Building the System of National Accounts - statistical sources

This article is part of a set of background articles explaining in some detail how statistics producers, such as national or international statistical institutes, may build a coherent system of national accounts (SNA) , especially in developing countries. The articles are based on the official Eurostat handbook Essential SNA - Building the basics and they focus particularly on the early stages of the implementation.

The aim of this article is to highlight the fact that the status and quality of the statistical infrastructure make a decisive contribution to the compilation and quality of national accounts . One of the main pillars of statistical infrastructure, statistical data sources, is identified and described in this article. Statistical data sources may directly provide the information required for compiling national accounts.

Statistical indicators estimating is based on information collected from two main sources: statistical sources (censuses and surveys) and administrative registers. The following section describes the characteristics and the collection of data from censuses and surveys.

The other main components of statistical infrastructure, business register and statistical classifications and administrative data sources have their own articles.

Survey	Periodicity	Data items used
Manufacture industry	Monthly, Quarterly	Turnover by industry, number of employees
Statistics of energy, gas and water	Quarterly, Annual	Production of electricity, turnover, prices of energy and gas, natural gas distribution, water distribution
Statistics on oil	Monthly, Quarterly	Oil production
Retail sales	Monthly, Quarterly	Turnover, number of employees
Building and engineering construction	Monthly, Quarterly	Value of construction, number of employees
Housing construction	Annual	Number of finished households constructions, and in different stages of execution; surface, number of rooms, etc.
Services for population	Monthly, Quarterly	Turnover, number of employees
Transport	Monthly, Quarterly	Number of passengers, number of km made by kind of transports
Tourism	Monthly, Quarterly	Activity of tourism agency, number of hotels, number of beds, visitors
Post and telecommunication	Monthly, Quarterly	Postal, telecommunications, telephone activity
Employment, earnings	Monthly, Quarterly	Number of employees, wages and salaries
Labour force	Quarterly, Annual	Employment, number of hours worked, by industry
Households budget	Monthly, Quarterly, Annual	Household income and expenditure, by kind
Imports and exports of goods	Monthly, Quarterly, Annual	
Consumer price index	Monthly, Quarterly	
Producer price index	Monthly, Quarterly	
Construction price index	Monthly, Quarterly	
Unit value index	Monthly, Quarterly	
Agriculture production	Annual	
Structural Business Survey (cover industry, construction, transport, other services)	Annual	Enterprise income and expenditures. The main items: turnover, changes in inventories, investment, expenditures for intermediate consumption, wages and salaries, number of employees

Figure 1: Main statistical data sources used in SNA - Source: Measuring the Non-Observed Economy – a Handbook, OECD 2002

Censuses

Data obtained through the census is used for estimating some specific national accounts indicators and as a basis for further developments. The three principal types of censuses are:

Agricultural census : the observation unit is the agricultural holding, which is the techno-economic unit of agricultural production (i.e. crop-producing and livestock establishments). Agricultural censuses provide

detailed statistical information, such as location, areas cultivated, uncultivated, under crop, types of crop obtained, irrigated/rain-fed, number and type of animals, animal production obtained, expenditures, number of persons engaged, etc.

Economic census for non-agricultural units : the observation unit is the non-agricultural establishment with a fixed structure (size) and location characterised by a unique economic activity. Economics censuses produce specific information on individual establishments, such as location, name, address, type of economic activity, legal and ownership status, turnover, expenditure, number of employees, etc.

Population census : the observation unit is the household and the person. Generally it is carried out together with the housing census. The population census provides an inventory of the nation's human resources in great geographical, demographic and socio-economic detail.

In respect of the housing census, the units of enumeration are buildings, living quarters, households and occupants. The main topics included in the housing census refer to the type of ownership of the housing, type of building, construction materials, access to water and electricity, location, number of rooms, etc.

The **disadvantages** of a census are:

- It is very costly to enumerate (collect) the data and to process it;

- Timeliness is not high because data is available for use only many months after it is collected;

- The census is carried out after a long period, normally every five or ten years.

Surveys

Surveys elicit responses about specific phenomena from a few representative units scientifically selected from a population. Population data is obtained by expanding the sample data and by extrapolating the sample size to the population size.

Surveys provide more up-to-date statistics and are less costly than a census. They are normally carried out monthly, quarterly or annually. Timeliness requires prompt data processing, thus less information is gathered.

