GDP Exhaustiveness, Consistency, and Methods of Estimating GDP Expenditure Values in the Context of International Comparisons

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Abstract

The International Comparison Program requires all participating countries to provide national accounts estimates of expenditure on GDP, expressed in terms of their national currency and broken down into 155 detailed expenditure categories. This GDP splitting provides detailed values to be converted into real expenditures. They are also used as weights when estimating PPPs for more aggregated subcomponents up to the level of GDP.

This splitting process is a major challenge in the National Accounts component of the ICP. Equally challenging is the need to ensure that the prices underlying the PPPs are consistent with the values estimated for the 155 detailed categories, which would be used as weights in the aggregation procedure. Both challenges are addressed in this paper where emphasis is laid on GDP exhaustiveness and consistency between prices and expenditures on GDP. The authors also elaborate on five possible approaches for estimation splitting the GDP expenditure values in the context of the International Comparisons program.

Keywords: International Comparison Program, National Accounts, GDP, Prices, Expenditures.

1   Introduction

The International Comparison Program (ICP) produces internationally comparable price and volume measures for Gross Domestic Product (GDP) and its component expenditures. This requires final expenditure data for 155 detailed expenditure components to be converted to a common currency and valued at a uniform price level. This detailed data is also used as weights in aggregating the purchasing power parities (PPPs) at the 155 level to higher levels, up to the level of GDP itself.

Many countries, however, do not compile expenditure-based estimates of GDP and some among those that do estimate expenditures on GDP and its components, make do with rudimentary methods due to lack of data. Whatever method is used, in most instances the level of detail required for the ICP is not available. In such cases, it is necessary to develop techniques to break down the GDP estimates into the 155 detailed expenditures for the ICP. Special validation procedures are required to ensure that the GDP estimates provide a reasonable and exhaustive picture of the economies and that the prices collected for the ICP are consistent with the prices underlying the gross domestic expenditure values.

2   Exhaustiveness of GDP

The ICP requires national accounts data to be consistent with the 1993 System of National Accounts (SNA) conceptual framework and provided at the "Basic Heading (BH)" level. The basic heading, defined as a group of similar well-defined goods and services is the lowest level of aggregation of items in the GDP breakdown for which parities are calculated.

The estimates of GDP to be broken down must be "exhaustive", meaning all expenditure components, both actual and imputed, are included to ensure that the international comparability of the national accounts data is meaningful. To assess the degree of exhaustiveness of a country's GDP estimate, the national accounts experts in each country is requested to provide necessary metadata through two metadata questionnaires. The first is a simplified "GDP Exhaustiveness" questionnaire derived from the "Eurostat Tabular Approach to Exhaustiveness". The second is a quality assurance questionnaire meant to describe the process of GDP compilation in the country.

The analysis of the information provided in these questionnaires is used both to evaluate the quality of GDP estimates and identify areas that require further attention and action by national accounts experts in the country. These are areas, where experience has shown, can be under-estimated or omitted from national accounts. These measurement issues need to be addressed to ensure accuracy, quality and compliance with the 1993 SNA recommendations. The 1993 SNA recommendations are not included in this paper; rather the paper singles out three selected areas - private education, dwelling services, and government services - for which special price collection methods are recommended which could be regarded as alternative approaches in estimating their expenditure values.

3   Consistency between price and GDE data

3.1   General consistency requirements

In the context of the ICP, two levels of consistency must be ensured when conducting the ICP price surveys for the computation of Purchasing Power Parities. The first is that prices collected through the ICP price surveys, must be consistent with the underlying prices in the GDP expenditure estimates; and the second is that products identified for pricing must be representative of the consumption expenditure within a country. At the same time, these products and their prices must also be comparable across countries. To manage these consistencies, the GDP is broken down into sub-expenditure categories, the lowest level of which is the basic heading level. However there are instances where expenditure values (of GDP) for a particular basic heading may not be available even though price data can be collected for that basic heading. Conversely, for some basic headings, expenditure values may be available, but no price data is available/collected. In the former case, specific methods need to be designed to estimate the expenditures values, whereas in the latter case, missing prices can be "imputed" by a process termed "gap filling" or if gap filling is not possible reference PPP can be used.

