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Essential SNA: Building the basics

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Foreword

I am pleased to present the latest version of the handbook *Essential SNA – building the basics*, intended as a practical tool for the implementation and the improvement of a country's System of National Accounts (SNA).

National Accounts provide information on the design and assessment of economic and social policies. They describe, in a comprehensive way, the level of activity in an economy over time and facilitate a comparison of the economic performance between countries. Many countries have recently undertaken important steps for improving their statistical and institutional capacity to compile National Accounts. Internationally, a new set of standards was agreed in 2008 (SNA 2008) to improve the conceptual basis and the quality of national accounts and supporting economic statistics. Implementation plans are being set-up and followed through by many countries around the world.

This handbook proposes an approach to the implementation of the SNA in developing countries and illustrates the gradual compilation of the accounts and tables that are considered to be most relevant for addressing policy issues. (The main reference framework used is the Minimum Requirement Data Set defined by the Inter-Secretariat Working Group on National Accounts – ISWGNA).

The topics covered by the handbook are grouped into two broad headings. The first includes the main requirements to be fulfilled in order to ensure the conditions for the 2008 SNA implementation, such as the elaboration and application of a strategic plan for statistical development, implementation of the new classifications, improvement of the business registers, refinement and increasingly use of administrative data sources and improvement of the statistical data sources needed for the estimation of national accounts indicators. The second heading includes topics covering methodological considerations as well as practical guidelines for specific domains such as volume measurement, the elaboration of the supply and use tables, the estimation of the non-observed economy and the informal sector and the implementation of quarterly national accounts.

The 2014 handbook develops the work undertaken over the last four years. It includes the most recent developments of the ISWGNA and its work on monitoring 2008 SNA implementation. A new chapter covering the implementation of quarterly national accounts has been introduced with this edition. All the topics now included are supported by an e-learning module and 36 methodological papers, available at:

https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp

I hope that the new version of the handbook will continue to be a valuable resource for statisticians in countries seeking to develop their National Accounting systems. In my view, the book may also be used for the purpose of training in National Accounts for professionals working in a range of organisations (not only in the statistical office but across the government sector). Indeed, this handbook is useful for all users of economic statistics that would like to gain a basic level of knowledge of how National Accounts are built up. Eurostat would like to thank the authors for their contributions, as well as the experts from national statistical offices and international organisations who have sent comments and suggestions for improvement and supported the handbook development, implementation and promotion.

Pieter Everaers

Director of Cooperation in the European Statistical System; International Cooperation; Resources

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This tool is the result of the work of Eurostat Unit A3, coordinated by Claudia Junker, with contributions from Ceri Thompson, Susana Martins and Mihaela Bogatu and the external contractor DevStat Servicios de Consultoría Estadística (represented by José Cervera Ferri and Monica Bergamini) with its associated experts Clementina Ivan-Ungureanu (senior expert) and Livia Dragusin (assistant expert), together with the company ICON-INSTITUT Public Sector GmbH and his associate expert Gosse Hommes.

Unit A3 would also like to thank all contributors to this handbook from Eurostat and from national and international offices and organisations.

Finally, Eurostat accepts the sole responsibility for all remaining errors in the text; please consider this as a work in progress.

Acronyms and abbreviations

1968 SNA	System of National Accounts 1968
1993 SNA	System of National Accounts 1993
2008 SNA	System of National Accounts 2008
ADB	Asian Development Bank
ANA	Annual National Accounts
BEC	Classification by Broad Economic Categories
BPM6	Balance of Payments Manual and International Investment Position, sixth edition
CFC	Consumption of Fixed Capital
CHAPO	Calcul Harmonisé des Prix par Ordinateur
CIF	Cost, Insurance and Freight
CIS STAT	Interstate Statistical Committee of the Commonwealth of Independent States
COFOG	Classification of the Functions of Government.
COICOP	Classification of Individual Consumption by Purpose
CPA	Classification of Products by Activity
CPC	Central Product Classification
CPI	Consumer Price Index
DQAF	Data Quality Assessment Framework (IMF)
ECE	Economic Commission for Europe
ERETES	Equilibres ressources emplois, Tableaux entrées-sorties
ESA 2010	European System of National and Regional Accounts, version 2010
ESCAP	Economic and Social Commission for Asia and The Pacific
FIFO	First In, First Out
FISIM	Financial Intermediation Services Indirectly Measured
GDDS	General Data Dissemination Standard
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GFSM	Government Finance Statistics Manual
GVA	Gross Value Added
HBS	Household Budget Survey
HS	Harmonised System
IAS	International Accounting Standards
IASC	International Accounting Standards Committee
IC	Intermediate Consumption
ICLS	International Conference of Labour Statisticians
ICP	International Cooperation Programme
IFRS	International Financial Reporting Standards
ILO	International Labour Organisation
IMF	International Monetary Fund
IPI	Industrial Production Index
ISIC, Rev. 4	International Standard Industrial Classification, Revision 4
ISTAT	Italian National Statistical Institute
ISWGNA	Intersecretariat Working Group on National Accounts
LFS	Labour Force Survey
LIFO	Last In, First Out
MPI	Import Price Index
MRDS	Minimum Requirement Data Set
NAQ	United Nations Questionnaire
NOE	Non-Observed Economy
NPISHs	Non-profit Institutions Serving Households
NSDS	National Strategies for the Development of Statistics
NSIs	National Statistical Institutes
NSO	National Statistical Office
NSS	National Statistical System
OECD	Organisation for Economic Co-operation and Development
P	Production
PALOP	Portuguese-Speaking African Countries
PC	Personal Computer
PPI	Producer Price Index
QGDP	Quarterly Gross Domestic Product
QNA	Quarterly National Accounts
R&D	Research and Development
SBR	Statistical Business Register
SBS	Structural Business Survey
SDDS	Special Data Dissemination Standard
SITC	Standard International Trade Classification
SUTs	Supply and Uses Tables

UEMOA	Economic Community of West African States
UK	United Kingdom
UN	United Nations
UVI	Unit Value Indices
VAT	Value Added Tax
WB	World Bank
XPI	Export Price Index

Contents

Introduction

1. Scope and aims

Building the System of National Accounts (SNA) in the framework proposed by the last revision (the 2008 SNA) is a complex task, especially for developing countries. The main aim of this handbook is to provide statistics producers with clear and simple guidelines for implementing the SNA.

Developing countries have to face two kinds of challenges in implementing the 2008 SNA: the first refers to the political will and the economic capacity to create the general framework; the second is how to adapt the methodological requirements of the 2008 SNA to the country's specific situation and with the available resources (data sources, human resources and financial support). This raises the question of what is the best strategy to adopt for implementing the 2008 SNA and satisfying user needs (national and international).

The handbook is especially designed to clarify, prioritise and present alternative ways of facing these challenges and preparing countries for estimating national accounts indicators. It focuses on presenting ways of laying the groundwork for compiling national accounts.

The key issues for implementing the 2008 SNA presented in the handbook are:

1. institutional issues, such as the need to create the legal framework for implementing national accounts and the strategy for developing the statistical system, which forms the basis for the implementation of national accounts;
2. technical issues relating to statistical infrastructure, such as the business register and classifications;
3. technical issues relating to statistical and administrative data sources required for compiling national accounts, and especially the use of this data for estimating national accounts indicators;
4. specific issues for the compilation of national accounts, common in developing countries, such as the non-observed economy and the informal sector;
5. conceptual background of price and volume measures in national accounts, the main data sources and methods used for annual estimates.

The most reasonable approach to implementing the SNA consists of a gradual compilation of the accounts and tables required for addressing policy issues and deemed the highest priority for a country. For this reason, the main reference framework is provided by the Minimum Requirement Data Set (MRDS), developed by the Intersecretariat Working Group on National Accounts (ISWGNA) and approved by the UN Statistical Commission during its March 2001 meeting. The MRDS includes a set of required, recommended and desirable data on national accounts that should be provided by countries intending to implement the SNA for the first time (see Table 2.4).

In order to implement the SNA in line with the MRDS, priority should be given at the first stage to compiling GDP data according to production and expenditure and by industry for the overall economy and external counterpart sector. This will enable estimates of the major SNA aggregates to be made.

Incorporating the SNA into routine practice requires a transformation of the entire system of producing socio-economic statistics. This will entail changes and improvements in statistical areas, linked to the SNA or integrated with it, such as government finance statistics, banking statistics, balance of payments, statistics based on households surveys, etc. It will also involve introducing new economic classifications closely linked to the 2008 SNA, such as the International Standard Industrial Classification of All Economic Activities (ISIC) Rev.4, the Central Product Classification (CPC) Ver.2, or the Classification of the Functions of Government (COFOG).

2. Contents

To achieve the objectives outlined above, the handbook has been divided into seven chapters, each focusing on a key issue.

Chapter 1: System of national accounts offers a short introduction to the national accounts system, and in particular the 2008 SNA, stressing the importance for a country of national accounts. This chapter aims to provide arguments for implementing national accounts, providing Chief Statisticians with the tools for justifying the need to allocate human and financial resources to this activity.

The definition and characteristics of the national accounts system are presented, as well as how it may be used in the economy. One section is devoted to the new SNA: it includes a brief history of SNA developments and the main improvements in the 2008 SNA with respect to previous versions.

Chapter 2: Building the SNA presents the guidelines for drafting a national strategy for implementing the SNA and compiling national accounts, these can be adapted to the specific situation in each country.

Three phases of the 2008 SNA implementation process may be identified:

1. elaborating or reviewing the strategic framework and implementation plan as part of the national statistical development strategy;
2. adapting the classification framework and business registers, surveys, and administrative data sources that make up the infrastructure for the compilation of national accounts;
3. collecting data sources and applying the 2008 SNA methodological requirements to calculate the main economic aggregates.

This chapter focuses on the first phase of the process; the last two phases are outlined in Chapter 4: Statistical infrastructure for national accounts.

The first section of the chapter highlights the main point of the National Strategies for the Development of Statistics (NSDS), as a basic foundation for the SNA implementation strategy. The NSDS is expected to provide countries with a strategy for strengthening their statistical capability across the entire national statistical system (NSS) in response to evolving user needs and priorities.

Section 2 presents the main phases of the SNA implementation strategy, starting with the establishment of an appropriate institutional environment (including organisational, human resources and management approaches) followed by drawing up an inventory of data sources, and collection, analysis and translation of indicators into national account concepts.

In detail, the strategy of SNA implementation includes:

1. defining the objectives;
2. setting priorities based on the Minimum Requirement Data Set (MRDS);
3. ensuring institutional conditions are in place;
4. designing a compilation strategy:
   (a) inventory of data sources: general principles, statistical sources, administrative sources;
   (b) classification and nomenclature implementation: units, institutional sectors, flows and stocks, activities, function adapted to the country's situation;
   (c) use of data sources: collection of data sources, analysis of quality and coverage, translation into national accounts concepts, estimation of indicators, reconciliation of data;
   (d) use of IT tools for national accounts – the case of ERETES (Equilibres ressources emplois, Tableaux entrées-sorties).
5. drawing up the dissemination strategy to meet users' needs.

Chapter 3: Basic concepts: an introduction to SNA 2008 concepts is made. The chapter outlines who are the stakeholders in an economy and how they are grouped; the kind of actions they undertake and how these are translated into national accounts indicators; and the purpose of their actions and how the SNA describes and evaluates these actions to obtain the main aggregates.

The main aggregates of the SNA are presented in the second section of the chapter and introduce users to the main results that national accounts provide.

Chapter 4: Statistical infrastructure for national accounts outlines the statistical basis needed for compiling national accounts, set out in two sections: the basis (business register and classifications), and the statistical sources.

The first section deals with objectives, variables, updating methods and uses of the Statistical Business Register (SBR). A short presentation of the following classifications is included: International Standard Industrial Classification of All Economic Activities (ISIC Rev. 4), Classification of the Functions of Government (COFOG), Classification of Individual Consumption by Purpose (COICOP), Central Product Classification (CPC Ver. 2), Standard International Trade Classification (SITC Rev.4) and Harmonised System (HS 2007). For detailed content and explanations, various references are provided (UN website, manuals, etc.).

The second section of the chapter focuses on the main statistical data sources, such as census and surveys, broken down according to main domains. Recommendations concerning the minimum statistical data sources necessary for implementing the SNA are also given.

Chapter 5: Administrative data sources, presents in the first sections the administrative data and the advantages of their use for statistical purposes; in Section 2, the administrative sources are grouped into three main categories: data from the accounting system of non-financial units and financial units, data concerning government revenues and expenditures as well as international trade data and examples of how each of these administrative indicators are translated into national accounts concepts are provided.

Chapter 6: Informal sector provides general guidelines for identifying and assessing the informal sector, a phenomenon found in many developing countries. The first section presents a general overview of the non-observed economy and the role of the informal sector within it. Criteria for identifying the informal sector, measurement methods and the main sources used for its estimation are to be found in the second section.

Chapter 7: Volume measures, introduces the need for main methods used and data sources to compile price and volume measures in national accounts. Section 1 deals with price and volume measures of GDP explaining the aim of the estimations, the main conceptual issues, the basic and specific measurement methods, and main data sources. Section 2 provides a brief description of volume measures of the GDP components by production and expenditure approaches. The main recommendations and conclusions are presented in Section 3, via a tabular synthetic overview of the methods used for volume measures of the main national accounts indicators by activities.

Chapter 8: Supply and Use Tables presents the methodology, the main procedures and the data sources necessary to start and improve their compilation. The compilation of supply and use tables is very laborious, requires detailed ad-

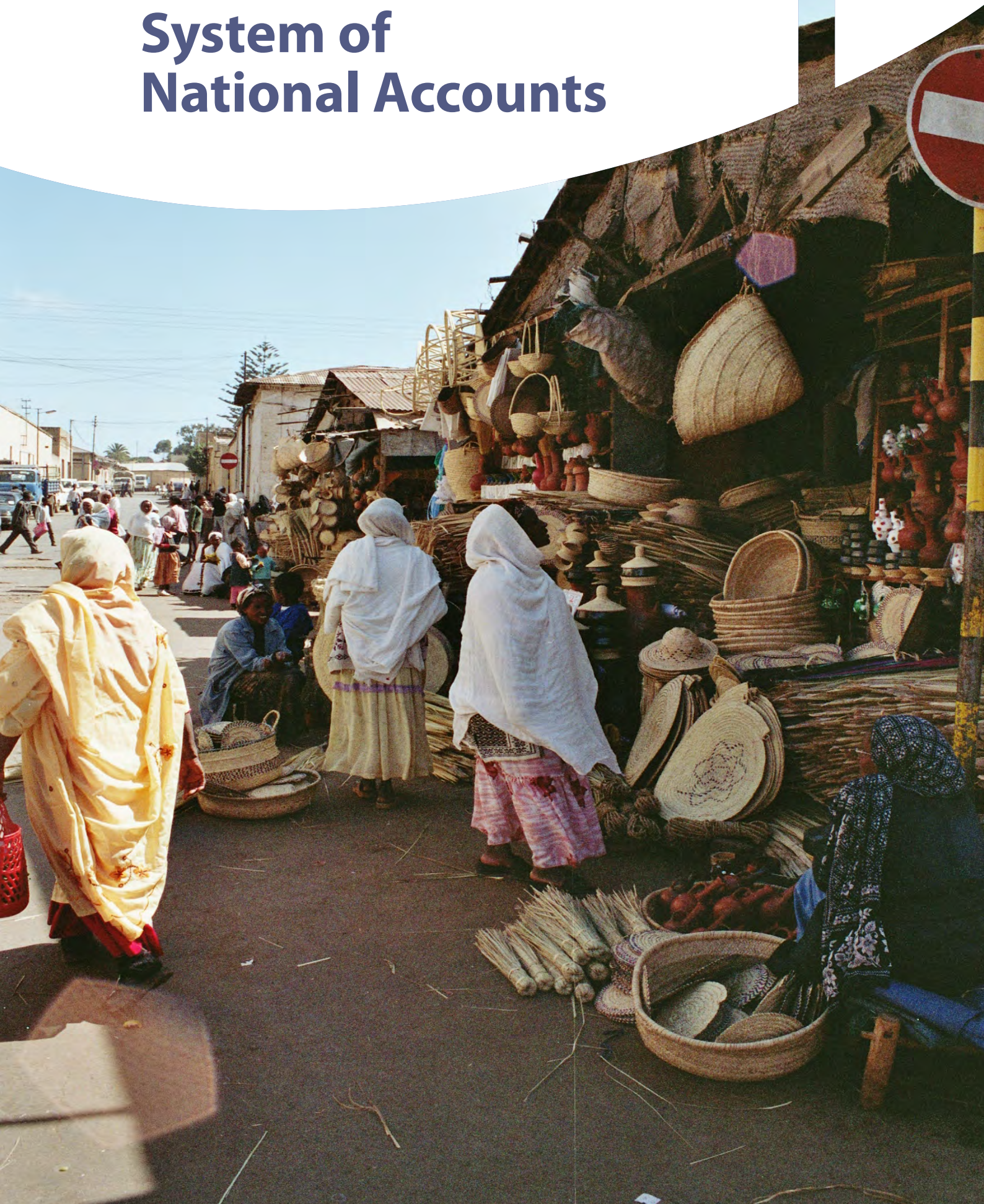
ministrative and statistical data sources, a large investment of human resources and a deeply knowledge of the economy. On the other hand, they provide useful information and their main uses in the economy are presented in Section 1: Why we need supply and use tables. Section 2 includes the basis for building supply and use tables: their structure and integration in national accounts, the classifications used and the main data sources necessary for their compilation in current and constant prices. A special attention is paid to some aspects, specific to the compilation of the supply and use tables, as the estimation of trade and transport margins. The main phases of the compilation process are presented in the section 3, together with the balancing methods of the supply table with the use table.

The last chapter of the handbook, "**Measuring quarterly GDP**" describes the main methodological aspects of quarterly national accounts implementation and development, focusing on the estimation of GDP quarterly GDP (QGDP). Detailed data sources and methods used for its compilation at a quarterly frequency, based on two approaches (production and expenditure), are presented, along with numerical examples of the estimation of different aggregates. The compilation process of quarterly national accounts should meet two important requirements: be available as soon as possible after the end of the reference period and be as accurate as possible, leading to few revisions. The revision policy represents one of the main phases of quarterly national accounts compilation process and for this reason, a section of the chapter is dedicated to it. The main steps to maintain the compilation of quarterly national accounts in the current statistical practice represents one of the concluding remarks. Following the same structure as of the other chapters, questions to practitioners are presented at the end of the chapter, in order to help with the assessment of the current situation and for further improvements.

Common to all chapters is a list of references to other manuals and documents to provide guidance for users interested in further developing the topics covered by the handbook. The references can be found at the end of each chapter.

Boxes 'To find out more…' complete the above-mentioned list of references, providing supplementary information for users of the handbook.

1 System of National Accounts



The chapter in brief

The essential phenomena comprising a country's economic behaviour (production, consumption, accumulation and associated concepts of income and wealth) are identified and measured in the general framework of the System of National Accounts (SNA). Questions such as 'what is the SNA?' and 'what is it for?' are explained in this chapter advocating basic arguments for encouraging the implementation and maintenance of viable statistics.

There is a section in which the new 2008 System of National Accounts (2008 SNA) is described, including a brief history of recent SNA developments and the main recommendations contained in this revised system.

1. SNA in the economy

1.1 What is SNA?

National accounts are an essential tool for evaluating, analyzing and forecasting economic phenomena. Their existence is justified by economic necessities, because they measure what needs to be developed and highlight the size and structure of the economy and all its components. Accordingly, by using national accounts concepts and indicators, economic phenomena are better described and understood. Economic forecasts based on the national accounts framework become realistic and provide tools for decision-makers.

Two different levels of analysis may be identified in an economy:

1. Microeconomic analysis, based on the interpretation of the individual behaviour and inter-individual relationships of economic stakeholders.
2. Macroeconomic analysis, in which a collective analysis of relationships associated with homogeneous groups of individuals is provided. The referent of macroeconomic analysis is often the nation. This enables coherent analysis of an integrated market, a monetary unit, or social behaviour, to name but a few.

The models used in economic analysis are based on four main groups of relationships:

1. accounting equations (linking flows and economic goods);
2. technical equations (for physical units);
3. institutional equations (for certain legal or contractual constraints);
4. behavioural equations (that highlight the proposed rules).

The economy needs a special framework in which to put these equations into practice. This framework has been developed gradually by economists and it represents what are called 'national accounts'. The system of national accounts is a measurement tool offering a suitable means of quantification adapted to macroeconomic needs. It provides the conceptual framework required for developing macroeconomic equations and measuring all aspects of an economy.

Definition

The System of National Accounts (SNA) is the internationally agreed standard set of recommendations on how to compile measures of economic activity in accordance with established accounting conventions based on economic principles. The recommendations are expressed in terms of a set of concepts, definitions, classifications and accounting rules that comprise the internationally agreed standard for measuring such items as gross domestic product (GDP), the most frequently quoted indicator of economic performance. The accounting framework of the SNA allows economic data to be compiled and presented in a format that is designed for purposes of economic analysis, decision-taking and policy-making.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 1: Introduction.

National accounts provide a unique overview of the economy, of the main groups of economic stakeholders, and of various economic flows, stocks and economic processes. The concepts contained in national accounts give specific meaning to the economy and provide factual data for users.

The main characteristics of the national accounts system are:

1. Universality
   National accounts constitute a universal system which takes into consideration the specific circumstances existing in different economies. By way of example, the 2008 SNA includes a new treatment of goods for processing and remittances from persons working abroad, especially relevant for developing countries that are moving into the global economy.
2. Transparency
   National accounts are transparent. The accounting system has a uniform base: the written handbooks and manuals. Furthermore, qualitative descriptions of calculation rules and basic data ensure that the whole process of compilation is intelligible.
3. Harmonisation
   National accounts are harmonised statistics; they employ concepts and classifications that are also used for other social and economic statistics (industry, trade, employment statistics, etc.). Concepts and methodology are harmonised with those of other major international guidelines on economic statistics, in particular the IMF Balance of Payments Manual (BPM) or the IMF Government Finance Statistics (GFS). This harmonisation enables results to be linked and compared.

4. Flexibility
   The SNA incorporates satellite accounts, which offers evidence of its flexibility: by using satellite accounts the relevance of national accounts is increased without affecting the comparability of the central framework. Satellite accounts provide a framework, linked to the central accounts, so that attention can be focused on a certain field or aspect of economic and social life. Common examples are satellite accounts for the environment, tourism or health.

To find out more…

The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 29: Satellite accounts and other extensions.

1.2 SNA and the economy

National accounts represent a broad and comprehensive statistical system aimed at describing a national economy and how it works. The system uses data on economic activities and relevant classifications to provide a systematic picture of the structure and evolution of a national economy.

A national economy circuit is illustrated in Figure. 1.1.

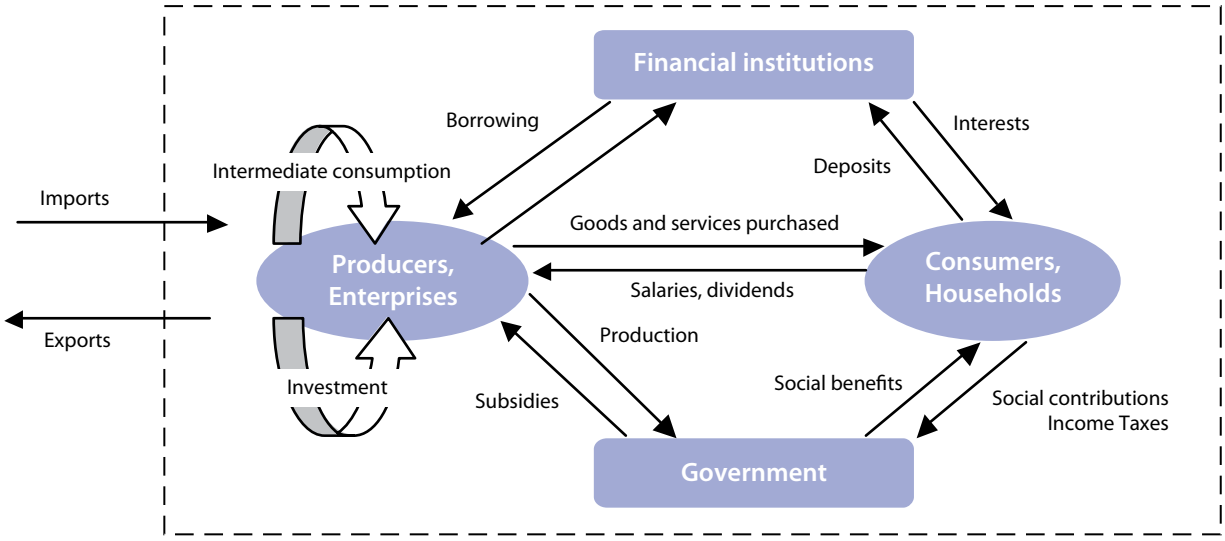
A national economy encompasses a closed space (a country), the outside is the rest of the world. This circuit can be analysed on two levels:

1. The first describes only those flows included in the scheme and corresponds to what are called the consolidated national accounts.
2. The second more detailed level (such as the Input Output Table or Social Accounting Matrix), proposes a breakdown of internal flows highlighting the different economic agents involved in the economy. National accounts evaluate the flow of the economy as represented by the income created by the nation. Income is generated by productive activity.

In Figure 1.1, the economic circuit presents the distribution of income within a national economy and between a national economy and the rest of the world. The economic circuit describes economic flows (transactions of various types) carried out by the resident economic stakeholders as producers or consumers, based on symmetrical transactions that entail the existence of a financial counterpart (e.g. a household consumes goods and services produced by enterprises that pay salaries or dividends to households; households pay taxes to the government and receive services such as education, health, justice and other social benefits). Relations with the rest of the world deal with aspects such as imports and exports of goods and services, the development of the economy based on foreign aid or foreign direct investment, remittances sent by members of a family working abroad, etc.

The concept of residence is presented in Chapter 3: *Basic concepts*.

Figure 1.1: National economy circuit



Sources: European Statistical Training Programme, Course: *Advanced national accounts*, 2007

Transactions and flows that take place in an economic circuit are diverse and, for this reason, the SNA classifies them into four groups:

1. *transactions involving goods and services* (products) describes the supply source (domestic output or imports) and use (intermediate consumption, final consumption, capital formation or exports) of goods and services;
2. *distributive transactions* consist of transactions by which the value added generated by production is distributed to labour, capital and government and transactions involving the redistribution of income and wealth (taxes on income and wealth and other transfers);
3. *transactions involving financial instruments* (or financial transactions) refer to the net acquisition of financial assets or the net incurrence of liabilities for each type of financial instrument;
4. *other accumulation entries* cover transactions and other economic flows not previously taken into account that alter the quantity or value of assets and liabilities.

To find out more…

The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009;

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

National Accounts: A practical introduction, Studies in Methods, Series F, No.85, UN 2003;

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

The concept of national accounts makes a substantial contribution to the quality, stability, neutrality and international comparability of the system and describes transactions in national economies and/or the links between different national economies. National accounts concepts are based on the different systems in an economy, such as: business accounting, production, employment, productivity, monetary policy, inflation, budgetary policy, government finance, personal income, wealth and consumption, balance of payments, etc.

Each system describes a different aspect of a national economy, and explains some of the specific national accounting conventions. National accounts combine these systems into a single accounting framework. As a result, the system of national accounts offers an overview of each of these specific aspects and can also show all kinds of interactions between them and with the national economy as a whole.

1.3 Need for the SNA

The System of National Accounts was developed to provide a tool to be used for macroeconomic analysis and for checking the assumptions that drive economic policy measures. This role has been confirmed over time; but the SNA has succeeded in other areas too.

The key indicators of national accounts such as Gross Domestic Product (GDP), economic growth rate, national income or government deficit play a central role in managing and analyzing economies all over the world. Many economic decisions which have a direct impact on the level of households' income and expenditure are directly influenced by the data provided in the national accounts.

Furthermore, development aid policies include targets for aid flows as a percentage of GDP, and the effectiveness of aid programmes is measured by their impact on GDP growth. In the same way, international programmes aimed at poverty reduction use per capita GDP to identify target regions and to evaluate the results of actions taken.

National accounts data is used by governments, economic policymakers, economic modellers and analysts, financial markets, etc. The stakeholders range from the general public to business, from domestic institutions and government to international organisations. This means that the level of detail of the estimated indicators should be adapted to user needs and should be set out in the framework of the national accounts dissemination strategy.

Chapter 2: *Building the SNA* sets out the national accounts dissemination strategy.

To find out more…

The 2008 SNA European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 1: Introduction; part C 'Uses of the SNA';

To read more about the promotion of economic and official statistics in general as input for evidence-based decision-making, please refer to the documents of Paris21.

http://www.paris21.org/advocacy

The particular importance of national accounts is determined by their diverse uses:

1. The SNA is an excellent tool for obtaining information **on the structure and evolution of a country's economy**. It offers users coherent, comprehensive and permanent access to the main macroeconomic indicators, useful for monitoring an economy's overall performance, strengths and weaknesses.
2. The SNA is the framework used for **economic forecasting**. It provides the accounting framework for formulating the equations used in macroeconomic models. From the data series provided, the national accounts indicators can be used to assess the significant parameters which show how the economy behaves. National accounts can also be used for predictions, such as for testing specific

economic policy measures (fiscal policy, currency parity, allocation of subsidies, investments, etc.).

3. The SNA is the **central statistical framework** that must be used as the **coordinating framework** for all other statistics so as to obtain consistent definitions, and hence data. This is especially true of countries in the early phases of organizing their statistical production.
4. National accounts indicators help to establish a country's **economic policy**: they are used by policy makers to analyse the current situation, identify the major problems and find a common solution for development.
5. **International comparisons** should be based on national accounts indicators. The performance of one economy as compared to that of another is evaluated by economists, journalists, or other analysts in accordance with the common concepts, definitions and classifications provided by the SNA.

Box 1.1: Examples of national accounts uses for economic policy

National accounts indicators	Policy uses
Agricultural accounts with data on farmer income	Agricultural policy
Growth of particular types of manufacturing or service industries using the input-output tables or data on value added by type of activity	Industrial policies
Government deficit and debt as a percentage of GDP	Monetary policy and public finance
Economic growth, expenditure on Research and Development as percentage of GDP	Productivity and growth policy
Expenditure on defence as a percentage of GDP	Defence policy
Social protection statistics closely linked to national accounts concepts	Social policy
Regional gross value added (GVA) per capita; regional households consumption per capita	Regional policy for granting regional funds
GDP per capita	Used to identify countries that need development funds and to establish measurements for poverty reduction
Satellite accounts: health, tourism, environments	Economic policy in the specific domain

Source: Policy uses of National Accounts: an OECD perspective, paper presented to the joint ECE/Eurostat/OECD, Meeting on national accounts, 2002

National accounts have an important role in society, being the main tool for communication and decision-making. They provide a coherent set of concepts and facts about national economies all over the world and serve as frame of reference for thinking and communicating about national economies and their major components. All the users as private and public actors, e.g. households, non-profit organisations, various layers of government, international organisations, economists, journalists and trade-unions think and communicate in terms of national accounting concepts, like economic growth, final consumption expenditure of households, capital formation, government deficit, taxes and subsides, and the external position with the Rest of the World. Forecasts of national accounts statistics are also available all over the world. The monopolistic position of national accounts statistics, and their worldwide use and acceptance reinforce their role as a universal language and body of factual information.

Decision-making is affected by national accounts in a direct way, because it is formulated in terms of SNA, and in an indirect way by shaping our general perceptions about the performance of the national economy and how it works. National accounts' main uses are:

(a) Frame of reference for decisions on investment, consumption and wages.

Economic growth is used as an indicator of financial strength and economic performance of the country. As a consequence, it can influence e.g. foreign direct investments, the purchase and sale of equity and currencies, and the granting and conditions of international loans. These changes can then influence many other variables, like exchange rates, interest rates, consumer prices, and imports and exports. National accounts data indicating poor economic growth can also cause governments to lose elections. Wage negotiations by trade unions can be partly based on forecasts of the macro-economic productivity increase according to the national accounts. Negotiations on big investment projects (e.g. planes, dwellings and infrastructure) are based on national accounts indicators such as economic growth, capital formation, wage increases, public debt, etc.

(b) Target of public policy.

Some examples of the national accounts indicators used to define the economic objectives are:

- The supply of money growth is based on the nominal growth of domestic product corrected for changes in the velocity of circulation (monetary policy target in order to avoid excessive inflation);
- Development aid should be at least 0.7% of national income (international norm of development aid);
- The modification of taxes and social security contributions is established by taking their value as a percentage of national accounts aggregates;
- The European budget for stimulating Research and Development should grow in line with the average nominal growth of European national income;
- The government deficit should not exceed 3% of national income (entrance-criterion for the European monetary union);
- Expenditure on Research and Development is established as a percentage of GDP.

(c) Tax or aid measure for nations and regions.

National accounts statistics as a tax or aid measure includes e.g.:

- The contributions to international organisations like the UN, OECD and IMF and to supra-national economic and political unions, like the EU. These contributions are generally based on national income figures;
- Development aid should be 1% of national income (national policy on development aid);
- Development aid is only provided to the 20 countries with the lowest GDP per capita (national policy on aid);
- Regions with a relatively low GDP per region per capita receive funds from the European Structural Funds.

The uses of national accounts can be improved; for this purpose, the role of the statistical offices is crucial. More attention should be paid to giving guidance to data users about the proper use and misuse of national accounts indicators.

This can be achieved by different methods. Some of them are:

1. Investigating user practice.

The major uses of national accounts should be investigated critically in order to identify major cases of misuse, sub-optimal use and improper use. These have to be remedied by taking proper actions, such as, for example, presenting in a practical way the capacity of national accounts to meet specific economic and social purposes.

2. Accompanying national accounts statistics with supplementary information.

National accounts figures reflect the operational concepts, data sources, statistical techniques and compilation strategies used. Providing information on these (e.g. publish statistics and economic analyses based on national accounts indicators) is indispensable for a proper use of national accounts. International databases of specific sets of national accounts statistics from various countries seem to be a major help for data users. However, if they do not provide information on the meaning, comparability and limitations of these statistics, they create conditions for misuse and misinterpretation of national accounts indicators.

3. Efficient and accessible presentation of national accounts results.

Providing guidance to users implies that the presentation of national accounts is clear and simple and responds to their needs. If very detailed information which requires deeply knowledge of the methodology is disseminated, the attention of the users can be drawn away from the real content of national accounts indicators and national accounts are regarded as an unattractive and inaccessible subject. For example, there is a tradition of emphasizing the subtle differences between net domestic product, gross domestic product, gross national income and net national income. However, for most users, these differences are irrelevant: they only want to use what they always used or what is the best according to official or international standards. The role of the statistical office is to provide the useful information for the major part of the users and to keep the 'door open' for special users who need special information.

Providing guidance to users may even imply an explicit link to standard software on economic modelling, e.g. for conducting simple input-output or institutional sectors analyses.

National accounts statistics could be considered as a product of public service. Being a monopolistic product, it seems that it is not always, and in all countries, well-promoted by presenting its benefits. However, the trend towards more market-oriented government reinforces a drastic improvement in the marketing of the national accounts. This marketing can take various forms: improving the presentation of the national accounts statistics, linking the national accounts statistics better to specific data users and current popular issues, giving courses for users of national accounts statistics and ensuring all kinds of publicity.

The efforts to promote national accounts should stress their central purpose (to provide an overview of the national economy and its major components), and to make the national accounts an attractive resource by presenting concrete cases and pointing out the value added offered to efficient and democratic decision making. In recent years, the availability of national accounts statistics which present economic phenomena in more detail has increased substantially based on the efforts of statistical offices to follow the new methodology. However, no new ways to make use of this relative abundance of data have been developed.

To increase the use of national accounts demands a substantial investment in education. The general knowledge of data users and compilers should be enriched and much easier ways to acquire more knowledge and information (e.g. about the concepts and data sources used) should be developed in order to increase the uses of national accounts. Various methods can be applied, such as international and national courses for different groups of data users (researchers, policy makers, journalists, etc) and at various levels. The investment in education will increase interaction between data compilers and data users and can substantially improve the role of national accounts as a tool for analysis and policy in economy.

2. Towards the 2008 SNA

An accounting framework should reflect the actual economic reality and users' data needs. Given that the economic situation around the world is constantly changing and developing, there is a clear need for a more comprehensive model of national accounting.

Over the years, the SNA has been constantly updated by international organisations making recommendations and concepts suitable for new aspects of production, consumption and accumulation – characteristics of the changing economy.

Box 1.2: Evolution of the SNA's purview

1953 SNA - Simple set of tables and accounts in current prices;

1968 SNA - Extended accounting system, including input-output tables, general principles on prices and volumes and financial accounts;

1993 SNA - Inclusion of balance sheets, employment and purchasing power parities, more detailed accounting structure (more accounts, more sub-sectors and detailed supply and use tables); separate chapters on satellite accounts and flexible adjustments for national circumstances; detailed discussion of general principles on prices and volumes (e.g. chaining and index formulae);

2008 SNA - More detailed presentation of several topics, e.g. government accounts, the informal sector and capital services (important for productivity measurement).

Source: Uses of national accounts; History, international standardisation, and applications in the Netherlands, Bos Fritz, Eagle Economic &Statistics, Working Paper, 2008-1.

The new economic phenomena that the world has witnessed over the last decade, such as the increasing role of information and communication technologies in production processes, the growing role of intangible assets and service activities, the expansion of financial services, the globalisation of national economic systems and the reforms in social security systems require changes to be made to the method of compiling economic statistics.

Under these conditions, the need to update the System of National Accounts 1993 (1993 SNA) became evident in order to adapt it to the new economic environment and the advances in methodological research and user needs.

The updating process has been organised and coordinated by international organisations and supported by experts from all over the world.

The fruits of this process, the 2008 SNA, contains changes in economic structures and improvements in methodologies for measuring economic activities. In order to do so, the fourth generation of official guidelines on national accounting required other sets of international recommendations and standards to be updated:

1. The International Monetary Fund's Balance of Payments Manual and International Investment Position, sixth edition (BPM6).
2. The International Standard Industrial Classification of All Economic Activities (ISIC Rev.4) and the Central Product Classification (CPC Ver.2).
3. The Government Finance Statistics Manual (GFSM2001): note has been taken of any discrepancies between the Manual and the 2008 SNA which will serve as input for a future revision of the Manual. In addition, the Monetary and Finance Statistics Compilation Guide, published in 2007, was improved on the basis of the 2008 SNA.

The 2008 SNA introduces changes and new content to nearly all sections, especially those dealing with non-financial assets, financial services and financial instruments, the rest of the world (balance of payments), government and the public sector. The majority of the recommendations relate to the unit and transaction characteristics of an increasingly globalised economy, innovation in financial instruments and a stronger interest in the sources of private and the public sector wealth and debt. Some recommendations affect major SNA aggregates, such as Gross Domestic Product (GDP) and savings, as would be expected from an update intended to capture the evolving aspects of production, consumption and accumulation. Other recommendations involve instead a range of other elements, including the drafting and clarification of definitions and classifications.

With respect to the previous version (SNA 1993), the major changes affect the following areas: pension schemes, cost of capital services, research and development, military expenditure, goods for processing, etc. These changes concern:

1. statistical units and revisions of institutional sectoring;
2. scope of transactions, including the production boundary;
3. concepts of assets, capital formation and consumption of fixed capital;
4. treatment and definition of financial instruments and assets;
5. scope of government and public sector transactions;
6. harmonisation with the concepts and classifications in the SNA and the BPM, sixth edition.

Some of these changes have an impact on the level of GDP, others on the collection of data or the method used for the estimation of indicators.

Further, some changes of the 2008 SNA are presented more in detail. These concern:

1. statistical units and issues of classification and sectoring
2. production boundary and intermediate consumption
3. assets and capital formation
4. other changes.