Statistical surveys may be classified into the following categories:

- **Agricultural surveys** , to obtain data concerning crop, livestock, prices, etc;

- **Enterprise surveys** , having as main goal to obtain detailed information about the output, intermediate consumptions, investments, labor force, etc;

- **Household surveys** , are an important source of socio-economic data, providing important indicators about the revenues and expenditures of the households and the use of labour force. In developing countries, they have become a dominant form of data collection, supplementing or sometimes even replacing other data collection programmes and civil registration systems;

- **Mixed household-enterprise surveys** : The sampling units comprise a household that is asked whether any of its members own and operate an unincorporated enterprise, so it can provide coverage of small enterprises that are not included in list-based enterprise surveys, thus facilitating the measurement of the non-observed economy ;

- **Price surveys** : used to obtain data on prices, which may involve collection from enterprises or households, or direct observation of prices in the market;

- **Indirect enterprise surveys** : are those in which the enterprises managing city markets are asked for data about the holders of their market stalls. This sort of survey provides only limited data about the observation units and often only in aggregate form.

The SNA requires the use of extensive information from different data sources. The information obtained is used directly, or is translated into national accounts concepts. Some information can be used indirectly, to check the plausibility of estimates and to verify some assumptions made in the process of compiling national accounts.

Agricultural statistics

The main sources of data for agricultural activity include censuses of agriculture and livestock, crop estimation surveys, studies on farm management and cost of cultivation studies, agricultural household surveys and various returns collected by administrative agencies concerned with prices and production relating to agriculture.

Indirect data can also be obtained from a population census, some statistics relating to industrial production, balance of payments statistics, wholesale and retail prices, quantum and prices of imports and exports , government budget expenditure and reports available from specialised agencies or boards dealing with other agricultural activities (marketing of specific crops, fertiliser or pesticides, veterinary activity, agricultural activity finances etc.), cooperative (agricultural) societies, etc.

- Demographic variables (e.g. date of the creation of the enterprise, temporary interruption, permanent closure, changes in the capital structure, etc.);
- Input-related variables: labour input (e.g. employment, personnel costs) and capital input (e.g. investment, research and development);
- Output-related variables (e.g. turnover, own account assets production, expenditures, taxes, changes in inventories, value of the direct export).

Figure 2: SBS: main variables - Source: Eurostat-European Business-Introduction

Every year Trinidad and Tobago Statistical Office conducts an annual survey of business establishments encompassing every industry and is in charge of maintaining the Business Register. The survey is conducted in accordance with the Statistics Act, Chapter 19:02 of the Revised Laws of Trinidad & Tobago (1981) and its information is used to calculate Gross Domestic Product (GDP).

Figure 3: The SBS questionnaires used by the Trinidad and Tobago Statistical Office - Source: See the Business Surveys form

Structural business statistics

Structural business statistics (SBS) describes the structure, coordination and performance of economic activities, down to the most detailed activity level (several hundred sectors).

The SBS collects detailed information about an enterprise's economic activity and represents the most important data source for the compilation of national accounts indicators, using a breakdown by industry. At the same time, the SBS analyses business structure and evolution, production factors used, as well as other elements.

The SBS describes the economy by observing units engaged in an economic activity, generally the enterprise. An enterprise carries out one or more activities at one or more locations and may comprise one or more legal units. Enterprises active in more than one economic area are classified under the ISIC Rev. 4 heading corresponding to their principal activity, normally the one that generates the largest amount of value added.

The SBS covers the business economy, which includes industry, construction and services. In many countries, financial services are kept separate because of their specific nature and the limited availability of most types of standard business statistics in this area, but there are also countries that conduct this survey for financial institutions. SBS does not cover agriculture, forestry and fishing, nor public administration and (largely) non-market services such as education and health.

A subset of the SBS variables is available with a breakdown according to size of enterprise (for instance small and medium-sized enterprises) and with a regional breakdown (as in the regional structural business statistics).

Implementation of the SBS in the statistical system is a strategic decision impacting on economic indicator compilation quality, and especially that of national accounts. There are many countries where, for various reasons (financial restrictions, lack of personnel, etc.) the SBS has not been yet implemented. As presented in the article Building the System of National Accounts - strategy , national accountants should start compiling

indicators based on available data sources and at the same time promote the implementation of the SBS in the statistical system.