For a given basic heading, prices collected for the ICP must commensurate with the prices underlying the expenditure values. Sometimes, the ICP requirements in terms of product representativeness (and comparability) can result in prices collected not being equivalent to those underlying gross domestic expenditure estimates. In such instances, it is important to use statistical diagnostics tools to identify such cases and it may be necessary to exclude such prices in the computation of PPPs, as such prices may distort the real expenditures values.

Countries that compile their national accounts using the commodity-flow method and/or supply-use tables (SUTs) may be able to use the underlying estimation techniques to resolve price issues and more so to obtain the detailed expenditure values at the basic heading level. The task of splitting GDP expenditures into the detailed components of

basic headings would be relatively straightforward if the broad aggregates in the GDP estimates were based on a bottoms-up approach where detailed information on prices, production and expenditures would be available fairly readily. However, the paucity of basic data sources often precludes such a simple solution in many countries, particularly in countries with less developed statistical systems.

The commodity-flow approach is based on the identity that total supply of a product is equal to the total amount used: domestic output + imports (total supply) = intermediate consumption + final consumption + gross capital formation + exports (total use). This equation allows for not only identifying data gaps but is also an useful editing tool in ensuring that available supply is equal its use (both intermediate and final) at a relatively detailed (product) level, and allows for each of the components in the equation to be estimated independently.

This approach therefore can be used in two broad ways. The first is to assess the coherence of a full set of data relating to the supply and use of a product. The second is to provide the framework for one of the components to be derived residually.

Generally, certain assumptions have to be made in using the commodity-flow approach. In some cases, it is necessary to assume a particular split or the share of household expenditure within the total expenditure for a specific service has remained constant since the last reliable (survey) data available.

3.2   Special consistency requirements

The general requirement for consistency can be implemented in a special manner for three areas for which special price collection methods and PPP estimation procedures are recommended in the 2011 round of the ICP. These areas cover 7 basic headings - 1 private education BH; 1 housing BH; and 5 government services BHs.

Private education:

Price surveys related to private education cover five major levels (primary education; lower secondary education; upper secondary education; tertiary education; and other education programs). Their purpose is to collect and provide national annual average tuition fees as well as other key education indicators: the number of private/public education institutions and the number of students enrolled at each level. These data sets are used both for validation purposes and to estimate the expenditure value for the relevant basic heading.

Dwelling services:

According to the SNA, household consumption expenditure should include both the actual expenditure by households on rents for dwellings and an estimate of how much owner-occupiers would have paid in rent if they had to pay rents for their dwellings instead of owning them. This estimate is referred to as an "imputation" and the SNA suggests that the best way to make the imputation is to use rents actually paid for similar dwellings.

In order to make these imputations, the national accounts compiler will need information on rents being paid for a variety of different kinds of houses and apartments in different parts of the country. In many countries however, dwellings are only available for rent in a few locations and the few that are available for rent may not be typical of the majority of dwellings in the country.

Because of these problems, the estimates in the national accounts for dwellings are very often understated in many countries. Some countries make no imputation for rents of owner-occupied dwellings and other countries only impute rents for owner-occupied dwellings in urban areas and do not make any imputation for traditional dwellings in rural areas. All countries taking part in ICP 2011 are required to reconsider their national

accounts estimates for dwelling services. Countries where the SNA guidelines cannot be followed because the dwellings that are available for rent are not representative of the dwelling stock as a whole should make new estimates for dwelling services based on the user cost approach. The user cost approach stems from the fact that landlords usually expect that the value of the dwellings they own will rise in line with the overall rate of inflation. The user cost method is as follows:

User cost = intermediate consumption + other taxes net of subsidies on production + consumption of fixed capital + nominal operating surplus – nominal holding gain.

Government services:

The PPPs for government services are estimated on the basis of data on compensation of government employees. For the ICP 2011, participating countries are required to provide the relevant data through two questionnaires on compensation and employment indicators.

