishes global data linking ICP and OECD/Eurostat results for 150 benchmark countries.

*The opinions expressed in The ICP Newsletter are those of the authors, and do not represent the views of the ICP Global Office or the World Bank.*