Box 1.3: SNA2008 compared to SNA 93

Differences	*Where in SNA2008?*	*Impact on GDP?*
A. Further specifications of statistical units and revisions in institutional sectoring		Not directly
1. Producer unit undertaking ancillary activities to be recognised as a separate establishment in certain cases	*Chapter 5, paragraphs 5.41to 5.42*	
2. Artificial subsidiaries not regarded as institutional units unless resident in an economy different from that of their parents	*Chapter 4, paragraphs 4.62 to 4.64*	
3. Branch of a non-resident unit recognised as an institutional unit	*Chapter 4, paragraph 4.47*	
4. Residence of multi-territory enterprises clarified	*Chapter 4, paragraph 4.13*	
5. Special purpose entities recognised	*Chapter 4, paragraphs 4.55 to 4.58; Chapter 22, paragraphs 22.51 to 22.54*	
6. Holding company allocated to the financial corporations sector	*Chapter 4, paragraph 4.54*	
7. Head office to be allocated to the institutional sector of the majority of its subsidiaries	*Chapter 4, paragraph 4.53*	
8. Sub-sector for non-profit institutions introduced	*Chapter 4, paragraphs 4.35, 4.94, 4.103 and 4.128*	
9. Definition of financial services enlarged	*Chapter 4, paragraph 4.98 and Chapter 6, paragraph 6.158*	
10. Sub sectoring of the financial corporation sector revised to reflect new develop-ments in financial services, markets and Instruments	*Chapter 4, paragraphs 4.98 to 4.116.*	
B. Further specifications of the scope of transactions including the production boundary		
1. Research and development is not an ancillary activity	*Chapter 6, paragraph 6.207*	Yes
2. Method for calculating financial intermediation services indirectly measured (FISIM) refined	*Chapter 6, paragraphs 6.163 to 6.165*	Not directly
3. Output of central bank clarified	*Chapter 6, paragraphs 6.151 to 6.156; Chapter 7, paragraphs 7.122 to 7.126*	Not directly
4. Recording of the output of non-life insurance services improved	*Chapter 6, paragraphs 6.184 to 6.190 and 6.199; Chapter 17, paragraphs 17.13 to 17.42*	Not directly
5. Reinsurance similarly treated as direct insurance	*Chapter 6, paragraph 6.200; Chapter 17, paragraphs 17.56 to 17.65*	Not directly
6. Valuation of output for own final use by households and corporations to include a return to capital	*Chapter 6, paragraph 6.125*	Yes
C. Extension and further specification of the concepts of assets, capital formation and consumption of fixed capital		
1. Change of economic ownership introduced	*Chapter 3, paragraphs 3.21, 3.26, 3.169; Chapter 10, paragraph 10.5*	Not directly
2. Asset boundary extended to include research and development	*Chapter 10, paragraphs 10.103 to 10.105*	Yes

Differences	*Where in SNA2008?*	*Impact on GDP?*
3. Revised classification of assets introduced	*Chapter 3, paragraphs 3.5, 3.30 to 3.31, 3.37 to 3.39; Chapter 10, paragraph 10.8*	Yes, linked to extension
4. Extension of the assets boundary and government gross capital formation to include expenditure on weapons systems	*Chapter 10, paragraphs 10.87 and 10.144*	Yes
5. The asset category 'computer software' modified to include databases	*Chapter 10, paragraphs 10.110 to 10.114*	Yes
6. Originals and copies recognised as distinct products	*Chapter 10, paragraphs 10.100 to 10.101*	Not directly
7. The concept of capital services introduced	*Chapter 20*	Not directly
8. Treatment of costs of ownership transfer elaborated	*Chapter 10, paragraphs 10.48 to 10.52, paragraph 10.97 and paragraphs 10.158 to 10.162*	Not directly
9. Mineral exploration and evaluation	*Chapter 10, paragraphs 10.106 to 10.108*	Not directly
10. Land improvements	*Chapter 10, paragraphs 10.79 to 10.81*	Not directly
11. Goodwill and marketing assets	*Chapter 10, paragraphs 10.196 to 10.199*	Not directly
12. Water resources treated as an asset in some cases	*Chapter 10, paragraph 10.184*	Not directly
13. Consumption of fixed capital to be measured at the average prices of the period with respect to a constant-quality price index of the asset concerned	*Chapter 10, paragraph 10.156*	Not directly
14. Definition of cultivated biological resources made symmetric to uncultivated resources	*Chapter 10, paragraph 10.88*	No
15. Intellectual property products introduced	*Chapter 10, paragraph 10.98*	Not directly
16. Concept of resource lease for natural resources introduced	*Chapter 7, paragraph 7.109*	No
17. Changes in the items appearing in the other changes in the volume of assets account introduced	*Chapter 12*	No
D. Further refinement of the treatment and definition of financial instruments and assets		No
1. Treatment of securities repurchase agreement clarified	*Chapter 11, paragraphs 11.74 to 11.77*	
2. Treatment of employee stock options described	*Chapter 11, paragraph 11.124; Chapter 17, paragraphs 17.384 to 17.398*	
3. Treatment of non-performing loans elaborated	*Chapter 11, paragraph 11.129; Chapter 13, paragraphs 13.66 to 13.68*	
4. Treatment of guarantees elaborated	*Chapter 17, paragraphs 17.207 to 17.224*	
5. Treatment of index-linked debt securities elaborated	*Chapter 17, paragraph 17.274 to 17.282*	
6. Treatment of debt instruments indexed to a foreign currency revised	*Chapter 17, paragraph 17.281*	
7. Flexibility on valuation of unlisted equity	*Chapter 13, paragraphs 13.69 to 13.70*	
8. Unallocated gold accounts treated as financial assets and liabilities	*Chapter 11, paragraph 11.45*	
9. Definition of monetary gold and gold bullion revised	*Chapter 11, paragraph 11.45 and 11.46*	

Differences	*Where in SNA2008?*	*Impact on GDP?*
10. Liability in special drawing rights recognised	*Chapter 11, paragraphs 11.47 to 11.49*	
11. Distinction made between deposits and loans	*Chapter 11, paragraph 11.56*	
12. Fees payable on securities lending and gold loans	*Chapter 17, paragraph 17.254*	
13. Financial asset classification	*Chapter 11*	
14. Distinction between financial leasing and operating leasing based on economic ownership	*Chapter 17, paragraphs 17. 301 to 17.309*	
15. Changes in recommendations for recording pension entitlements	*Chapter 17, paragraphs 17. 116 to 17.206*	
E. Further specifications of the scope of transactions concerning government and public sector		Not directly
1. The boundary between private/public/government sectors clarified	*Chapter 4, paragraphs 4.25 and 4.77 to 4.80, Chapter 22*	
2. Treatment of restructuring agencies elaborated	*Chapter 22, paragraphs 22.47 to 22.50*	
3. Treatment of government issued permits clarified	*Chapter 22, paragraphs 22.88 to 22.90*	
4. Exceptional payments from public corporations should be recorded as withdrawals from equity	*Chapter 22, paragraphs 22.135*	
5. Exceptional payments from government to public quasi-corporations should be treated as capital transfers	*Chapter 22, paragraphs 22.138*	
6. Accrual recording of taxes	*Chapter 22, paragraphs 22.91 to 22.94*	
7. Tax credits	*Chapter 22, paragraphs 22.95 to 22.98*	
8. Treatment of ownership of fixed assets created through public-private partnerships clarified	*Chapter 22, paragraphs 22.154 to 22.163*	
9. Taxes on holding gains continue to be shown as current taxes on income and wealth	*Chapter 8, paragraph 8.61*	
F. Harmonisation between concepts and classifications of the SNA and the sixth edition of the Balance of Payments Manual		No
1. Centre of predominant economic interest as the basic criterion for determining the residence of the unit	*Chapter 4, paragraph 4.10*	
2. Individuals changing residence	*Chapter 26, paragraphs 26.37 to 26.39*	
3. Goods sent abroad for processing are recorded on change of ownership basis	*Chapter 6, paragraphs 6.85 to 6.86 and Chapter 14, paragraphs 14.37 to 14.42*	
4. Merchandised goods	*Chapter 14, paragraphs 14.73.*	

The Box 1.4 offers an example of the compilation of own-account production in the absence of reliable market prices. One should know that, by convention, no net return to capital is included when own-account production is undertaken by non-market producers.

Box 1.4: Own-account output compilation according to SNA2008

	Non-financial corporations	*General Government*	*Non-profit institutions*	*Households*	*Total*
Output for own final use, made of:	**181**	**35**	**20**	**67**	**303**
a. Intermediate consumption	100	15	8	1	124
b. Compensation of employees	45	17	9	26	97
c. Consumption of fixed capital	15	3	2		20
d. A net return to fixed capital*	20				20
e. Other taxes (less subsidies) on production	1		1		2
f. Mixed income (only for Households)				40	40

** By convention, no net return to capital is included when own-account production is undertaken by non-market producers*

Besides the methodological work on national accounts, one of the important objectives of international organisations in this period is to ensure suitable conditions for countries to implement the recommendations of the SNA. The implementation of the 2008 SNA represents a global statistical initiative with the objective to assist countries in developing their statistical and institutional capacity to:

1. make the conceptual change over from the 1993 SNA to the 2008 SNA;
2. improve the scope, detail and quality of the national accounts and supporting economic statistics.

The principles of the implementation strategy are based on four elements:

1. Use of National Strategies for the Development of Statistics (NSDS), or similar national plans setting out priorities, as the strategic planning framework.
2. The programme information structure built around the statistical production process, scope and compliance of the national accounts, and supporting economic statistics, which facilitates the coordination, monitoring and reporting on the SNA implementation in a multi-stakeholder environment.
3. The modalities of statistical capacity building through training and technical cooperation, publication of manuals and handbooks, research, and advocacy. Statistical capacity building comprises four modalities:
   (a) training and technical cooperation, which emphasise institutional capacity building and the development of data sources;
   (b) manuals and handbooks, which provide methodological guidance and consideration for the fundamental issues of data sources and quality;
   (c) applied research to development of new concepts for meeting new measurement challenges;
   (d) advocacy, which aims to support ongoing dialogue among statistical producers, the various levels of government, the business sector, the academic community, and the general public about user needs for official statistics and the progress in meeting those needs.
4. The stages of implementation leading to the change over to the 2008 SNA which represent:
   (a) a review of strategic frameworks and detailing of national and regional implementation programmes;
   (b) the adaptation of classification frameworks, business registers and frames, surveys, administrative data sources and information technology infrastructure;
   (c) the application of adapted frameworks and source data, backcasting and changeover to 2008 SNA.

Each country determines its own duration of the stages leading to the change over to the 2008 SNA. However, it is expected that from 2014 onwards, most of the countries would change over to the 2008 SNA following a gradual two- to three-year transition for each change-over stage.

To find out more…

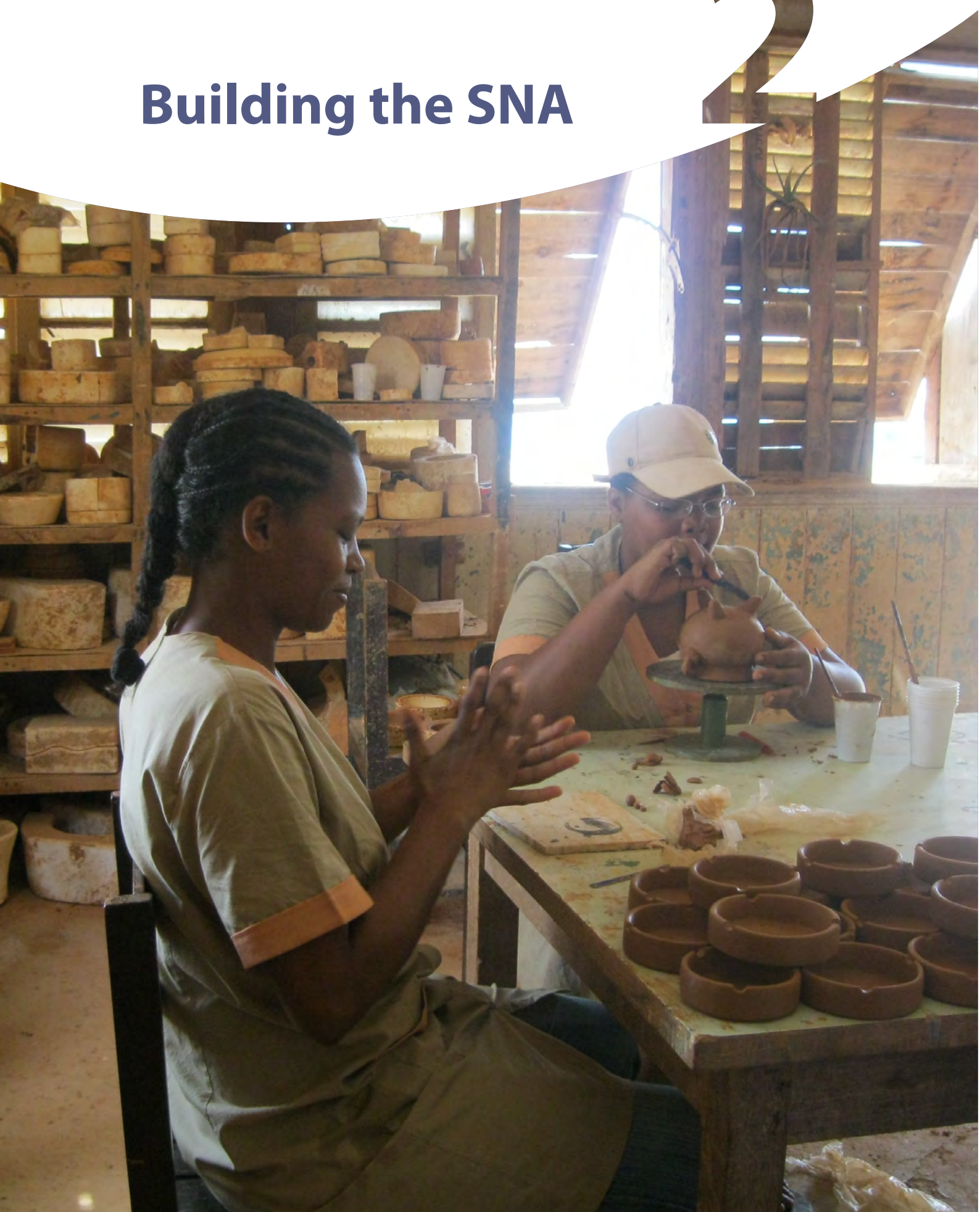
The 2008 SNA European Commission, IMF, OECD, UN, World Bank, 2009, Annex 3: The changes from the 1993 System of National Accounts.

http://unstats.un.org/unsd/nationalaccount/SNA2008.pdf

3. Recommended reading

- *The 2008 SNA,* European Commission, IMF, OECD, UN, World Bank, 2009; Chapter 1: Introduction; annex 3: Changes from the 1993 System of National Accounts;
- *ESA 2010*, Chapter 1: General Features and Basic Principles- Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union;
- *National Accounts: A practical introduction,* Studies in Methods, Series F, No.85, UN 2003; Chapter VIII: SNA framework for the total economy;
- *A system approach to national accounts compilation,* Studies in Methods, Series F, No.77, UN 1999; Introduction;
- *System of National Accounts 1993*, Training manual, SADC, 1999; Chapter I: National accounts and the 1993 SNA;
- *Uses 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;
- *Uses of national accounts; History, international standardisation and applications in the Netherlands,* Fritz B., MPRA, 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-..);
- *Policy uses of National Accounts: an OECD perspective*, paper presented to the joint ECE/Eurostat/OECD Meeting on national accounts, 2002;
- *Understanding National Accounts,* Lequiller F., Blades D., OECD 2006;
- *Guide methodologique pour l'elaboration des comptes nationaux dans les états membre d'Afristat,* Afristat, Serie Méthodes No.4, 2001;
- *Use, misuse and proper use of national accounts statistics,* Boss F., MPRA paper no.2576, 2007.

2 Building the SNA



The chapter in brief

The SNA has an important function insofar as it is the framework for statistical coordination. In this respect, the implementation and development of the SNA represent major strategic decisions that impact on the entire statistical system. The National Strategies for the Development of Statistics (NSDS) and the main phases of their elaboration are presented in the first section of the chapter. The second section presents the national accounts implementation strategy and the main actions undertaken to achieve it.

1. National Strategies for the Development of Statistics (NSDS)

Statistics are important since they are used to support policy-making aimed at economic growth, the allocation of resources, monitoring national progress and making government activities more transparent.

In many developing countries, the statistical system is fragile and under increasing pressure, mainly due to growing requests from national and international users and the limited technical and human resources available, often devaluing the reliability and integrity of the data provided. Furthermore, as part of government administration, the national statistical office has to work on tight budgets while still ensuring efficiency and productivity.

A crucial condition for ensuring that statistical activities are managed efficiently under these circumstances is to have a clear picture of further development and integrate this into **Strategic planning**.

A **number of initiatives** and **systems** that promote best statistical practices and serve as a framework for strategic planning have been developed over the past few years by international organisations. They are meant to help countries to build a realistic statistical strategy. Among these, it is important to highlight:

1. *Fundamental Principles of Official Statistics*, adopted by the United Nations Statistical Commission, setting out guidelines on the fundamental values and principles to be followed for producing useful, high-quality statistics deemed reliable by data users;
2. Drafting and promoting by the International Monetary Fund of the *Data Quality Assessment Framework* (DQAF), which provides a more detailed structure for assessing the quality of statistics, from the institutional framework to the dissemination of data;
3. *The PARIS21 Statistical Capacity Building Indicators* (SCBI), based on the DQAF, help countries to identify strengths and weaknesses in their national statistical systems and facilitate communication and coordination among development partners by providing common yardsticks for countries' statistical capacity needs (see Box 3.3);
4. Other international, regional, and sectoral frameworks contribute to the building capacity and output of the National Statistical System, including the Multi-annual Integrated Statistical Programme (MISP) developed by the statistical office of the European Union, Eurostat, in co-operation with Eastern European countries and members of the Commonwealth of Independent States.

Box 2.1: What is Paris 21?

The Partnership in Statistics for Development in the 21st Century (PARIS21) was founded in November 1999 by the United Nations, the European Commission, the OECD, the IMF and the World Bank, in response to the UN Economic and Social Council resolution on the goals of the UN Conference on Development. PARIS21's goal is to develop a culture of evidence-based policy making and implementation which serves to improve governance and government effectiveness in reducing poverty and achieving the Millennium Development Goals. PARIS21 pursues this goal by encouraging and assisting low-income, least developed countries to design, implement, and monitor a **National Strategy for the Development of Statistics (NSDS)**. An NSDS is expected to provide a country with a strategy for strengthening statistical capacity across the entire national statistical system (NSS).

Source: Paris 21, http://www.paris21.org

1.1 Elaborating an NSDS

The **National Strategies for the Development of Statistics (NSDS)** approach has been adopted as a new benchmark for planning the strengthening of statistical capacity in response to evolving user needs and priorities. An NSDS is expected to provide a country with a strategy for strengthening its statistical capacity across the entire national statistical system (including national accounts). The NSDS *provides a vision for where the NSS should be in five years and sets milestones for getting there*, offering a comprehensive and unified framework for user needs and statistical capacity assessment and for priorities decision.

Except for the few countries that are not in the midst of an NSDS process (most of them being countries in special situations, such as fragile states or small island economies), the main concern countries have for the immediate future is how to implement an NSDS, through a continuous, flexible and well-managed strategic planning process that will both build statistical capacity and generate the data needed to support their progress.

Before putting in place an NSDS, an analysis of the strengths and weaknesses of the national statistical system has to be carried out. The analysis is focused on:

1. institutional framework and decision-making processes regarding official statistics (including producer coordination instruments and confidentiality protection);
2. statistical infrastructure (dissemination, networks with users and respondents, statistical registers, analytical capacity, etc.);
3. capacity to carry out household and business surveys such as regular data collection;
4. access to administrative data;
5. capacity to integrate different data sources (e.g. for national accounts or the Millennium Development Goals indicators);
6. staff and their skill level;
7. capacity to develop IT tools for statistics;
8. capacity to participate in international activities and to integrate activities funded by international donors into national programmes;
9. user confidence in the integrity of the national statistical office (NSO) (and in other producers), and in the quality of the results produced.

Box 2.2: Summary table of NSDS status for the International Development Association (IDA) countries (situation at March 2013)

	Countries currently implementing a strategy		Countries currently designing a strategy or awaiting adoption		Countries with strategy expired or without strategy and currently planning an NSDS		Countries without a strategy or with strategy expired and not planning one		TOTAL
	No.	%	No.	%	No.	%	No.	%	
AFRICA	22	55.0%	13	32.5%	4	10.0%	1	2.5%	40
ASIA & PACIFIC	17	58.6%	7	24.1%	5	17.3%	0	0.0%	29
LATIN AMERICA & CARIBBEAN	1	11.1%	4	44.4%	4	44.4%	0	0.0%	9
EUROPE	2	66.7%	0	0.0%	1	33.3%	0	0.0%	3
TOTAL	**42**	**51.9%**	**24**	**29.6%**	**14**	**17.3%**	**1**	**1.2%**	**81**

Source: National Strategies for Development of Statistics, Progress Report, Progress Report, March 2013, http://paris21.org/sites/default/files/NSDS_Status_Table_Mar2013.pdf

The main phases for the drafting of the NSDS are:

Phase I: Launching the process (NSDS Design Road Map)
This first phase is crucial for the drafting of the NSDS. In some countries, the decision to implement the NSDS has to be taken formally by the government, for example, through a decision of the cabinet or the minister with responsibility for statistics. Once the decision has been taken, the agencies leading the preparation of the NSDS will have to draw up a programme, or road map, that will set out in detail what needs to be done, by whom, and when and how it will be financed.

Phase II: Assessment of the Current Status of the National Statistical System
Once the legal framework has been set, several domains of the NSS have to been assessed. The main areas to be analysed are: user needs, the legal and institutional framework, cooperation, coordination arrangements, existing gaps (methodological or in data quality) in statistical data compilation, and finally the statistical capacity to implement new activities.

Phase III: Developing the vision and identifying strategic options
Based on the statistical assessment, the desired results are agreed and priorities set out.

Phase IV: Preparing the implementation plan
This phase defines the resources to be allocated for the implementation and the main actions that will be undertaken by the statistical office.

Phase V: Implementation, monitoring and evaluation
The most important consideration is that the NSDS be seen as a continuously evolving process. To be effective, the statistical system must remain flexible and respond to new demands for data and changing environments. Mechanisms for monitoring and evaluating progress, reviewing the strategy and making modifications (if needed) must be developed to ensure the success of the NSDS over time.

Box 2.3: Tools offered by PARIS21 to prepare an NSDS

The main tools put in place by PARIS21 to help countries to implement an NSDS are:

1. the **mobilisation and leveraging** of resources (both national and international) for implementing NSDSs;
2. the establishment of **country-level statistical sub-groups** to co-ordinate statistical system support;
3. **partnership** initiatives (e.g.: Partner Report on Support to Statistics - PRESS) to coordinate donor support to statistics;
4. the **coordination of all stakeholders** within the National Statistical System (statistical units in sector line ministries, central bank, central statistical office, etc.);
5. the production of **statistical advocacy materials** promoting the increased use of statistics in decision-making and the need for a well-financed NSDS integrated into wider development policy frameworks;
6. **peer reviews** focused on strategic planning and National Statistical System governance;
7. production of **guidance and documentation** on strategic statistical planning;
8. provision of **technical assistance** to address issues such as statistical legislation, national statistics councils, training, human resources, etc.;
9. support for special situations in **fragile/crisis** states and **small island developing states**.

Source: Paris 21, http://www.paris21.org

1.2 Advocacy for statistics

The success of an NSDS in developing countries is influenced by the advocacy work of managers of the statistical offices.

A well-designed, well implemented and well-financed NSDS will lead to better use of statistics, better decision-making and better development outcomes. NSDS is a great opportunity for statistical advocacy, in particular at its design stage. It is during this phase that very important questions (ownership, actors involved, political support, technical and financial assistance) arise and that need for advocacy action is at its highest. The level of engagement of political leaders will vary upon the political set-up and decision-making process. However, the sooner the political leaders are involved in the process, the better.

The statistical advocacy is a means of convincing policy-makers, media, civil society, and representatives of multilateral and bilateral agencies of the importance of statistics in the wider context of development and, in particular, of the necessity for developing countries to have a NSDS as tool for improving NSS.

The main steps to elaborate the advocacy strategies for statistics are:

1. Deciding the goals for which the advocacy is needed

There could be a number of changes and improvements needed in the statistical office, but the approach will be most effective if it focuses on a few (maybe five or six) of the most desirable for the implementation of the NSDS. These outputs represent the basis for the advocacy strategy.

Some examples of possible goals:

- Elaborate an NSDS;
- Implement the action plan developed in the frame of NSDS;
- Obtain funds for the development of social statistics as presented in the NSDS;
- Produce good quality, timely statistics across NSS;
- Develop skills and capacity of staff across NSS;
- Develop NSS work plans and financing strategy;
- Improve uses of statistics, etc.

2. Identifying the social, political, economic and institutional factors to achieve the goals proposed

The analysis of the current situation in the statistical office and in the country offers the possibility to identify the positive and negative factors that may have an impact on reaching the objectives. Table 2.1 presents some possible factors.

Table 2.1: Factors impacting the proposed objectives

Positive factors	Negative factors
MDGs and PRSPs have increased demand for monitoring information	Limited resources available to government
Donors becoming more interested in statistics to demonstrate effectiveness of aid; and to monitor budget support	Most donors not supporting statistics
Minister of Finance needs to demonstrate that development (and aid) is working	
High profile statistics (e.g. Consumer Price Index) have raised media and public interest in statistics	Demand for statistics generally low
etc	etc

Source: Advocating for the National Strategy for the Development of Statistics, Paris 21, OECD, May 2010

3. Identifying the organisations and individuals (internal and external) that can help the change or the improvement

In many cases, putting in place of the desired changes or improvements requires additional staff or funds. The NSO can apply directly to the Minister of Finance and donors to obtain additional funds and/or indirectly through the media and civil society groups interested in statistical improvement.

4. Deciding the messages for the organisations' and individuals' sensitisation

The type of organisation to which the request for funds is being made influences the content of the messages that the NSO should elaborate and transmit. There are a wide variety of messages that could be put across - Table 2.2 presents a selection of them.

Table 2.2: Messages for the advocacy

Who can influence the change?	Messages
Minister of Finance	– Investment in statistics will pay for itself many times over by improving the efficiency of resource allocation – Statistics are needed to manage the way that results of government policy are presented and analysed – Statistics are useful for the social policy of the government – Statistics are important for development planning at the local levels (villages, traditional areas)
Donors	– Better statistics will improve allocation and monitoring of aid – Statistics are needed to present, measure and analyse the results of policies
Media (and civil society)	Better statistics will improve means to hold government accountable for its policies

Source: Advocating for the National Strategy for the Development of Statistics, Paris 21, OECD, 2010

5. Defining the ways to deliver the messages

The best ways of getting these messages across to their audiences are decided by taking into account the particular profile of each audience and the ways in which they can support the objectives of the statistical office. Possibilities for the best approaches in each case are displayed in Table 2.3.

Table 2.3: Ways to transmit the messages

To:	The messages are delivered	
	Directly	Indirectly
Minister of Finance	Demonstrate impact of good statistics (good and bad examples) Deliver quality statistics, subject to budget limitations	Regular media coverage Donor interest in statistics
Donor group	Meeting with DAC donor group Individual donor meetings Make sure donor representatives see statistics that are produced	Regular media coverage
Media (and civil society)	Press releases Interviews with journalists Press briefing/ training sessions Posters, leaflets User-friendly publications	

Source: Advocating for the National Strategy for the Development of Statistics, Paris 21, OECD, May 2010

The strategic approach provides a way of thinking and acting which is useful for the managers when developing the statistics advocacy necessary to elaborate and implement a successful NSDS.

Within the NSDS, the implementation or the development of national accounts represents the core objective. As part of the general strategy, the SNA strategy is based on existing conditions; however, it has a decisive impact on the development of the entire statistical system. Its main role within the SNA is to serve as the coordinating framework for statistics because:

1. It ensures consistency of definitions and classifications used in different fields of statistics;
2. The methodological demands of national accounts require statistics to be developed (for example, in response to the need for estimating the growth rate of the economy based on GDP at constant prices, a price system is implemented and developed in the statistical system);
3. It provides an accounting framework and ensures the numerical consistency of data from different sources (statistical and administrative); thus errors in the statistical indicator calculations can be detected;
4. Requests to harmonise the SNA will determine the nature of the revisions and improvements made to all related statistical systems, such as financial statistics or balance of payments statistics.

To find out more…

Guide to statistics in EC development co-operation, Eurostat, 2009.

For more information concerning the National Strategies for the Development of Statistics see **http://www.paris21.org**

2. The 2008 SNA implementation strategy

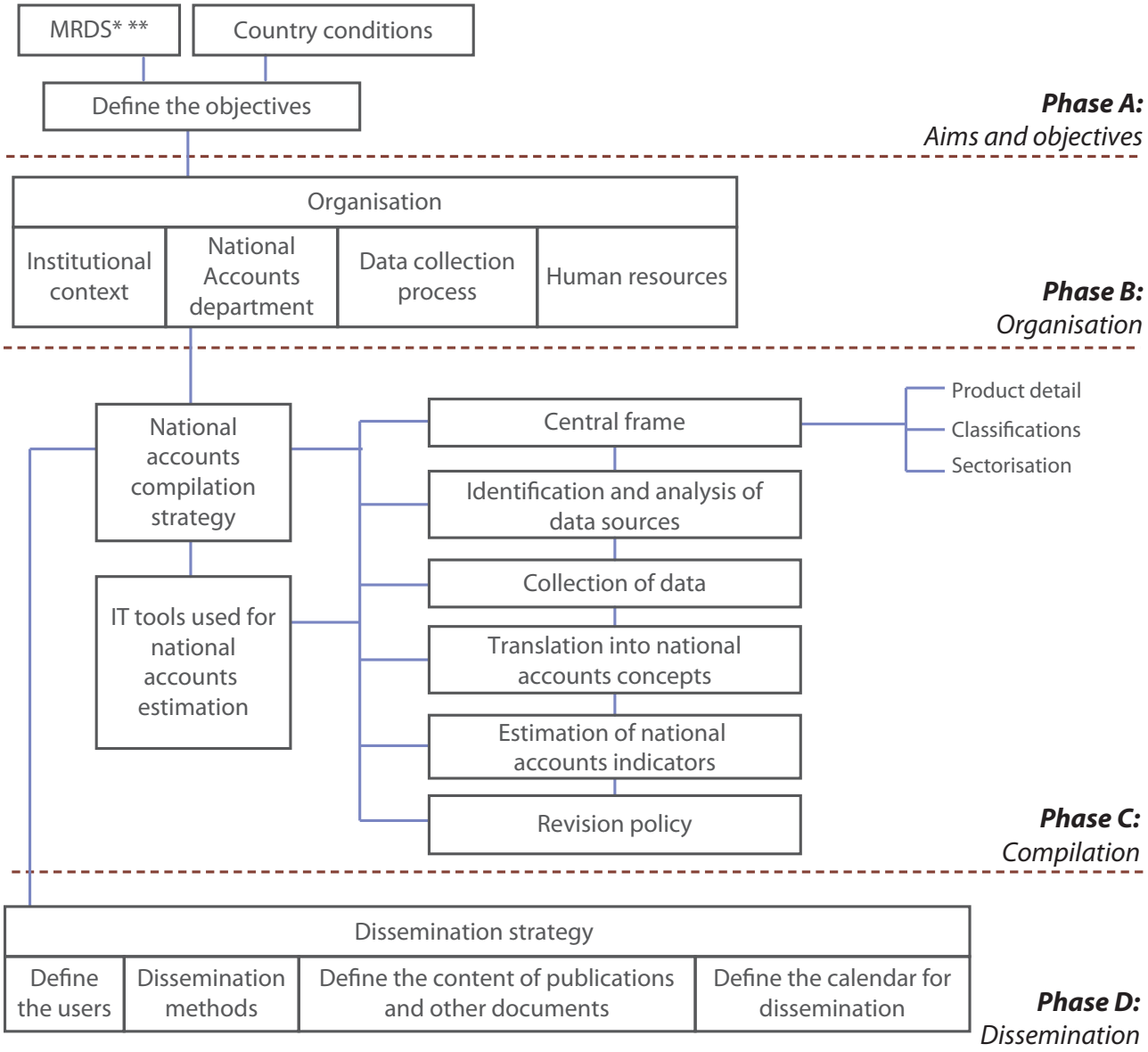
The 2008 System of National Accounts serves as the general conceptual framework for the compilation of national accounts. The ways of implementing the system vary greatly and depend on the general strategy adopted for the statistical system.

A strategy for implementing the SNA comprises the following phases:

1. Phase A: Aims and objectives
2. Phase B: Organisation
3. Phase C: Compilation
4. Phase D: Dissemination

The phases are presented in Figure 2.1

Figure 2.1: The SNA implementation strategy



*MRDS= Minimum Requirement Data Set. See Table 2.4.

2.1 Phase A: Aims and objectives

The first stage of the strategy entails the definition of the aims and objectives for implementing the 2008 SNA. The general aim is the implementation of SNA while the objectives refer to the specific results to be achieved during a defined period (3-5 years).

The decision about which objectives a country wants to achieve should be based on an in-depth analysis of the local situation. It is helpful to present some important factors to be taken into consideration when deciding which objectives to achieve:

1. the country's statistical capacity for providing the data sources required for compiling national accounts;
2. the human resources (number and level of knowledge) capable of implementing and developing national accounts;
3. the possibility of using financial data (i.e. business accounts) from the formal sector and the ability to translate this information into national accounts indicators by activity or institutional sector;
4. the structure of the economy, especially the extent of the informal sector and the ability to cover it with existing data sources.

Generally, implementation of SNA starts with the compilation of GDP by production and expenditure, because some of the data sources needed exist in almost all countries, and the result, the GDP, represents the most important national accounts indicator.

The decision on whether to implement the SNA is based on:

1. Availability of data sources supporting its implementation. The first estimates of national accounts indicators will refer to a period in the past for which data has to be taken as it is, because the sources cannot be improved or new ones introduced. Only after 2-3 years, when the needs for national accounts have been clarified, based on the experience obtained, can improvements to data sources be made. Data sources and users' needs will also determine the breakdown of national accounts indicators by industry, institutional sectors, or by geographical region.
2. Institutional capacity of the unit in charge of implementing the SNA.
3. Needs of national and international users for national accounts indicators.

For many countries, full implementation of the SNA is not feasible due to the unavailability of some (or many) of the elements just described. Furthermore, implementation of the SNA involves data collection and processing, which may not coincide with a country's policy priorities at a given moment. For all of these reasons, countries implementing the SNA for the first time will have to decide what targets they want to achieve; to facilitate this task, they can refer to the six 'milestones' adopted by the UN Statistical Commission (see Annex 1).

The milestones represent the six phases for full implementation of the SNA. A country has reached a particular milestone when it is able to produce a combination of key tables, defined for each milestone. The specific results of SNA implementation reflect the country's ability to produce national accounts data.

There have been developed three data sets to assess the scope of national accounts implementation according to the 1993 SNA. The first set is a defined benchmark called the minimum requirement data set (MRDS). The MRDS is a set of annual accounts that essentially groups together the accounts recommended in milestones 1 and 2. The second set is the recommended data set, which are annual accounts 'recommended' for compilation by all countries plus some 'recommended' quarterly accounts; these are recommended because of their importance in assessing developments of an economy. The third data set is the desired data set, which comprises useful data that should be compiled if possible. In addition, the recommended data set and the desirable data set facilitate scope assessments beyond the threshold of the benchmark.

The data sets of the scope and compliance measures used for the 1993 SNA have been developed to also assess the scope and compliance for the 2008 SNA. However, the need for more timely information to facilitate appropriate policy responses highlights the importance to include also the compilation of quarterly national accounts, which require some adjustments to the scope measure as reflected by the required data set measure.

The MRDS defined for the 2008 SNA implementation take into accounts the present requirements of the users by including quarterly accounts for the nominal and volume measure of GDP by industry or by expenditure components and the quarterly compilation of the integrated accounts until net lending for the total economy and the rest of the world. The MRDS include also the compilation of annual institutional sector accounts until net lending for the corporate, government, households and non-profit institutions serving households sectors; the quarterly compilation of these sectors is recommended. The data sets to assess the scope of the 2008 SNA implementation MRDS are presented in Table 2.4.

Table 2.4 Scope of the implementation of 2008 System of National Accounts – Data sets

NAQ Table Number	Indicators	Annual accounts	Quarterly accounts
	GDP, value added and employment		
	Nominal and volume measure of GDP by industry or by expenditure components	Minimum requirement	Minimum requirement
1.1	Expenditures of the GDP in current prices	Minimum requirement	Optional Minimum requirement
1.2	Expenditures of the GDP in constant prices	Minimum requirement	Optional Minimum requirement
2.1	Value added and GDP in current prices by industry	Minimum requirement	Optional Minimum requirement
2.2	Value added and GDP in constant prices by industry	Minimum requirement	Optional Minimum requirement
2.3	Value-added components by industry, current prices	Minimum requirement	Recommended
	Employment by industry	Minimum requirement	Recommended
	Integrated accounts and tables, including integrated satellite accounts		
1.3/4.1	Accounts for the total economy (until net lending)	Minimum requirement	Minimum requirement
	Supply and use table	Recommended	Desirable
5.1	Cross-classification of output/value added by industries and sectors	Recommended	
	Tourism accounts, environmental accounts and other socio-economic accounts	*	
	Purpose classification of expenditures		
3.1	General government final consumption (and other) expenditure by purpose in current prices	Recommended	
	General government final consumption expenditure by purpose at constant prices	*	
3.2	Individual consumption (and other) expenditures by purpose in current prices	Recommended	
	Individual consumption expenditures by purpose at constant prices	*	
	Purpose classification of intermediate and final consumption across all sectors		
	Institutional sector accounts (until net lending)		
4.2	Rest of the world accounts (until net lending)	Minimum requirement	Minimum requirement
4.3	Non-financial corporations sector accounts (until net lending)	Minimum requirement	Recommended
4.4	Financial corporations accounts (until net lending)	Minimum requirement	Recommended
4.5	General government sector accounts (until net lending)	Minimum requirement	Recommended
4.6	Household sector accounts (until net lending)	Minimum requirement	Recommended
4.7	Non-profit institutions serving households sector accounts (until net lending	Minimum requirement	Recommended
	Financial accounts		
4.1-4.7	Financial accounts for all sectors	Recommended	Desirable
	Balance sheets and other changes in asset accounts		
	Balance sheets, revaluation and other volume changes in asset accounts for all sectors	Recommended	Desirable

Note: Minimum requirement indicates an adequate scope of implementation of the 2008 SNA, when relevant. Recommended: recommended for compilation by all countries. Desirable: Useful statistics that should be compiled, if possible. * Other data sets that would count in assessing the degree of 2008 SNA implementation. Tables shown without a number are not included in the annual United Nations questionnaire (NAQ). For the Institutional sector accounts the Household accounts and the non-profit institutions serving households could be presented together.

Source: Report of the Intersecretariat Working Group on National Accounts (ISWGNA) to the forty second session (2011) of the United Nations Statistical Commission.

Implementation of the 2008 SNA has different objectives depending on the milestone that a country wants to achieve.

Possible objectives for a country that is starting to compile national accounts could be:

1. estimating Gross Domestic Product (GDP) by expenditure and production approaches, by industry;

The main results of this objective are:

(a) the value in current and constant prices of the Gross Domestic Product (GDP) and its elements, as estimated by production and expenditure;

(b) production, intermediate consumption and Gross Value Added (GVA) by industry.

This objective corresponds to milestone 1 and allows the country to meet part of the MRDS (Tables 1.1, 1.2, 2.1, 2.2, 2.3) (see Table 2.4)

> The main national accounts aggregates, including GVA and GDP are outlined in Chapter 3: *Basic concepts*, Section 2: *Accounts and main aggregates.*

2. estimating the rest of the world accounts which means fulfilling Table 4.2;
3. estimating Gross National Income (GNI), and other primary indicators such as: compensation of employees, mixed income, taxes on production;
4. employment by industry;

These objectives (2, 3 and 4) correspond to milestone 2 and enable the country to achieve the bulk of the minimum requirement data set.

Further development of national accounts involves new objectives, such as:

5. estimating Supply and Uses Tables (SUTs) and production account and generation of income account by institutional sector;
6. estimating the full sequence of accounts for institutional sectors; estimating accounts for the rest of the world;
7. estimating the financial accounts for institutional sectors;
8. estimating balance sheets.

The objectives presented are in order of increasing complexity: the first requires the least amount of data, incorporating a small number of identities (total GDP by production is equal to GDP by expenditure; GDP by production and expenditure is equal to GDP by income) and revealing a limited number of statistical discrepancies (if any) (by way of example, the difference between the value of GDP by production and by expenditure). The more complex the objectives become, the more data is required to compile them. But, complex objectives give a realistic description of the socio-economic structure and development of a country, and they are more suitable for policy and analytical purposes. In particular, they differ in their ability to integrate production analyses with income, financial, fiscal and monetary as well as with social and environmental analyses and policies based thereon.

The decision about which objectives a country wants to achieve should be based on an in-depth analysis of the local situation. It is helpful to present some important factors to be taken into consideration when deciding which objectives to achieve:

(a) the country's statistical capacity for providing the data sources required for compiling national accounts;

(b) the human resources (number and level of knowledge) capable of implementing and developing national accounts;

(c) the possibility of using financial data (i.e. business accounts) from the formal sector and the ability to translate this information into national accounts indicators by activity or institutional sector;

(d) the structure of the economy, especially the extent of the informal sector and the ability to cover it with existing data sources.

Generally, implementation of SNA starts with the compilation of GDP by production and expenditure, because some of the data sources needed exist in almost all countries, and the result, the GDP, represents the most important national accounts indicator.

2.2 Phase B: Organisation

Building national accounts for the first time is a demanding task that requires important and constant resources.

The national accounts implementation strategy should not only take into consideration institutional conditions, but also the capacity to provide the financial and human resources as explained below.

2.2.1 Institutional context

The strategy for implementing national accounts is mainly based on a country's political will. Consequently a guarantee of long-term support from the government is essential.