The first questionnaire collects information on compensation of government employees for 44 typical occupations. These occupations relate to individual services provided by government in the areas of health and education and collective services such as parliaments, ministries of finance, economic planning, statistical offices, and foreign affairs. Some of the occupations are common to both collective and individual services. Countries are requested to provide details of compensation of employees as defined in their national accounts.

The second questionnaire asks for information on government current and capital expenditure. It covers general government with a breakdown between central/federal government and local/state/municipal government. The questionnaire covers all government functions and provide for the distinction between health, education, and collective services.

The above information, when effectively compiled serves several purposes: the calculation of PPPs for several basic headings related to government services and the direct estimation of expenditure values for those basic headings.

4 Five splitting approaches in the ICP

Direct estimation of expenditure values is one of the several methods suggested to obtain values for basic headings in the ICP. Five approaches have been identified for splitting GDP and its main expenditure components. These are: direct estimation; extrapolation from a recent year; borrowing a per capita quantity or volume from a country in the same cluster (similar economic structure); borrowing a structure related to a class, sub-group or group from a country in the same cluster; splitting a category's volume or quantity into its component basic headings by using expert opinion.

The direct estimation is the most preferred method. Here each of the 155 basic headings could be estimated directly, and GDP can be obtained as the sum of these basic headings. This direct approach would be adopted when the basic heading expenditures can be estimated by using data directly related to the reference year. In practice, a common approach is to take direct estimates at the most detailed level possible, and then split them further into underlying basic headings.

Other approaches are regarded as indirect methods which may not be ideal, but are still preferable over the (least preferable) crude method by which the expenditure for a class could be allocated evenly (pro-rated) across the basic headings in that class. Approaches such as borrowing a per capita or a structure require the prior clustering of countries within a region for each group or each category of basic headings. First, the per capita quantity or volume of a BH could be borrowed from a same-cluster country, and then multiplied by the population of the "borrowing" country and a price factor which represents the price level index between the two countries in order to estimate values of

basic headings for the ICP. An alternative borrowing approach is to borrow a structure related to a class, sub-group or group from a country in the same cluster related to a particular higher level heading. This approach also requires the clustering of countries for each basic heading or group of basic headings. Here the economic structure could be borrowed from a same-cluster country, and then adjusted by a vector of price factors which represents the price level indices between the two countries for the relevant higher level heading.

Instead of borrowing structural data from another country, a country may strive to look for appropriate data sets and extrapolate them from a recent year. For example, if an expenditure breakdown is available for an earlier year, e.g. in the 2005 ICP, the relevant detailed expenditures could be updated using population growth rates, price evolutions, etc. For many components of household final consumption expenditure, if they are similar to those included in a country's consumer price indexes (CPI), the CPI weights can be used to estimate the expenditure values for the relevant basic headings. Values of some basic headings could be obtained by using the CPI weights (price updated) for splitting higher level values. But, this requires that higher level values are estimated directly.

The last approach consists in splitting a category's volume or quantity into its component basic headings by using expert opinion. In this case, the category may be a class or a sub-group or a group. The resulting notional volume or quantity for each basic heading would be multiplied by a price factor that expresses the price level of the basic heading. This factor could provide the lower-level basic headings with expenditure indicators which would be calibrated to the total expenditure value of the higher aggregate.

To assist the countries participating in the 2011 ICP in splitting their GDP estimate and reporting the underlying process and metadata, a Model Report on Expenditure Statistics (MORES) has been prepared. It includes a detailed metadata sheet showing how expenditures are estimated for each basic heading using available data sources, specific indicators, and appropriate calculation formulae.

5 Conclusions

To improve the quality of ICP results, the ideal is where gross domestic expenditures for 155 basic headings are reliably estimated and provided by all statistical authorities of participating countries. However levels of statistical capacity varies among countries, ranging from being able to provide detailed and reliable statistical information to being able to provide crude estimates only. Yet their expenditure values need to be consistent, exhaustive and comparable internationally. Hence the need for common approaches to be designed centrally and implemented by all the countries, in particular in those with weak statistical systems. This would go a long way to ensure consistency and exhaustiveness in the gross domestic expenditure estimates and in compliance with the 1993 SNA,

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