Construction statistics

The construction industry generally represents a significant share of the total economic activity of a country and changes in construction tend to amplify and lead changes in the economy as a whole. Construction statistics not only give information about capital formation by the sectors served by the industry but also on the organisation, structure and productivity of the industry itself. Construction statistics are captured by business surveys or household surveys depending on the type of unit that carries out the construction activity.

Countries in Phase zero or even in the first stage of SNA implementation may not have developed construction statistics and direct information on the activity of this sector may be difficult to gather. Should this be the case, national accountants should investigate the possibility of using other available information and developing their own methods of estimation, following the phases presented in the article Building the System of National Accounts - strategy .

In the absence of direct statistical information, one method that can be developed uses production estimates as the sum of its components: intermediate consumption and gross value added (GVA) . Data on domestic production, import and export of raw materials used in the construction process is the basis for estimating intermediate consumption; information concerning the number of employees, the average wage of the sector and assumptions about the gross profit of the construction enterprises can be used to estimate GVA. The number of employees in the construction sector may also be provided by the Labour force survey (LFS) or in its absence, administrative information can be used.

Price statistics

Major price indices are clearly related to national accounts aggregates, as these aggregates represent the major flows of goods and services and levels of tangible and intangible stocks in the economy. A precise relationship emerges then between the well-known headline price indicators – the producer price index (PPI) , consumer price index (CPI) , unit value index (UVI) – and the closely-watched national accounts aggregates. Major price indices should, in principle, cover those value aggregates in national accounts.

Consumer price index (CPI)

The consumer price index measures change over time in the general level of prices of goods and services that a reference population acquires, uses or pays for consumption. A consumer price index is estimated as a series of summary measures of the period-to-period proportional change in the prices of a fixed set of consumer goods and services of constant quantity and characteristics, acquired, used or paid for by the reference population.

Each summary measure is constructed as a weighted average of a large number of elementary aggregate indices. Each of the elementary aggregate indices is estimated using a sample of prices for a defined set of goods and services obtained in or by residents of a specific region from a given set of outlets or other sources of consumption goods and services.

CPI is used in national accounts estimates to deflate expenditures at current prices or money incomes to derive measures of real consumption and real income. However, it should be noted that in practice price indices and expenditure series are often compiled independently of each other by different departments of a statistical agency or even by different agencies, so the coverage of a CPI may differ from that of total household consumption expenditure in the national account. Obviously this could lead to inconsistencies.

The price index used to deflate expenditures in national accounts should cover additional goods and services, not included in the CPI. However, this may not be easy to achieve in practice because the relevant price data may not be easily available, especially if the price collection procedures are geared to the CPI. Moreover, even if all the basic price data are available, the price index needed for deflation purposes is likely to be calculated using a different type or formula from the CPI itself.

Producer price index (PPI)

The producer price index is the measure of the change in price of goods and services either as they leave their place of production or as they enter the production process; but it is also a measure of change in price received by domestic producers for their outputs or of the change in price paid by domestic producers for their intermediate inputs.

In general terms, PPI can be described as an index designed to measure either the average change in price of goods and services as they leave the place of production or as they enter the production process. Thus, production price indices fall into two clear categories: input prices (i.e. purchase prices) and output prices (i.e. basic prices).

Although PPI is an important economic indicator, the main use of the PPI is as an output or sales data deflator when compiling production volumes and deflating capital expenditure and inventory data in national accounts. As a result, the concepts underlying the PPI are often conditioned by those underlying the national accounts. This can lead to various conflicts: for example, for contract escalation[1], users would like weightings to be fixed for a long period. However, for deflating national accounts, current-weighted indices and fine aggregations are required, since in theory deflation is best done at the lowest level of disaggregation.

Unit value indices (UVI)

Unit value index is a composite cost index designed to express, in a single index, price (value) changes involving a range of internationally traded commodities. UVI provides an overall measure of price changes in imported /exported goods, although they not only reflect changes in price but also changes in quantity.

Unit value is calculated as the ratio of commodity value (\$) to net commodity mass (kg), derived from administrative customs documents: UVI = \$/Kg. Export price index (XPI) and import price index (MPI) are based on unit value indices and price survey indices. These indices are used in national accounts as export and import value deflators to obtain the afore-mentioned in quantity terms.