After the legal groundwork has been laid, it is necessary to establish which institution will be in charge of implementing and developing national accounts. There are countries where national accounts are compiled by the national statistical office, others by the Central Bank or by other administrative agencies.

The situation in each country and its institutional history are decisive for entrusting an institution with the responsibility of implementing national accounts. In a large percentage of countries, **the national accounts are the responsibility of the national statistical office**. The main explanation for this is its proximity

to the statistical data sources and the coordinating role generally assigned to the statistical office, by statistical legislation.

2.2.2 Organisational aspects

Regardless of which institution is in charge of compiling national accounts, the crucial issue is the organisation of the activity. It is obvious that such a task requires that the entire national accounts process be properly organised, starting with data gathering, data analysis, translation to national accounts concepts and compilation of the main indicators. 'Efficient' organisation for ensuring the right conditions for SNA implementation refers to:

1. the organisation of the national accounts department and deciding the main tasks to be performed for the com-pilation of national accounts that the statistical office and other administrative institutions are involved (for ex-ample, the preparation of government accounts by the Ministry of Finance or the financial accounts drawn up by the Central Bank);
2. mobilizing and developing human resources;
3. organizing and establishing cooperation within the statistical office and with other administrative institutions for data collection or exchange.

2.2.2.1 Organising the national accounts department

In a small statistical office, it may be advisable to place the national accounts at the heart of its economic statistics. The basic data needed for national accounting are wide ranging, such as the output of different activities, labour market statistics, household statistics, company business accounts, etc. Implementation of national accounts involves:

1. The existence of basic conditions: the Statistical Business Register, and classifications.
2. The elaborating of important statistics, such as economic statistics, household statistics, prices, etc.
3. The establishment of proper coordination and cooperation between different departments in the statistical office. Cooperation should be directed not only at ensuring the data sources needed for compiling national accounts, but also for laying the groundwork for developing statistics in the office. Thus, the national accounts department may be quite small, relying on the participation of specialists from other departments where necessary.
4. The establishment of cooperation with other administrative institutions in order to access the data required for compiling national accounts.

Countries in phase zero of implementing the SNA should pay special attention to making sure the department is organised so as to make efficient use of human resources. The organisation will take into consideration the main objectives, primarily focusing on reaching the next phase, phase 1, the capacity to compile GDP data by production and expenditure.

The typical tasks of a national accounts department are:

1. Collecting statistical and administrative data sources.
2. Translating the statistical and administrative data sources into concepts of national accounts. This task may be done by the national accounts department in cooperation with other departments of the statistical office and with experts from other institutions such as the Central Bank (for the financial sector and rest of the world) and the Ministry of Finance (for government statistics). It is important to note that very often the members of staff of the national accounts department are the most important and knowledgeable users of statistical and administrative data.
3. Elaborating national accounts indicators.
4. Preparing publications and other documents for the dissemination of national accounts.
5. Making proposals and taking actions to improve data sources and compilation methods to meet SNA requirements as far as possible.

Implementation of the SNA is quite complex; to ensure efficient and coordinated coverage of methodological issues, a certain level of specialisation among staff members is necessary.

Staff specialisation is determined by the main tasks of the national accounts department. Depending on the objectives set, the tasks may refer to: elaboration of GDP by production and expenditure approaches, at current and constant prices; compilation of GDP by income approach; elaboration of the SUTs, estimation of institutional sectors accounts, etc.

Proper integration of the SUTs and the sector accounts undoubtedly demands a certain level of knowledge of SNA methodological requirements, compilation practice, economic characteristics, etc. from those in charge. In this context, national accountants should be very well-acquainted with the theoretical and practical problems involved in the compilation process. Sometimes, a person can combine specialisation in the compilation of a transaction (for example estimating production and intermediate consumption of public administration with the estimation of the final consumption of government). For other difficult tasks, such as balancing, reconciliation and final estimation of national accounts indicators, it is advisable to assign experts with experience and wide-ranging knowledge of methodological requirements and the characteristics of the economy. A list of possible expert specialisations is shown in Table 2.5.

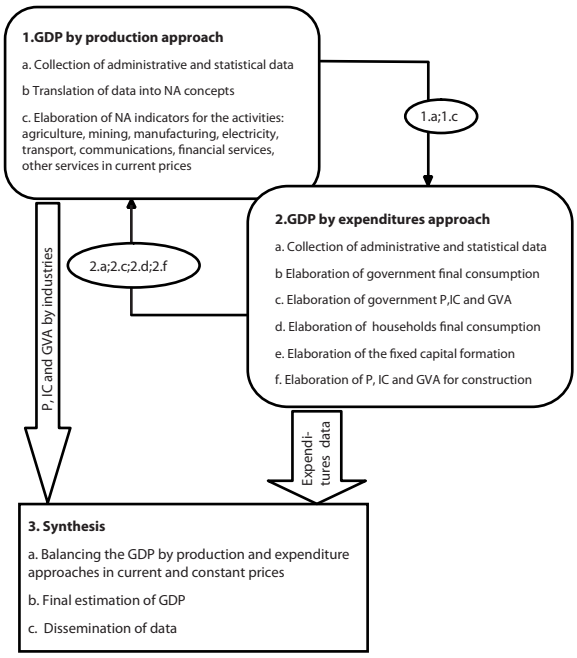
The list is based on the typical tasks of the national accounts department. The number of persons depends on the objectives set for the implementation and development of the SNA, the capacity of the statistical office (including staff expertise) and the current situation of a country (population size, capacity of the administrative units to provide data, etc.).

Table 2.5: Possible specialisations and staff numbers in a national accounts department

Tasks	Requirements	Envisaged number of staff
Production, intermediate consumption and gross value added by main activity at current and constant prices (agriculture, mining, manufacturing industry, electricity, construction, transport, communication services, financial services, other services)	The experts may be responsible for one (such as agricul-ture, or manufacturing industry, or construc-tion, etc.) or several related branches (such as con-struction and raw materials, construction industry, or agriculture and food industry, etc.)	3-5
Government indicators	The expert may be responsible for drawing up pro-duc-tion, intermediate consumption, GVA of public adminis-tration and final consumption of government statistics	1
Household Final Consumption	Specialisation relating to household budget surveys and unincorporated enterprises	1
Gross Fixed Capital	The person in charge of the construction sector may also be responsible for the drawing up the GFC; the person in charge of drafting agricultural and industry in-dicators may also be responsible for estimating change in inventory.	1
Balancing the system and final estimations	Coordinating the activity, experience and good knowl-edge of national accounts	2

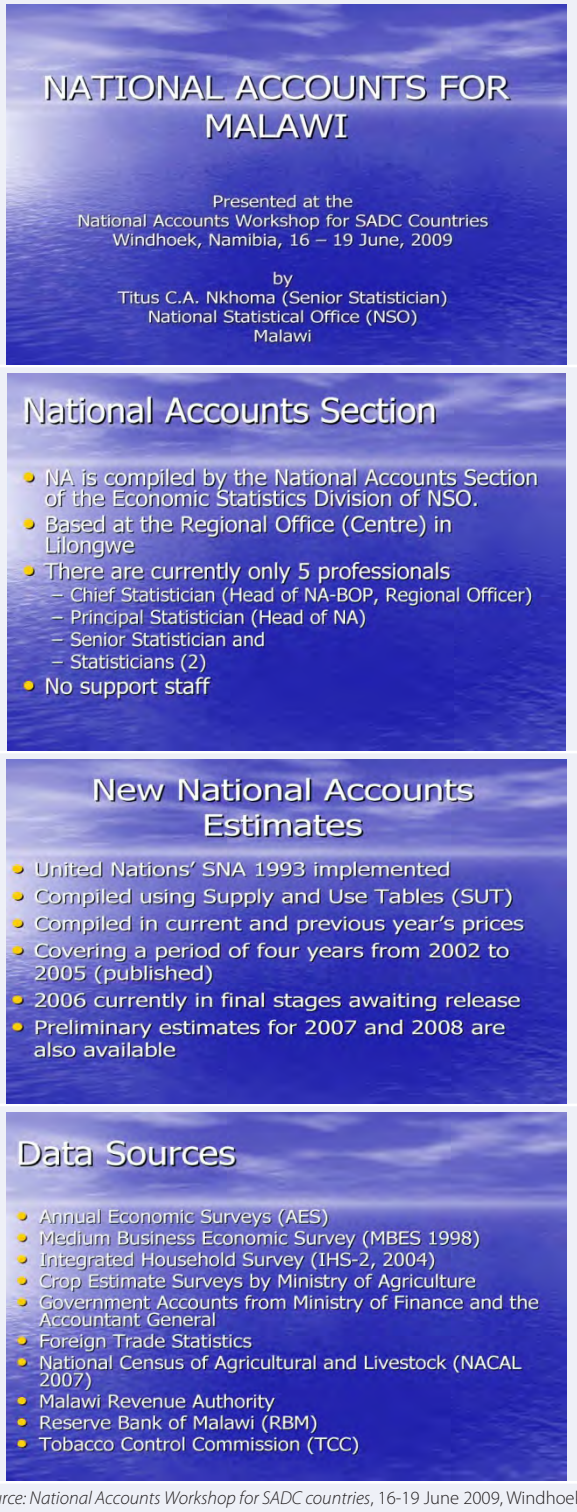
The organisation of the work inside the national accounts department is based on staff number and tasks regarded as having an important impact on the results. An example of the work flow is presented in Figure 2.2.

Figure 2.2: Example of a work flow inside the national accounts department



Due to a lack of human and/or financial resources, it is possible that the necessary staff cannot be mobilised in developing countries wishing to meet the MRDS. Under such conditions, it is important to adapt compilation of national accounts to available staff. One example is presented in Box 2.4.

Box 2.4: National accounts for Malawi



Source: National Accounts Workshop for SADC countries, 16-19 June 2009, Windhoek, Namibia

2.2.2.2 Human resources

The compilation of national accounts requires that the staff involved possess special abilities in different domains: statistics, national accounts methodology, economics, etc. For these reasons, the persons in charge should have the following profile:

1. a university education, wherever possible, in economics or statistics;
2. work experience in different economic domains;
3. ability to understand and apply the SNA methodology;
4. good knowledge of economic legislation and economic phenomena in the country;
5. good knowledge of the economic and social indicators existing in the statistical and administrative system.

To obtain this high level of professional capability the staff should be permanently trained and supported by the institution management.

Participation in training programmes organised by international or regional organisations, and training seminars and workshops on the organisation and management of national accounts and basic statistics (including economic, environment and financial statistics) as well as their application for evidence-based policy making is necessary for building statistical capability in the field of national accounts.

One fundamental principle of official statistics states that *'To retain trust in official statistics, the statistical agencies need to decide according to strictly professional considerations, including scientific principles and professional ethics, on the methods and procedures for the collection, processing, storage and presentation of statistical data'* (see the Fundamental Principles of Official Statistics, **http://www.unstats.un.org**).

In line with this principle and the need to develop a system of national accounts, the professional independence of national accountants must be ensured. This independence refers to:

1. the definition of the system and its adaptation to the country;
2. the methods used for estimating national accounts;
3. access to information, especially when it is protected (fiscal sources, defence information, etc.);
4. the treatment and measurement of 'special' aspects of the economy, such as illegal activity (illegal labour, drug production, etc.) that are in fact the weak points of political power;
5. responsibility for the main indicators, such as GDP, economic growth rate or revenue distribution, especially when the values are different from government forecasts or expectations.

2.2.2.3 Organising data collection

Once the SNA implementation strategy objective has been set and the national accounts department organised, the next step is to establish formal relationships for ensuring availability of the data required for compiling national accounts. Data collection for national accounts requires internal and external cooperation with the statistical office.

Statistical data sources are usually provided by different departments within the statistical office (responsible for industrial statistics, foreign trade, agriculture, demographics, education, health, prices, etc.) or even by other institutions. An efficient flow of information from them to the national accounts department has a decisive impact on the quality and timeliness of national accounts estimations. On the other hand, the methodological requests for the compilation of national accounts are the starting point for developing the overall statistical system.

Collection from administrative data sources depends on the capacity of the statistical office and its relations with other institutions: data may be collected by a different department (if resources allow for a special department) or by national accountants themselves (it being for them an additional task to their usual workload). Special formal relations based on agreements, protocols or memorandums with administrative institutions ensure access to their data. Even in the event of statistical legislation explicitly stipulating that the statistical office must have access to administrative data, it is necessary to have protocols or memorandums that establish the specific conditions under which data may be collected.

For example, the Ministry of Finance, is one of the most important providers of administrative data, and it can supply data on VAT (monthly, for each economic agent, by main activity, etc.), on capital gains tax, income tax, business account data, income and expenditure of local and central government, etc. Thus it is of the utmost importance that the statistical office should agree on a cooperation protocol outline, in principle:

1. the data to be delivered;
2. the level of detail of the data (individual, aggregated, by region, etc.) and the frequency (monthly, yearly, etc.);
3. the data collection method (access to database, electronic format, paper, etc.).

In this kind of cooperation protocol not only should administrative data be included, but also delivery of statistical indicators by the statistical office. It may be possible that the Ministry of Finance is also interested in having detailed statistical information (such as, for example, household expenditure in order to formulate its policy on subsidies). Thus, the protocol would include data exchange between the two institutions. Cooperation is important for the statistical office because it allows access to administrative data and at the same time strengthens its position in the economy as the main provider of economic and social indicators.

Box 2.5: General structure of a cooperation protocol

INSTITUTION 1 — INSTITUTION 2

Cooperation protocol

INSTITUTION 1, address, represented by *<name of leadership institute>, <function of leadership institute>*

INSTITUTION 2, address, represented by *<name of leadership institute>, <function of leadership institute>*

Conclude the Protocol, aimed at cooperation in the field of official national accounts statistics with international standards *here will be mentioned the general considerations regarding the importance of the protocols for each of party*

Legal framework: *law / regulation on the organisation and functioning of the each institution party in the protocol* <Institution1> and <Institution2> agreed to the following:

The objective of the Protocol
main goal of the protocol

Duration Protocol
mentioned the duration, in connection with the activities that has to be done

Obligations of parties
mentioned each activity, with precisely results that have to be done by each party

Notifications/Communication
Mentioned type of communication (written, by telephone, fax, email)

Annexes
mentioned all the annexes like components of the protocol
Type of annexes:
- *description and structure of data files which are changed between partners*
- *working group responsibilities*
- *nomenclatures for data transmission*
- *deadlines for data transmission*

2.3 Phase C: Compilation

The compilation process should take into account resources (e.g. resources for compiling good economic and social statistics, price statistics, for maintaining a reliable business register or for compiling national accounts), policy (continuity and stability in the compilation process, priorities for some parts of national accounts, professional independence), professional skills of the staff (e.g. skills in analyzing data and making plausible economic assumptions) and access to statistical and administrative data sources.

The compilation process is based on three elements:

1. *Accounting identities* which means exploiting as far as possible the multitude of accounting identities existing in the system, such as: supply is equal to demand (both at current and constant prices); paid taxes should be equal to received taxes, etc. Accounting identities ensure consistency and can act as a plausibility check and permit residual estimates.
2. *Assumptions* essential for combining and completing the basic data set. Many types of assumptions are used, such as: fixed ratios, transition schemes, specific conventions, expert opinions, historical trends and ratios, analogies, etc. Plausible assumptions can remedy to a great extent the absence of data and are preferable to implausible data.
3. *Plausibility checks*, which are very important for the reliability of national accounts statistics. Types of plausibility checks are:
   (a) comparison of different data sources and different estimates;
   (b) investigation of all 'abnormal' developments and ratios (numerical, conceptual, institutional, economic) by seeking a plausible explanation.

The national accounts compilation strategy is based on:

1. definition and organisation of the different phases;
2. development of the necessary IT tools.

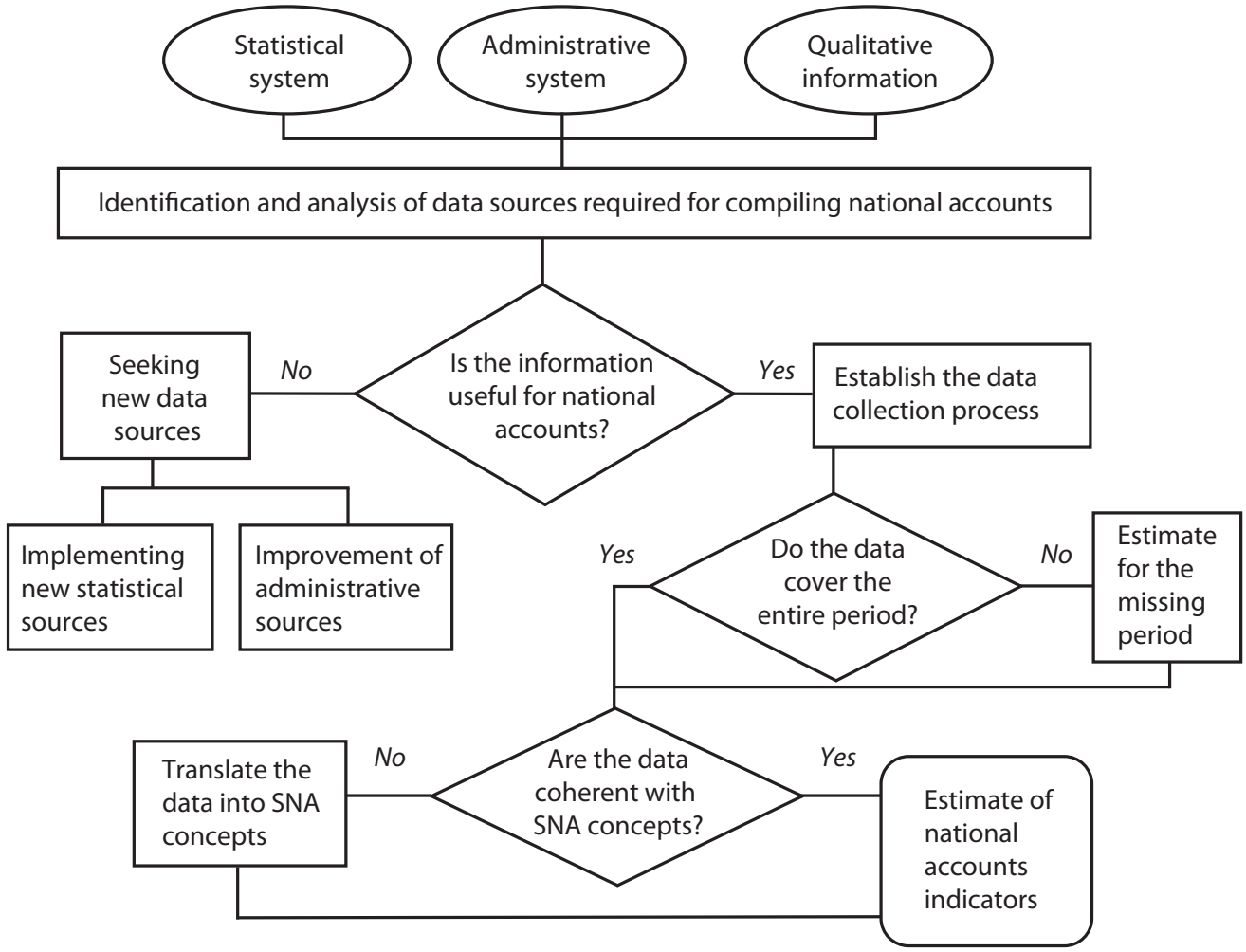
2.3.1 Definition and organisation of the different phases

The compilation process has its own scope, detail and methods used and working methods, reflected in the design of the phases to be followed. Briefly, the main phases are:

1. designing the central framework;
2. identifying data sources;
3. collecting data;
4. translating data into national accounts concepts;
5. elaborating estimates;
6. data revision.

The schematic presentation of the decisional tree to establish the compilation routine for national accounts shown in Figure 2.3 helps to address the definition and organisation of general compilation phases.

Figure 2.3: Decisional tree for national accounts compilation



2.3.1.1 Designing the central framework

The central framework for compiling national accounts refers to the determination of the four classifications used in the system:

1. product detail;
2. economic activities;
3. transactions, other flows and stocks;
4. sectorisation of the economy.

Classification details are based on the strategy aims and objectives set and the country's current situation. The central framework is established according to the development level of the statistical system (including the human resources capability) and the specific needs of the country. The availability of statistical and administrative data reduces or increases the detail of the classifications adopted.

The strategy for implementing classifications and the characteristics of the main classifications are outlined in Chapter 4: *Statistical infrastructure for national accounts*, Section 1.2: *Classifications*.

One important activity in this phase is the identification of the key sectors of the economy. If in a country, agriculture, the oil industry or tourism is the main activity, it should be reflected in detail in the estimates made and in the breakdown by industry or institutional sector.

2.3.1.2. Identifying data sources

The data sources used for compiling national accounts may be specific statistics (statistics on producer sales and production costs, on investment, on employment, wages and salaries, on household expenditures, on consumer prices, on producer prices and interest rates, on imports and exports, etc.) or administrative records (government revenue and expenditure, financial statements of non-financial and financial units, balance of payments, etc.).

> The main data sources used for compiling national accounts are set out in Chapter 4: *Statistical infrastructure for national accounts*, Section 2: *Statistical data sources*, and Chapter 5: *Administrative data sources,* Section 1: *What are administrative data sources.*

In order to identify available information, the existing data sources have to be analysed with respect to national accounts requirements. If the data sources identified are useful for the implementation objectives of the national accounts, the process of collecting data can start.

Data sources may not include all the information needed for implementing the national accounts strategy. For example, statistical information concerning construction and investments may not be available. In this case, depending on the type of information required and the objectives established, two options exist:

1. To carry out a rough estimate of the national accounts indicators using poor data sources and indirect information, or

> An example is given in Chapter 4: *Statistical infrastructure for national accounts*, Section 2: *Statistical data sources*.

2. To halt implementation of SNA until the necessary data sources become available.

It is recommended that countries in phase zero of the SNA implementation define their future actions based on the following:

1. Start estimating GDP by production and expenditure (corresponding to the requirements of phase 1), even if the lack of information may affect the quality of the initial results.
2. They must ensure at the same time that the necessary data sources are developed. To do so national accountants must propose and promote:

(a) improvement of the existing statistical data sources to obtain the required information;

(b) implementation of new statistical surveys that will provide the missing information;

(c) development of collaboration with administrative institutions to improve or develop their data sources.

In the process of compiling national accounts, qualitative information is also relevant. For example, articles in newspapers or specialised magazines may provide qualitative information on developments in the economy (e.g. sales of furniture or software) or specific events (e.g. a large direct investment project or the reorganisation of a national insurance system). This information can be used to complete existing data and to check the consistency of different data.

2.3.1.3. Collecting data

Data collection requires structured and organised activity, which directly affects the quality of estimates.

The main activities that should be organised and carried out are:

1. agreements on data delivery: what data will be delivered, in what detail and with what frequency, when and in what format, etc.;
2. checks on the data delivered: timeliness, detail and completeness;
3. data storage in automated systems (spreadsheets or databases) for compiling national accounts;
4. searches for other relevant quantitative and qualitative information, e.g. by reading specialised journals, newspaper articles and annual reports of various large companies, organisations, foundations, or by asking corporations, institutions and experts directly.

As part of the compilation strategy, an efficient circuit of data collection internal and external to the statistical office must be established. The main steps in this process are:

1. Decide what data is to be used for compiling national accounts.
2. Decide the level of detail of this data.
3. How the data will be delivered to the national accounts department: on paper, in electronic format (CD-ROM, by email, etc.) or direct access to the databases of other departments.
4. Establish the deadline for receiving data. It is very important for national accountants to respect their own dissemination calendar. For this reason, some of the statistical and administrative data may be provided to national accounts department before being published. It is the case, for example (as statistical source), of the Struc-

tural Business Survey: after validating data and achieving final results, the detailed information (with the agreed content and format) may be sent to the national accounts department to be included in the compilation process. At the same time, the department in charge of the Structural Business Survey carries on with the task of disseminating the results of the survey.

Good cooperation between different departments of the statistical office and administrative institutions on the one hand, and the national account department, on the other, will ensure the right conditions for implementation of the SNA.

2.3.1.4 Translating data into the concepts of national accounts

Statistical and administrative data sources, in the majority of cases, are not consistent with national accounts concepts.

> The translation of administrative data into national accounts concepts is outlined in detail in Chapter 5: *Administrative data sources*.

Statistical indicators generally convert administrative information into indicators with content not very different from that used in national accounts. However a major difference between economic statistical indicators and national accounts is often product breakdown. Box 2.6 provides an example.

Box 2.6: Conversion tables from COICOP to ISIC – an example

In household budget surveys, product breakdown can be very limited or rather different from national accounts requirements. Household consumption is collected through various household surveys using the COICOP classification. In order to be used in national accounts, a reclassification to ISIC rev.4 should be carried out. It should be noted that for some COICOP products and groups of products, more than one ISIC activity is needed. Value estimation for each activity is made using other indirect sources or expert knowledge. For example, household 'meat' consumption should be classified under ISIC codes 01 'Agriculture, hunting and related services activities' and 15 'Manufacture of food products and beverages' based on population consumption habits.

COICOP		ISIC REV 4	
Code	**Description**	**Code**	**Description**
0.1.1	**FOOD**		
0.1.1.1	Bread and cereals	1	Agriculture, hunting and related service activities
		15	Manufacture of food products and beverages
0.1.1.2	Meat	1	Agriculture, hunting and related service activities
		15	Manufacture of food products and beverages
0.1.1.3	Fish and seafood	05	Fishing, operation of fish hatcheries and fish farms
		15	Manufacture of food products and beverages
0.1.1.4	Milk, cheese and eggs	1	Agriculture, hunting and related service activities
		15	Manufacture of food products and beverages
0 1.1.5	Oils and fats	15	Manufacture of food products and beverages
0.1.1.6	Fruit	1	Agriculture, hunting and related service activities
		15	Manufacture of food products and beverages
0.1.1.7	Vegetables	1	Agriculture, hunting and related service activities
		15	Manufacture of food products and beverages
0.1.1.8	Sugar, jam, honey, chocolate and confectionery	15	Manufacture of food products and beverages
0.1.1.9	Food products n.e.c.	15	Manufacture of food products and beverages
0.1.2	**NON-ALCOHOLIC BEVERAGES**		
0.1.2.1	Coffee, tea and cocoa	15	Manufacture of food products and beverages
0.1.2.2	Mineral waters, soft drinks, fruit and vegetable juices	15	Manufacture of food products and beverages

More information concerning correspondence tables of classifications are available to the UN website at: http://unstats.un.org/unsd/cr/registry/default.asp

For the most part, translating administrative concepts to national accounts concepts is to be performed by national accountants themselves. This applies especially to business accounts, VAT data, personal income tax data, financial statements of financial institutions, revenues and expenditures of general government, and BoP indicators, to name a few.

This translation is based on a system of bridge tables at macro-economic levels, and specific adjustments called the intermediate system.

2.3.1.5. Elaborating estimates

The important phase of the compilation process is estimating national accounts indicators. Several activities are carried out during this complex phase:

1. Checking data sources, with respect to:
   (a) the evolution of the variables over time;
   (b) consistency of the values and trends of the ratios between different variables in a single data source;
   (c) plausibility of values and volumes;
   (d) conceptual differences with national accounts indicators;
   (e) weightings used for grossing up survey results.
2. Elaboration of the first estimates of national accounts indicators. If the chosen target is to reach the first milestone (see Annex 1), estimates will focus on GDP and its components at current and constant prices.
3. Inclusion of additional or more complete data and second estimate of indicators. Assumptions play an important role at this stage: they are used to fill gaps and imperfections in the basic data set according to the analysis of economic relationships.
4. Balancing procedures and reconciling data to identify data deficiencies and assist in making the appropriate adjustments to ensure consistency of results. Balancing involves checking the economic consistency of the estimates. This depends on the available accounting framework and national accountants' experience and ability to perform plausibility checks in combination with timeliness for data dissemination.
5. Elaboration of the final estimates of national accounts indicators.

To find out more…

A system approach to national accounts compilation, Studies in Methods, series F, No.77, UN 1999;

The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 16: Summarizing and integrating the accounts.

If statistical discrepancies have been identified during the balancing process and their causes determined, adjustments can be made to the intermediate data or estimation methods. The adjusted data will then be integrated again, leading to a revised set of statistical discrepancies. This data will then be reconciled and reintegrated and so on until all the discrepancies are eliminated.

The core of balancing and reconciling data will always depend on the availability and quality of information used and the expertise of the accounting team.

2.3.1.6 Data revision

In the process of compiling national accounts three important revisions can be made: (1) routine revisions, (2) benchmark revisions and (3) methodological revisions.

1. *Routine revisions (or current revisions)* encompass all changes in national accounts estimates for a particular period from the first to the final estimate. These revisions are in principle based on the availability of new information from data sources used to achieve full comparability in volume and prices changes with the previous year and for all indicators.
2. *Benchmark revisions (or major regular revisions)* are revisions of data sources or methods used for estimation of national accounts indicators. These can affect GDP and can cause discontinuity in time series. It is recommended that, as standard practice, benchmark revisions be carried out every five years.
3. *Methodological revisions (or major occasional revisions)* are normally due to changes in principles of national accounting.

These revisions have several implications for the dissemination of national accounts data as detailed explanations about major changes have to be presented with the data. An example is presented in Box 2.7.

Box 2.7: Example of the methodological revisions impact on GDP

Methodological revisions 1995-2004 in Slovenia

In the period since 2000 three methodological revisions have been conducted in Slovenian national accounts and they covered the period back to 1995. Their main purpose was to improve the compilation of GDP according to ESA95 methodology and criteria on exhaustiveness. The main revision points were improvements of data sources and methods.

The main points in methodological or benchmark revisions of March 2003 and April 2004 were: delimitation of market and non-market units together with improvement of institutional sectorisation; introduction of new methodology for the estimation of housing services of owner-occupiers; estimation of the consumption of fixed capital (including for public roads, bridges, etc.) by the perpetual inventory method for the general government sector; and improvements of GDP exhaustiveness adjustments and other improvements of methods. With these methodological revisions, all data for the period since 1995 were revised and published.

The last methodological revision was published in September 2005; its main reason was the change in the bookkeeping of financial intermediation services indirectly measured (FISIM), which were allocated to the final users of these services. At the same time, measurement of volume changes at constant previous year prices was introduced.

Also the results of this methodological revision were published for the whole 1995-2004 period.

Table shows the effects of three methodological revisions on nominal GDP level and on the estimate of GDP volume growth rate for 1999, 2000 and 2001. The effects on data for years which are shown in the table are not the same for all years, mostly due to overestimated GDP level for 2000 and 2001 before the revision.

Table with GDP revisions, 1999-2001

			n.c. = national currency SIT
	1999	**2000**	**2001**
1. Quarterly accounts, mio SIT	3 637 437	4 045 469	14 566 191
Volume growth rates (%)	4.9	4.8	3.0
2. Annual accounts, April 2002, mio n.c.	3 648 401	4 035 518	4 566 191
Volume growth rates (%)	5.2	4.6	3.0
2.1 First methodological revision, March 2003, mio n.c.	3 839 852	4 222 404	4 740 122
Change to the previous GDP nominal level (%)	+5.2	+4.6	+3.8
2.2 Second methodological revision, April 2004, mio n.c.	3 874 720	4 252 315	4 761 815
Change to the previous GDP nominal level (%)	+0.9	+0.7	+0.5
2.3 Third methodological revision, September 2005, mio n.c.	3 918 974	4 300 350	4 799 552
Change to the previous GDP nominal level (%)	+1.1	+1.1	+0.8
Volume growth rates (%)	5.4	4.1	2.7

Source: Gross National Income Inventory, Statistical Office of the Republic of Slovenia, 2008

2.3.1.7 Conclusions

Implementing and developing the compilation of national accounts should take into consideration the following:

1. It is not a strict chronological sequence of given steps. In practice, the steps are intertwined, interact strongly, can occur in somewhat different chronological sequences and have recursive loops.
2. The compilation process is adapted and adjusted according to data sources, new economic, social and/or political conditions existing in a country and new international requirements in the field of statistics.

2.3.2 Developing IT tools for compiling national accounts

The computer systems used in the framework for compiling national accounts should be flexible and able to:

1. store detailed data used for compiling national accounts, relating to groups of economic agents, i.e. industries and sectors in electronic worksheets in their original format;
2. use the worksheets to convert the intermediate data obtained from different sources (censuses, surveys, administrative data sources, and intermediate statistical data) from their specific format to the format of the national accounts and record all adjustments made to the data, thus creating a complete compilation history;

3. after conversion to the national accounts format, calculate appropriate national accounts aggregates. Faithful to the principle of the industry and sector orientation, the information for the total economy should be obtained only through aggregation of the resident sectors and industries;
4. check data compatibility across industries and sectors by identifying statistical discrepancies in national accounts identities;
5. provide helpful tools for the final data reconciliation process, e.g. by including data links between worksheets and the central framework tables, so that the impact of adjustments to the data in the worksheets is reflected immediately in the central SNA tables, where remaining statistical discrepancies can be checked;
6. generate working tables that are helpful during the reconciliation process, e.g. transaction matrices in which, for each transaction, other flow or stock, the resources and the uses (or assets and liabilities) of different sectors may be confronted;
7. store final estimates of national accounts and disseminated versions. This enables national accountants to set up a systematic analysis of the reliability of published data.

The need for common tools for implementing the SNA worldwide has led to the development of specialised software in national accounts among international organisations and developed countries. Advanced countries have developed tailor-made computer systems based on relational database packages such as: Access, Oracle, SAS, dBase, etc.

Other known IT tools for compiling national accounts are:

1. ERETES (Equilibres ressources emplois, Tableaux entrées-sorties) is database software developed by a French consultancy firm at the University of Lyon, in cooperation with the Institut national de la statistique et des études économiques (INSEE) and Eurostat. This software is installed or being installed in approximately 27 countries[(1)] becoming very popular among Developing Countries and Least Developed Countries. The system is offered free of charge to users by the co-owners (EUROSTAT and the French Cooperation).
2. IAS (Integrated Accounts System) is a software program developed by a group associated with the Institute of Social Studies (ISS) in The Netherlands and used in Caribbean countries like Aruba and the Netherlands Antilles.
3. SNAPC (System of National Accounts on a Personal Computer) is the product of Statistics Sweden and is used in Southern Africa countries and others (e.g.: Belize, Namibia, Laos, Lesotho, South Africa, Zimbabwe, Jamaica and Kenya).

(1) Algeria, Benin, Burkina Faso, Botswana, Brazil, Cameroon, Cape Verde, Central African Republic (RCA), Colombia, Ivory Coast (RCI), Ecuador, Gabon, Ghana, Guadeloupe, Guiana, Madagascar, Mali, Morocco, Martinique, Mauritania, Niger, Nigeria, Peru, Reunion, Senegal, Togo, Tunisia.

To find out more…

www.ERETES.net

For ERETES refer to the biannual newsletter of the Inter-Secretariat Working Group on National Accounts 'SNA News and Notes' issue 5 (January 1997); available from: **http://unstats.un.org/unsd/nationalaccount/sna/sna5-en.asp**

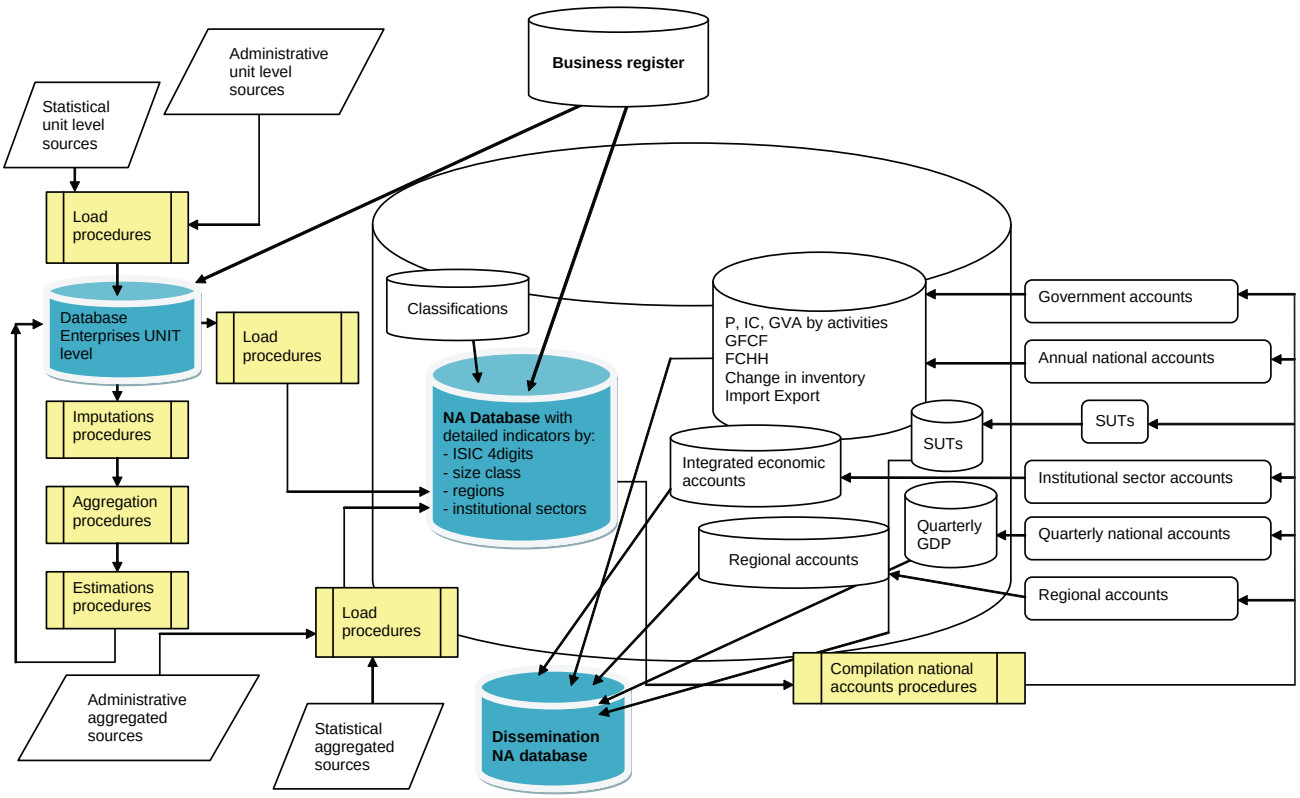
For IAS refer to the biannual newsletter of the Inter-Secretariat Working Group on National Accounts 'SNA News and Notes' issue 6 (July 1997), available from: **http://unstats.un.org/unsd/nationalaccount/sna/sna6-en.asp**

ERETES and IAS include three elements:

1. the use of database software (SYBASE, ORACLE and PROGRESS);
2. selection of SNA and compilation attributes (transaction categories, sector and industry categories, identification of current or constant prices, data source, etc.);
3. worksheets and tables where data conversion and reconciliation takes place.

Selection of attributes and the design of tables determine how national accounts are compiled. Conditions in each country, statistical capability and available resources determine the strategic decision of whether to use IT tools for compiling national accounts.

Figure 2.4: Organisation scheme of IT activity for national accounts compilation



2.4 Phase D: Dissemination

The main objective of compiling the SNA is to provide comprehensive knowledge of an economy and its structure. The dissemination of national accounts results is an activity as important as the compilation of indicators. Presenting national accounts indicators to the public, adding an analysis, providing useful economic interpretations and understanding the methodology used are an important part of national accountants' tasks.

Box 2.8: Principles of a statistical dissemination strategy

A dissemination strategy is based on good practices in official statistics adopted by the EU and the UN. The main principles of a statistical dissemination strategy are:

1. Statistics must be relevant for users, comprehensive and as detailed as possible in statistical terms, while complying with requirements regarding legislation, confidentiality and quality, and produced in a cost-effective way;
2. Statistics must be accurate, reliable, consistent and comparable in space and time;
3. Statistics must be up-to-date and disseminated in a timely and punctual manner;
4. Statistical information must be released according to a pre-announced schedule and presented in a clear and understandable form to all users;
5. The confidentiality of disseminated statistical data must be ensured;
6. Data must be made available on an impartial and objective basis to all users.

Source: Dissemination Policy, INE, Portugal, 2008

The main steps involved in defining the dissemination strategy are summarised in the following sections: user identification, providing quality data that meets users expectation and establishing a calendar for dissemination.

2.4.1 User identification

Five major user categories stand out by area of activity:

1. all levels of government
2. international agencies
3. the private sector
4. research institutions
5. the public, including the media.

They can be grouped into two categories with respect to the intensity of statistical use:

1. general data users: journalists, students, teachers, small businesses who have simple data requirements but from a great range of information;
2. analysis users: government departments, local authorities, researchers, international organisations with complex data requirements on detailed variables, time series and regional breakdowns.

The demand for national accounts data is different for each category of user. The value of GDP and the growth rate of the economy is the information most utilised by general users. Policy makers, government, researchers, international organisations are interested in the details of national accounts indicators, by activity and institutional sector.

To meet these different demands, dissemination of national accounts is made using different channels:

1. Press releases, used in general by the media and the general public with the presentation of the main national accounts indicators, such GDP, its main components and growth rate.
2. Detailed information on national accounts by industry or institutional sector is usually presented in the Annual Yearbook of each country. This information can be used by researchers, students or international organisations.
3. A special publication with time series of national accounts indicators, with detailed data, accompanied by metadata and sometimes by a short economic analysis based on these indicators. This publication is used for different purposes by government, researchers, academic media or international organisations.
4. Electronic dissemination that offers the opportunity to reduce the costs of dissemination and make information more usable and accessible. However, to move to an environment in which documents are disseminated in electronic format, a number of challenges would have to be overcome (such as ensuring that these documents are authentic, permanently maintained, and equally accessible to all individuals).

2.4.2 Providing quality data that meet users expectations

Users expect quality information. If this cannot be provided the user will stop asking for data and try to find it elsewhere. Quality is normally defined in terms of **accuracy, relevance, timeliness, consistency and availability** in no specific order.

To find out more…

Quality framework and guidelines for OECD statistical activities, **http://www.oecd.org/document/43/0,3343,en_2649_33715_21571947_1_1_1_1,00.html**

The dissemination of national accounts should be integrated into the general statistical dissemination strategy, having as its main objective to provide data of the expected quality for users. This should take into consideration:

1. The details of information disseminated according to target audience.
2. Presentation of results in a comprehensive structure.
3. Provision of all necessary methodological explanations, to help users understand national accounts concepts.
4. National accounts represent a special overview of the economy and the dissemination of data without economic analysis and interpretation of the results is not advised, even if this imposes additional work on national accountants. The analysis will help users not familiar with these indicators to understand national accounts better and their possibilities to reflect the economic phenomena.

Box 2.9: Data Quality Assessment Framework (DQAF) and Reports on Observance of Standards and Codes

The IMF uses the Data Quality Assessment Framework (DQAF) in its data modules of the Reports on Observance of Standards and Codes (data ROSCs) as a tool to evaluate the quality of country practices in producing macroeconomic statistics. The DQAF comprises six dimensions:

1. prerequisites of quality includes organisational aspects;
2. assurances of integrity covers objectivity in collecting, processing and disseminating statistics;
3. methodological soundness analyses the standards adopted in the compilation process;
4. accuracy and reliability covers the data sources and statistical methods used in compiling the statistics;
5. serviceability deals with fitness for use criteria, such as periodicity and timeliness, temporal and internal consistency;
6. accessibility presents how effectively data and information about data are disseminated to users.

Source: IMF, http://dsbb.imf.org

2.4.3 Establishing a calendar for dissemination

For data to be useful, it is widely recognised that it should be available in a reasonable and timely manner. Such an expectation, especially in the field of national accounts is not easy to fulfill. Compilation is not simply computer processing: national accounts compilers need very diverse raw data from statistical and administrative systems available at different periodicity; after data is collected, this information needs to be converted into national accounts and the consistency of the entire system to be verified. This process has a large impact on the timeliness of dissemination.

Box 2.10: Example of the dissemination calendar

Timetable for revising and finalizing the accounts in Slovenia

National accounts data for year t are revised and finalised in four steps and final data for year t are usually published in September of year t + 3 or 33 months after the end of the year.

The four steps and the time in which GDP estimates and main national accounts aggregates for year t are first published, routinely revised and finalised are:

1. t + 70 days: first complete GDP estimate and main national accounts aggregates on the basis of quarterly accounts;
2. t + 9 months: first complete annual accounts estimate of GDP and main national accounts aggregates;
3. t + 21 months: first revision of annual accounts estimate of GDP and main national accounts aggregates;
4. t + 33 months: final revision of annual accounts estimate of GDP and main national accounts aggregates.

As the national accounts estimates start with quarterly accounts it is important that after the introduction of the expenditure approach at current and constant prices on quarterly basis in 2000 the quality and reliability of quarterly accounts have significantly improved. The main basis for the first complete annual accounts estimate of GDP in t + 9 months are complete and exhaustive data sources of GDP by the production approach as data sources for all institutional sectors are available in May each year.

Already in the first routine revision of annual accounts (t + 21 months) the majority of data from supply and use tables is already incorporated and this is particularly important for the product structure of gross fixed capital formation. It is also important that in this revision all statistical and other data sources for the expenditure approach are available and used in the compilation. Because of this changes between the first routine revision and the last step of finalizing annual accounts estimate in t + 33 are usually small.

Source: Gross National Income Inventory, Statistical Office of the Republic of Slovenia, 2008

As general framework for their dissemination strategy, countries intending to implement the SNA are recommended to adopt the International Monetary Fund's 'Special Data Dissemination Standards' (SDDS) and 'General Data Dissemination Standards' (GDDS).

The main purpose of the SDDS, established and promoted by the IMF in 1996 is to monitor the standards used to guide countries in the dissemination of economic and financial data. Several dimensions are monitored in the SDDS: a 'data' dimension (relating to coverage, frequency and timeliness of data), an 'access' dimension, an 'integrity' dimension and a 'quality' dimension (see Box 2.11). The SDDS prescribes that countries disseminate key macroeconomic data covering the real, fiscal, financial, and external sectors.

Box 2.11: Dimensions and Elements of the Special Data Dissemination Standard

Data Dimension (coverage, periodicity, and timeliness)

1. dissemination of 18 data categories, including component detail, covering the four main macroeconomic statistical sectors, with prescribed periodicity and timeliness.

Access Dimension

1. dissemination of advance release calendars providing notice at least one quarter ahead of approximate release dates, and notice at least one week ahead of the precise release dates;
2. simultaneous release of data to all users.

Integrity Dimension

1. dissemination of the terms and conditions under which official statistics are produced and disseminated;
2. identification of internal government access to data before release;
3. identification of ministerial commentary on the occasion of statistical release;
4. provision of information about revision and advance notice of major changes in methodology.

Quality Dimension

1. dissemination of documentation on statistical methodology and sources used in preparing statistics;
2. dissemination of component detail and/or additional data series that make possible cross-checks and checks of reasonableness.

Source: The IMF's Data Dissemination Initiative After 10 Years, IMF 2008

The GDDS followed the SDDS and was developed in 1997 to assist those IMF's member countries that are not in a position to subscribe to the SDDS, to develop nevertheless a sound statistical system as the basis for timely dissemination of data to the public. The purposes of the GDDS are to encourage member countries:

1. to improve data quality;
2. to provide a framework for evaluating needs for data improvement and setting priorities in this respect;
3. to guide member countries in disseminating comprehensive, timely, accessible, and reliable economic, financial, and socio-demographic statistics to the public.

Together, these three priority areas constitute a solid basis on which to formulate long-run policies for statistical development.

To find out more…

SDDS and GDDS at **www.imf.org**

The IMF's Data Dissemination Initiative After 10 Years, IMF 2008.

3. Recommended reading

- *The 2008 SNA,* European Commission, IMF, OECD, UN, World Bank, 2009;
- *National Accounts: A practical introduction,* Studies in Methods, Series F, No.85, UN 2003; Chapter XIV: Data collection, compilation and estimation methods: a summary;
- *Guide to statistics in EC development co-operation*, Eurostat, 2009;
- *A system approach to national accounts compilation,* Studies in Methods, Series F, No.77, UN 1999; chapter I: The compilation approach;
- *Uses of Macro Accounts in Policy Analysis*, Studies in Methods, Series F, No.81, UN 2002; Chapter IV: Policy analysis beyond the economic core; Chapter V: Administrative and other policy uses of national accounts by international organisations and countries;
- *Use, misuse and proper use of national accounts in statistics,* Fritz B., MPRA, 2007; Chapter IV: Tool for communication and decision making;
- *Advocating for the National Strategy for the Development of Statistics,* Paris 21, OECD, May, 2010;
- *Compiling the national accounts demystified,* Fritz B., MPRA, 2007; Chapter III: The compilation process; chapter V: How to improve compiling national accounts;
- *Quality framework and guidelines for OECD statistical activities, OECD, 2003;*
- *A Guide to Designing a National Strategy for the Development of Statistics (NSDS),* Paris 21 Secretariat, 2004 (**http://www.paris21.org/documents/1401.pdf**);
- *Fundamental principles for the official statistics, UN* **http://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx**;
- *General Data Dissemination System,* IMF **http://dsbb.imf.org/Pages/GDDS/home.aspx**;
- *Special Data Dissemination Standard,* IMF **http://dsbb.imf.org/Pages/SDDS/Home.aspx**;
- *The IMF's Data Dissemination Initiative After 10 years,* IMF 2008; Chapter I: International data dissemination standards; Chapter III: The general data dissemination system: what has been accomplished after 10 years and where do we go from here;
- *The future dissemination of OECD statistics: a policy proposal*, OECD, 2006;
- *Global assessment of the availability, periodicity, timeliness and dissemination of high- frequency indicators,* UNSD paper presented at the Workshop on International Eco-

nomic and Social Classifications, Mali, January 2010;

- *Communicating with the Media - A guide for statistical organisations,* UNECE, UN 2004; Chapter I: Principles, objectives and management issues in data dissemination; Chapter II: Organisational aspects of dissemination;
- *Making Data Meaningful- Part I- A guide to writing stories about numbers,* UNECE UN, 2009;
- *Making Data Meaningful- Part II- A guide to presenting statistics,* UNECE, UN 2009;
- *Making Data Meaningful- Part III- A guide to communicating with the media,* UNECE, 2011;
- *Best practices in designing websites for dissemination of statistics,* United Nations Statistical Commission and Economic Commission for Europe, UN 2001*;*
- *Construire les comptes de la nation,* Michel Seruzier, Economica 1993; Chapter XVII: Environnement nécessaire a la construction des comptes de la nation;
- *Manual de la comptabilité nationale, Comptabilité de la production: Sources et méthodes,* Etudes méthodologiques, Séries F, No, 39, UN 1987.

3 Basic Concepts

The chapter in brief

The basic concepts of the 2008 SNA presented in the first section of the chapter offer a broad view of the fundamental requirements that should be envisaged in the strategic development of national accounts. They centre on the main categories that form the skeleton of the system: stakeholders in the economy, the economic activities they perform, and the scope of their actions, and the rules applied to evaluating national accounts indicators. A separate section provides evidence relating to the main aggregates obtained from national accounts and used to characterise the economy.

1. Fundamentals for national accounting

SNA should be able to describe economies which, over time, are becoming increasingly complex, whilst envisaging at the same time descriptive simplicity. They cover a wide variety of situations, from developed countries to developing countries, least developed countries and countries in transition. Irrespective of the stage of development, in order to 'measure the economy', commensuration limits need to be properly defined.

The 2008 SNA is a **system of macroeconomic accounts** based on a set of concepts, definitions, classifications and registration rules. It provides a framework within which economic data can be collected and analysed to assist decision-makers and provide guidance on economic policies.

National accounts aim to describe the economic activity (measurable in monetary terms) of every unit of a national economy. The basic concepts of the SNA are used to analyse and aggregate the numerous aspects of the elementary actions in the economy, and are capable of answering important questions:

1. Who takes action in the economy?
2. What do they do?
3. Why do they take action?
4. How are the actions known?

The definitions, classifications and accounting rules in the SNA give answers to these questions (see Table 3.1).

Table 3.1: Main concepts of the 2008 SNA

QUESTION	EXPLANATION	THE 2008 SNA CONCEPTS
Who?	Refers to the economic agents (institutions, firms, individuals) that perform activities in the economy.	Institutional units Institutional sectors Total economy and the rest of the world
What?	Refers to the transactions and other flows and stocks, which are the objects of the economy.	Transactions and other flows Assets and liabilities Products and producing units
Why?	Refers to the reason why an economic agent takes an action	Classifications by purposes of expenditure
How?	Refers to the recording of who, what and why.	Accounting rules: – recording – time of recording – valuation – consolidation and netting

To find out more…

The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 2: Overview, Chapter 3: Stocks, flows and accounting rules, Chapter 4: Institutional units and sectors, and Chapter 5: Enterprises, establishments and industries.

1.1 WHO? Institutional units and sectors

1.1.1 Institutional sectors

The SNA is designed to represent the economy in a simplified way. However, given the complexity of an entire economy, a difficult task of aggregation is required which uses specific classifications:

1. Classification by industry, called 'functional classification' because it represents the production process and the flows experienced by goods and services produced in the economy, in other words, it shows the balance between supply and demand. In this case, units are defined according to their technical-productive profile, so they are units of production in the strict sense of the term.
2. Classification by institutional sector is another approach to the production process where the units are defined according to their economic behaviour, economic function and economic objectives. This classification highlights how income is obtained and distributed in an economy, how share capital is generated and how this is financed.

Classification by industry is linked to SUTs while institutional classification is associated with integrated economic accounts (IEA).

Definition

An institutional unit is an economic entity that is capable, in its own right, of owning assets, incurring in liabilities and engaging in economic activities and in transactions with other entities.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 4: Institutional units and sectors, point 4.2

An institutional unit has the following characteristics:

1. it is entitled to own goods or assets in its own right; it is therefore able to exchange ownership of goods or assets in transactions with other institutional units;
2. it is able to take economic decisions and engage in economic activities for which it is itself held directly responsible and accountable at law;
3. it is able to incur liabilities on its own behalf, to take on other obligations or future commitments and to enter into contracts;
4. it has a complete set of accounts, including a balance sheet of assets and liabilities, or it would be possible and meaningful, from an economic viewpoint, to compile a complete set of accounts if required.

Essentially two types of institutional units exist in an economy:

1. Persons or a household

Definition

A household is defined as a group of persons who share the same living accommodation, who pool some, or all, of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 4: Institutional units and sectors, point 4.4.

In the same category are included groups of persons staying in hospitals, retirement homes, prisons for long periods of time.

2. Legal or social entities

Definition

A legal or social entity is one whose existence is recognised by law or society independently of the persons or other entities that may own or control it.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 4: Institutional units and sectors, point 4.6.

In respect of legal units, the 2008 SNA distinguishes three main categories:

(a) Corporations (financial and non-financial) are entities capable of generating profit or other financial gain for their owners, are recognised by law as separate legal entities from their owners who enjoy limited liability and are set up for purposes of engaging in market production. Under this category legally constituted corporations (such as incorporated enterprises, public limited companies, public corporations, private companies, joint-stock companies, limited liability companies, limited liability partnerships, etc.), national resident units (non-resident units which have a centre of predominant economic interest in the economic territory of a country other than their prior resident country), and quasi-corporations (an unincorporated enterprise owned by a resident institutional unit that has a complete set of accounts and is operated as if it were a separate corporation and whose de facto relationship to its owner is that of a corporation to its shareholders) are all included.

(b) Non-profit institutions (NPIs) that are created for the purpose of producing goods and/or services but whose status does not permit them to be a source of income, profit or other financial gain for the units that establish, control or finance them.

(c) Government units are legal entities established by political processes. They have legislative, judicial or executive authority over other institutional units within a given area. The principal functions of government units are to assume responsibility for the provision of goods and services to the community or to individual households and to finance their provision out of taxation or other incomes, to redistribute income and wealth by means of transfers, and to engage in non-market production.

Institutional units are grouped together into **institutional sectors** on the basis of their principal functions, behavior and objectives.

The 2008 SNA includes five main institutional sectors:

1. Non-financial corporations;
2. Financial corporations;
3. General government;
4. Households;
5. Non-profit institutions serving households (NPISHs).

For the SNA to provide information concerning relations between a national economy and the *rest of the world*, transactions between residents and non-residents, such as claims by residents on non-residents, and vice versa are recorded in the rest of the world. It is not a sector for which complete sets of accounts have to be compiled, although it is often convenient to describe the rest of the world as if it were a sector. The rest of the world includes certain institutional units that may be physically located within the geographical boundary of a country, for example, foreign enclaves such as embassies, consulates or military bases, and also international organisations.

The allocation of a unit to an institutional sector is based on the following questions:

1. Is the unit resident?
2. Is it a household, institutional household (ex. a hospital) or a legal unit?
3. Is the unit a non-market or market producer?
4. Is the unit controlled by the government?
5. Does the unit provide financial services?
6. Is the unit foreign-controlled?

To find out more…

The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009 Chapter 4: Institutional units and sectors.

Institutional units can also be grouped according to ownership. A distinction is made between public, national private and foreign-controlled corporations. National private and foreign-controlled corporations belong to the private sector. General government belongs to the public sector in its entirety. Households and NPISHs belong to the private sector. Corporations are classified as public if the government, normally through ownership of more than half of the voting shares, controls them through government units or other public corporation(s). Control by government may also be due to special legislation. The criterion of owning more than half of the voting shares also applies to the classification of corporations into national private or foreign-controlled.

Table 3.2: Institutional units cross-classified by sector and ownership

Sector / Ownership	Non-financial corporations sector	Financial corporations sector	General government sector	Households sector	NPIs serving households sector
Public sector	Public non-financial corporations	Public financial corporations	All government units and government NPIs		
National private sector	National private non-financial corporations	National private financial corporations		All households	All NPIs serving households
Foreign-controlled sector	Foreign-controlled non-financial corporations	Foreign-controlled financial corporations			

Source: System of National Accounts 1993 Training manual, SADC, 1999.

1.1.2 The total economy and the concept of Residence

The **total economy** is defined in terms of institutional units.

Definition

Total economy is defined as the entire set of resident institutional units.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 4: Institutional units and sectors, point 4.23.

The **economic territory** of a country does not coincide exactly with its geographical territory. The term 'economic territory' means the geographical territory administered by a government within which persons, goods, services and capital move freely. It also includes international waters declared as an exclusive economic zone where the country enjoys exclusive fishing, fuel and mineral exploitation rights. Finally, certain enclaves in foreign countries, such as embassies, consulates and military bases, are included in an economic territory. On the other hand, enclaves in a country used by foreign governments and international organisations are excluded from the economic territory of that country.

The concept of economic territory in the 2008 SNA coincides with that of the Balance of Payments and Investment Position Manual, sixth edition.

Residence:

Definition

The residence of each institutional unit is the economic territory with which it has the strongest connection, in other words, its centre of predominant economic interest.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 4: Institutional units and sectors, point 4.10.

The concept of residence is not based on citizenship or legal criteria. Having **a centre of predominant economic interest** in a territory implies being engaged for an extended period (usually one year or more) in economic activities in this territory (e.g. to have ownership of land or ownership of structures or to engage in production in a territory).

Some clarifications on residence:

1. A **household** is resident when it maintains a dwelling that the members of the household treat and use as their principal residence. All individuals who belong to the household are also residents. There are several special cases for considering households still resident:
   (a) students continue to be resident in the territory in which they were resident prior to studying abroad;
   (b) patients going abroad for the purpose of medical treatment, even if the treatment takes a year or more;
   (c) crews of ships, aircraft, oil rigs, space stations etc. that operate outside a territory or across several territories;
   (d) diplomats, military personnel and other civil servants employed abroad in government enclaves;
   (e) cross-border workers, who maintain their principal dwelling in the national territory;
   (f) refugees, when they do not change their home territory regardless of their legal status or intention to return.
2. A **corporation or quasi-corporation** is considered as resident if it maintains at least one establishment where it plans to operate over a long period of time, e.g. at least one year. Practical considerations must often be made regarding construction by foreign enterprises, as they usually are borderline cases.

1.1.3 Enterprises, Establishments and Industries

Units engaged in production are recognised by the 2008 SNA as **enterprises**.

Definition

An enterprise is the view of an institutional unit as a producer of goods and services.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 5: Enterprises, establishments and industries, point 5.1.

An enterprise may be a corporation, a quasi-corporation, a non-profit institution or an unincorporated enterprise.

An institutional unit such as a corporation may be engaged in different kinds of production activities in different locations, producing various kinds of goods and services. This implies that some institutional units must be divided into smaller and more homogeneous units. Homogeneous activity is one criterion for dividing an enterprise into **kind of activity unit** (KAU).

Definition

A kind-of-activity unit is an enterprise, or a part of an enterprise, that engages in only one kind of productive activity or in which the principal productive activity accounts for most of the value added.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 5: Enterprises, establishments and industries, point 5.12.

An enterprise engaged in different activities has one or more locations and for the purposes of differential analysis it is useful to divide it accordingly into local units.

Definition

A local unit is an enterprise, or a part of an enterprise, that engages in productive activity at or from one location.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 5: Enterprises, establishments and industries, point 5.13.

The combination of location and kind of activity of an enterprise results in what is called an '**establishment**'.

Definition

An establishment is an enterprise or part of an enterprise that is situated in a single location and in which only a single productive activity is carried out or in which the principal productive activity accounts for most of the value added.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 5: Enterprises, establishments and industries, point 5.14.

Establishments are also called *local kind-of-activity units* (LKAU).

Establishments allow for the possibility of carrying out one or more secondary activities, although they should be on a small scale compared to the principal activity. The main activity of an enterprise may also involve ancillary activities that facilitate the efficient running of the enterprise but do not normally result in goods and services that can be marketed (for example keeping records, purchases of material and equipment, repair and maintenance of machinery and equipment, cleaning and maintenance of buildings and premises, sales promotion, etc.) but which could not be separately identified.

An enterprise may have one or more establishments. On the other hand, an establishment can belong to one and only one enterprise. In practice, an establishment may usually be identified with an individual workplace in which a particular kind of productive activity is carried out: an individual farm,

mine, quarry, factory, plant, shop, store, construction site, transport depot, airport, garage, bank, office, clinic, etc.

A complete set of accounts, including balance sheets, cannot be compiled for an establishment because it cannot have own assets, incur liabilities or engage in transactions with other entities in its own right. The only data that can be meaningfully compiled for an establishment are:

1. the items included in the production and generation of income accounts;
2. gross fixed capital formation and changes in inventories;
3. stock of fixed capital and land;
4. number of employees, types of employees, hours worked.

A SNA distinguishes, as an essential feature of its structure, between establishments that are **market producers, producers for own final use and non-market producers.** Market establishments produce goods and services mostly for sale at prices that are economically significant. Producers for own final use produce goods and services mostly for final consumption or fixed capital formation by the owners of the enterprises in which they are produced. Non-market establishments supply most of the goods and services they produce without charge or at prices that are not economically significant.

A group of establishments engaged in the same, or similar, kinds of activity are classified into one **industry** according to ISIC, Rev. 4.

Definition

An industry consists of a group of establishments engaged in the same, or similar, kinds of activity.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 5; Enterprises, establishments and industries, point 5.46.

The classification refers to the principal activity of the establishment as defined above. Certain activities produce more than one product simultaneously, while the same product may sometimes be produced by using different production tech-niques. The most important criterion used for classifying industries is the type of goods and services produced.

The enterprise is the main unit for national accounts because it represents the institutional unit for which production accounts are prepared and value added is estimated. Aggregating value added over activities is the one of the main activity of national accountants since this will directly yield GDP. Activities are grouped into 'industries' which are classified according to ISIC 4. In the same time, the main activity is one of the important variables of the SBR and base for defining the economic survey samples.

For more information concerning statistical business register and classifications see Chapter 4: *Statistical infrastructure for national accounts.*

The principal activity determines the activity class in ISIC to which the enterprise belongs. It is important to realise that once this assignment has been made, the whole enterprise – including output for other activities – will belong to this class, even if some of the other output belongs to a different class. This other output is called secondary output. What distinguishes main from secondary output is determined by its relative importance. Typically, value added is taken, but output, sales, wages and salaries and employment are also possible. If the value added for determining the inclusion criterion is selected, the main activity is the one with the highest value added of the unit. So there is only one main activity, but there can be more than one secondary activity. Value added of a secondary activity is usually less than that of the main activity, although this is not always necessarily the case. Usually, there is some minimum value that a share can take as well, e.g. 10%. Activities below this threshold are then ignored. It is quite normal for enterprises to have at least some secondary activities, although this is less likely for smaller enterprises than for larger.

It is important to realise that it is not necessary that the main activity account for 50 per cent or more of the total value added of a unit. When there are three activities A, B and C, with value added shares of 40%, 30% and 30% respectively, activity A will be main and activities B and C secondary. It should also be noted that in order for activities to be either main or secondary, their output should be suitable for delivery outside the producer unit.

Establishing the principal activity of one enterprise engaged in two or more activities for which the output serves a market is based on the so called 'top-down' method. The method operates according to the following rules:

1. In case one activity accounts for more than 50% of value added, this activity determines the classification;
2. Activity is determined according to the ISIC class with the largest share of value added from top to bottom:
   (a) first determine the highest classification level (1-digit)
   (b) then the lower (2- and 3-digit) levels
   (c) finally the class (4-digit level).

In Box 3.1 is presented one example how to determine the main activity of the enterprise.

Box 3.1: Determining the main activity of enterprise

The enterprise A has 5 activities A1, A2, A3, A4, A5, classified (fictitiously) as:

A1: ISIC4 code = 310 (manufacture of furniture), value added = 1450

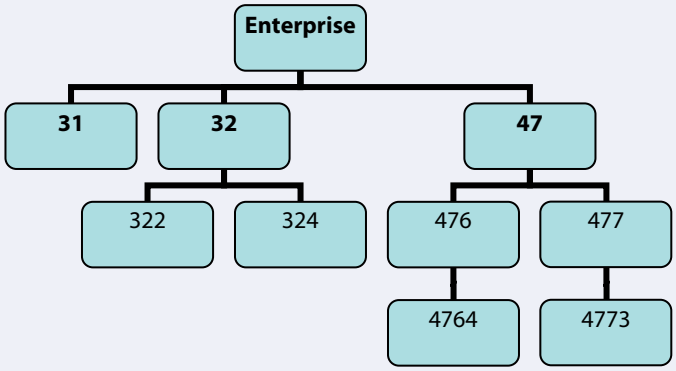
A2: ISIC4 code = 322 (manufacture of musical instruments), value added = 1200

A3: ISIC4 code = 324 (manufacture of game and toys), value added = 1330

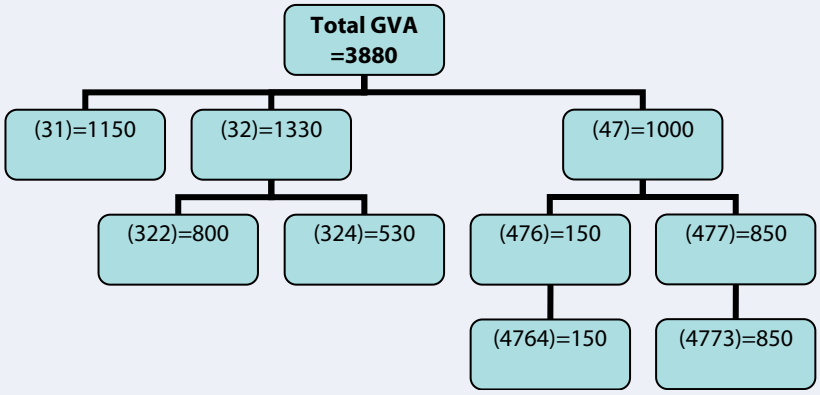
A4: ISIC4 code = 476 (retail sale of cultural and recreation goods in specialised stores), value added = 350

A5: ISIC4 code = 477 (retail sale of other goods in specialised stores), value added = 750

There are 5 activities at 3-digit ISIC4 level, which can be grouped into three activities at the 2-digit level according to the following tree structure:



Given the above data on value added at 3-digit level, we can calculate the totals at 2-digit levels and for the enterprise as a whole. The value added totals are presented in the same tree structure:



Following the top-down method, one obtain:

1. the largest share in the total GVA has activity 32;
2. of the total value added for 32, activity 332 has the largest share (800).

In these conditions, the activity 322 is the main activity and the whole enterprise is classified as 322 at 3-digit level, as 32 at 2-digit level and as 3 at 1-digit level.

Note that the activity 477 (value added = 850) has higher value added than this principal activity, but according to this methodology, it is still classified as a secondary activity.

1.2 WHAT? Flows and Stocks

The aim of SNA accounts, tables and balance sheets is to register in monetary terms the economic actions or events that take place within a given period of time and the effect of these events on the stocks of assets and liabilities at the beginning and end of that period.

In the economy, institutional units have various economic functions: they produce, consume, save, invest, etc. When they produce, they can be engaged in various type of production (agricultural, industrial, trade, etc.) as entrepreneurs, providers of labour or suppliers of capital. The actions they undertake are aimed at creating, transforming, exchanging, transferring economic value, or changing the volume, composition or value of assets and liabilities. All these actions are **economic flows**.

The 2008 SNA distinguishes two broad categories of economic flows: transactions and other economic flows.

1. Transactions

Transactions are economic flows that result from interaction between institutional units by mutual agreement and can take place within institutional units or between establishments belonging to the same enterprise. The main types of transactions are:

(a) Transactions in goods and services (products) describe the supply of products (domestic output or imports) and the use of products (intermediate consumption, final consumption, capital formation or exports). An example would be the output of shirts produced by an enterprise, the intermediate consumption of textiles and buttons used in the production of the shirts, investments in a new sewing machine, etc.

(b) Distributive transactions comprise:

- transactions by which the income generated in production (value added) is distributed as compensation of employees, or as taxes on production and imports (less subsidies), or as property income to different institutional sectors and the rest of the world (for instance gross salaries paid by the enterprise manufacturing shirts to its employees);
- transactions by which the generated income is redistributed as transfers between institutional sectors and/or the rest of the world (e.g. a general insurance premium paid by the enterprise for the building where the shirts are produced).

(c) Transactions in financial instruments include acquisitions and disposals of financial assets and incurrence, net of liabilities (e.g. the manufacturing enterprise pays for the raw material by cheque, with money from the deposit in national currency constituted in a bank).

(d) Other accumulation entries, as results of the transactions defined above which enable the change in the net worth of an institutional unit or sector between the beginning and end of the accounting period (e.g. the consumption of fixed capital registered for the machinery used in the production of bread in a bread factory).

Transactions in goods and services are also classified according to type of product. The 2008 SNA recommends the use of the Central Product Classification (CPC) Version 2 for the classification of goods and services. Besides products that, by definition, must be the output of productive activities, the CPC also accommodates some non-produced assets, such as land, patents, licences, trademarks and copyrights.

There are other schemes of classification of goods, mainly used in foreign trade statistics, namely the Harmonised System (HS 2007), which is very detailed, and the Standard International Trade Classification (SITC) Rev.4. Both HS and SITC are also used in industrial statistics. These have a different dimension for classification of products compared to that used by CPC, namely the classification of products as market, own-account or other non-market products.

Chapter 4: *Statistical infrastructure for national accounts*, Section 1.2: *Classifications* presents the main classifications used in the statistical system and the SNA.

Transactions may be categorised as monetary (e.g. a good is purchased or sold at a given number of units of currency) or non-monetary (e.g. barter and consumption of fixed capital).

They can both be either of two kinds:

1. Transactions with counterparts ('something for something'). There is an exchange between two parties in the transactions in products, labour, and/or assets.
2. Transactions without counterparts ('something for nothing'). Only one party to the transaction gets something. Examples are taxes, social assistance and gifts in kind. Such transactions are called transfers.

2. Other economic flows

Other economic flows arise from non-economic phenomena, recorded only in accumulation accounts. They include consumption of fixed capital, revaluation of assets and liabilities, economic appearance and disappearance of assets, natural growth of non-cultivated biological assets, uncompensated seizure and catastrophic losses of assets. Other accumulation entries cover transactions and other economic flows not previously taken into account, that change the quantity or value of assets and liabilities. They include:

(a) Acquisitions less disposals of non-produced non-financial assets;

(b) Other economic flows of non-produced assets, such as discovery or depletion of subsoil resources or transfers of other natural resources to economic activities;

(c) The effects of non-economic phenomena such as natural disasters and political events (for example, wars) and finally, they include holding gains or losses, due to changes in prices (e.g. the holding gain of the enterprise due to price increases over a year of the value of the stock of the produced shirts), and some minor items.

Stocks are a position in, or holdings of, non-financial (produced or non-produced) assets and the financial assets and liabilities at a point in time. They must be subject to ownership rights (economic ownership prevailing over legal ownership) and must also be used in some kind of economic activity. Consumer durables are excluded, as are natural resources that are not owned.

Flows and stocks are recorded on both sides of accounts and balance sheets. A **balancing** item is derived as the difference between the sums of the entries on both sides of an account or balance sheet. Balancing items have analytical significance of great importance. As a matter of fact, many important variables in national accounts are calculated as balancing items, e.g. value added.

More information concerning balancing items is presented in Chapter 3: *Basic concepts*, Section 2: *Accounts and main aggregates*.

1.3 WHY? Purposes

From the SNA point of view, purpose means the function relating to the type of need a transaction or group of transactions aims to satisfy. Transactions are first analysed in the SNA according to their nature. For certain sectors or type of transactions, they are analysed by purpose, in answer to the question 'for what purpose?'.

In this case, the SNA recommends using the following classifications for functional analysis:

1. **COICOP - Classification of Individual Consumption by Purpose** (and of household final consumption expenditure);
2. **COFOG - Classification of the Functions of Government** (used to classify consumption expenditure, other current expenditure, capital expenditure and other government outlays);
3. **COPNI - Classification of the Purposes of Non-profit Institutions serving households** (used to classify the same type of transactions as for governments);
4. **Classification of Outlays of Producers by Purpose** (COPP) can provide information on the 'outsourcing' of business services.

More information concerning the classifications is provided in Chapter 4: *Statistical infrastructure for national accounts*, Section 1.2: *Classifications*.

1.4 HOW? Accounting Rules

Transactions of economic agents (who), of their actions (what) undertaken for different purposes (why) are recorded in the SNA according to clear rules (how). These Rules are related to the content of institutional units resources and uses, the valuation of transactions, the way and the time of recording them in a defined structure.

1.4.1 The accounting model

National accounts are built according to the accounting model used in business accounting (see Chapter 5: Administrative data). The two accounting systems have the following similarities:

1. Two-side presentation

(a) The left side of a 'T' business account is called debit and the right side credit;

(b) In national accounts, the following terms are used:

- **resources** for transactions which add to the amount of economic value of a unit or a sector are presented on the right side of the account;
- **uses** for transactions that reduce the amount of economic value of a unit or sector are shown on the left side of the current account.

2. Double-entry principle

(a) Business accounting is based on the principle of double-entry, whereby one transaction requires two entries, in principle one credit and one debit;

(b) National accounts reflect mutual economic relationships between different institutional units based on 'horizontal' double entry. This means that if an institutional unit provides something to another institutions unit, the accounts of both units will show the transaction: as a resource in the accounts of one unit and as a use in the accounts of the other. As for example, the compensation of employees paid by different economic units should be equal to the sum received by employees.

(c) In the accounts of an institutional unit, each transaction must be recorded twice, as a resource (or a change in liabilities) and as a use (or a change in assets). This is the so-called 'vertical' double–entry. Thus, the total of the transactions recorded as resources (or changes in liabilities) and the total of the transactions recorded as uses (or changes in assets) are equal, enabling consistency checking. The simultaneous application of both the vertical and horizontal double-entry bookkeeping results in quadru-

ple-entry bookkeeping, that is the accounting system underlying the recording in the SNA (financial accounts must be compiled to take full practical advantage of the quadruple-entry principle).

As an example of a relevant transaction in national accounts, the 'Output' (P1) which measures the amount of goods and services produced during the accounting period is considered. In order to generate this output by a particular production process, inputs are required, such as raw materials, energy, transport, etc. The costs of these inputs are measured by the transaction, 'Intermediate consumption' (P2). Between them, there exists an identity from the accounting point of view. For each institutional unit the resources (representing incoming money flows) and uses (representing outgoing money flows) are collected and presented in a T-account, with transactions involving resources on the right side and those involving uses on the left side.

Uses		Resources	
P2 Intermediate consumption	2800	P1 Output	4500
B1g Gross value added	1700		

For example, a social benefit in cash paid by a government unit to a household is recorded in the accounts of government as a use under the relevant type of transfers and a negative acquisition of assets under currency and deposits; in the accounts of the household sector, it is recorded as a resource under transfers and an acquisition of assets under currency and deposit.

1.4.2 Time of recording

The time of recording in SNA is different for flows and stocks:

1. flows are recorded over a certain period of time;
2. stocks are recorded at a certain point in time, namely at the beginning (opening balance) and at the end (closing balance) of the accounting period.

The accounting period in national accounts usually corresponds to the calendar year or a quarter of a year.

The time of recording must be the same for the entries in the different accounts of the all the stakeholders involved. There are three moments when flows can take place, each of them defining a basis for the timing:

1. 'cash basis' records cash flows at the time these payments occur;
2. 'due for payment basis' records flows at the time they are due to be paid;
3. 'accrual basis' records flows at the time economic value is created, transformed, exchanged, transferred or extinguished.

As a general principle, transactions between institutional units in the SNA have to be recorded when claims and obligations arise, are transformed, or are cancelled; this time represents the 'accrual basis'. For example, in May a company delivers computers to a customer who will pay for it 30 days later. Under the cash method, the revenue from this sale will be recorded in June, when the money will be received; however the accrual method requires recording the income in May, in the month when the transaction took place.

The SNA favours accrual accounting because:

1. The timing of accrual accounting is in full agreement with the way economic activities and other flows are defined in the SNA. This agreement allows the profitability of productive activities to be evaluated correctly (that is, without the disturbing influence of leads and lags in cash flows) and a sector's net worth to be calculated correctly at any point in time.
2. Accrual accounting can be applied to non-monetary flows.

One of the problems for national accounts is that activities of institutional units often extend over periods in which several important moments can be distinguished. For example, many commercial sales start with the signing of a contract between a seller and a buyer, which includes the date of delivery, and a date or dates on which payments become due and are only completed as of the date the last payment is received by the seller. Each of these distinct moments is, to some extent, economically relevant.

With regard to taxes, for example, important moments are the day or the period in which the liability arises, the moment the tax liability is definitively assessed, the day that it becomes due for payment without penalty, and the day the tax is actually paid or refunds are made.

Some issues of the time of recording for the main transactions:

1. The time of recording of the acquisition of goods is the moment when the economic ownership of those goods changes hands. When change of ownership is not obvious, the moment of entering in the books of the transaction partners may be a good indication and, failing that, the moment when physical possession and control is acquired.
2. Imports and exports of goods are recorded when change of ownership occurs. In the absence of sources specifying the date on which ownership changes, there is a strong presumption that the goods will cross the frontiers of the countries concerned either shortly before or soon after the change of ownership takes place.
3. Services are recorded in the SNA when they are provided. Some services are special in the sense that they are characteristically supplied on a continuous basis. Examples are operating leasing, insurance and housing services (including those of owner-occupied dwellings). These

services are recorded as provided continuously over the whole period the contract lasts or the dwelling is available.

4. The output is recorded over the period in which the process of production takes place. Thus, additions to work-in-progress are recorded continuously as work proceeds. When the production process is terminated, the whole of the work-in-progress accumulated up to that point is effectively transformed into a stock of finished product ready for delivery or sale.
5. The intermediate consumption of a good or service is recorded at the time when the good or service enters the process of production, as distinct from the time it was acquired by the producer.
6. Inventories may be materials and supplies held as inputs by producers, output as yet unsold, or products held by wholesale and retail traders. In all cases, additions to inventories are recorded when products are purchased, produced or otherwise acquired. Deductions from inventories are recorded when products are sold, used up as intermediate consumption or otherwise relinquished.
7. The distributive transactions, as for example, compensation of employees, interest, rent on land, social contributions and benefits are all registered in the period during which the amounts payable are built up.
8. Entries for taxes are made at the moment on which the underlying transactions or other flows occur that give rise to the liability to pay. This implies that taxes on products and imports are recorded at the times the products in question are produced, imported or sold, depending on the basis for taxation.
9. Current taxes on income are recorded when the income to which they pertain is earned although taxes deducted at source may have to be recorded when they are deducted.

To find out more…

The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 3: Stocks, flows and accounting rules.

1.4.3 Valuation

Under SNA a transaction must be recorded at the same value throughout all the accounts of all the sectors involved.

Transactions are valued at the actual price agreed upon by the economic agents. The basic reference for valuation in the SNA is **current market prices**. In the absence of market transactions, valuation is made according to costs incurred (for example, non-market services produced by the government) or by reference to the market prices for analogous goods or services (for example, services of owner-occupied dwellings).

Transaction valuation methods used in the SNA are based on more than one set of prices depending upon how taxes and subsidies on products, and also transport charges, are recorded.

The measurement of output in SNA is taken using two kinds of prices, namely, basic prices and producers' prices.

Definition

The *basic price* is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any tax payable, and plus any subsidy receivable, by the producer as a consequence of its production or sale. It excludes any transport charges invoiced separately by the producer.

The *producer's price* is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any value added tax (VAT), or similar deductible tax, invoiced to the purchaser. It excludes any transport charges invoiced separately by the producer.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 6: The production account, point 6.51.

Basic price measures the amount retained by the producer and is, therefore, the price most relevant to the producer's decision taking. It excludes any taxes on products the producer receives from the purchaser and passes on to government, but includes any subsidies the producer receives from government and uses to further lower the prices charged to purchasers.

The producer's price includes taxes on products (taxes payable per unit of output) and excludes subsidies on products (subsidies receivable per unit of output). It is the price, excluding VAT, that the producer invoices to the purchaser. It is becoming increasingly common in many countries for producers to itemise taxes separately on their invoices, so the purchasers are informed about how much they are paying for the product (to the producer) and how much for the taxes (to the government).