In many countries, where no XPI and MPI exist, UVI is used as a proxy for pure price or survey-based price index. Unit value indices were suggested by the United Nations[2]for countries with a tight or medium budget, while well-endowed countries were advised to base their external trade price indices on data from establishment surveys. It should be noted that unit value indices may lead to error mainly due to changes in the mix of heterogeneous information collected in customs documents, but sometimes also due to the often poor quality of data on quantities.

An example of an input index is the building costs index compiled in Finland which monitors price change in 95 cost items using price information obtained from construction enterprises and price lists.

The Austrian residential and non-residential building output price index records price change in residential buildings by monitoring changes in 82 representative construction operations involved in their construction.

Figure 4: Examples of Construction Price Index - Source: Main economic indicators - Sources and methods: construction price indices, p.49 and p.84, OECD, and Eurostat, 2001

Construction price index

The construction price index provides measures of price change in either inputs to, or outputs of construction activity. It is used to track changes/trends in the cost (or price) of construction. However, it does not provide information on the current market value of construction work, earning capacity or rental values.

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[1]Adjustment obligations that may be affected by changes in the prices.

[2] Strategies for Price and Quantity Measurement in External Trade , United Nations 1981.

The best well-known types of construction price index are the following:

- **Input price index** : measures price change in inputs to the construction process by separately monitoring the cost of each factor. This generally entails compiling a weighted index of wages and materials costs;

- **Output price index** : measures price change in what is produced by entities engaged in a construction activity. It covers most of the items that are normally included in the price paid by purchasers or clients to constructors. These items generally include materials, labour, equipment hire, land preparation costs, bathroom/kitchen fittings, overheads, profits, and trade margins;

- **Seller's price index** : measures price change in construction output paid by the purchaser or final owner of the construction activity output. The term 'seller's price' is used to distinguish it from 'purchasers' price' as used in the SNA, since the latter excludes the land component of ownership transfer.

The construction price index is also used to deflate national accounts construction output estimates, and gross fixed capital formation in residential construction to assess real changes in the output of these activities.

The Cayman Islands Government Statistics Office has initiated a *Continuous Household Survey Programme (CHSP)* to collect socio-economic information to be used for programme planning and policy making. One of the key tools used for collecting such information is the *Labour Force Survey (LFS)*.

Figure 5: The Labour Force Survey in the Cayman Islands - Source: 2009 Labour Force Survey And Pilot Census - Interviewer Field Manual and Cayman Islands 2009 LFS Questionnaire

The *HBS* aims to gather data on household expenditures and income-based on a questionnaire and a diary of expenses. These are used to estimate the cost of living in the Cayman Islands and determine the poverty line and the number of households living below the poverty line.

Figure 6: Household Budget Survey (HBS) in the Cayman Islands - Source: The 2007 Survey of Living Conditions and Household Budgets - Interviewer Manual, and the questionnaires Household Questionnaire, Household Expenditure Diary Questionnaire and Individual Questionnaire

Household statistics

Household statistics describe family and household composition and offer a cross-sectional picture of families and their patterns, yielding comprehensive data not only on their economic activities but also on demographic and social aspects, as well as on overall living conditions. Household statistics are gathered from household surveys, among which the Labour force surveys (LFS) and the Household budget survey (HBS) are the most common and useful ones.

The **Labour Force Survey (LFS)** is a survey that provides data on working-age persons living in private households. Its main emphasis is on employment, unemployment and inactivity.

The LFS divides the population of working age (15 years and above)[3] into three mutually exclusive and exhaustive groups - persons in employment, unemployed persons and inactive persons - and it provides descriptive and explanatory data on each of these categories. The information is detailed by industry, using the ISIC classification.

The LFS is usually conducted on a quarterly basis, but there are countries where this survey is carried out once a year.

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[3] Recommended by the International Labour Organization (ILO).

The main use of LFS in national accounts is for estimating the non-observed economy (NOE), although it is also used to refine the measurement of wages and employment by sector.

The **Household Budget Survey (HBS)** is intended to give a picture of living conditions of private households in a defined area and time, by providing the total consumption expenditure of private households and groups of private households, broken down by household characteristics such as income, size and composition, socio-economic characteristics, degree of urbanisation, region and so on.

The basic unit in the HBS is the household. It is important to identify the reference person (often the head of the household) whose personal characteristics (the socio-economic group, occupation and employment status, income, sex, age, etc.) are used in the classification and analysis of information on the whole household.