Definition

The *Purchaser's price* is the amount paid by the purchaser, excluding any VAT or similar tax deductible by the purchaser, in order to take delivery of a unit of a good or service at the time and place required by the purchaser. The purchaser's price of a good includes any transport charges paid separately by the purchaser to take delivery at the required time and place.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 6: The production account, point 6.64.

A purchaser has two options to buy:

1. directly from the producer. In this case, the purchaser's price may exceed the producer's price by (a) the value of any non-deductible VAT, payable by the purchaser and

(b) the value of any transport charges on a good paid separately by the purchaser;

2. from a wholesaler or retailer. In this case, it is necessary to consider also the trade margins that the retailer will apply.

Figure 3.1 presents the relationships between prices.

Figure 3.1: Relationships between prices

BASIC PRICE
+ Taxes on products excluding invoiced VAT
- Subsidies on products
= PRODUCER'S PRICE
+ VAT not deductible by the purchaser
+ Separately invoiced transport charges
+ Wholesalers' and retailers' margins
= PURCHASER'S PRICES

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009

Example

Imagine the following situation:

An enterprise produces cigarettes. The value of the total production costs and the enterprise profit for a packet of cigarettes is 200 units. The enterprise must pay an excise duty, which is 20% applied to the value of each packet. The packet of cigarettes is sold to a retail trader. The transport cost is valued at 10 units and the trade margin is 20 units. In the country, the value added tax (VAT) is 20%.

The final consumer of the packet of cigarettes pays 324 units.

Evaluation at **basic price** = 200 units.

Evaluation at **producer's price** = production at basic price + taxes on products = 200 + (20% x 200) = 200 + 40 = 240 units.

Evaluation at **purchaser's price** = production at producer's price + transport cost + trade margin + VAT = 240 + 10 + 20 + [(240 + 10 + 20) x 20%] = 324 units.

2. Accounts and main aggregates

2.1 Accounts

The immense number of individual transactions and other flows and assets has to be aggregated in a manageable number of analytically useful groups, representing the accounts according to standard SNA classifications.

The sequence of accounts describes how income is generated, distributed, redistributed and used for consumption or the acquisition of assets and when assets are disposed of, or a liability is incurred, in order to acquire other assets or undertake more consumption than current income permits. The accounts of the economy presented in the SNA are described below.

1. Current accounts consist of a production account and accounts showing the primary distribution of income, the secondary distribution of income and the use of income. In addition to these accounts the entries from the rest of the world account (imports and exports of goods and services) show the value of goods and services that reach the national economy from the rest of the world and those that are produced in the national economy but are provided to the rest of the world. In detail, the accounts are: (a) a production account; (b) a generation of income account; (c) an allocation of primary income account (including an entrepreneurial income account and an allocation of other primary income account); (d) a secondary distribution of income account; (e) a use of income accounts (including a use of disposable income account and a use of adjusted disposable income account).
2. Accumulation accounts are represented by four accounts dealing with changes in the values of assets held by institutional units, recording transactions in non-financial and financial assets and the other changes in the volume of assets: (a) capital account; (b) financial account; (c) other changes in assets account; (d) revaluation account. The effects of price changes are recorded in the revaluation account. These four accounts enable the change in the net worth of an institutional unit or sector between the beginning and end of the accounting period to be broken down into its constituent elements by recording all changes in the prices and volumes of assets, whether resulting from transactions or not. The impact of all four accounts is brought together in balance sheets.
3. Balance sheets present, with respect to a particular point in time, the values of assets owned and the liabilities owed by an institutional unit or group of units. A balance sheet may be drawn up for institutional units, institutional sectors and the total economy. It includes: (a) an opening balance sheet; (b) total changes in assets; (c) a closing balance sheet.
4. Goods and services account (see below).

5. The accounts for the rest of the world. The entries in the integrated accounts for the rest of the world correspond to the entries in the balance of payments, as set out in BPM sixth edition.

An alternative view of the economy focuses less on income and more on the processes of production and consumption and is presented in a goods and services account.

Definition

The goods and services account shows the balance between the total goods and services supplied as resources to the economy as output and imports (including the value of taxes less subsidies on products not already included in the valuation of output) and the use of the same goods and services as intermediate consumption, final consumption, capital formation and exports.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 16: Summarizing and integrating the accounts, point 16.27.

The goods and services account is the basic identity in the SNA. It captures the idea that all output plus imports must be accounted for in one of the two basic activities of the SNA (consumption of goods and services or accumulation of goods and services). The whole sequence of accounts is built around the goods and services account by adding transactions relating to the generation, distribution and redistribution of income and saving.

The total amount of goods and services supplied to the economy must be equal to the total use made of those goods and services. The identity is the following:

Output + imports + taxes less subsidies on products = Intermediate consumption + final consumption + exports + capital formation

Based on this equation, it reflects the fact that goods and services produced in the current period are used:

1. to generate more goods and services in the current period (intermediate consumption);
2. to generate more goods and services in future periods (capital formation);
3. to satisfy human needs immediately (final consumption).

Due to the fact that no economy is entirely closed, it is necessary to add those goods and services supplied from outside the economy (imports) and those goods and services used by other economies (exports).

2.2 Main aggregates

Aggregates in national accounts are composite values that measure one aspect of the activity of the entire economy. They are summary indicators and key magnitudes for the purposes of macroeconomic analysis and comparisons over space and time. For user needs, the aggregates of the SNA provide a simplified but complete and detailed picture of an economy.

Some aggregates can be obtained directly as totals of particular transactions in the SNA, such as total production, final consumption, gross fixed capital formation, etc. Others result from aggregating balancing items of institutional sectors accounts: value added, balance of primary incomes, disposable income and savings, etc.

Definition

A balancing item is an accounting construct obtained by subtracting the total value of the entries on one side of an account (resources or changes in liabilities) from the total value of the entries on the other side (uses or changes in assets). It cannot be measured independently of the entries in the accounts; as a derived entry, it reflects the application of the general account in rules to the specific entries on the two sides of the account.

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 3: Stocks, flows and accounting rules, point 3.9.

Balancing items reflect the application of general accounting rules to specific entries on both sides of an account. They do not relate to any specific set of transactions, or any set of assets, and so they cannot be expressed in terms of their own price or quantity units. Balancing items are often used as key macroeconomic indicators to assess economic performance. Balancing items in sector accounts are presented in Table 3.3.

Table 3.3: List of balancing and net worth items

Account	Balancing items	
	Cod	Name
Production account	B1 B11	Value Added/ Domestic Product External balance of goods and services
Generation of income account	B2 B3	Operating Surplus Mixed Income
Allocation of primary income account	B5	Balance of primary incomes/ National Income
Entrepreneurial income account	B4	Entrepreneurial income
Allocation of other primary income account	B5	Balance of primary incomes/ National Income
Secondary distribution of income account	B6	Disposable Income
Redistribution of income in kind account	B7	Adjusted disposable Income
Use of disposable income account	B8 B12	Saving Current external balance
Capital account Changes in assets Change in liabilities and net worth	 B9 B101	 Net lending (+) / net borrowing (–) Change in net worth due to saving and capital transfers
Financial account	B9	Net lending (+) / net borrowing (–)
Other change in the volume of assets account	B102	Changes in net worth due to other changes in volume of assets
Revaluation account	B103	Changes in net worth due to nominal holding gains/losses
Balance sheets	B10 B90	Changes in net worth, total Net worth Net worth

Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009

Based on balancing items, the main aggregates of the 2008 SNA used as key indicators for assessing economic performance are:

1. Gross Domestic Product (GDP);
2. Gross National Income (GNI) and Net National Income (NNI);
3. Gross National Disposable Income (GNDI) and Net National Disposable Income (NNDI).

The concept 'domestic product' is basically a production concept: it measures the total value created in the production of goods and services. On the other hand, national income and national disposable income are income concepts designed to measure different aspects of the total incomes receivable in the economy.

The ways of calculating the main aggregates using different approaches are presented in Table 3.4.

Table 3.4: Main aggregates in SNA

Production Approach (1)	Expenditure Approach (2)	Income Approach (3)
+ Sum of values added at basic prices of all producers + Taxes on products - Subsidies on products	+ Final consumption expenditure + Gross fixed capital formation + Changes in inventories + Exports of goods & services - Imports of goods & services	+ Compensation of employees + Taxes on production and imports - Subsidies on production + Operating surplus / mixed income
= Gross domestic product (GDP) at market prices (I) – Consumption of fixed capital = Net domestic product		
(I) + Primary incomes receivable from the rest of the world – Primary incomes payable to the rest of the world		
= **Gross national income (GNI)** at market prices (II) – Consumption of fixed capital = Net national income at market prices		Can also be calculated as the sum of the balance of primary incomes of all institutional sectors
(II) + Current transfers receivable from the rest of the world – Current transfers payable to the rest of the world		
= Gross national disposable income (GNDI) at market prices (III) – Consumption of fixed capital = Net national disposable income at market prices		Can also be calculated as the sum of the disposable incomes of all institutional sectors

Source: System of National Accounts 1993, Training manual, SADC, 1999

The most well-known and well-used aggregate is GDP. The objective of the first phase of implementation of national accounts is to estimate it by production and expenditure.

The three methods of GDP estimation define the needs and the limits for the generation of statistics in support of national accounts which differ from country to country. In these conditions, there are several national accounts compilation practices, from the very simple GDP compilation by industry and type of expenditures to more comprehensive systems of national accounts, including supply and use tables, institutional sector accounts, flow of funds analysis, balance sheets, and, recently, satellite extensions such as environmental accounts or human resources accounts, based on milestones (see Chapter 2: Building the SNA, point 3.1. Phase A: Aims and objectives).

1. The production approach

GDP using the production approach is obtained in the framework of the production account. Producers engaged in production can be either institutional units classified by institutional sectors or establishments classified by industry. The latter is the most common in practice.

The compilation formula is:

GDP at market prices = gross value added (GVA) at basic prices
+ taxes on products
– subsides on products

Value added represents a measure of the additional value created in the process of production and it is equal to:

Gross value added = production – intermediate consumption

To find out more…

For additional information concerning the content and evaluation of production and intermediate consumption:

- *The 2008 SNA*, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 6: The production account;
- *ESA 2010*, Chapter 3: Transactions in products and non-produced assets - Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union;
- *National Accounts: A practical introduction*, Studies in Methods, Series F, No.85, UN 2003, Chapter III: Production account and goods and services account.

2. The expenditure approach

GDP using the expenditure approach is estimated in the framework of the goods and services account. The extended compilation formula is:

GDP at market prices = Final consumption expenditure (of Households, of NPISHs, of Government)
+ Gross capital formation (Gross fixed capital formation and Change in inventories)
+ Exports of goods and services
- Imports of goods and services

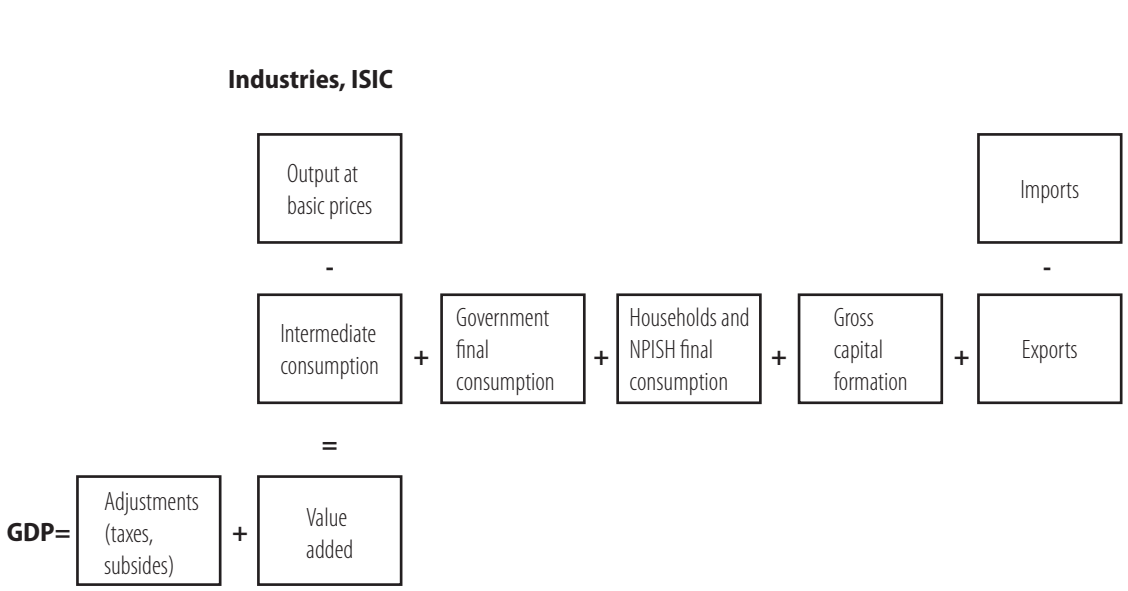
3. The income approach

GDP estimated using the income approach is derived from the generation of income account for producers classified by industry or by institutional sector. The produced value added components are entered into the formula (see Table 3.4). For this reason, this procedure is sometimes used as an alternative to the production approach for calculating values added.

Table 3.4 shows that **net aggregates** can be obtained by deducting consumption of fixed capital from gross aggregates. Consumption of fixed capital is not a value created in the production process; it is a production cost. Therefore, values added, domestic product and income measures should be preferably measured net. However, it is very difficult to measure consumption of fixed capital properly and many countries do not measure it at all. Gross aggregates are more often available and more widely used.

The production-expenditure-income approaches constitute the basic ways of compiling national accounts and correspond to the objectives of milestones 1 and 2. These simplest approaches to national accounting aim at estimating GDP and its alternative breakdowns by economic activity or industry, by expenditures, and by income (which represents the cost com-ponents of value added). The scope of this approach is represented in Figure 3.2.

Figure 3.2: Production, expenditure, income approaches to national accounts compilation



Source: A system approach to national accounts compilation, Studies in methods, Series F, No77, UN 1999

There are countries where often the GDP estimation follows one or two approaches; in most of the cases the income approach is missing as it is generally regarded to be the most difficult one to compile. Most often, GDP is estimated by the production approach. The basic statistical units used may be establishments, which group production activities with similar characteristics in terms of output, inputs and technology used; alternatively, in less refined approaches, institutional units may be used. Total output and intermediate consumption are compiled and hence value added is obtained as the difference between the two. The statistical sources that are used range from specific surveys and censuses (agriculture, industry, etc.) to business accounts of public and private enterprises from financial and non-financial sectors as well as administrative records concerning government revenues and expenditures. Initial estimates may be further adjusted for output of households for own consumption, imputations for the output of financial intermediaries (FISIM) and insurance, and so on.

Statistical and administrative data sources used for national accounts compilation are presented in Chapter 4: *Statistical infrastructure for national accounts,* Section 2: *Statistical data sources* and Chapter 5: *Administrative data sources,* Section 1: *What are administrative sources.*

When using the expenditure approach, the different elements are estimated in the following way:

1. government final consumption expenditure is estimated based on data obtained from government records concerning its expenditures and revenues;
2. household final consumption expenditure is estimated based on retail sales statistics or, where available, household expenditure surveys and other appropriate sources;
3. data on fixed capital formation is obtained from specialised surveys or from general production surveys and, in the case of government and public corporations, directly from the accounts;
4. changes in inventories are more difficult to estimate, especially because of the related problems of stock valuation;
5. import and export estimates are based on foreign trade and balance of payments statistics, which are in general readily available.

The income approach is used by relatively few countries because of statistical measurement problems. If applied, however, independent estimates are most frequently made for compensation of employees which are based on labour statistics and wage rates, and taxes on production and imports which are estimated based on government data. Estimates of consumption of fixed capital are often not included because they can only be made if produced capital stock data are available. The operating surplus can be estimated using as a basis profit and loss accounts and similar statements of enterprises.

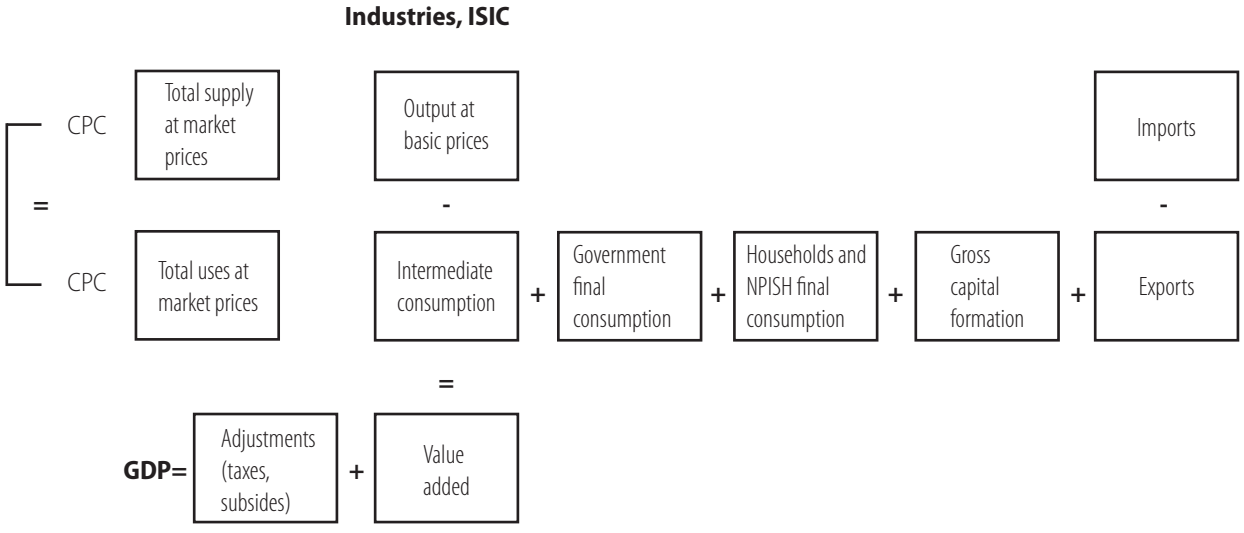
Normally, the three approaches described above should be used simultaneously and independently from each other. If that is the case, the data resulting from each approach can be used as checks to evaluate and analysis the data obtained from the other two approaches and to determine the final data.

The Chapter 2: *Building the SNA*, point 3.3: Phase C: *Compilation* presents the estimation process for national ac-counts.

The reconciliation of GDP obtained based on the three approaches independently should be realised at a detailed level, by cross-checking, for example, 'final expenditures by products' and 'industries producing those products'.

The previous practices could be characterised as the more simple approach to implementing milestone 1. The next degree of complexity is reached by including, in addition to the data elements of Box 3.2, output and intermediate consumption for all industries and by introducing a systematic breakdown of the supply and use rows by products or CPC categories, as well as by including data on labour inputs per industry. This could be considered as the more complete approach to milestone 1; the result is shown in Figure 3.3, which represents a genuine supply and use framework. The compilation methods that utilise the product detail, as represented in the box, are generally characterised as the 'commodity flow' approach to national accounts compilation. The inclusion of additional detail on output, intermediate consumption and labour inputs serves for more comprehensive analyses based on production functions.

Figure 3.3: Commodity flow approaches to national accounts compilation



Source: A system approach to national accounts compilation, Studies in methods, Series F, No77, UN 1999

The basic principle of the methods described is that, on the level of the total economy, the identity for total resources and total uses must hold for each individual product category.

Concerning the statistical sources for the commodity flow method, they are similar to the sources mentioned above, with the additional requirement of a detailed product (i.e. goods and services) breakdown. Where detailed annual information is not available, structural parameters such as input/output coefficients or intermediate/final consumption proportions are used to distribute the supply of products over the uses.

The commodity flow method provides a very detailed set of data reconciliation checks at the level of product or commodity groups, and improves the reliability of the GDP data as compared to the estimates resulting from the production-expenditure-income approaches which often only reconcile data at the aggregate GDP level.

The compilation approaches mentioned so far are strongly production-oriented and yield results which correspond to what was defined as milestone 1. When the coverage of national accounts is extended to describe not only the production process, but also the ensuing income distribution and redistribution processes, and the linkages to capital and financial flows and stocks, the country passes to milestone 2. The extension of the previous compilation approach to this more comprehensive approach requires that data not only be compiled on the basis of establishments that are grouped together by industries, but also for institutional units – corporations, households, government units – that together define the institutional sectors of the 1993 SNA. The introduction of institutional units in the collection of statistical data often required costly changes in the content of surveys and survey procedures. This represents one of the objectives of the SNA implementation strategy and its advocacy should be developed.

For more information see Chapter 2: *Building the SNA,* Section 2: *The 2008 SNA implementation strategy.*

3. Recommended reading

- *National Accounts: A practical introduction,* Studies in Methods, Series F, No.85, UN 2003; chapter I: Overview; Chapter III: Production account and goods and services account; Chapter V: Enterprises, establishments and industries;
- *The 2008 SNA,* European Commission, IMF, OECD, UN, World Bank, 2009; Chapter 2: Overview; Chapter 3: Stocks, flows and accounting rules; Chapter 4: Institutional units and sectors; Chapter 5: Enterprises, establishments and industries;
- *ESA 2010, Chapter 2: Units and groupings of units; Chapter 3: Transactions in products and non-produced assets* - Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union;
- *Understanding National Accounts,* Lequiller F., Blades D., OECD 2006; Chapter IV: Production: what it Includes and Excludes; Chapter V: Defining Final Uses of GDP;
- *Guide méthodologique pour l'élaboration des comptes nationaux dans les états membre d'Afristat,* Afristat, Serie Méthodes No.4, 2001; Chapter I: Introduction au system de comptabilité nationale;
- *System of National Accounts 1993*, Training manual, SADC, 1999; Chapter II: Categories in the 1993 SNA; Chapter IV: Main aggregates;
- *Balance of Payments and Investment Position*, Sixth Edition, (BPM6), IMF, 2009;

4

Statistical Infrastructure for National Accounts

The chapter in brief

The aim of this chapter 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. The main pillars of statistical infrastructure are identified and described in separate sections: the statistical business register, classifications and statistical data sources. While a good-quality statistical business register should offer a realistic view of a country's businesses, the classifications implemented by countries should envisage comparability in space and time. Statistical data sources may directly provide the information required for compiling national accounts.

1. The basis: business register and statistical classifications

1.1 Business Register

The Statistical Business Register (SBR) plays an essential role in the construction and maintenance of an integrated economic information system, serving multiple purposes. One of these objectives is to provide quality data needed for the compilation of national accounts indicators.

Definition

Business registers for statistical purposes are the main source for business demography, as they keep track of business creations and closures as well as the structural changes in the economy by concentration or de-concentration, brought about by operations such as mergers, takeovers, break-ups, split-offs and restructuring.

Source: Regulation (EC) No 177/2008 of the European Parliament and the Council of 20 February 2008 establishing a common framework for business registers for statistical purposes and repealing Council regulation (EEC) no. 2186/93

In other words, it is a list of businesses which includes those engaged in the production of goods and services.

For statistical purposes the business register is a tool used for preparing and coordinating surveys as well as an information source used in the statistical analysis of the business population and its demography. It is also used for administrative data as well as for identifying and constructing statistical units.

The register comprises:

1. all enterprises carrying on economic activities contributing to the GDP and their local units;
2. the legal units of which those enterprises consist;
3. truncated enterprise groups and multinational enterprise groups;
4. all resident enterprise groups.

1.1.1 Objective

The SBR exists primarily for the purpose of supplying a framework for all economic surveys. Therefore it is designed to provide a means of coordinating the coverage of business surveys and of achieving consistency in classifying statistical reporting units. It also serves as a data source for compiling demographic information about businesses.

1.1.2 Variables

The typical units in an SBR are legal units and local units, whereas for statistical purposes, these must be transformed into units such as enterprises and establishments.

Legal units include:

1. legal persons whose existence is recognised by law irrespective of the individuals or institutions which may own them or are members of them;
2. natural persons engaged in an economic activity in their own right.

A legal unit always forms, either by itself or sometimes in combination with other legal units, the legal basis for a statistical unit known as the 'enterprise'.

A **local unit** is an enterprise or part thereof (e. g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place. At or from this place, an economic activity is carried out for which – save for certain exceptions – one or more persons work (even if only part-time) for one and the same enterprise.

Chapter 3: *Basic concepts*, Section 1: *Fundamentals for national accounting* outlines the relations between enterprises, local unit and establishment.

The units listed in a register should be described according to type of statistical unit (legal unit, local unit and enterprise) using three categories of variables:

1. **Identification variables** (identity number, name of enterprise, name of the owner, address, legal status);
2. **Stratification variables** (economic activity, number of employees, sales turnover, geographical location);
3. **Demographic variables** (births, date of changes in economic activity, deaths).

It is important to ensure the utmost accuracy of data, particularly those used as stratification variables in the sampling process (for example, variables relating to size and activity classification), together with identification data thus enabling contact with firms. The main variables included in an SBR are presented in Boxes 4.1, 4.2 and 4.3.

The use of standardised statistical units in an SBR guarantees time-consistency in surveys, avoids duplications and omissions in data collection and improves the final quality of results by allowing greater coordination between surveys. The existence of a unique identification number, usually a legal code attributed by the tax administration, can greatly enhance the capacity for coordination between the various sources, including administrative ones.

To find out more…

Eurostat-OECD Manual on Business Demography Statistics, OECD, Eurostat, 2007, available from: **http://www.oecd.org/dataoecd/8/8/39974460.pdf**

Box 4.1: Main variables collected for a Legal Unit

Identification Characteristics	1.1.		Identity number
	1.2a.		Name
	1.2b.		Address (including postcode) at the most detailed level
	1.2c.	Optional	Telephone and fax numbers, e-mail address, and information to permit electronic collection of data
	1.3.		Value Added Tax (VAT) registration number or, failing that, other administrative identity number
Demographic Characteristics	1.4.		Date of incorporation for legal persons or date of official recognition as an economic operator for natural persons
	1.5.		Date on which the legal unit ceased to be part of an enterprise (as identified in 3.3)
Economic/ Stratification Characteristics	1.6.		Legal form
	1.7.	Optional	Reference to balance sheet data (for units required for publication of accounts), and Reference to the balance of payments register or foreign direct investment register, and Reference to the farm register
Link with Enterprise Group	1.8.		Identity number of the all-resident/truncated enterprise group, to which the unit belongs
	1.9.		Date of association to the all-resident/truncated group
	1.10.		Date of separation from the all-resident/truncated group
	1.11a.		Identity number(s) of resident legal unit(s), which are controlled by the legal unit
	1.11b.		Identity number of the resident legal unit, which controls the legal unit
	1.12a.		Country(ies) of registration, and identity number(s) or name(s) and address(es) of the non-resident legal unit(s), which are controlled by the legal unit
	1.12b.	Conditional	VAT number(s) of non-resident legal which are controlled by the legal unit
	1.13a.		Country of registration, and identity number or name and address of the non-resident legal unit, which controls the legal unit
	1.13b.	Conditional	VAT number of the non-resident legal unit, which controls the legal unit
	1.14a.	Conditional	(a) Identity number(s), and (b) shares (%) of resident legal unit(s) owned by the legal unit
	1.14b.	Conditional	(a) Identity number(s), and (b) shares (%) of resident legal unit(s), which own(s) the legal unit
	1.15.	Conditional	(a) Country(ies) of registration, and (b) identity number(s) or, name(s), address(es), and VAT number(s), and (c) shares (%) of non-resident legal unit(s) owned by the legal unit
	1.16.	Conditional	(a) Country(ies) of registration, and (b) identity number(s) or, name(s), address(es), and VAT number(s), and (c) shares (%) of non-resident legal unit(s), which own(s) the legal unit

Source: Regulation (EC) No 177/2008 of 20 February 2008 on establishing a common framework for business registers for statistical purposes and repealing Council Regulation (EEC) No 2186/93

Box 4.2: Main variables collected for a Local Unit

Identification Characteristics	2.1.		Identity number
	2.2a.		Name
	2.2b.		Address (including postcode) at the most detailed level
	2.2c.	Optional	Telephone and fax numbers, e-mail address, and information to permit electronic collection of data
	2.3.		Identity number of the enterprise (3.1), to which the local unit belongs
Demographic Characteristics	2.4.		Date of commencement of activities
	2.5.		Date of final cessation of activities
Economic/ Stratification Characteristics	2.6.		Principal activity code at 4-digit level
	2.7.	Conditional	Secondary activities, if any, at 4-digit level; this point concerns only local units which are the subject of surveys
	2.8.	Optional	Activity carried out in the local unit constituting an ancillary activity of the enterprise to which it belongs (Yes/No)
	2.9.		Number of persons employed
	2.10a.		Number of employees
	2.10b.	Optional	Number of employees in full-time equivalents
	2.11.		Geographical location code
Links with Other Registers	2.12.	Conditional	Reference to associated registers, in which the local unit appears and which contain information which can be used for statistical purposes (if such associated registers exist)

Source: Regulation (EC) No 177/2008 of 20 February 2008 on establishing a common framework for business registers for statistical purposes and repealing Council Regulation (EEC) No 2186/93

Box 4.3: Main variables collected for an Enterprise

Identification Characteristics	3.1.		Identity number
	3.2a.		Name
	3.2b.	Optional	Postal, e-mail and website addresses
	3.3.		Identity number(s) of the legal unit(s) of which the enterprise consist(s)
Demographic Characteristics	3.4.		Date of commencement of activities
	3.5.		Date of final cessation of activities
Economic/ Stratification Characteristics	3.6.		Principal activity code at 4-digit level
	3.7.	Conditional	Secondary activities, if any, at 4-digit level; this point concerns only enterprises which are the subject of surveys
	3.8.		Number of persons employed
	3.9a.		Number of employees
	3.9b.	Optional	Number of employees in full-time equivalents
	3.10a.		Turnover save as provided in 3.10b
	3.10b.	Optional	Turnover for agriculture, hunting and forestry, fishing, and public administration and defence, compulsory social security, private households with employed persons and extra-territorial organisations
	3.11.		Institutional sector and sub-sector according European System of Accounts
Links with Other Registers	3.12.		Identity number of the all-resident/truncated enterprise group, to which the enterprise belongs

Source: Regulation (EC) No 177/2008 of 20 February 2008 on establishing a common framework for business registers for statistical purposes and repealing Council Regulation (EEC) No 2186/93

1.1.3 Implementing and developing an SBR

The starting point for the construction of an SBR is invariably the use of administrative records showing the enterprises created and maintained for supporting administrative regulations. In order to answer statistical needs, information from administrative registers is adapted and included in an SBR.

The main issue in managing an SBR is its maintenance and update, given the pace of change in the business world. Registers must be updated at least once a year.

The most effective method of updating an SBR combines using information from administrative sources(1), business surveys and register maintenance surveys.

1. *Administrative sources* have the advantage of covering the entire enterprise universe. It is essential for statistical and administrative bodies to employ a standardised activity classification system. Failure to do so may seriously compromise the final quality of the results of surveys based on a register. The use of conversion tables to adapt the data to the classification employed by the statistical body is not recommended, because this process results in major quality losses, since it is common to find situations where the transfer is not direct or one-to-one. To avoid this problem, statistical offices should attempt to persuade the bodies that produce the main administrative records to use a single activity classification table.
2. *Economic Surveys* offer more complete information, albeit for a more restricted population.
3. *Register Maintenance Surveys* are specifically undertaken to update an SBR. Some statistical agencies undertake the survey in cooperation with the primary registration authority. For small enterprises, including informal sector operators, Register Maintenance Surveys are crucial.

Box 4.4: An example of Business Register implementation

H. Berby and Y. Bergstrøm (1997), Development of a Demonstration Data Base for Business Register Management. An Example of a Statistical Business Register According to the Regulation and Recommendations of the European Union, Statistics Norway.

Source: http://www.ssb.no/histstat/doc/doc_199709.pdf

Box 4.5: Implementation of the Brazilian statistical business register

The Central Business Register (CEMPRE) is a comprehensive database maintained by the Brazilian Institute of Geography and Statistics or IBGE, which contains data about the universe of units enrolled in the tax office, companies and their local units in the Brazilian economy.

The Business Register has adopted the same definition of legal units as that used by the administrative records, that is, enterprises are the legal units registered in the Internal Revenue Service and each of their different addresses is treated as an establishment. This means that the smallest unit in the statistical register is a mix of the theoretical definition of a local unit and an establishment: one location, one or more activities, and one legal identification (usually one for each local unit, but in a few cases more than one legal identification for the same location may be found).

CEMPRE checks the existence of enterprises, their different local units (addresses), identifying them by name (legal situation), location, unique legal identification number, activity code, size (based on the variable number of employees, salaries paid, income) and other elements needed for administering the register, these constitute the reference base for the sampling design of business surveys.

All major administrative registers, as well as CEMPRE, use a single identification number for legal units. This 14-digit keynumber enables perfect linkage between administrative and statistical business registers, and also links enterprises to their local units. The first 8 digits are assigned to an enterprise, the following 4 digits are a serial number for identifying its local units, and the 2 last digits are check codes. The existence of a single identification code and the adoption of the same basic unit of investigation by administrative registers and the statistical institute facilitate update procedures and prevent duplicate entries for an enterprise in the register.

The maintenance and update of the Business Register is based on previous sample surveys and complemented by data from the administrative record with the widest coverage available.

Source: Instituto Brasileiro de Geografia e Estatística (IBGE) – Estadísticas del Cadastro Central de Empresas (CEMBRE), IBGE. http://www.ibge.gov.br/

1.1.4 Questions for practitioners

An important issue relating to the construction of statistics and the national accounts system of a country is the existence and the quality of its business register.

The main issues concerning business registers relevant for statistics and national accounts are:

1. Does an SBR exist in the statistical office or does it need to be constructed? What other administrative records and registers exist in the country?
2. If an SBR exists, how good is the quality of its information? Is it based on the most suitable administrative

(1) Authorities responsible for the primary registration of private sector businesses, tax offices, social security offices, government departments for information about public sector establishments (schools, hospitals, public utilities etc.), organisations of professionals (physicians, lawyers, etc.) and the ministry of agriculture for agricultural establishments.

sources? Is it updated regularly? In countries where administrative records are insufficient or unavailable for frequently feeding and updating their business registers, an economic census becomes a crucial tool for providing information about active enterprises and establishments required for compiling national accounts.

3. To what extent does the quality of an *SBR* affect the quality of statistical surveys used for compiling national accounts?
4. Is the classification of industries used in an SBR in line with SNA requirements?
5. Is the SBR used as a sample for statistical surveys?

1.2 Classifications

Classifications are a key element in the compilation of statistical indicators. The SNA uses several classifications; some of them are specific to the compiling of national accounts, such as classifying units into institutional sectors, goods and services, or transactions. Others are common to national accounts and other statistical domains.

The premise used for compiling national accounts is that data sources should be adapted and collected in accordance with international classifications.

The implementation of a classification and the main classifications used in SNA are presented below.

1.2.1 Importance of adopting international classifications

Definition

Classifications are an exhaustive and structured set of mutually exclusive and well-described categories, often presented in a hierarchy that is reflected by the numeric or alphabetical codes assigned to them, used to standardise concepts and compile data.

Source: Standard Statistical Classifications: Basic Principles, E Hoffmann, M. Chamie, paper presented to the 30th UN Statistical Commission, 1999

Classifications organise units such as persons, enterprises, activities, etc. into groups according to a standard format defined according to the principles and criteria that have been used to construct them.

A standard statistical classification (SSC) is a set of discrete categories that may be assigned to a specific variable registered in a statistical survey or in an administrative file, and used in the production or presentation of statistics. National statistical authorities are responsible for the implementation, development, use and updating and/or revision of the national standard statistical classifications (NSSCs).

International standard statistical classifications (ISSCs) are developed and adopted by international institutions to ensure correct implementation of international agreements and to standardise national and international communication, promoting comparability of international statistics. ISSCs are products of agreements between national authorities responsible for statistics in the respective areas, and may serve as models for developing corresponding national, multinational and regional statistical instruments.

One of the advantages of *ISSCs* is that they can be adopted as national classifications by countries that do not have the experience or resources to develop them; in addition they can be used as a guide for adapting national classifications to international standards.

1.2.2 Implementing a classification

Four types of methodological issues must be considered when adapting *ISSCs* for national use: (1) issues relating to the identification of user requirements; (2) issues relating to the conceptual basis for the SSCs and their structure; (3) issues relating to the collection of the information required for developing the classification and (4) maintenance and update of classifications.

1. *User requirements*: It should be determined who the users are, and how they will use the classification and the statistics produced with its help, to accommodate the adaptation of ISSCs to national needs.
2. *Conceptual tasks*: Primary statistical units[2] should be identified, as well as the possible ISSC categories to be assigned to them. How statistical units are linked to the classification's primary unit needs to be determined. The structure of the classification needs to be defined in order to arrange content in such way that the aggregations of the most detailed categories in the set are based upon similar criteria and which will be meaningful for descriptive and analytic comparisons. Rules should be drawn up to identify when statistical units should be classified into the same most detailed classification category, and when they should be classified differently. Similarity criteria are required to define higher-level categories (aggregated groups of categories) in hierarchical classifications[3].
3. *Collecting and presenting information*: in order to develop a classification, information needs to be collected and explanatory notes prepared which explain the boundaries between each of the classification categories using definitional descriptions and/or listing what is included or excluded. It is also important to present correspondence tables which enable systematic comparisons between classifications to be made and which present a classification structure map, listing levels, codes, hierarchies, etc. Correspondence tables indicate how, where and to what extent, concepts and categories in one classification may

(2) The observable units that can be assigned to one unique category of the classification without reference to any other observable unit.
(3) A tree-like structure consists of different levels into which a response can be classified depending on its detail. The most detailed level is always the lowest level of the classification.

be found in other classifications, or in earlier versions of the same classification.

4. *Maintenance of a classification* includes the activities undertaken to ensure classification errors, or ones in the explanatory notes or associated coding tools are corrected. Updating is an important process for presenting all the news in the field, for modifying descriptive category definitions, as well as introducing new categories into the existing structure and new coding tools.

Box 4.6: Cases of conceptual tasks for implementing a classification

Defining the primary variable(s) of a classification:

In the International Standard Classification of Occupations (ISCO), the primary variable is 'occupation' which is defined as 'the main tasks and duties of work performed'. In ISIC, the primary variable is 'activity' defined as the main productive economic activity of a unit (establishment, enterprise or household), as indicated by the principal production process of that economic activity.

Defining rules for linking different statistical units to the classification's primary unit:

In the case of classifying persons by 'industry', e.g. according to ISIC, a link has to be established between each person and a job, e.g. the 'main job' held during the reference period, which can then be linked to an establishment, as this is one of the main statistical units for ISIC.

Formulating rules for classifying units into the same detailed categories:

In ISCO, the rule is that when the main tasks and duties of a set of jobs are characterised by a high degree of similarity, then these jobs should be classified into the same detailed category. The main tasks and duties define an occupation, which is the designation for the most detailed element in the set of categories of this classification. For ISIC, the rule is that when the economic activity of two establishments is characterised by a common production process resulting in the same homogeneous set of products, then the two units should be classified into the same detailed category.

Formulating similarity criteria for defining higher level categories:

In ISCO, the main similarity criteria are the skill level and skill specialisations needed to carry out the tasks and duties of the jobs, where skill level is the main criterion used to delineate the most aggregate categories, while skill specialisation is used to delineate the more detailed categories within the aggregate categories.

Source: Standard statistical classification- Basic Principles, E. Hoffmann, M. Chamie, paper presented at the 30th UN Statistical Commission, 1999.

1.2.3 Main classifications

1. ***Standard Industrial Classification of All Economic Activities Revision 4 (ISIC, Rev.4)*** is the international reference classification for productive activities. It groups activities according to homogeneous production technologies for a range of products.

The scope of ISIC is to provide a set of activity categories that can be utilised for the collection and reporting of statistics according to such activities. It provides a comprehensive framework within which economic data can be collected and reported in a format that is designed for purposes of economic analysis, decision-taking and policy-making. ISIC Rev.4 aims to present a set of activity categories in such a way that entities can be classified according to the economic activity they carry out. ISIC Rev.4 is a classification according to kind of economic activity.

To find out more…

International Standard Industrial Classification of All Economic Activities - Revision 4, Statistical papers, Series M No. 4/Rev.4, UN 2008, available from: **http://unstats.un.org/unsd/publication/SeriesM/seriesm_4rev4e.pdf**

Box 4.7: Top Level of ISIC Rev.4

A - Agriculture, forestry and fishing

B - Mining and quarrying

C - Manufacturing

D - Electricity, gas, steam and air conditioning supply

E - Water supply; sewerage, waste management and remediation activities

F - Construction

G - Wholesale and retail trade; repair of motor vehicles and motorcycles

H - Transportation and storage

I - Accommodation and food service activities

J - Information and communication

K - Financial and insurance activities

L - Real estate activities

M - Professional, scientific and technical activities

N - Administrative and support service activities

O - Public administration and defence; compulsory social security

P - Education

Q - Human health and social work activities

R - Arts, entertainment and recreation

S - Other service activities

T - Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use

U - Activities of extraterritorial organisations and bodies

The ***main uses*** of ISIC are:

(a) In the field of *national accounts*, the ISIC classification is used to develop the production account and the generation of income accounts by industry. In this sense, the following main aggregates are compiled by industry: output, intermediate consumption, value added, compensation of employees, gross operating surplus. The supply and uses tables are based on ISIC, providing the value of different products produced by and consumed in different industries.

(b) ISIC provides the basis for the construction of the survey framework, namely the Statistical Business Register. An SBR contains information on the enterprises detailed in different classifications: the one used for the main activity being ISIC.

More information about the Statistical Business Register (SBR) is presented in section 1.1: *Business register.*

(a) The observation and collection of selling prices for industrial products used to calculate the *industrial production price index (IPPI)* are carried out on a representative sample of economic operators for each ISIC activity class.

(b) ISIC is the basis for addressing the reports and surveys of enterprises related to their *activity performance*, thus obtaining indicators (intermediate inputs, compensation of employees, fixed assets, etc.) by industry. *Structural surveys* cover enterprises from almost all ISIC classes. The turnover/value and volume indices of turnover are obtained from ISIC. Specific industry surveys are based on samples from the business register, enterprises involved in the same activity formed by grouping ISIC classes.

(c) Many *social indicators* relate to ISIC classification, being compiled by industry indicators such as: number of employees, gross/net average salary, labour force cost indices, etc.

Box 4.8: Examples of national classification adaptations to ISIC

General Industrial Classification of Economic Activities within the European Communities (NACE) has been developed using ISIC Rev.4, categories at all levels of NACE have been defined so as to be either identical or to form subsets of single ISIC categories.

The North American Industry Classification System (NAICS) was developed in the mid-1990s and has undergone some changes to increase comparability among the three custodians of this classification (Canada, Mexico and USA). However, definitions of individual categories have been designed in a way that statistical data collected according to NAICS can be aggregated into the two-digit divisions of ISIC, Rev.4, ensuring comparability of data.

The Australian and New Zealand Standard Industrial Classification (ANZSIC) was revised in 2006 and broadly aligned with ISIC at the detailed level.

More information concerning national classifications is available from United Nations Statistics Division, at **http://unstats.un.org/unsd/cr/ctryreg/default.asp?Lg=1**

2. ***Central Product Classification Version 2 (CPC, Ver.2)*** is a classification based on the physical characteristics of goods or on the nature of services rendered. It includes products that are an output of an economic activity, including transportable goods, non-transportable goods and services. CPC presents categories for all products that can be the object of domestic or international transactions or that can be stocked.

CPC Ver. 2, finalised in 2008, was imposed by the revision of the Harmonised System in 2007, by the fourth revision of ISIC and by the changes in the world economy.

To find out more…

Central Product Classification (CPC) – Version 2, available from **http://unstats.un.org/unsd/cr/registry/cpc-2.asp**

The ***main purpose*** of the CPC is to provide a framework for comparing international product statistics and to serve as a guide for developing or revising existing product classification schemes to make them compatible with international standards.

The ***main uses*** of CPC are:

(a) the SNA uses the CPC *to balance the supply and uses tables*. In this sense, all main component aggregates are balanced by product;

(b) the CPC is used as an instrument for assembling and tabulating all kinds of *statistics requiring product detail;*

(c) for the calculation of *industrial production indices*, quantitative data regarding achieved production of goods are registered using the CPC;

(d) the *industrial production price index* is based on selling prices for industrial products identified by CPC, for selected industries classified using ISIC.

Box 4.9: Top Level of CPC Ver.2

1 - Agriculture, forestry and fishery products;

2 - Food products, beverages and tobacco; textiles, apparel and leather products;

3 - Other transportable goods, except metal products, machinery and equipment;

4 - Metal products, machinery and equipment;

5 - Constructions and construction services;

6 - Distributive trade services; accommodation, food and beverage serving services; transport services; and electricity, gas and water distribution services;

7 - Financial and related services; real estate services; and rental and leasing services;

8 - Business and production services;

9 - Community, social and personal services.

Box 4.10: Example of national classification adaptations to CPC

The Classification of Products by Activity (CPA) is the European version of the CPC, and the purposes it serves are in line with those of the CPC. Whilst the CPC is merely a recommended classification, however, the CPA is legally binding in the European Community. Since the elements of the CPA are based on those of the CPC, links between the CPA and the *Harmonised Commodity Description and Coding System* (HS) exist in the same way as those between the CPC and the HS which have been referred to above. According to the desegregation level of the CPA, it can be broken into 21 sections identified by an alphabetical code, 88 divisions identified by a two-digit numerical code, 261 groups identified by a three-digit numerical code, 575 classes identified by a four-digit numerical code, 1342 categories identified by a five-digit numerical codes, and 3142 sub-categories identified by a six-digit numerical code.

Source: RAMON, Eurostat's Metadata Server, at http://ec.europa.eu/eurostat/ramon/index.cfm?TargetUrl=DSP_PUB_WELC

3. ***Standard International Trade Classification (SITC Rev.4)*** classifies commodities into different categories according to the nature of the merchandise and the materials used in their production as well as according to their stage of production, in turn suitable for economic analysis. The origin of SITC is the *Harmonised Commodity Description and Coding System (HS07)*. SITC is the aggregated classification of transportable goods both for international trade statistics and for analytical purposes.

The ***scope*** of SITC is to cover all goods *classifiable in HS except for monetary gold, gold coin and current coin*. All basic headings in SITC Rev.4, (except for 911.0- Postal packages not classified according to kind and 931.0- Special transactions and commodities not classified according to kind) are defined in terms of HS07 subheadings.

To find out more…

Standard International Trade Classification - Revision 4, Statistical papers, Series M No. 34/Rev. 4. UN 2006, available from: **http://unstats.un.org/unsd/publication/SeriesM/SeriesM_34rev4E.pdf**

The SITC ***is used***:

(a) in SNA, as a *classification of imports and exports.* This classification identifies details of commodities for a variety of purposes, including customs, statistical and analytical purposes, particularly for the presentation of external trade statistics with detailed commodity specifications.

(b) *to present and disseminate* the huge amount of data in respect of import and export of goods.

These three classifications (*ISIC, CPC* and *SITC*) are closely interrelated. *ISIC* represents the activity side of the system, *CPC* is the central instrument for classifying goods and services and *SITC* is, for analytical purposes, the aggregated classification of goods for international trade statistics. Both *CPC* and *SITC* use the headings and subheadings of the *HS* as building blocks for their categories. Subsequently, relationships with other classifications that may require a degree of comparability with *ISIC* have been added to these considerations. By rearranging the *CPC* categories according to their industrial origin and using the link between *CPC*, *SITC* and *HS*, a detailed correspondence table between *SITC*, *CPC* and *ISIC* has been established.

Box 4.11: Classification hierarchy

	***ISIC**, Rev.4*	***CPC**, Ver.2*	***SITC** Rev.4*
Sections	21	10	10
Divisions	88	71	67
Groups	238	305	262
Classes	419	1 167	1 023
Sub-classes or basic headings	N/A	2 096	2 970

Source: http://unstats.un.org/unsd/cr/registry/regct.asp?Lg=1.

4. ***The Classification by Broad Economic Categories (BEC) Rev.3*** was initially developed by *UNSD* for internal purposes in order to reclassify merchandise imports (reported in terms of *SITC*) into the product categories relevant to the *SNA*. Over time, many countries have started to use *BEC* for a variety of purposes including economic analysis and setting tariffs. In addition, it was designed to serve as a means of converting external trade data compiled using *SITC* into end-use categories that are meaningful within the framework of the *SNA*, namely categories approximating the three basic classes of goods in the *SNA* (capital goods, intermediate goods and consumption goods). Specifically, the subcategories of the *BEC* can be aggregated to approximate these three classes of goods. This aggregation enables external trade statistics to be considered jointly with other sets of general economic statistics, such as national accounts and industrial statistics, for national, regional or worldwide economic analysis. The *BEC* consists, at level 1, of 7 main categories identified by one-digit numerical codes, at level 2, of 14 categories identified by two-digit numerical codes, at level 3, of 8 sub-categories identified by three-digit numerical codes.

Box 4.12: Top Level of BEC

1 - Food and beverages;

2 - Industrial supplies not elsewhere specified;

3 - Fuels and lubricants;

4 - Capital goods (except transport equipment), and parts and accessories thereof;

5 - Transport equipment and parts and accessories thereof;

6 - Consumer goods not elsewhere specified;

7 - Goods not elsewhere specified.

Source: http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=10&Lg=1

5. ***Classifications of Expenditure According to Purpose***

The SNA uses special classifications to analyse consumption, or more generally outlays, by different sectors depending on the purpose for which the expenditure is undertaken. Such classifications are referred to as functional classifications or as Classifications of Expenditure According to Purpose. They are: *Classification of Individual Consumption According to Purpose (COICOP), Classification of the Functions of Government (COFOG), Classification of the Purposes of Non-Profit Institutions, Serving Households (COPNI), Classification of the Outlays of Producers, According to Purpose (COPP).*

To find out more…

Classifications of Expenditure According to Purpose: Classification of the Functions of Government (COFOG) - Classification of Individual Consumption - According to Purpose (COICOP) - Classification of the Purposes of Non-Profit Institutions - Serving Households (COPNI) - Classification of the Outlays of Producers - According to Purpose (COPP), Statistical paper, SERIES M No. 84. UN 2000, available from: **http://unstats.un.org/unsd/publication/SeriesM/SeriesM_84E.pdf**

(a) ***Classification of Individual Consumption According to Purpose (COICOP)*** includes categories such as: food, health, education services, etc. *COICOP* has 14 main categories, the first 12 refer to individual consumption expenditure of households and the last two identify those parts of consumption expenditure by Non-Profit Institutions Serving Households (*NPISHs)* and general government that are treated as social transfers in kind.

Once the consumption expenditures of *NPISHs* and general government have been classified according to *COPNI* and *COFOG* (see following page), individual consumption expenditures in these two classifications can be transferred directly into Divisions 13 and 14 of *COICOP*. In *COICOP*, classes are divided into services, non-durables, semi-durables and durables.

Box 4. 13: *COICOP* main categories

1-12 Individual consumption expenditure of households

1. Food and non-alcoholic beverages;
2. Alcoholic beverages, tobacco and narcotics;
3. Clothing and footwear;
4. Housing, water, electricity, gas and other fuels;
5. Furnishings, household equipment and routine household maintenance;
6. Health;
7. Transport;
8. Communication;
9. Recreation and culture;
10. Education;
11. Restaurants and hotels;
12. Miscellaneous goods and services;
13. Individual consumption expenditure of NPISHs;
14. Individual consumption expenditure of general government.

Source: http://unstats.un.org/unsd/cr/registry/regct.asp?Lg=1

(b) The ***Classification of the Functions of Government (COFOG)*** is consistent with that proposed in the *Government Finance Statistics Manual 2001 (GFSM 2001)*[4], e.g.: government expenditure. The units of classification are, in principle, individual transactions. This means that a *COFOG* code should be assigned to each purchase, wage payment, transfer, loan disbursement or other outlay according to the function the transaction serves.

A major use of *COFOG* is to identify consumption expenditures that benefit individual households and which are transferred to Division 14 of *COICOP* to derive the 2008 SNA aggregate of actual final consumption of households. *COFOG* is also used to distinguish between individual and collective services provided by general government. Expenditures on individual services are treated as social transfers in kind. They are deducted from total final government consumption expenditure to obtain actual final government consumption and added to the final consumption expenditures of households and *NPISHs* to obtain actual final consumption of households.

(4) IMF (1998), Government Finance Statistics Manual 2001, International Monetary Fund, Washington D.C., available from: http://www.imf.org/external/pubs/ft/gfs/manual/pdf/all.pdf

Box 4.14: *COFOG* main categories

1. General public services;
2. Defence;
3. Public order and safety;
4. Economic affairs;
5. Environmental protection;
6. Housing and community amenities;
7. Health;
8. Recreation, culture and religion;
9. Education;
10. Social protection.

Source: http://unstats.un.org/unsd/cr/registry/regct.asp?Lg=1.

(c) The ***Classification of the Purposes of Non-Profit Institutions Serving Households (COPNI)*** classifies individual outlays of *NPISHs* according to the purpose they serve. These outlays could be from health, education services, religious associations, etc. The same outlays as for *COFOG* can, in principle, be classified according to *COPNI*. The main emphasis should be on the classification of final consumption expenditure since this is to be transferred to *COICOP* Division 13 to obtain actual final consumption of households. *NPISHs* produce goods and services, but typically services, which are provided to individual households, so the consumption expenditures are treated as individual consumption.

Box 4.15: *COPNI* main categories

1. Housing;
2. Health;
3. Recreation and culture;
4. Education;
5. Social protection;
6. Religion;
7. Political parties, labour and professional organisations.
8. Environmental protection;
9. Services n.e.c

Source: http://unstats.un.org/unsd/cr/registry/regct.asp?Lg=1

(d) The ***Classification of Outlays of Producers According to Purpose (COPP)*** applies to all producers, whether market or non-market, although in practice, market transactions are the most interesting. *COPP* may provide information on 'outsourcing' business services, that is, on the extent to which producers buy catering, cleaning, transport,

auditing and other services that were previously carried out as ancillary activities within the enterprise. It has to be borne in mind that this classification is mainly used to classify production cost, capital formation and other production-related data that are identified by establishments. The *COPP* categories can be easily identified with *ISIC*, and *CPC* categories.

Box 4.16: *COPP* main categories

1. Outlays on infrastructure;
2. Outlays on research and development;
3. Outlays on environmental protection;
4. Outlays on marketing;
5. Outlays on human resource development;
6. Outlays on current production programmes, administration and management.

Source: http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=7&Lg=1

1.2.4 Questions for practitioners

Within a business register, classifications represent the essential elements for building the statistical system, including national accounts. As part of the central framework of the national accounts compilation strategy, the main classifications used in the statistical system are adopted and/or developed according to the answers to the following questions addressed in a systematic way:

1. Are international classifications implemented in the statistical system and are they used for the collection, compilation and dissemination of statistical data sources?
2. What are the classifications used in the administrative system? Are they in line with the statistical classifications and can they be used for national accounts purposes?
3. Are there correspondence tables between the different classifications to ensure system consistency?

If these issues are respected then this will contribute significantly to ensuring compatibility and comparability of statistics and national accounts indicators.

2. Statistical data sources

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; administrative data are presented in chapter 5 of the handbook.

2.1 Censuses

Definition

A census is a survey conducted on the full set of observation objects belonging to a given population or universe.

Source: Glossary of Statistical Terms, OECD, http://stats.oecd.org/glossary/detail.asp?ID=2620

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:

1. **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.
2. **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.
3. **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:

1. it is very costly to enumerate (collect) the data and to process it;
2. timeliness is not high because data is available for use only many months after it is collected;
3. the census is carried out after a long period, normally every five or ten years.

To find out more…

- Conducting Agricultural Censuses and Surveys, Rome, Statistical Development Series No. 6 FAO 1996, available from: **http://www.fao.org/economic/ess/world-census-of-agriculture/conducting-of-agricultural-censuses-and-surveys/en/**;

- Handbook on design and implementation of business surveys, Willeboordse A., 1998, available from: **http://ec.europa.eu/eurostat/ramon/statmanuals/files/Handbook%20on%20surveys.pdf**;

- Principles and Recommendations for Population and Housing Censuses, Revision 2, Statistical papers, Series M No. 67/Rev.2, UN, 2008, available from: **http://unstats.un.org/unsd/demographic/sources/census/docs/P&R_Rev2.pdf**

2.2 Surveys

Definition

A **survey** is an investigation about the characteristics of a given population by means of collecting data from a sample of that population and estimating their characteristics through the systematic use of statistical methodology.

Source: Glossary of Statistical Terms, OECD, http://stats.oecd.org/glossary/detail.asp?ID=2620

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:

1. **Agricultural surveys**, to obtain data concerning crop, livestock, prices, etc;
2. **Enterprise surveys**, having as main goal to obtain detailed information about the output, intermediate consumptions, investments, labour force, etc;
3. **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;
4. **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;
5. **Price surveys**: used to obtain data on prices, which may involve collection from enterprises or households, or direct observation of prices in the market;
6. **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.

Box 4.17: Main statistical data sources used in SNA

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

Source: Measuring the Non-Observed Economy – A handbook, OECD 2002

2.2.1 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.

To find out more…

Guide méthodologique pour l'élaboration des comptes nationaux dans les états membres d'Afristat, Afristat Série Méthodes No.4, 2001.

2.2.2 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.

Box 4.18: SBS: main variables

- 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).

Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/european_business/introduction

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).

Box 4.19: The SBS questionnaires used by the Trinidad and Tobago Statistical Office

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).

See the Business Surveys form:

http://cso.gov.tt/files/cms/Form%20A%20-%20Survey%20of%20Establishments%20-%20General%20Long%20Form.pdf

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 Chapter 2: Building the SNA, 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.

2.2.3 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 Chapter 2.

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.

To find out more…

International Recommendations for Construction Statistics, Statistical papers, Series M No. 47/Rev.1 United Nations, 1997, available from: **http://unstats.un.org/unsd/EconStatKB/Attachment218.aspx**

2.2.4 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 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 that of 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(5), users would like weightings to be fixed for a long period. However, for deflating national accounts, current-weighted indices and fine

(5) Adjustment obligations that may be affected by changes in the prices.

aggregations are required, since, in theory, deflation is best done at the lowest level of disaggregation.

Unit Value Indices (UVI)

The 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 these figures 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[6] 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.

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.

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

1. **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
2. **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
3. **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.

Box 4.20: Examples of Construction Price Index

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.

Source: Main economic indicators – sources and methods: construction price indices, page 49 and page 84, Statistics Directorate, OECD (2001), Paris.

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.

To find out more…

Producer Price Index Manual: Theory and Practice 2004, ILO, IMF, OECD, United Nations, and the World Bank, 2004, available from: **http://www.imf.org/external/np/sta/tegppi/index.htm**;

Export and Import Price Index Manual: Theory and Practice, ILO, IMF, OECD, Eurostat, UNECE, World Bank, 2009, available from: **http://www.imf.org/external/np/sta/xipim/pdf/xipim.pdf**;

Practical Guide to Producing Consumer Price Indices, UNECE, ILO, IMF, OECD, Eurostat, World Bank, Office for National Statistics, UK, United Nations, 2009;

Main economic indicators - Sources and methods: construction price indices, OECD, and Eurostat, 2001, available from: **http://www.oecd.org/dataoecd/49/4/2372435.pdf**

2.2.5 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)[7] into three mutually exclusive and exhaustive groups

(6) Strategies for Price and Quantity Measurement in External Trade, United Nations 1981.

(7) Recommended by the International Labour Organisation (ILO).

- 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.

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.

To find out more…

Measuring the Non-Observed Economy – a Handbook, OECD 2002;

The European Union labour force survey - Methods and definitions – Eurostat, 2001, available from: **http://unstats.un.org/unsd/EconStatKB/Attachment269.aspx**

Box 4.21: The Labour Force Survey in the Cayman Islands

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)*.

'2009 Labour Force Survey And Pilot Census - Interviewer Field Manual', available from: **http://www.eso.ky/file.php?path=docum354.pdf**

'Cayman Islands 2009 LFS Questionnaire' is available from: **http://www.eso.ky/file.php?path=docum353.pdf**

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.

Box 4.22: Household Budget Survey (HBS) in the Cayman Islands

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.

'The 2007 Survey of Living Conditions and Household Budgets - Interviewer Manual', available from: **http://www.eso.ky/file.php?path=docum178.pdf**

The three questionnaires used can be found at:

- Household Questionnaire, available from: **http://www.eso.ky/file.php?path=docum174.pdf**
- Household Expenditure Diary Questionnaire, available from: **http://www.eso.ky/file.php?path=docum176.pdf**
- Individual Questionnaire, available from: **http://www.eso.ky/file.php?path=docum175.pdf**

To find out more…

More information concerning the household questionnaires from all the countries are presented by the International Survey Network, **http://www.ihsn.org/home/index.php?q=country_questionnaires**;

- Household Budget Surveys in the EU: Methodology and Recommendations for Harmonisation, Eurostat, 2003, available from: **http://secgen.comunidadandina.org/andestad/adm/upload/file/eurostat_hsb.pdf**.

2.3 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 Chapter 2: *Building the SNA*, Section 2: *The 2008 SNA implementation 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. Table 4.1 presents an example of how the basic data requirements may be obtained through surveys that need to be carried out in the statistical system.

Table 4.1: Minimum surveys required for implementing the SNA

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

2.3.1 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:

1. What statistical surveys are conducted by the statistical office?
2. Are the concepts, content and classifications used in these surveys in line with the requirements of the 2008 SNA?
3. 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?
4. What statistical survey needs to be implemented to in order to guarantee national accounts compilation requirements?

3. Recommended reading

Section 1.1: Business register

- *Business register Recommendations manual*, Eurostat, 2010; Chapter III: 'Objectives and uses of the business registers for statistical purposes'; Chapter IV: 'Maintenance of the register';
- *Eurostat-OECD Manual on Business Demography Statistics*, OECD, Eurostat, 2007;
- *Statistical business registers based on administrative records,* paper presented to the Second meeting of the Statistical Conference of the Americas of the Economic Commission for Latin America and Caribbean, June 2003; Chapter II: 'Objectives and uses of the statistical business register';
- *A motivational model for running a statistical business register,* by Sturm R., Paper presented to the European Establishment Statistics Workshop – EESW09, Stockholm, 2009.
- *Statistical Business Register in countries of Eastern Europe, Caucasus and Central Asia: 2008 Questionnaire Survey results*, paper presented to the Conference of European Statisticians, 2009;

Section 1.2: Classifications

- *The 2008 SNA*, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 5: 'Enterprises, establishments and industries'; Chapter 29: 'Satellite accounts and other extensions' International Standard Industrial Classification of All Economic Activities (ISIC) Rev.4, Statistical papers, Serie M, No.4/Rev.4, UN 2008 **http://unstats.un.org/unsd/publication/SeriesM/seriesm_4rev4e.pdf**;
- Central Product Classification Version 2 (CPC2) **http://unstats.un.org/unsd/publication/SeriesM/SeriesM_77ver1_1E.pdf**;
- Classifications of Expenditure According to Purpose **http://unstats.un.org/unsd/publication/SeriesM/SeriesM_84E.pdf**;
- Harmonised Commodity Description and Coding System (HS07) **http://www.imf.org/external/np/leg/tlaw/2007/eng/ith.pdf**;
- **http://unstats.un.org/unsd/publication/SeriesM/SeriesM_52rev2E.pdf**;
- Standard International Trade Classification (SITC Rev.4) **http://unstats.un.org/unsd/publication/SeriesM/SeriesM_34rev4E.pdf**.

Section 2: Statistical data sources

- *The 2008 SNA*, European Commission, IMF, OECD, UN, World Bank, 2009;

- *Measuring the Non – Observed Economy – A Handbook*, OECD, 2002; Chapter VI: 'Assessment and improvement of data collection programme';
- *Use of the System of National Accounts in Economies in Transition*, Studies in methods, Series F, no.66; Chapter VI: 'Reorientation of data sources';
- *A system approach to national accounts compilation,* Studies in Methods, Series F, No.77, UN 1999; Chapter III: 'Cycles of national accounts and supporting compilation of micro(economic) statistics';
- *International Recommendation for Distributive Trade Statistics 2008,* Statistical papers, Series *M, No.89, UN 2009;*
- *International Recommendation for Industrial Statistics, 2008*, Statistical papers, Series M, No.90, UN 2009;
- *Export and Import Price Index Manual-Theory and Practice*, ILO, IMF, OECD, Eurostat, UNECE, World Bank, IMF,2009;
- *Practical Guide to Producing Consumer Price Indices*, UNECE, ILO, IMF, OECD, Eurostat, World Bank, Office for National Statistics, UK, United Nations, 2009;
- *Producer Price Index Manual Theory and Practice,* ILO, IMF, OECD, UNECE, World Bank, 2004*;*
- *Eurostat-OECD Manual on Business Demography Statistics*, OECD, Eurostat, 2007;
- *Main economic indicators, comparative methodological analysis: Consumer and Producer Price Indices, OECD, 2002;*
- *Main economic indicators-Sources and methods: construction price indices*, OECD, Eurostat, 2001.

5

Administrative Data Sources

The chapter in brief

The aim of this chapter is to present the administrative data sources used for national accounts compilation. The arguments favouring the use of these sources for statistical purposes highlight their importance. In general, the transition from administrative concepts to SNA aggregates is based on 'bridge tables', developed by each country according to its particular profile. Several simplified examples of transition to national accounts are provided for financial statements of non-financial and financial corporations, government statements, and balance of payments.

1. What are administrative sources

The term *'administrative record'* encompasses any record resulting from fiscal, taxation or other authority requirements, created to facilitate the administration or operation of government programmes, or to supervise and oversee compliance with legal obligations by certain segments of society.

Definition

The administrative source is the register of units and data associated with an administrative regulation (or group of regulations), viewed as a source of statistical data.

Source: Glossary of Statistical Terms, OECD, http://www.oecd.org/dataoecd/9/20/1963116.pdf

Administrative processes are set up in response to legislation and regulations. Each regulation (or related group of regulations) results in registering institutional units – enterprises, persons, etc. – bound by that regulation and in a data set. The register and data are referred to collectively by the statistical office as an *administrative source*.

Administrative sources contain information that is not primarily collected for statistical purposes, but is used by statistical offices. Some examples of administrative sources include the following:

1. value Added Tax (VAT) data;
2. personal income tax data;
3. business (including corporate) taxation data;
4. social security data;
5. business registration and administration records;
6. business accounts of corporations;
7. records held by Central Banks;
8. records (other than VAT) held by Customs and Excise Authorities;
9. records of government (central and local);
10. records held by associations of employers, of employees and of businesses and professions;
11. records held by other private sector bodies, e.g. credit-rating agencies, non-profit units, etc.

The use for statistical purposes of administrative sources requires a careful evaluation of their conceptual base, classification and time reference.

The use of administrative data sources offers several ***advantages***:

1. They are '*cheaper*' than other sources and often even free.
2. They provide *complete,* or *almost complete, coverage* of the population to which the administrative process applies. Generally they have very high response rates, no survey errors, providing more accurate and detailed estimates of sub-populations.
3. The *timeliness* of the statistical variables derived from administrative sources is improved. This is particular the case for annual ad-hoc surveys, which are based on administrative sources via the business register (however this does not apply to short-term indicators).
4. They *reduce the response burden* on businesses.
5. They *may increase business register quality*, which is why statistical surveys are carried out.

Although there are many good reasons for using administrative sources, there are also a number of ***problems***:

1. The most important problem for a statistical office, and implicitly for national accountants, is *obtaining access* to administrative sources. This may be because there is no legal framework in place between the statistical office and the authority gathering the data. Sometimes, it may respond to practical issues relating to data transfer (formats, details, responsibilities, ways of collection, etc.). This problem can be easily avoided if agreements and memoranda of understanding (clearly establishing frequency, data format and any relevant information for data transfer) are signed between the statistical office and the administrative authority.

For more detailed information concerning the access to administrative data sources see Chapter 2: *Building the SNA.*

2. The information used in administrative sources *does not directly correspond to the statistical indicator definitions*. The process of converting concepts used in administrative units (which may often be equivalent to legal units) to national accounts will be presented later.

3. The *classification systems* used within administrative sources may be different from those used in the statistical world, or may be applied differently, depending on the purpose of the administrative source. Where possible, it is preferable to rely on several administrative data sources.
4. Another common problem relates to timeliness. Data may either not be available in time to meet statistical needs or may refer to a period that does not coincide with that required for statistical purposes, e.g. a tax year may not coincide with the calendar year required for structural business statistics.
5. Administrative sources are generally set up for the purpose of collecting taxes or monitoring government policies. For this reason, they are susceptible to **political change**. If a policy changes, administrative sources may be affected in terms of coverage, definitions, thresholds etc., or possibly even abolished completely.

Despite these problems, administrative data is an important data source. The use of these sources for compiling national accounts has an important effect on the quality of results.

2. Transition to national accounts

One important phase in the national accounts compilation process is the translation of information from the administrative source into national accounts concepts.

> The compilation process of national accounts is presented in Chapter 2: *Building the SNA*, Section 2: *The 2008 SNA implementation strategy*.

The main administrative sources used for compiling national accounts are the financial statements of the stakeholders involved in different economic actions.

National accounts are virtually standardised worldwide, while business accounting (financial statements) is still in the process of international harmonisation.

The International Accounting Standards Committee (IASC) was created in 1973 to establish basic accounting standards referred to as IAS (International Accounting Standards) and then International Financial Reporting Standards (IFRS). Since its creation, IASC has issued and implemented accounting standards which were then changed, or abolished, or replaced by new ones, in line with the economic environment at the time.

Data quality increases in pace with the degree of standardisation of private accounts. However, even when business accounts are not compiled using a strictly standardised basis, they may be used for compiling national accounts, especially for sectors of the economy dominated by a small number of very large enterprises.

To find out more…

Links between business accounting and national accounting, Studies in Methods, Series F, No.76, UN 2000

ESA2010, Chapter 21: Links between business accounts and national accounts and the measurement of corporate activity, Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32013R0549:EN:NOT

In general, the main rules and methods for business accounting (IAS/IFRS) are consistent with those of the SNA. Examples are: recording transactions in accounts using the accrual principle, double-entry principle and use of balances, monetary valuation, and internal consistency of the accounts system.

Depending on the specificity of each country's business accounting, national accountants may apply certain ***'bridge tables'*** that serve to convert business accounting indicators (obtained at mezzo-economic level like, for example, sectors of activity) into national accounts aggregates, albeit in a rough format. Due to the fact that micro-indicators do not exactly fit the requirements of the SNA aggregates, the transition is completed by applying certain ***adjustments***, such as: conceptual adjustments, adjustment to achieve accounting consistency with other sectors and adjustments for exhaustiveness.

Preparation of 'bridge tables', as part of compiling a national accounts strategy, follows the phases outlined below:

1. identification of administrative data sources;
2. analysis of content in respect of national accounting methodological requirements;
3. collection of data source indicators;
4. translation of each indicator from administrative data sources into national accounts concepts;
5. application of adjustments to meet national accounting requirements;
6. estimation of the national accounts indicators.

'Bridge tables' are used for non-financial and financial corporations, for government and for the rest of the world using the existing administrative data source format.

2.1 Financial statements of non-financial corporations

IAS 1 is the reference standard for the 'Presentation of the financial statement', whose proposed structure is applied as such for non-financial corporations (or enterprises). Various other standards regulate specific accounting issues pertaining to the activities of an enterprise.

Enterprises disclose their accounting information by using at least two accounting statements:

1. The *income statement,* covering income and costs transactions during the financial year, considered as flow accounts;
2. The *balance sheet,* showing the value of assets and liabilities at the end of the financial year, covering stock accounts.

International standards also require information on:

1. *Cash flow statement*, which specifies an enterprise's sources and uses of cash from operating, investing and financing activities, during the financial year; its aim is to present real cash flows and it is similar to the SNA in the sense that internal transactions for depreciation and reservation are not taken into account.
2. *Accounting policies* and *explanatory notes*, offering valuable details about how the information already disclosed was completed.

Compilation of national accounts using data from non-financial business accounting is easier if the income statement is presented ***by nature*** (origin of the expenditures such as: depreciation, purchase of materials, transport costs, employee benefits, and advertising costs) instead of ***by function*** (destination of expenditures such as: costs of sales, selling and administrative expenses).

The income statement is mostly used for drawing up the production account of non-financial enterprises. Output and intermediate consumption can be roughly calculated as follows (assuming the availability of an income statement presented mostly by nature):

Output = Output sold + Output held as inventory + Capitalised output + Sales of goods bought for resale – Purchases of goods bought for resale + Changes in stocks of finished and semi-finished products + Changes in stocks of goods bought for resale + Other operating income

Intermediate consumption = Purchases of raw materials and supplies – Changes in stocks of raw materials and supplies + Other purchases and external charges + Other operating costs

Compensation of employees corresponds to the expenses incurred by an enterprise in relation to its employees, a definition which is also used in private accounting, so that there are relatively few adjustments to be made to convert data from business accounting to national accounting.

Other indicators may be estimated using information from the financial statements:

1. **Taxes and subsidies** are recorded in an enterprise's financial statement. Business accounts are generally operated exclusive of deductible VAT so that the information on input VAT and output VAT often only appears in the notes to the accounts. Other production taxes and other production subsidies appear in the income statement. The tax on profit paid during the course of the financial year may be found either in the income statement of the previous financial year, or in the sources and uses of funds statement for the financial year or in the appended tables.
2. **Property income** includes interests, dividends, rents on non-produced assets and equity earning**.** Interest received and paid appears in the income statement, and must be adjusted for financial intermediation services indirectly measured (FISIM). Income received from investment must also be increased by commission deducted at source. Dividends received appear on the credit side of the income statement. Conversely, dividends paid by an enterprise appear neither on the income statement, nor on the balance sheet, and it is therefore necessary to consult another document such as the sources and uses of funds statement. Reinvested earnings on direct foreign investment cannot be gleaned directly from either the balance sheet or the income statement, and can only be estimated on the basis of supplementary information about company shareholders. Property income allocated to policyholders is deducted from insurance premiums paid by an enterprise by applying a ratio calculated from the accounts of insurance companies.
3. **Other current transfers** are rarely identifiable as such in business accounting as they are often grouped with other items under 'other income' or 'other expenses'.
4. **Gross fixed capital formation** is defined in national accounts as the difference between acquisitions and disposals of fixed assets. These two components may be separately extracted from business accounting (especially from the balance sheet) by type of assets. However, the main impediment to directly transposing these two information items to national accounts is due to their evaluation, as national accounts requires valuing them at current market prices. The best way to value acquisitions is to use a reconciliation schedule between the opening and closing book values of fixed assets. This schedule, which has been made mandatory by the IFRS standards, provides information on acquisitions and the various elements that allow a transition from the opening value of the assets to their closing value, maintaining their fair value. On the other hand, when assets are valued on the basis of an amortisation schedule, the reconciliation schedule only provides information on disposals valued at historic cost. To translate the disposal price when estimating national accounts, capital gains or capital losses made on these disposal operations need to be taken into consideration. When this information is not expressly shown in the income statement, disposal value may be reconciled with the historical cost taken from the reconciliation schedule which appears in the cash-flow statement. For all enterprises, payments must differ very little from disposals. Available accounting documents should

allow for distinguishing tangible fixed assets from intangible fixed assets and financial fixed assets.

5. The **balance sheet** in national accounts is very similar to that of business accounting, in particular where the latter applies the concept of fair value. Two main limitations need to be pointed out: possible differences in classification and evaluation at historic cost of assets. Information contained in the balance sheet may be used to value fixed assets. National accountants generally use perpetual inventory methods (PIM) to value them.

Table 5.1 presents a simplified 'bridge table', with no other adjustments, when very few indicators are available from accounting statements, on the hypothesis that cash-flow statements can provide information on actual flows (at current valuation).

Table 5.1: Simplified bridge table for non-financial corporations

No. Crt	Financial statement indicators	Financial Statement (code)	Thou. currency	SNA aggregates
1	Net turnover	IS	32 200	P.1
2	Other income (e.g. from licences)	IS	500	P.1
3	Own production of non-mobile assets	IS	80	P.1
4	Changes in stocks of finished products and work-in-progress	IS	300	P.1
5	Cost of goods bought (for resale)	IS	100	P.1
6	Cost of sales (goods & services)	IS	15 000	P.2
7	Other operating expenses (less personnel expenses)	IS	10 000	P.2
8	Increase in provisions (they should be removed, since they are not real expenses)	CFS	-300	- P.2
9	Movement of inventories	CFS	350	P52
10	Investment in tangible fixed assets	CFS	4 600	P.51
11	Disinvestment in tangible fixed assets	CFS	-200	P.51
12	Personnel expenses	IS	6 800	D.1
13	Interest (net)	IS	400	D.4
14	Dividends Paid	CFS	1 500	D.4
15	Profit taxes current year	IS	800	D.5
16	Profit taxes previous year	IS	700	D.5

IS = income statement
CFS = cash-flow statement
Note: SNA transactions are presented in Annex 2

From the numerical example, the main indicators can be estimated:

Output = 32 200 (1) + 500 (2) + 80 (3) + 300 (4) – 100 (5) = 32 980

Intermediate consumption = 15 000 (6) + 10 000 (7) – 300 (8) = 24 700

Gross value added = Output (32 980) – Intermediate consumption (24 700) = 8 280

After establishing the rough 'bridge table', the transition from business accounting to national accounting may be completed by making some **adjustments** to base data – mostly for compiling value added.

The main adjustments that can be made are:

1. Conceptual adjustments

Conceptual adjustments are required because of differences in the concepts used in country-specific private accounting and in national accounting. The nature of the adjustments applied to each indicator is diverse, but sometimes the same adjustments can be applied for consistency. They vary among countries, thus no comprehensive list can be supplied; however a few examples can be presented:

(a) In the case of output, adjustments are applied for the transition to basic price. The turnover of enterprises is generally net of VAT but often includes taxes on products. Contrarily, subsidies on products are rarely included in turnover. Therefore, data resulting from business accounting needs to be adjusted by deducting taxes on products and adding subsidies on products in order to obtain the basic price.

(b) Own-account output for research and development is part of output. In business accounting it is not valued and an adjustment must be made to the total value when translating it to national accounting.

(c) Adjustment for deliveries between establishments belonging to the same enterprise impacts on the value of output and intermediate consumption. Such deliveries are not usually the object of a sale and although they do not appear in the accounts system of an enterprise, they have to be recorded in the national accounts where they correspond to an output and/or intermediate consumption by one establishment delivered to another establishment belonging to the same enterprise.

(d) Adjustment for holding gains/losses in stock valuation. Holding gains/losses may appear whenever elements from the income statement are deducted from elements valued in the balance sheet. In business accounting, stock changes are measured by the difference between the closing stock value and the opening stock value. In national accounting, the stock changes correspond to the difference between entries into and withdrawals from stock. For example, an intermediate consumption of raw materials generally originates not directly from a purchase, but from a withdrawal from stock. In national accounting, a withdrawal from stock must be valued at the market price at the time it took place, while business accounting values a withdrawal from stock at its historical cost (i.e. at the price of the goods item at the time they were purchased). The difference between the two prices is considered in national accounting as a holding gain or a holding loss.

(e) Consumption of fixed capital included in national accounts is different from the depreciation concept existing in the accounting system and adjustments are necessary.

To find out more…

Links between business accounting and national accounting, Studies in Methods, Series F, No.76, UN 2000, paragraph. 2.22

The 2008 SNA, European Commission, IMF,OECD, UN, World Bank, 2009, Chapter 20: Capital service and national accounts.

2. Adjustments for consistency with the accounts of other sectors

This adjustment applies in particular to taxes and subsidies. Taxes and subsidies derived from the accounts of an enterprise must be equivalent to those received by or paid by general government. In practice, this is not the case. Data from business accounts has to be adjusted because usually information relating to general government is more reliable than those drawn from the statistics of enterprises.

3. Adjustments for exhaustiveness

They are applied to improve the coverage of national accounts aggregates. They can depend on various situations such as: absence of an enterprise from statistical files, exemption from tax and social declarations, and evasion.

An example with the main adjustments necessary to obtain national accounts indicators is presented in Table 5.2.

Table 5.2: Example of adjustments for transition from accounting gross value added to SNA gross value added

	Output	Intermediate consumption	Gross value added
Total accounting	32 980	24 700	8 280
Conceptual adjustments:			
~Taxes on products	-1 800		
~Subsidies on products	80		
~Holding gains	-310	400	
~FISIM allocation		150	
~Intra-unit deliveries	300	230	
Exhaustiveness adjustments:			
~Black labour	2 100	650	
~VAT fraud	900		
TOTAL National accounts indicators	**34 250**	**26 130**	**8 120**

2.2 Financial statements of financial corporations

There is a wide variety of financial units in the world. To describe them all is beyond the scope of this handbook, so only the financial units that best describe the three main types of financial services (financial intermediation, financial auxiliary services and insurance and pension schemes services) will be explained.

2.2.1 Banks

Banks are deposit-taking corporations whose main activity is financial intermediation. They have liabilities in the form of deposits or financial instruments (such as short-term certificates of deposit) that are close substitutes for deposits. Their accounting is internationally standardised, using the structure required by IAS 1, but also in accordance with other standards (such as IFRS 2 'Share-based payment – Vesting conditions and cancellations', IAS 23 'Borrowing costs', IFRS 7 'Financial instruments: disclosures', etc.).

Banks accept deposits from units wishing to receive interest on funds for which the unit has no immediate use and lends them to other units whose funds are insufficient to meet their needs. Each of the two parties pays a fee to the bank for the service provided, the unit lending funds by accepting a rate of interest lower than that paid by the borrower, the difference being the combined fees implicitly charged by the bank to the depositor and to the borrower. From this basic idea emerges the concept of a 'reference' rate of interest (R*). The difference between the rate paid to banks by borrowers and the reference rate R* plus the difference between the reference rate R* and the rate actually paid to depositors represents the costs for Financial Intermediation Services Indirectly Measured (FISIM).

Table 5.3 shows the simplified bridge table for banking institutions linking income statement transactions (as stated by IAS/IFRS and European Directives on Accounting) to SNA transactions and a fictitious numerical example (first column of the table) to show how to estimate the output and the intermediate consumption.