HBS data is used to collect detailed information on household consumption expenditures (expenditures are recorded at the price actually paid, which includes indirect taxes - VAT and excise duties) borne by the purchaser. The data is used for measuring consumption expenditure elements in national accounts and updating the 'weightings' for the basket of goods used in Consumption Price Indices.

Statistical survey	Used for the estimation of
Surveys of enterprises on performance	Production, intermediate consumption by industry; investment and inventory
Survey of enterprises on trade turnover and sales of services	Production, intermediate consumption of specific industries; investment and inventory; household final consumption
Household budget survey (HBS)	Production, intermediate consumption for agriculture; inventory in agriculture; household final consumption
Consumer Price Index survey	Indicators in constant price

Figure 7: Minimum surveys required for implementing the SNA

Concluding remarks

One important phase of the SNA implementation strategy is the identification and analysis of data sources needed for compiling national accounts.

For more information, see the section on *The SNA implementation strategy* in the article Building the System of National Accounts - strategy .

In this context, the statistical office, in charge of building the bases for meeting the national accounts minimal requirements, must implement and develop some essential statistical surveys. From the perspective of SNA implementation, the most important data requirements are those associated with compiling gross domestic product (GDP) by production and expenditure approaches, at current and constant prices. Figure 7 presents an example of how the basic data requirements may be obtained through surveys that need to be carried out in the statistical system.

Questions for practitioners

Following the main SNA implementation guidelines, the process of compiling national accounts using statistical data sources should be established by addressing some specific issues, such as:

- What statistical surveys are conducted by the statistical office?
- Are the concepts, content and classifications used in these surveys in line with the requirements of the 2008 SNA ?
- Are the needs for national accounts compilation covered in a sufficient way by the existing statistical surveys? If not, is there a strategy for development?

- What statistical survey needs to be implemented to in order to guarantee national accounts compilation requirements?

See also

- Building the System of National Accounts (online publication, overview of all articles)

Further Eurostat information

Publications

- Essential SNA - Building the basics

- Eurostat-OECD Manual on Business Demography Statistics

- Handbook on the design and implementation of business surveys [4]

- Household budget surveys in the EU - Methodology and recommendations for harmonisation 2003

- The European Union labour force survey: Methods and definitions – 2001

Dedicated section

- International statistical cooperation

External links

- Afristat - Guide methodologique pour l'elaboration des comptes nationaux dans les états membre d'Afristat , Serie Méthodes No.4, 2001

- FAO - Conducting Agricultural Censuses and Surveys , Rome, Statistical Development Series No. 6, 1996 (PDF version)

- Fritz B., MPRA - Uses of National Accounts; History, International Standardization and Applications in the Netherlands , Eagle Economic & Statistics, Working paper 2008-1; Chapter II: The early estimates (1660-1930); Chapter III: Revolutionary decades (1930-1950); Chapter IV: The era of the international guidelines (1950-.)

- IMF

Producer Price Index Manual: Theory and Practice 2004 , ILO, IMF, OECD, United Nations, and the World Bank, 2004

Export and Import Price Index Manual: Theory and Practice , ILO, IMF, OECD, Eurostat, UNECE, World Bank, 2009

- International Household Survey Network

- OECD

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Understanding National Accounts , Lequiller F., Blades D., OECD 2006

Main economic indicators - Sources and methods: construction price indices , OECD, and Eurostat, 2001

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[4]searchable PDF version available here

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    Introduction

International Recommendations for Construction Statistics , Statistical papers, Series M No. 47/Rev.1 United
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Practical Guide to Producing Consumer Price Indices , UNECE, ILO, IMF, OECD, Eurostat, World Bank,
    Office for National Statistics, UK, United Nations, 2009

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    M No. 67/Rev.2, UN, 2008

Strategies for Price and Quantity Measurement in External Trade , United Nations 1981

Use of Macro Accounts in Policy Analysis , Studies in Methods, Series F, No.81, UN 2002; Chapter II: The
    role of macroeconomic and social accounting in policy analysis; Chapter III: Uses of National Accounts in
    economic analysis

Use of the System of National Accounts in Economies in Transition , Studies in methods, Series F, no.66;
    Chapter VI: 'Reorientation of data sources'

Notes