Table 5.3: Simplified bridge table for banking institutions

No. Crt	Items from accounting statements	Thou. Currency	SNA transactions
1	Stock of loans (asset)	43 78 889	
2	Stock of deposits (liability)	5 152 500	
3	Interest receivable (on loans) and similar income	78 820	D.4
4	Dividend income	870	D.4
5	Interest payable (on deposits) and similar expenses	61 830	D.4
6	Income from fees charged	10 950	P.1
7	Expenses with fees paid	2 980	P.2
8	Personnel expenses, of which: *Wages and salaries* *Social security costs* *Pension costs* *Post-employment medical benefits*	 7 740 3 110 2 500 10	D.1 D.11 D.121 D.121 D.122
9	General and administrative expenses	10 480	P.2
10	Interest receivable (on loans) and similar income	3 550	(not used for Consumption of fixed capital, because of different valuation)
11	Other operating expenses	219	(not of P.2 nature)

R - reference rate of interest, with no service element (usually an inter-bank borrowing and lending rate); let us assume that R* = 1.5%*
Note: SNA transactions are presented in Annex 2.

From the numerical example, the main indicators can be estimated:

FISIM = FISIM loans + FISIM deposits = [78 820 (3) – 4 378 889 (1) x R*] + [5 152 200 (2) x R* – 61 830 (5)] = 13 137 + 15 458 = 28 595

Output = 28 595 + 10 950(6) = 39 545

Intermediate consumption = 2 980 (7) + 10 480 (9) = 13 460

Gross value added = 39 545 – 13 460 = 26 085

Box 5.1: Compilation of Reference rate, according to ESA2010

Statistical data required

For each of the Financial intermediaries subsectors (S.122 and S.125), data is needed in the form of a table of stocks of loans and deposits categorised by user sectors, and averaged over a four quarter period, and the corresponding accrued interest. The interest is calculated after reallocation of interest rate subsidies to the recipients.

Reference rates

In the balance sheets of financial intermediaries included in subsectors S.122 and S. 125, loans and deposits with resident units have to be broken down to differentiate between loans and deposits:

— which are interbank (i.e. within the institutional units providing FISIM included in subsectors S.122 and S.125),

— which are undertaken with the user institutional sectors (S.11 — other S.12 subsectors — S.13 — S.14 — S.15) (except with the central banks)

To obtain the FISIM output of the resident FIs by resident user institutional sector, the internal reference rate is calculated as the ratio of interest receivable on loans within and between subsectors S.122 and S.125 to stocks of loans within and between subsectors S.122 and S.125 as follows:

R* = (interest receivable on loans within and between subsectors S:122 and S:125)/

(stock of loans within and between subsectors S:122 and S:125)

In theory, the internal reference rate is the same when using deposits data rather than loans data. Due to data inconsistencies, the estimate from the deposits data will be different from the estimate from the loans data.

When the deposits data is more reliable, the internal reference rate should be calculated on interbank deposits as the ratio of:

R* = (interest payable on deposits within and between subsectors S:122 and S:125)/

(stock of deposits within and between subsectors S:122 and S:125)

If the loans and deposits data are equally reliable, the internal reference rate should be calculated on interbank loans and deposits as the ratio between interest receivable on loans incurred plus interest payable on deposits held between FIs, and the stock of loans plus the stock of deposits held by FIs on behalf of other FIs.

In cases where resident FIs, for their resident customers, provide loans and take deposits expressed in foreign currencies, several 'internal' reference rates by currencies or groups of currencies are to be calculated if this improves the estimates significantly. This would require splitting by currency or groups of currencies both the calculation of the 'internal' reference rates and the loans and deposits from resident FIs towards each resident user sector.

Source: ESA 2010, Chapter 14: Financial intermediation services indirectly measured – Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union

Estimates for other SNA transactions from financial statements adopt the same approach as for non-financial corporations, bearing in mind the fact that no subsidies are usually offered to financial institutions and that classified taxes must be made consistent with the rest of the institutional sectors, as described for non-financial corporations.

2.2.2 Insurance services

Insurance services are specific financial intermediations. The accounting statements of insurance companies are regulated by international standards, such as IAS 1.

Expenses are in general disclosed by function, although classification by nature (including wages and salaries) may be found in the Notes to financial statements.

The output of insurance services in 2008 SNA is particularly important. The formula for compiling output is described separately for non-life insurance and life insurance. Within the SNA, the output of the insurance industry is determined in a manner intended to mimic the premium-setting policies of insurance corporations. Output is usually compiled using income statements, while the technical account is the main part of the income statement which relates exclusively to insurance activity.

The basic method for measuring ***non-life insurance output*** is the following:

Total premiums earned, plus premium supplements, less adjusted claims incurred (the 2008 SNA, Chapter 6: The production account, paragraph 6.185).

Table 5.4 offers a model of a simplified bridge table for non-life insurance institutions linking income statement transactions (as set out in IAS/IFRS and European Directives on Accounting) to SNA transactions, plus a fictitious numerical example to show how the main indicators are calculated.

Table 5.4: Simplified bridge table for Non-life-insurance business

No. Crt	Items from accounting statements	Thou. Currency	SNA transactions
1.	Earned premiums, net of reinsurance	25 700	+ P.1
2.	Allocated investment return transferred from the non-technical account ~ *apart from insurance activity*	10	D.4
3.	Other technical income, net of reinsurance	100	+P.1
4.	Claims incurred, net of reinsurance	6 500	- P.1
5.	Changes in other technical provisions, net of reinsurance, not shown under other headings (+/-)	700	+P.1
6.	Bonuses and rebates, net of reinsurance	40	- P.1
7.	Net operating expenses:	3 000	P.2
	a) acquisition costs	4 000	
	b) change in deferred acquisition costs (+/-)	200	
	c) administrative expenses	1 000	
	d) fees from reinsurance (-)	-2 200	
	e) Wages and salaries (including social security contributions)	800	D.1
	f) Depreciation	250	
8.	Change in the equalisation provision (+/-)	90	-P1

Note: SNA transactions are presented in Annex 2.

From the numerical example, the main indicators can be estimated:

Output = Premium earned (25 700 (1) – 40 (6)) + Premium supplements (700 (5)) + Other technical income (100 (3)) - Adjusted claims incurred (6 500 (4) + 90 (8)) = 19 870

Intermediate consumption = Net operating expenses (3 000 (7)) – Wages and salaries (800 (7e)) – Depreciation (250 (7f)) = 1950

Gross value added = Output (19 870) – Intermediate consumption (1 950) = 17 920

The output of ***life insurance*** is based on the following formula:

Premiums earned, *plus* premium supplements, *less* benefits due, *less* increases (*plus* decreases) in life insurance technical reserves (The 2008 SNA, Chapter 6: The production account, paragraph 6.195).

The simplified bridge table for life insurance institutions linking income statement transactions to SNA transactions is shown in Table 5.5. As usual, a numerical example is also provided in the table and calculations of the main indicators below the table.

Table 5.5: Simplified bridge table for Life-insurance business

No. Crt	Items from accounting statements	Thou. currency	SNA transactions
1.	Earned premiums, net of reinsurance	13 000	+ P.1
2.	Investment income:	4 600	+ P.1 / D.4
	a) income from participating interests, with a separate indication of that derived from affiliated undertakings	2 600	
	b) income from other investments, with a separate indication of that derived from affiliated undertakings	2 000	
	aa) income from land and buildings	1 400	
	bb) income from other investments	600	
3.	Unrealised gains on investments	40	-P.1
4.	Other technical income, net of reinsurance	50	P.1
5.	Claims incurred, net of reinsurance	3 000	- P.1
6.	Changes in other technical provisions, net of reinsurance, not shown under other headings (+/-)	100	- /+P.1
7.	Bonuses and rebates, net of reinsurance	30	- P.1
8.	Net operating expenses:	5 000	P.2
	a) acquisition costs	2 100	
	b) change in deferred acquisition costs (+/-)	1 000	
	c) administrative expenses	1 900	
9.	Wages and salaries (including social security contributions)	1 250	D.1
10.	Depreciation	900	
11.	Investment charges	30	P.2
	a) investment management charges, including interest	15	
	b) value adjustments on investments	7	
	c) losses on the realisation of investments	8	
12.	Unrealised losses on investments	60	P.1
13.	Other technical charges, net of reinsurance	1	P.2

Note: The SNA transactions are presented in annex 2.

From the numerical example, the main indicators can be estimated:

Output = Premium earned (13 000(1) – 30(7)) + Premium supplements (4 600(2)) –Difference of gains and losses in realisation of investments (40 (3) – 60 (12)) – Benefit due (3 000(5)) – Changes (+/–) in technical reserves (1 00(6)) = 14490

Intermediate consumption = Net operating expenses (5 000 (8) – 1 250 (9) – 900 (10)) + Investment charges (30 (11)) + Other technical charges, net of reinsurance (1 (13)) = 2 881

Gross value added = Output (14 490) – Intermediate consumption (2 881) = 11 609

2.3 Government financial statement

Administrative data sources for the general government sector are a central element in compiling national accounts. Statistics for government units and public corporations are often derived directly from the micro-data in the government financial accounting database and are based heavily on accounting information. The development in recent years of International Public Sector Accounting Standards by the International Public Sector Accounting Standards Board of the International Federation of Accountants has increased the need for clear guidance on the compilation of government finance statistics so that detailed accounting data can be transposed correctly into the framework of the SNA. Such guidance is especially important when government financial accounts are compiled on a cash basis and must be converted to an accrual basis to comply with SNA accounting methods.

To find out more…

The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 22: The general government and public sector.

Government Financial Statistics Manual, IMF 2001.

Essentially the presentation of government finance, based on the budgets of government units (state, central, local, social security, etc.) consists of ***transactions*** that increase net worth leading to an aggregate called 'revenue' and transactions that decrease net worth leading to an aggregate called 'expense'. In addition, there are two main balancing items: 'net operating balance' and 'net lending or net borrowing'. Additional accounts can be shown for other economic flows and balance sheets.

Revenues include all resources acquired by governments as recorded in the SNA current accounts and capital transfers receivable recorded in the capital account. Revenues comprise: taxes, social contributions including grants, other current revenue (property income, market sales of goods and services, fines, penalties and forfeits, voluntary transfers, miscellaneous and unidentified revenue) and capital transfers receivable.

Expenses may be defined as all uses incurred by governments as recorded in the SNA current accounts and capital transfers payable as recorded in the capital account. Specifically, expenses cover: production expenses (compensation of employees, intermediate consumption and consumption of fixed capital), interest payable, grants, social benefits, other current expenses and capital transfers payable.

Net lending or net borrowing is the amount a government has available to lend or must borrow to finance its non-financial operations. Net lending or net borrowing can be calculated as the net operating balance *less* the net acquisition of non-financial assets, or as total revenue *less* total outlays. Government budgets in each country are determined by law, being first adopted, and then executed during the period (year). Data are allocated to SNA elements, according to two classifications of expenses:

1. economic classification of expenses
2. functional classification- Classification of the Functions of Government (COFOG).

Table 5.6 and Table 5.7 offer an example (not exhaustive) of how each transaction extracted from government data contained in the budget income and expenses (here the State budget) are linked to SNA transactions. Note that each budget may contain, under the main titles, specific items according to specific necessities of the government units in each country.

Table 5.6: Simplified bridge table for the State budget – income

Budget items	SNA transactions
TOTAL INCOME	
I. CURRENT INCOME	
A. FISCAL INCOME	
A.1 INCOME TAX, PROFIT AND CAPITAL EARNINGS	
A.1.1 INCOME TAX, PROFIT AND CAPITAL EARNINGS FROM LEGAL ENTITIES	
1.1.1 INCOME TAX	D51
e.g. Income tax from economic agents	D51
1.1.2 OTHER TAXES ON INCOME, PROFIT AND CAPITAL EARNINGS FROM LEGAL ENTITIES	D51
e.g. Tax on the incomes obtained by non-resident legal entities	D51
A.1.2. TAX ON INCOME, PROFIT AND CAPITAL EARNINGS FROM NATURAL PERSONS	
TAX ON INCOME	D51, D21
e.g. Tax on salary income	D51
e.g. Tax on the income from the transfer of real estate properties from own total assets	D21
BROKEN DOWN QUOTAS AND AMOUNTS FROM THE TAX ON INCOME (TO BE DEDUCTED)	D51
A.1.3. OTHER TAXES ON INCOME, PROFIT AND CAPITAL EARNINGS	D51
A2. TAX ON SALARIES	D51
A3.TAXES AND DUTIES ON OWNERSHIP	
e.g. Tax on the land located outside the city area	D59
A4.TAXES AND DUTIES ON GOODS AND SERVICES	
VALUE ADDED TAX	D21
BROKEN DOWN VAT AMOUNTS (to be deducted)	D21
e.g. Broken down VAT amounts for roads (to be deducted)	D21
OTHER TAXES AND GENERAL DUTIES ON GOODS AND SERVICES	
e.g. Tax on the crude oil from internal production and natural gases	D21
e.g. Quotas applied on the income obtained in the civil aviation field	D29
EXCISES	D21, D21
e.g. Excises collected from the sale of mineral oils	D21
e.g. Excises collected in customs from the import of mineral oils	D21
DUTIES ON SPECIFIC SERVICES	D.21
DUTIES ON THE USE OF GOODS, AUTHORISATION OF THE USE OF GOODS OR PERFORMANCE OF ACTIVITIES	D51, D29, D21
e.g. Duties on gambling	D51
A5. TAX ON FOREIGN TRADE AND INTERNATIONAL TRANSACTIONS	
CUSTOMS DUTIES AND OTHER DUTIES ON INTERNATIONAL TRANSACTIONS	D21, D29
e.g. Custom duties from legal entities	D21
A6. OTHER TAXES AND FISCAL FEES	D51
B. INSURANCE CONTRIBUTIONS	D611
C. NON-FISCAL INCOME	
C1.OWNERSHIP INCOME	
OWNERSHIP INCOME	D42, D75, D45, D51, D73
INCOME FROM INTEREST	D41, D21, D29, D75, D99
C2. SALE OF GOODS AND SERVICES	P11
II. CAPITAL INCOME	
INCOME FROM CAPITALISATION OF ASSETS	P51
III. FINANCIAL OPERATIONS	Financial transaction
IV. SUBSIDIES	D74, D75, D92, D99

Note: The SNA transactions are presented in Annex 2.

Table 5.7: Simplified bridge table for State budget – expenses

Budget items	SNA transactions
TOTAL EXPENSES	
A. CURRENT EXPENDITURES	
TITLE I. STAFF EXPENDITURES	
e.g. salary expenditures in cash	D11
salary expenditures in kind	D11
Contributions	D12
TITLE II. GOODS AND SERVICES	
Goods and services	
-office supplies	P2
-cleaning materials	P2
-heating, lighting	P2
-water, sewerage, sanitation	P2
-fuels and lubricants	P2
-transport	P2
-mail, telecommunications, radio, TV, internet	P2
-other goods and services for maintenance and operation, etc.	P2
Current repairs	P2/D73
Food	
-food for humans	D11
-animal feed	P2
Medicinal products and medical materials	P2
Goods as inventory items	
-uniforms and equipment	D11
-bed linen and accessories	P2
Travels, secondments	P2/D11
Books and publications, etc.	P2
Actions of a scientific and social and cultural nature	D75
…….	
Other expenditure, such as:	
-protocol and representation	P2
-non-life insurance premiums	D71
-rents	D45
TITLE III. INTEREST	D41
TITLE IV. SUBSIDIES	
Subsidies for products	D31
Social protection in the mining sector	D62
Support for farmers, other grants, etc.	D39
TITLE VI.TRANSFERS BETWEEN THE GENERAL GOVERNMENT'S UNITS	
**** Current transfers***	
Transfers to public institutions	D73
Maintenance of road infrastructure, etc.	D92
**** Capital transfers***	
Transfers to finance investments in hospitals	D73
Programme for paving of roads and water supply of villages, etc.	D92
TITLE VII. OTHER TRANSFERS	
A. Internal transfers	
Reimbursable financing programmes	P51/D92

Budget items	SNA transactions
Community programmes	D75
Investment of economic operators with state capital	D92
Restructuring of the defence industry	D39
Current repairs relating to public railway infrastructure, etc.	P2
B. Current transfers abroad (to international organisations)	D74
TITLE VIII. SOCIAL ASSISTANCE	
Social security	D62
Special pensions	D12
-social aids in kind	D63
TITLE IX. OTHER EXPENDITURE	
Scholarships	D62
Associations and foundations, etc.	D75
State orders for books and publications, etc.	P2
B. CAPITAL EXPENDITURES	
TITLE X. NON-FINANCIAL ASSETS	
Fixed assets: e.g. constructions, machines, equipment and transportation means, etc.	P51
Inventories	P52
TITLE XI. FINANCIAL ASSETS	Financial transactions
TITLE XII. LOANS	Financial transactions
TITLE XIII. REPAYMENT OF LOANS	Financial transactions

Note: The SNA transactions are presented in Annex 2.

From budgetary execution data, functional classification allows direct classification by activity. Thus, COFOG is more appropriate than ISIC for classifying government expenditure because the COFOG list of functions is more detailed than the ISIC list of activities, having been drawn up specifically to take into account the range and diversity of government activities.

2.4 Balance of Payments

The Balance of Payments (BoPs) is the main data source that describes the international transactions used for building accounts for the rest of the world sector of SNA.

The 2008 SNA uses the same macroeconomic framework as the 'Balance of Payments and Investment Position Manual' 6th edition (BPM6).

The Balance of Payments includes all the transactions between residents and non-residents during a specific time period.

To find out more…

The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 26: The rest of the world accounts and links to the balance of payments.

International accounts cover accounts for current transactions (current accounts), accumulation accounts and balance sheets. The three current accounts are the goods and services account, the primary income account and the secondary income account. The primary income account corresponds to the allocation of primary income accounts in the SNA and the secondary income account corresponds to the secondary distribution of income account in the SNA. The structure of balancing items in the balance of payments is somewhat different from that in the SNA, in that each account has its own balancing item and another that carries forward to the next account.

With respect to the capital account, the transactions covered are more restricted than those covered in the SNA, including only acquisitions and disposals of non-produced non-financial assets and capital transfers.

In the description of the rest of the world accounts, exports, for example, are treated as a use by the rest of the world and imports as a resource from the rest of the world. Thus the BPM6 entries are the mirror image of the SNA entries.

Table 5.8: Simplified bridge table from BoPs items to SNA transactions

Items from Balance of Payments	Credit BoPs (Uses in SNA)	Debit BoPs (Resources in SNA)
1. CURRENT ACCOUNT		
A. Goods and services (Goods and services account)	P6	P7
a. Goods (FOB exports – FOB imports)	P61	P71
b. Services	P62	P72
- transport		
- tourism		
- other services		
B. Incomes (Primary income account)		
- Compensation of employees	D1	D1
- Interest	D41	D41
- Distributed income of corporations	D42	D42
- Reinvested earnings	D43	D43
C. Current transfers (Secondary income account)		
General government		
- Receipts from taxes, fines, penalties, etc.	D5	D5
- Granted subsidies/ received for sustaining the current budget; governmental contributions to administrative budgets of international organisations, etc.	D74	D74
- Miscellaneous current transfers of general government, such as:	D75	D75
-payments for scholarships and other similar transfers	D75	D75
-payments for taxes of being member of international organisations and other current transfers	D75	D75
Other sectors (financial corporations, non-financial corporations, NPISHs)		
-Taxes on income and wealth, fines, taxes, contributions payable to foreign governments	D51	D51
-Workers remittances - cash transfers made by foreign workers to residents belonging to workers former economy	D75	D75
-Miscellaneous current transfers, as:	D75	D75
-alimonies, successions etc.	D75	D75
-contributions to religious, scientific, cultural and charity organisations; donations, aids, subsidies, etc.	D75	D75
-rewards gained by non-residents	D75	D75
-scholarship and other similar aids, reimbursements of taxes, non-contractual pensions and other benefits received from foreign governments	D75	D75
-other monetary transfers residents - non-residents	D75	D75
2. CAPITAL AND FINANCIAL ACCOUNT		
of which:		
a. Capital transfers	D99	
- Public administration		
- Other sectors		
b. Acquisition/sales of non-produced, non-financial assets	NP	

This example does not cover all standard items in BoPs. For full coverage of transition, see Appendix 9, page 303-304 of Balance of Payments and Investment Position Manual sixth edition (BPM6), at http://www.imf.org/external/pubs/ft/bop/2007/pdf/bpm6.pdf
Note: SNA transactions are presented in Annex 2.

3. Concluding remarks

The use of administrative data sources is an important aspect of the national accounts estimation process. Statistical offices attempting to reach the first milestone for compiling the SNA must pay special attention to the identification, collection and uses of administrative data (following the phases presented in Chapter 2: *Building the SNA*).

Table 5.9 shows the main administrative sources according to which national accounts indicators can be estimated. The list is not exhaustive because administrative sources depend on country organisation, level of economic development and the way in which international recommendations are applied.

Table 5.9: Main administrative data sources useful for SNA implementation

Administrative sources	Used for the estimation of
Financial statements of non-financial and financial corporation.	Production, intermediate consumption, gross fixed capital formation, changes in inventory.
Financial statements of government (income and expenditure).	Production and intermediate consumption of government; gross fixed capital formation; changes in inventory; final consumption of government; taxes and subsides on products; taxes and subsides on production.
Custom declaration for import and export.	Import and export of goods.
Balance of Payments.	Import and export of services.

3.1 Questions for practitioners

The use of administrative data sources for compiling national accounts requires the following issues to be answered:

1. What is the administrative data in the country? What is its content, frequency, and deadline for dissemination? Could it be useful for national accounts purposes? Do you use them?
2. What is the current situation concerning the use of administrative sources for statistical purposes?
3. Is it possible to gain access to these sources? Do agreements and memorandums for collaboration need to be set up?
4. Are the proper ways of collecting administrative records and using them for statistical purposes in place? Have all administrative data sources been examined to determine to what extent the data they contain can be used to support the statistical programme?
5. Do 'bridge tables' exist for translation from accounting indicators to NA concepts?
6. Have the procedures for transforming from business to national accounting concepts been defined and fully understood by survey and national accounts staff?
7. Does there exist a strategy for improvement of the use of administrative sources?

In many developing countries and small islands, the problem of accessing the data sources needed for compiling the SNA do not only depend on the lack of basic statistical data, but also on legal and institutional arrangements: administrative data may be used for national accounts purposes if it is mandated by law and regulations. Under these conditions, the most important problem (lack of available data sources) may be resolved by creating the conditions for accessing administrative data.

4. Recommended reading

- *The 2008 SNA,* European Commission, IMF, OECD, UN, World Bank, 2009; Chapter 1: 'Introduction'; Chapter 22: 'The general government and public sector'; Chapter 26: 'The rest of the world accounts and links to the balance of payments';
- *ESA 2010*, Chapter 21: Link Between Business Accounts and National Accounts and the Measurement of Corporate Activity - Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union;
- *Guide méthodologique pour l'élaboration des comptes nationaux dans les états membre d'Afristat,* Afristat, Serie Méthodes No.4, 2001; Chapter II-III: ' Le comptes des administrations publiques '; chapter II-IV: ' Le commerce extérieur et la balance des paiements '; Chapters II-VII: ' Le traitement des données d'entreprises ';
- *Links between business accounting and national accounting*, Studies in methods Series F, No 76, UN 2000;
- *Understanding National Accounts,* Lequiller F., Blades D., OECD 2006; Chapter VII: 'Business accounts';
- *Balance of Payments and Investment Position*, Sixth Edition, (BPM6) 2009, International Monetary Fund;
- *IAS Plus: Summaries of IFRSs and IASs* at **http://www.iasplus.com/standard/standard.htm**.

6 The Informal Sector

The chapter in brief

The non-observed economy exists in all countries, while the observed and non-observed informal sector involves an important labour force in many least-developed and developing countries, which contributes to economic production. The economic impact of the informal sector is hard to measure because of the difficulty in defining and analyzing the phenomenon owing to the limited available information. This is often due to the financial restrictions faced by statistical offices and the characteristics of the informal sector in a country. This chapter looks at the informal sector vis-à-vis the non-observed and observed economies, defining and presenting the criteria used to identify the informal sector, the measurement methods to be adapted to country specificities and the most relevant statistical surveys used for estimating it.

Definition

The non-observed economy (NOE) refers to all productive activities that may not be captured in the basic data sources used for compiling national accounts. The following activities are included: underground, informal (including those undertaken by households for their own final use), illegal, and other activities omitted due to deficiencies in the basic data collection program. The term 'non-observed economy' encompasses all of these activities and the related statistical estimation problems.

Source: Non-Observed Economy in national accounts, Survey of Country l Practices, United Nations, 2008.

1. The Non-Observed Economy

The main purpose of national accounts is to offer an *exhaustive description* of an economy. This means that the main aim of compiling statistics is to cover as far as possible the productive activities belonging to the SNA. It is clear that an exhaustive coverage of national accounts is an important quality aspect.

Lack of coverage in national accounts leads to inconveniencing users and national accountants themselves:

1. For users, improper coverage causes problems in understanding the economy both in terms of levels and trends. Levels of GDP and other data are downward biased, giving an inaccurate view of the economy, affecting international comparability. Biases in trend estimates can be expected if the economic activities missing from GDP change at different rates from those included.
2. For national accountants, lack of coverage causes imbalances in the internal consistency of accounts because some economic transactions are not measured.

The possibility that some economic activities are omitted is addressed by the media, who often suggest, using simplistic assumptions, that the GDP figures published by national statistical offices are underestimates. To avoid this situation a national statistical office should elaborate a measurement program for improving the exhaustiveness of data, with clear objectives, roles and responsibilities for national accountants and for survey statisticians, including those in regional offices. This programme should be combined with other quality management and improvement initiatives. The major data users should also be informed of and involved in this program.

It is important to note that concerns about the non-observed economy do not lead to defining a separable way of measuring it. Concern should instead be aimed more at improving the overall quality of national accounts data.

Regular data sources – as described in Chapter 4: Statistical infrastructure for national accounts – may be affected by what are called *deficiencies in the basic data collection programme (statistical underground)*, due to:

1. *under-coverage of enterprises:* enterprises, or parts of them, are excluded from the data collection programme, though in principle they should have been included, due to several possible reasons:
   (a) an enterprise is new and has not yet been included in the survey frameworks;
   (b) an enterprise falls below the size cut-off for surveys;
   (c) an enterprise has been incorrectly classified by type of activity or by region and thus improperly excluded from the survey frame;
   (d) an enterprise has not been entered in the statistical register, regardless of its desire to be, because of the lack of efficiency of the statistical system, or due to the fact that registers are not updated, for instance.
2. *non-response* by enterprises, depending on the sensitivity of the statistical system: enterprises are included in the sample but no data are collected from them and no imputation is made for the missing observations, because:
   – the survey questionnaire was wrongly addressed;
   – the enterprise, or part of it, did not return the questionnaire.
3. *under-reporting by enterprises*: data is obtained from enterprises, but is misreported by the respondent, or correct data is received but is inappropriately input or weighted.

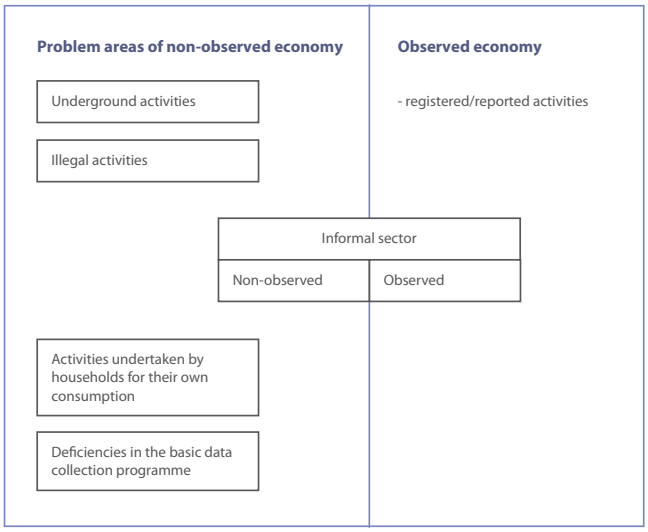
The situations above show quite clearly the need for improvements to basic data collection programmes with reference to the NOE: NOE measurements should be optimised by ensuring that basic data includes productive activities to the fullest extent possible.

In general, data sources are not enough to fully cover the productive process in the economy. This 'non-observed' part of the economy refers to the following activities[9]:

1. *underground activities*, defined as those activities that are productive and legal but are deliberately concealed from public authorities to avoid:
   (a) payment of income, value added or other taxes;
   (b) payment of social security contributions;
   (c) having to meet certain legal standards such as minimum wages, maximum hours, safety or health standards, etc.;
   (d) complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms.
2. *illegal activities*, defined as those productive activities specifically covered by SNA production boundary that:
   (a) generate goods and services forbidden by law (e.g. production and distribution of illegal drugs);
   (b) are unlawful when carried out by unauthorised producers (e.g. unlicenced practice of medicine).
3. *production of households for own final use*, defined as those productive activities that result in goods or services consumed or capitalised by the households that produced them, such as:
   (a) production of crops and livestock;
   (b) production of other goods for their own end use;
   (c) construction of own houses and other own-account fixed capital formation;
   (d) imputed rents of owner-occupiers, and services of paid domestic servants.
4. *non-observed informal activities*, being part of the informal sector also covering observed activities undertaken informally; in general, informal activities are those productive activities conducted by unincorporated enterprises in the household sector that are unregistered and/or are less than a specified size in terms of employment, and that have some market production.

These categories of non-observed activities were established to reflect a *convergence of opinion* amongst statisticians and national accounts experts. They attempt to cover all 'problem areas' encountered in achieving the most exhaustive estimates of national accounts. Various other terms are used to reflect these non-covered areas, such as the 'shadow' economy, the 'cash' economy, the 'parallel' economy, the 'underground' economy, etc. In all cases, said 'problem areas' must be *reciprocally exclusive*.

Figure 6.1: Delimiting the observed from non-observed economy in the 2008 SNA



The extent, impact and structure of the non-observed part of the economy vary considerably from country to country, depending on many aspects:

1. structure and development of economy;
2. legislation;
3. organisation of the national statistical system;
4. political interest, etc.

In order to facilitate comparison across countries and to improve exhaustiveness of national accounts, Eurostat has carried out two rounds of Pilot Projects on Exhaustiveness (PPE) to address the differences in concepts, definitions, and methods and to identify the types of non-exhaustiveness. The tabular approach undertaken relates NOE areas with statistical problems encountered by national accountants (see Box 6.1).

(9) Measuring the Non-Observed Economy – a Handbook, OECD, 2002.

Box 6.1: Eurostat's tabular approach: types of non-exhaustiveness

I Not registered

N1 - Producer deliberately not registering - underground
Producer deliberately does not register to avoid tax and social security obligations. Most often this refers to small producers with turnovers that exceed threshold levels above which they should register. Producers that do not register because they are engaged in illegal activities fall under type N2. Type N1 does not include all underground activities, some of which are associated with type N6.

N2 - Producers deliberately not registering - illegal
Producer deliberately does not register as a legal entity or as an entrepreneur because it is involved in illegal activities. Type N2 excludes illegal activities by registered legal entities or entrepreneurs that report (or misreport) their activities under legal activity codes.

N3 - Producers not required to register
Producer is not required to register because it has no market output. Typically these are non-market household producers that engage in production of goods for own consumption, for own fixed capital formation, and construction of and repairs to dwellings. Or, producer has some market output but it is below the level at which the producer is obliged to register as an entrepreneur.

II Not surveyed

N4 - Legal persons not surveyed
Legal persons not surveyed due to several reasons such as: the business register is out of date or updating procedures are inadequate; the classification data (activity, size or geographic codes) are incorrect; the legal person is excluded from the survey frame because its size is below a certain threshold etc. This leads to (systematic) exclusion of the legal person from surveys when in principle they should be included.

N5 - Registered entrepreneurs not surveyed
Registered entrepreneurs may not be surveyed for a variety of reasons: the statistical office does not conduct a survey of registered entrepreneurs; the registered entrepreneur is not in the list of registered entrepreneurs available to the statistical office, or if available, is systematically excluded from it; the registered entrepreneur is not in the survey frame because the classification data (activity code, size code, geographic code) are incorrect.

III Misreporting

N6 - Producers deliberately misreporting
Gross output is under-reported and/or intermediate consumption is overstated, in order to evade income tax, value added tax (VAT), other taxes, or social security contributions. Misreporting often involves maintenance of two sets of books, payments of envelope salaries which are recorded as intermediate consumption; payments in cash without receipts, and VAT fraud.

IV. Other

N7 - Other statistical deficiencies
Type N7 is subdivided into:
N7a: data that are incomplete, not collected or not directly collectable;
N7b: data that are incorrectly handled, processed or compiled by statisticians.
The following areas should be investigated: handling of non-response; production for own final use by market producers; tips; wages and salaries in kind; and secondary activities.

Source: Non-Observed Economy in national accounts; Survey of Country Practices, UN, 2008

The main goal of the framework is to ensure that the NOE is measured systematically, potential areas are covered and no activities are double counted. Country comparison of the NOE, similarity in methods used and exchange of experience in implementation can be more easily ensured if the same frame is employed.

Measurement methods for the non-observed economy vary across countries.

Several sources are quite common, such as agricultural censuses, business statistics, household surveys, demographic data/population censuses, Labour Force Survey/labour statistics, taxation and fiscal data, police records, social security records and foreign trade statistics. Some sources are used only in one or a few countries, particularly the surveys for capturing a specific activity (e.g. tobacco smuggling). Other sources such as Labour Force Surveys and employment data, structural business surveys, household budget/expenditure surveys, and taxation data are widely used by countries.

The main methods used in estimating the NOE can be classified into two types:

1. Statistical methods, such as direct estimations based on direct surveys (surveys on expenditure, income, labour, time use or opinion, for instance) or indirect estimation based on available data sources.

   Indirect statistical compilation methods can be classified by type into:

   (a) Supply based approach (including the *labour input* approach): it relies on data on the supply of inputs (number of primary raw materials, just one major raw material, labour, land, fixed capital stock, etc.) that are used for producing goods and services. Input/output and input/value added ratios are needed to calculate output and value added estimates from the input data.

   (b) Demand based approach: it aims to assess production by using indicator data on specific uses of goods and services that sufficiently describe their production: household final consumption expenditures of a certain commodity such as health and personal services;

uses of raw materials such as the processing of agricultural products; major export commodities; administrative data indicating demand for a product such as motor vehicle registrations and building permits, etc.

(c) *Income-based* approach: it is based on available data from administrative sources in some categories of income, which can be used to obtain an indication of production covered by the administrative system (income taxes, social security contributions paid by self-employed persons or private entrepreneurs, etc.).

(d) *Commodity flow* approach: it involves balancing total supplies and uses of individual products, using accounting equations. One specific application of a commodity flow method is to calculate the output of the retail trade from supply of commodities.

2. Methods based on modelling techniques. Macro-economic models (such as monetary models, global indicator method) provide some estimation of the NOE but should be avoided. The use of available basic data is preferred. Where model-based assumptions are unavoidable, they should be applied at the most detailed available level because it has been shown that the results are sensitive to data transformations, units of measurement and the sample used.

It should be noted that there is no unique standard method applied internationally; several methods or combinations of methods are usually applied, depending on the characteristics of each country.

The process of incorporating non-observed production into GDP estimates implies *complex procedures*, such as:

1. Some procedures yield estimates of total production for a specific activity without separately identifying various types of non-observed activities.
2. Ad hoc supplementary data are often required to make efficient use of existing sources (value added estimates can be derived from output estimates obtained from a commodity flow method using a value added/output ratio calculated from an ad-hoc study).
3. Compilation should be based on detailed and specific adjustments using specific sources and known linkages and relationships.
4. Where possible, alternative estimates should be derived, compared, and assessed for plausibility of results. Data relating to similar topics but from different sources should be compared and analysed to identify errors or remaining gaps.
5. Assumptions underlying estimation procedures should be made explicit in calculations and reviewed regularly for their plausibility.

2. The Informal Sector

2.1 Place of the informal sector in the economy

The informal sector manifests itself in different ways in different countries, different regions within the same country, and even different parts of the same city. It encompasses different kinds of activities, different types of enterprise, and different reasons for participating. Informal activities range from street vending, shoe shining, food processing and other minor activities requiring little or no capital and skills and with marginal output, to those involving a certain amount of investment in skills and capital and with higher productivity, such as manufacturing, tailoring, car repair and mechanised transport. While some informal sector activities resemble traditional activities in handicrafts, food processing or personal services, others such as car repair, recycling of waste materials or transport, are new and arise from modernisation.

Reasons for participating in the informal sector range from pure survival strategies undertaken by individuals facing a lack of (adequate) jobs, unemployment insurance or other forms of income maintenance, to the desire for independence and flexible work arrangements and, in some cases, the prospect of quite profitable income-earning opportunities, or the continuation of traditional activities.

Box 6.2: Examples of informal activities

1. A woman selling on street the cakes she cooked in-home. She has no licence for this activity, but her cookies are bought by people from neighborhood who appreciate the taste. Sometimes she bakes cakes to order for special oc-casions in exchange of money.
2. A man who uses his own car and carries out a taxi activity, main (or additional) source of income. He is registered and has a licence provided by the government.
3. A woman who takes care of a child of another woman, more than 9 hours per day. She did not find another job in the area, and sees no prospects for an improved employment situation. She is paid for this job with less than the minimum threshold which is required by Government as a gross wage.

It should be noted that the vast majority of informal sector activities provide goods and services whose production and distribution are perfectly legal (in contrast to criminal activities or illegal production). There is also a difference between the concept of the informal sector and that of the hidden or underground economy, because informal sector activities are not necessarily performed with the deliberate intention of evading the payment of taxes or social security, but to reduce production costs.

2.2 Defining the informal sector

The informal sector definition was adopted by the Fifteenth International Conference of Labour Statisticians (15th ICLS) in January 1993 and was linked to the conceptual framework of the SNA. This helps ensure compatibility with informal sector statistics and other economic and social statistics, and measurements of it are integrated in the overall economy. To be consistent with the framework of the SNA and provide separate GDP accounting for the informal sector, the definition was based on production units or enterprises rather than on employment relations. Furthermore, the informal sector was considered a sub-sector of the SNA institutional sector 'households'.

Definition

(1) The informal sector may be broadly characterised as consisting of units engaged in the production of goods or services with the primary objective of generating employment and incomes for the persons concerned. These units typically operate at a low level of organisation, with little or no division between labour and capital as factors of production and on a small scale. Labour relations - where they exist - are based mostly on casual employment, kinship or personal and social relations rather than contractual arrangements with formal guarantees.

(2) Production units of the informal sector have the characteristic features of household enterprises. The fixed and other assets used do not belong to the production units as such but to their owners. The units themselves cannot engage in transactions or enter into contracts with other units, nor incur liabilities, on their own behalf. The owners have to raise the necessary finance at their own risk and are personally liable, without limit, for any debts or obligations incurred in the production process. Expenditure for production is often indistinguishable from household expenditure. Similarly, capital goods such as buildings or vehicles may be used indistinguishably for business and household purposes.

Source: The SNA 2008, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 25: Informal aspects of the economy, point 25.36.

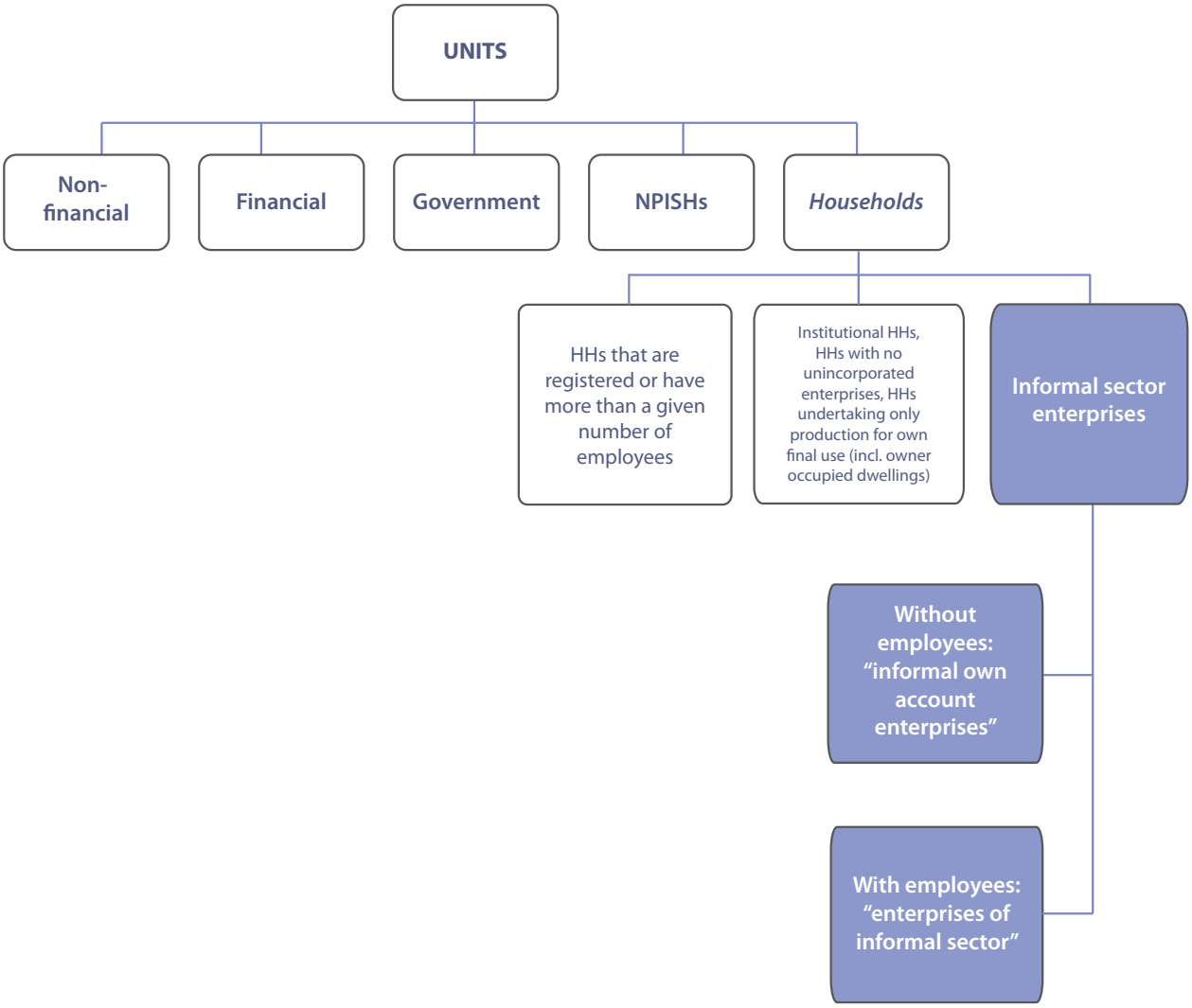
The above definition is only an 'umbrella definition' of the informal sector, as its scope and coverage depends on national circumstances. The conditions under which these activities come into existence and the constraints under which they are undertaken confer certain characteristics on them, leading to specific criteria for determining what is meant by informal.

The criteria used to identify the informal sector in the SNA framework may be classified as follows:

1. General essential criteria:
   (a) legal organisation of the enterprise: unincorporated enterprise;
   (b) ownership of the enterprise: belong to a household;
   (c) type of accounts: absence of separate complete accounts;
   (d) production destination: at least some production is destined for sale or barter, household enterprises with no market production (own-account agriculture or construction), services of paid domestic workers, and services from owner-occupied dwellings being excluded.
2. Additional operational criteria:
   (a) size limit of the enterprise: the number of employees engaged in the production is left to the country's discretion (for international reporting, countries should provide figures separately for enterprises with fewer than five employees);
   (b) non-registration of enterprise and/or of employees in an enterprise within some arm of government;
   (c) economic activity: non-agricultural activity including units mainly involved in agricultural sector and performing secondary non-agricultural activities;
   (d) location of units: urban and rural areas.

Figure 6.2 shows the units of the informal sector in the economy.

Figure 6.2: Informal sector



Source: The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009.

Production units are household unincorporated enterprises. Depending on types of employment involved, they are further sub-divided:

1. *Informal own-account enterprises*, which basically represent household enterprises as described above, and which may employ contributing family workers and employees on an occasional basis but not employees on a continuous basis and which have the characteristics described in the definition. Informal enterprises may comprise those who are not registered as provided by specific laws or may include all own-account enterprises.
2. *Enterprises of informal employers* are household enterprises that employ one or more employees on a continuous basis. Depending on the country, enterprises of informal employers are determined based on a threshold employment size and the non-registration of the enterprise or its employees. All or at least some of the goods or services produced are meant for sale or barter. In many countries, household enterprises engaged in agricultural activities are deliberately excluded, although the 15th International Conference of Labour Statisticians and SNA 2008 did not recommend this exclusion.

Box 6.3: Delhi Group on Informal Sector Statistics recommendations

The main recommendations for defining the informal sector are:

1. All countries should use the criteria of legal organisation (unincorporated enterprises), type of accounts (no complete set of accounts) and product destination (at least some market output).

2. Specification of the employment size limit of the enterprise in the national definition of the informal sector is left to the country's discretion. For international reporting, however, countries should provide figures separately for enterprises with fewer than five employees. In the case of multiple-establishment enterprises, the size limit should apply to the largest establishment.

3. Countries using the employment size criterion should provide disaggregated figures for enterprises, which are not registered, as well as for enterprises, which are registered.

4. Countries using the criterion of non-registration should provide disaggregated figures for enterprises with fewer than five employees as well as for enterprises with five or more employees.

5. Countries, which include agricultural activities, should provide figures separately for agricultural and non-agricultural activities.

6. Countries should include persons engaged in professional or technical activities if they meet the criteria of the informal sector definition.

7. Countries should include paid domestic services unless these are provided by employees.

8. Countries should follow paragraph 18 of the Resolution adopted by the 15th ICLS regarding the treatment of outworkers/home workers. Countries should provide figures separately for outworkers/home workers included in the informal sector.

9. Countries covering urban as well as rural areas should provide figures separately for both urban and rural areas.

10. Countries using household surveys or mixed surveys should make an effort to cover not only persons whose main job is in the informal sector, but also those whose main job is in another sector and who have a secondary activity in the informal sector.

Source: Measuring the Non-Observed Economy- a Handbook, OECD, 2002.

2.3 Informal economy

In the extended conceptual framework, the informal economy is considered as comprising informal employment (without secure contracts, worker benefits, or social protection) both inside and outside informal enterprises:

1. Informal employment in informal enterprises (small unregistered or unincorporated enterprises), including: employers, employees, own-account operators, and unpaid family workers in informal enterprises;
2. Informal employment outside informal enterprises (for formal enterprises, for households, or with no fixed employer), including: domestic workers, casual or day labourers, temporary or part-time workers industrial outworkers (including home-workers), and unregistered or undeclared workers.

The informal economy consists of a wide range of informal enterprises and informal jobs. Despite its heterogeneity, there are meaningful ways of classifying its component segments:

- by type of economic unit and
- by employment status.

Informal enterprises consist of micro-enterprises (with an employer plus some employees), family businesses (with an owner operator and, sometimes, unpaid family workers) and own-account operations (with an individual owner operator). Informal employment relations consist of informal enterprise employees as well as domestic workers without a regular contract, casual day labourers without a fixed employer, temporary workers obtaining work through an agency, part-time workers for a fixed employer, industrial outworkers for formal or informal firms (and their intermediaries) and unregistered or undeclared workers. Table 6.1 presents the framework of informal employment in the economy.

Table 6.1: The conceptual framework for the informal economy

Production units by type	Jobs by status in employment								
	Own-account workers		Employers		Contributing family workers	Employees		Members of producers' cooperatives	
	Informal	Formal	Informal	Formal	Informal	Informal	Formal	Informal	Formal
Formal sector enterprises					1	2			
Informal sector enterprises (a)	3		4		5	6	7	8	
Households (b)	9					10			

(a) As defined by the Fifteenth International Conference of Labour Statisticians in 1993
(b) Households producing goods for their own final use and households employing domestic workers.
Source: ILO, Decent Work and the Informal Economy Report VI, International Labour Conference, 90th Session, Geneva, 2002.

Table 6.1 should be read as following:

1. dark-coloured cells refer to jobs that by definition do not exist in the type of production unit in question.
2. light-coloured cells refer to jobs which exist in the type of production unit in question but which are not relevant for the informal sector.

Unshaded cells refer to types of jobs represented in the different segments of the informal economy:

Cells with numbers 1 and 5: Contributing family workers: no contract of employment and no legal or social protection arising from the job, in formal enterprises (cell 1) or informal enterprises (cell 5). Contributing family workers with a contract of employment, wage, social protection, etc. would be considered employees in formal employment.

Cells with numbers 2 and 6: Employees who have informal jobs whether employed by formal enterprises (cell 2) or informal enterprises (cell 6).

Cells with numbers 3 and 4: Own-account workers (cell 3) and employers (cell 4) who have their own informal enterprise. The informal nature of their jobs follows directly from the characteristics of the enterprise they own.

Cell with number 7: Employees working in informal enterprises but having formal jobs (this may occur, for example, when enterprises are defined as informal using size as the only criterion).

Cell with number 8: Members of informal producers' cooperatives.

Cell with number 9: Producers of goods for own final use by their household (e.g. subsistence farming).

Cell with number 10: Paid domestic workers employed by households in informal jobs.

To find out more…

The 2008 SNA, European Commission, IMF,OECD, UN, World Bank, 2009, Chapter 25: Informal aspects of the economy, European Commission, IMF, OECD, UN, World Bank, 2009;

Measuring the Non-Observed Economy – a Handbook, OECD, IMF, ILO and CIS STAT, 2002;

Non-Observed Economy in national accounts – Survey of Country Practices, UN, 2008.

2.4 How to measure the informal sector

2.4.1 Estimation methods

Several approaches may be used to estimate activity in the informal sector. The choice or combination will depend on the objectives which range from very simple such as only having information about the evolution of number and characteristics of persons involved in the informal sector, or more complex such as obtaining detailed information about the characteristics of the enterprises involved, the main activities undertaken, number of employees, income generation, capital equipment, etc. The choice of measurement method depends upon data requirements, statistical systems organisation, financial and human resources capability and user needs, especially policy makers involved in economic decision taking.

The main methods used to obtain estimates of the magnitude of the informal sector can be separated into three classes:

1. **Direct methods:**

   Direct methods are microeconomic in nature and based on surveys or the results from tax audits used to construct estimates of total economic activity and its official and

unofficial (or measured and unmeasured) components. In order to make a direct estimate of the informal sector several approaches are used:

(a) to conduct a special survey on the informal sector;

(b) to expand the coverage of the existing regular surveys, such as labour force or household surveys, with information pertaining to the informal sector;

(c) to carry out mixed household–enterprise surveys.

Special surveys on the informal sector, even if they are the most appropriate for data collection, are very costly and often entail sizeable financial and human resources.

2. **Indirect methods:**

Indirect methods are macroeconomic in nature, and combine various economic variables and a set of assumptions for producing estimates of total economic activity (that is, measured and unmeasured, official and unofficial). Hence, only the size of the informal sector may be estimated, not any other relevant information and indicators about the country, like the extent of social protection, access to education, health, credit, differences in wages and working conditions and prevalence of poverty. Indirect methods can be sub-classified as follows:

(a) Discrepancy methods that rely on differences between aggregate income and expenditure that capture the economic activity of the informal sector or between labour force and formal employment. This estimation of the informal sector based on the differences between aggregates requires having independently obtained measures of GDP using expenditure and income approaches and thus, limiting its application in practice.

(b) Monetary methods are by far the most used in the empirical literature. They are based on the assumption that hidden transactions use only cash; so, estimating the quantity of money in circulation and then taking away the incentives that induce agents into informality (usually taxes) should give a good approximation of the money used in informal activities.

(c) Physical input methods use discrepancies in electricity consumption and GDP. This method has limitations due to the assumption of a constant coefficient of use per unit of GDP which does not consider technological progress and starts its estimation from a base year in which the magnitude of the informal economy is zero or negligible (an unrealistic assumption for most countries).

3. **Model approaches:**

The Model approach for measuring the informal sector involves using structural equations to link unobserved variables to observed indicators and cause. The most common method is that of the Multiple Indicator–Multiple Cause (MIMIC) model that imputes a level of underlying informality from a set of presumed causes of informality, on the one hand, and measurable consequences of it, on the other. Among the causes that can be included are taxation level, inflation, salaries and unemployment; the indicators refer to the currency in circulation and real GDP. The two main components of the model, the measurement equation and the structural equation, provide the size of the informal economy using the causes and indicators included in estimations.

The use of the model is not recommended for compiling national accounts. As ISWGNA[10] presented, these methods suffer from serious problems that cast doubt on their utility for any purpose in which accuracy is important, such as the estimation of national accounts indicators.

2.4.2 Statistical data for estimating the informal sector

A major challenge for developing countries and economies in transition is the statistical measurement of the informal sector with respect to size, characteristics and contribution to GDP. There are not many countries that conduct regular surveys to measure employment in this sector and even fewer measure its contribution to GDP.

One of the main reasons for the lack of estimates is the limited resources of national statistical systems which do not allow for integrating regular data collection on the informal sector.

Depending on their objectives, countries use a variety of survey tools for measuring the informal sector, including independent *ad hoc* surveys, mixed household-enterprise surveys, labour force or other household surveys, enterprise/establishment surveys and economic censuses. For example, some statistical offices adopt a fragmented approach using different methods, questionnaires and reference periods in conducting *ad hoc* industry surveys of informal sector enterprises which reflect, for instance, the relative importance attached to a particular industry at a given point in time. Other countries limit their surveys to major urban areas only.

Bearing in mind that resources are often limited in countries with a large informal sector, national statistical offices should prioritise their strategic objectives for estimating the informal sector.

The first step, as for the general strategy for the SNA implementation offered in Chapter 2: *Building the SNA*, is that the main users of the statistics are consulted. This consultation ensures that the data to be produced is relevant to the needs and priorities identified at national and international levels and builds support for developing statistical programmes.

The ILO guidelines on employment statistics in the informal sector and informal employment serve as a framework for

(10) See: SNA News, Number 22/ 2006

defining the main measurement objectives and data requirements necessary for establishing the national data collection programme. The main data which needs to be provided with respect to the informal sector refers to:

1. the number of persons engaged in informal sector units by employment status and kind of economic activity and
2. the number of informal sector enterprises by kind of economic activity and by type (i.e. informal own-account enterprises, informal employer enterprises).

To find out more…

www.ILO.org at the site: ***http://www.ilo.org/public/english/support/lib/resource/subject/informal.htm***

www.WorldBank.org at the site: ***http://lnweb90.worldbank.org/eca/eca.nsf/1f3aa35cab9dea4f85256a77004e4ef4/0e1cfcae7d9efa4185256a940073f4e5?OpenDocument.***

The second step of the strategy refers to establishing the approach for collecting data and defining the main indicators to be estimated. The various survey approaches used are:

1. Household surveys

   These surveys include labour force surveys (LFS) and household income and expenditure surveys. They are the best data collection tools if the objective is to monitor the evolution of informal sector employment and informal employment in terms of the number and characteristics of the persons involved and the conditions of their employment and work. For this purpose, questions pertaining to the definition of the informal sector can be incorporated into LFS survey questionnaires and asked in respect of all persons employed during the survey reference period, irrespective of their employment status. A household income and expenditure survey provides information about household demand for goods and services produced in the informal sector.

   However this method, not being an appropriate source of information for estimating the total number of informal sector enterprises, is limited as far as disaggregation by industry, estimation of the total demand for informal production and other economic characteristics are concerned.

2. Enterprise surveys

   The most suitable approach for data collection when the objective is to monitor the number and characteristics of the informal sector units is to use enterprise and establishment surveys. These types of surveys provide reliable information on different aspects, such as: the number and characteristics of the businesses involved; their production activities, income generation, and fixed capital; the conditions and constraints under which they operate; their organisations and relationships with the formal sector, etc.

   However, an enterprise survey fails to capture the diversity and mobility of informal sector activities as they do not cover households.

   A crucial aspect underlying the quality of the statistics produced by informal sector enterprise surveys is the framework used to select the survey sample, particularly how complete and up-to-date it is. A business register can usually be used, where one exists, although in general it does not cover informal sector enterprises. An establishment census offers an alternative, even if it represents an 'upper' frame for the informal sector, especially for 'identifiable' establishments. However, constraints in using such data sources are: high costs, possible overlaps, failure to capture enterprises such as in-home food processing, ambulant trade, construction, etc. For these reasons, countries considering the possibility of establishing a regular statistical programme for the informal sector based on this approach need to plan early on how the approach would fit within the overall data collection schedule and with the financial and human resources available.

3. Mixed household and enterprise surveys

   This approach includes:

   (a) The modular approach: *informal sector attached to household survey*. In this case, a special questionnaire for evaluating the informal sector is attached to the existing LFS or household survey and the two surveys can be conducted simultaneous or, more usefully, subsequently (first the household survey and then the informal sector survey). This approach permits monitoring of trends in the informal sector over time, if the base survey (the household survey) is conducted regularly and an informal sector module is attached at sufficiently frequent intervals.

   (b) The stand-alone approach: informal sector survey designed as an independent survey represents a better option from a technical point of view because its sample can be specifically designed and selected to meet the set requirements (for example by branch of activity). The use of this approach is based on a multi-stage design involving the following steps: (i) selection of areas (census enumeration areas) as primary sampling units; (ii) listing or interviewing of all households in the sample areas; (iii) selection of sample households with owners of informal sector enterprises (household unincorporated enterprises with some market production); and (iv) interview of sample householders and enterprise owners. The advantages in the quality of the results obtained using this approach must be balanced against the complexity of the survey and operations required (sample design, estimation procedures, qualified survey staff, sound training of interviewers, etc.).

(c) *Integrated approach: informal sector surveys as part of a survey system designed to meet several objectives.* These are seen as special types of modular surveys. They are designed to meet several measurement objectives at the same time, such as data collection for the informal sector, labour force characteristics, household income and expenditure, etc. For this reason, this approach is especially useful for countries that do not have a regular household survey to which an informal sector survey can be attached. These surveys are based on a sample in which the number of households with informal sector enterprises is extended as much as possible in order to obtain a larger representation of the various types of informal sector.

Box 6.4: Examples of informal sector surveys - Mozambique case

In Mozambique the majority of economic units concerned with the NOE phenomena are included in the informal sector. In order to estimate the size of this part of economy, a project was conducted with the technical assistance of ISTAT (Statistical Institute of Italy). Due to the lack of other informative sources, a specific survey directly measuring IS **(INFOR04)** has been carried out in order to improve the knowledge on its characteristics. However, due to the continuous changes in the IS, the update of information proves to be a fundamental aspect; implementing a survey on a regular basis to study the IS is of course a solution, but rarely feasible, because of its high costs. Consequently, a two-step approach was experimented in Mozambique:

1. **The INFOR04 survey**, in which designing and implementing a specific sample survey on IS was designed and implemented in 2007 (INFOR04). The questionnaire was designed based on the socio-economic framework of the country. The starting point was not to ask the interviewer to decide whether the respondent belonged to IS but to ask him/her to propose questions to the respondent following a set of filtering rules that, step by step, would help to identify people belonging to IS; hence a questionnaire filter area was designed. In this module, questions about the recording of the activity in any register (at national and/or regional level, at the tax agency, etc.) were considered. In addition to the module, other modules of the questionnaire asked for the characteristics of the job such as the kind of activity, the plot production etc. Results were analysed and validated by the Mozambican experts. The figure shows the importance of the informal sector that actually is the largest part of the Mozambican labour force.
2. **An indirect estimation** of Informal Sector: the experience of the 2008 **Household Budget Survey** using an attached ad-hoc module. Since to run an IS survey every year is not sustainable, a sub-optimal solution was found in taking advantage of some other already planned surveys to gather information on, at least, the most important variables featuring the IS. It was decided to include in the questionnaire of the Mozambican 2008 Household Budget Survey **(IOF08)** a module similar to the questionnaire filter of INFOR04 used to understand whether the unit can be included in the informal sector or not. These information associated with those of some variables of IOF08 may give some interesting results on the IS that can be used to update the results of INFOR04. Of course the quality of estimates related to the IS variables may be affected by the fact that the focus of IOF08 is on different aspects, for instance the different definitions of variables, and the different preparation of interviewers. The results show that the quality of the process should and could be improved. The estimates were only reliable at a high level of aggregation. Nevertheless, this way of proceeding is feasible and further steps towards quality can be easily done taking into account this first experience.

In particular it was noticed that an improvement of data quality can be obtained by making the interviewer more sensible to the IS questions in order to avoid measurement errors and partial non-responses that were actually one of the main problems of this experience. In our opinion, using a IS module attached to a Labour Force Survey or to a Living Standard Measurement Survey could avoid most of the problems met with the HBS because of the similarity of topics to be dealt with.

Source: The Informal Sector in Mozambique;

Outputs From The First National Survey (2005), INE Mozambique, 2006

Box 6.5: Number of surveys on the informal sector across countries and data collection methods

Type of survey \ Region	Africa	Asia & Pacific	Latin America	Economies in transition	Total
Mixed survey	15	2	4	1	22
Labour Force Survey	8	6	14	5	33
Households survey	11	–	5	2	18
Establishment censuses and survey	11	4	–	–	15
Total	45	12	23	8	88

Source: Informal sector: Statistical definition and Measurement issues, P. Gennari, paper presented to the OECD/UNESCAP/ADB workshop, 2004, Bangkok.

The different approaches presented highlight the diversity in scope and coverage of the various informal sector surveys, which complicates their comparability across countries and over time (see Box 6.5). At the same time, flexibility in criteria adaptation is an important characteristic for measuring the informal sector given its unique economic structure and policy interests in each country. Bearing in mind the need for flexibility and international comparability of the dynamics and structure of the informal sector, the best approach is the Fully Integrated Rational Survey Technique (FIRST) methodology. This approach is based on a modified mixed household-enterprise survey integrated into a comprehensive data collection programme on economic statistics. However, its application requires financial and human resources and is difficult to conduct on a regular basis.

Addressing these critical issues in data collection on the informal sector, the ***Interregional Cooperation on the Measurement of Informal Sector and Informal Employment (ICMISIE)***[11] project proposed the '1-2' survey, which is a specific kind of mixed household- enterprise survey.

To find out more…

The '1-2' Survey: A data collection strategy for informal sector and informal employment statistics, Pietro Gennari, Margarita F Guerrero, Zeynep Orhun (United Nations ESCAP Statistics Division) Ivo Havinga, Gulab Singh (United Nations Statistics Division/Department of Economic and Social Affairs), April 2009;

Documents of the *Workshop on Informal Employment and Informal Sector Data Collection Strategy, Tools, and Advocacy*, organised by ESCAP in Bangkok, 2007, available at: **http://www.unescap.org/stat/isie/ws-isie1/index.asp**

The '1-2' survey utilises the LFS in the first phase as a tool for collecting information on informal employment and some of the required informal sector data items. Each individual respondent in the LFS will be asked about his/her main and second jobs so that Household Unincorporated Enterprises with at least some Market production (HUEMs) can be identified. In this way, the data collected through the LFS construct the sample frame for the second phase, which is an enterprise survey for household unincorporated enterprises with at least some market production (HUEMs) as a statistical unit. The HUEMs survey collects data on production in line with international recommendations on industry, construction trade, and services statistics.

To find out more…

A generic HUEMs survey questionnaire is presented in the ESCAP papers: *Phase 1 of '1-2' survey and Phase 2 of '1-2' survey*, presented to the *Workshop on Informal Employment and Informal Sector Data Collection Strategy, Tools, and Advocacy*, Bangkok, 2007.

The '1-2' survey can be successfully used by developing countries with limited budgets for data collection but with a large informal sector impacting on the development of their economies. They can conduct the survey once a year; while the HUEM survey may not be conducted annually, LFS surveys will gather information on informal employment that may be used for identifying informal enterprises. In this way, the informal sector's contribution to GDP can be fully integrated into the national accounts data compilation framework.

(11) ICMISIE is a multiyear and multilateral development account project of the United Nations, with the Economic and Social Commission for Asia and the Pacific as lead agency, whose objectives is to increase the availability of data on the informal sector and informal employment and to improve the calculation of the informal sector contribution to employment and GDP.

Box 6.6

Interregional Cooperation on the Measurement of Informal Sector and Informal Employment was an important project developed by UN Economic and Social Commission for Asia and the Pacific (ESCAP), in cooperation with the Economic and Social Commission for Western Asia (ESCWA) and Economic Commission for Latin America and the Caribbean (ECLAC). The project was implemented in the period 2007-2009 in close collaboration with United Nations Statistics Division (UNSD), International Labour Organisation (ILO), the Delhi Group, Economic Commission for Europe (ECE), Economic Commission for Africa (ECA), WIEGO (Women in Informal Employment: Globalizing and Organizing).

Recognizing the importance of data on the informal sector and informal employment, and their effective use, in promoting evidence-based socioeconomic policies and achieving the Millennium Development Goals and Targets, the objectives of the project were to improve the availability and the analyses of data on the informal sector – including employment and contribution to the GDP – and informal employment in developing countries and countries with economy in transition.

The first component of the project was to raise awareness among the national statistics offices and other government agencies in the participating countries of the importance of collecting and disseminating informal sector and informal employment data, and incorporating it into employment and GDP estimates. The second component was to enhance the capacity to collect, compile, analyse and disseminate informal sector and informal employment data complying with international methodological standards. The expected outputs were published informal sector and informal employment data, and a country report covering data collection, compilation, dissemination and analysis experience throughout the project. The project also contributed to the conceptual work on the informal sector by proposing a standardised data collection strategy and producing internationally comparable data.

One of the countries participating in this project was Saint Lucia, who carried out the '1-2' survey in order to estimate the informal sector and integrate it into the country's national accounts. The final report was published and is available on

http://www.eclac.org/deype/publicaciones/sinsigla/xml/1/39071/CE9_sala01i.pdf

Source: http://www.unescap.org/stat/isie/index.asp

2.5 Concluding remarks

The informal sector represents an important part of developing economies, and governments and international organisations are focusing their attention towards understanding what proportion it represents, why it exists and how it operates, so as to take adequate measures to reduce it. Measuring it is an important challenge for developing countries.

The SNA implementation strategy will take the informal sector into account, when the compilation of national accounts is well-established, by using the main phases presented in Chapter 2: Building the SNA, Section 2: The 2008 SNA implementation strategy. Information about size and characteristics of the informal sector must be obtained in order to help decision-makers take pertinent measures aimed at improving a country's welfare and reinforcing the important role of national accounts within the statistical system.

2.5.1 Questions for practitioners

To ensure the exhaustiveness of estimates represents one of the goals of national accountants. In order to build an appropriate strategy for NOE and informal sector estimation, improvement is useful to clarify the following issues:

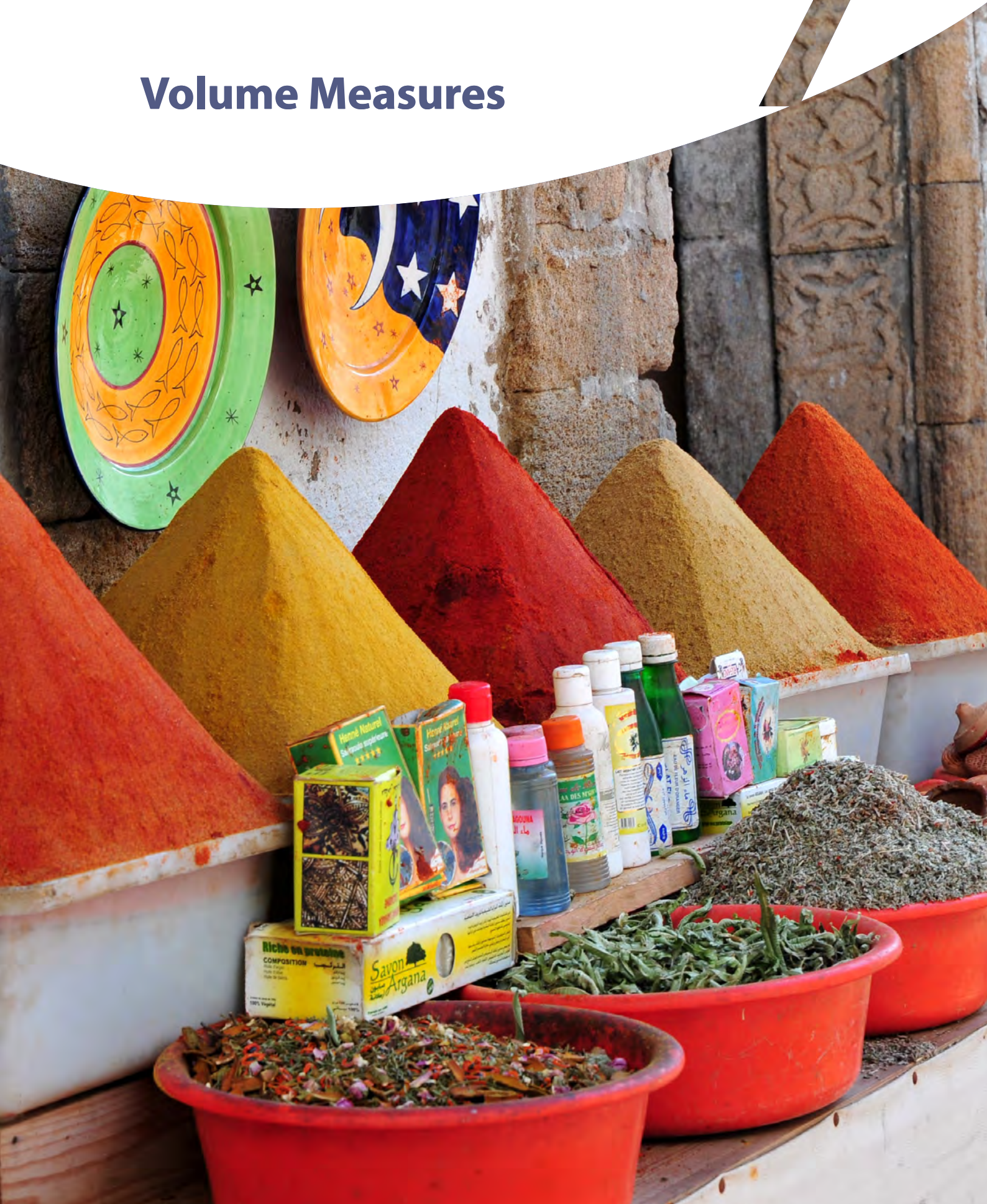
1. Which are the NOE elements in your country?
2. How big and important is the informal sector in the country? What are its components?
3. How concerned are the main users about any of the NOE problem areas? The bigger their concerns, the more effort NOE measurements merits.
4. Is a strategy developed in the statistical office to start the NOE and informal sector estimations or to improve them? Does the statistical office have a multi-year plan and what is the NOE's place in this plan?
5. Does the statistical office recognise and attach appropriate importance to its structure in order to implement and develop an NOE and informal sector measurement strategy?
6. Could the available data sources be used for estimating the NOE and informal sector? What new surveys must be implemented in the statistical system or new administrative sources used?
7. Are there partnerships with administrative agencies with a view to better use of administrative sources to satisfy statistical office data needs; in particular, to address NOE coverage problems and the informal sector?
8. Are methods to estimate the NOE and informal sector applied? What are the results? What is the quality of the results? Are the estimates disseminated?

3. Recommended reading

- *The 2008 SNA*, European Commission, IMF, OECD, UN, World bank, 2009, Chapter 25: Informal aspects of the economy;
- *Measuring the Non-Observed Economy, a Handbook*, OECD, 2002;
- *Non-Observed Economy in national accounts- Survey of Country Practices*, UN, 2008;
- *Women and men in the informal economy- A statistical picture*, International labour Office (ILO) 2002;
- *Eurostat's Tabular Approach to Exhaustiveness- Guidelines,* Eurostat 2005;
- *Measuring the informal economy: from employment in the informal sector to informal employment*, Ralf Hausmanns, working paper no.53, International labour Office (ILO) 2004;
- *Measuring the size of the informal sector*, **www.worldbank.org**;
- *Guide méthodologique pour l'élaboration des comptes nationaux dans les états membre d'Afristat,* Afristat, Série Méthodes no.4, 2001; Chapter II-V: La prise en compte du secteur informel dans les travaux de comptabilité nationale;
- *Household Accounting: experience in concepts and compilation*, Studies in Methods, Series F no 75/vol.1, UN 2000, Chapter II: The informal sector as part of the household sector;
- *How Can We Measure the Informal Sector?,* Dalisay S. Maligalig and Margarita F. Guerrero, paper will be presented at the Philippine Statistical Association, Inc. mid-year conference at the Ople Hall, Department of Labour and Employment, Intramuros, Manila, on 6 June 2008;
- Papers presented to the International Seminar on Informal Sector, organised by AFRISTAT, Mali, 2008 available at **http://www.afristat.org/index.php?option=com_content&view=article&id=204&catid=64**;
- *Modelling the informal economy in Mexico; A Structural Equation Approach,* Bramhla Macis J., MPRA paper No.8504, 2008;
- *The '1-2' Survey: A data collection strategy for informal sector and informal employment statistics,* Pietro Gennari, Margarita F Guerrero, Zeynep Orhun *(*United Nations ESCAP Statistics Division) Ivo Havinga, Gulab Singh (United Nations Statistics Division/Department of Economic and Social Affairs), April 2009, **http://www.unescap.org/stat/isie/project-resources/index.asp#workshop_materials**;
- *Comprehensive Measures of GDP and the Unrecorded Economy*, Adrian Bloem and Manik Shrestha, IMF Working Paper No. 00/204, December 2000;
- *Strategies for Measuring Industrial Structure and Growth,* Studies in methods, Serie F, No.65, UN 1994;
- *Measurement of Informal Sector and Informal Employment in St. Lucia,* http://www.eclac.org/deype/publicaciones/sinsigla/xml/1/39071/CE9_sala01i.pdf.

7

Volume Measures



The chapter in brief

Knowing the economy of a country means knowing its state and evolution in time and highlighting structural changes. This is based on national accounts compiled for successive periods as 'time series' which lead to the compilation of figures showing 'real' growth.

The 2008 SNA provides guidance about the estimations used to compile accounts in volume terms to obtain an integrated set of price and volume indices for flows of goods and services, gross and net value added, and GDP, which are consistent with general principles of national accounts.

This chapter addresses the conceptual background of price and volume measures in national accounts, the main data sources and methods used for annual estimates.

1. Price and volume in national accounts

In the system of national accounts, all flows and stocks are expressed in value, which enables the aggregation of a variety of goods and services produced in the economy. However, a major concern in economic analysis is to measure economic growth in volume terms between different periods.

Volume measures enable the analysis of real growth over time to be made: 'How much higher was GDP this year in comparison to previous years?'. In order to do this, the value changes for economic aggregates need to be split between those changes arising solely from changes in price and those from volume changes.

The system of national accounts provides a framework for measuring integrated price and volume for transactions in goods and services, taxes and subsidies on products, trade margins, consumption of fixed capital, compensation of employees, inventories, and produced fixed assets.

It should be stressed that many flows or stocks presented in the SNA do not have price and quantity dimensions. In this case, the flows or stocks refer to a number of transactions relating to distribution and financial intermediation, as well as to balancing items such as value added (value added does not represent any observable flow of goods and services which can be factored into a price and a quantity component directly).

1.1 Why measure price and volume in SNA?

Analyzing the evaluation of past economic performance, establishing the targets of the economic and social policy, or making comparisons between different economies is based on key variables represented by rates of inflation and economic growth. Economic growth is determined in the frame of national accounts.

The main uses of price and volume measures (or constant price estimates) in SNA are the following:

1. *Analyse the general economic growth*

Volume measures of national accounts indicators serve to study the long term development of an economy. It is usual to present the growth of an economy based on aggregated indicators such as GDP, but national accounts offer a wide range of data which shows the complexity of an economy.

The relative expansion or contraction of different sectors or industries presents the same importance as the aggregated growth of the whole economy. The important changes in the structure of the economy are best analysed in the framework offered by the accounts in constant prices. Data in constant prices are required not only to measure the way production increases, but also to estimate the growth or productive capacity of specific industries compared to the whole economy.

2. *Analyse economic cycle*

Presenting the long-term movements which accompany the changes in economic growth, the accounts in constant prices serve to register and analyse the economic cycles. The fluctuations of economic activity are always important information for a market economy. Moreover, besides the registration of the economic cycle, it is necessary to analyse the causal factors, based on decomposition, as completely as possible. These causal factors are provided by national accounts in constant prices. Data and amplitude of cyclic movements of various aggregates (such as capital formation, exports, consumption, etc.) must always be systematically analysed based on their interdependence. The compilation of quarterly accounts in constant prices along with the annual ones is more useful in analyzing the cyclical changes, especially for countries in development with large agricultural sectors.

3. *Economic projections*

The national accounts in constant prices refer to past events. The forecasts and projections for the future are normally established based on these accounts, due to the fact that it is not possible to decide on realistic economic objectives without knowing the present situation of the economy and its evolution.

For example, in order to project the increase of production, recent changes in this quantity, as well as productivity, resources, capital formation and other variables, should be taken into account.

The changes in private consumption or total consumption of the population recorded in constant prices are used extensively to measure the changes in living conditions and realise the projection of future development. It is possible to decompose aggregates and to analyse the real consumption of a particular goods and services such as, for example, food, housing, education, etc., or expenses measured by household or inhabitant. This information normally serves to indicate the changes in the population welfare level.

4. Basis for decision-taking

National accounts in current and constant prices serve to take rational economic decisions by knowing the reality of the national economy, offering decision-takers a valuable tool. Moreover, national accounts are used not only by the planning services, ministries of finances, central banks and public administration in general, but also by private institutions and enterprises. In order to analyse the flow of goods and services, the national accounts indicators in constant prices are probably more useful than the original accounts in current prices. On the other hand, accounts in current prices offer important information on other kinds of flows such as incomes, transfers, financial flows, etc., which cannot be estimated in constant prices in a convenient manner.

1.2 Conceptual background

The changes in the values of flows of goods and services can be directly factored into two components, one reflecting changes in the prices of the goods and services concerned, and the other, the changes in their volumes.

Changes in value can be broken down into price and volume components only for variables that have price and quantity elements. All transactions involving the exchange of goods and services and the levels of stocks of non-financial assets have this characteristic but income flows and financial assets and liabilities do not. Some balancing items have this characteristic but others do not and so they need to be considered individually.

Price and volume measures should be made within an integrated system of price and volume indices. An integrated system of volume measures must meet three requirements:

1. the goods and services account must be balanced for two successive years both in current and constant prices;
2. each flow at the level of the total economy must be equal to the sum of the corresponding flow of the various industries;
3. every change in the value of a transaction must be associated with a change in price or a change in volume, or a combination of the two.

The value of a homogeneous product is defined by:

$$v = p \times q \qquad (1)$$

where: v = value; p = price; q = quantity unit

1.2.1 Periods

An important issue in volume measure is the choice of the base year. The SNA favours the use of a moving base year. In practice, this means that t-1 will be the base year. The advantages are:

1. an up-to-date weighting scheme provides better estimates of growth rates;
2. introduction of new goods or disappearance of them is simplified;
3. no burdensome rebasing of time series.

A base year is the year for which price data at the most detailed level are collected and serve as benchmark data to weight different quantities to obtain one single volume index. The change of a base year affects real rate of growth. Consequently, the price base period is the period whose prices are used as denominators in calculating relatives price P_t/P_o (0 is the price base period). The quantity base period is the period whose quantities are used as denominators in calculating relative quantities Q_t/Q_o (0 is the quantity base period).

A reference year is simply any given year selected so that a series of values with different base years can be compared. More simply, the period in an index number time series is taken to be equal to 100. A change in the reference year should not change rates of growth.

The choice of base year and the choice of reference year are, in principle, unrelated issues. For the calculation of price and volume measures, only the problem of the choice of base year is relevant.

There is the need to re-reference or chain whenever data is calculated with the previous year as the base year and data is to be expressed with respect to a fixed reference year. This system which always uses the previous year as the base year is also known as a system of 'chain indices'. However, for the calculation of the year-to-year price and volume changes, no chaining is required.

Box 7.1: Example of base year and reference year

For example take the following series of index numbers:

Years:	*1990*	*1991*	*1992*	*1993*	*1994*
Data:	100	105	108	112	120

Suppose these numbers were calculated using weights from the year 1990. Hence 1990 is the base year. It is also the reference year, since 1990 = 100. The reference year can easily be changed to e.g. 1993 (divide all by 112/100 to get 1993 = 100):

Years:	*1990*	*1991*	*1992*	*1993*	*1994*
Data:	100/1.12	105/1.12	108/1.12	112/1.12	120/1.12

Such a procedure does not change the base year, since the year-to-year variations are still calculated using weights from 1990.

Instead of having a fixed base year as in the example above, one could take, each year, the weights of the previous year. This could, for example, lead to the following series of year-to-year changes:

Years:	1990	1991	1992	1993	1994
Data:	100	105	102	103	106

For each of these indices: t -1 = 100 holds. Hence the reference year is equal to the base year, but changes each year. It is easily possible to express the series on one reference year, by 're-referencing' or 'chaining'. This would yield:

Years:	1990	1991	1992	1993	1994
Data:	100	105	107.1	110.3	116.9

where: 107.1=105*102/100; 110.3=107.1*103/100, etc.

Source: Handbook on price and volume measures in national accounts, Eurostat, 2001

1.2.2 Indices

The index numbers of interest within the SNA are designed to decompose changes in value aggregates into their overall change in price and overall change in volume components. A price index can be written and calculated as a weighted average of the proportionate changes in the prices of a specified set of goods and services between two periods of time, say a reference period 0 and current period t.

Similarly, a volume index can be written and calculated as a weighted average of the proportional changes in the volumes of a specified set of goods and services between two periods of time, say a reference period 0 and current period t.

There are many index number formulae differing from each other mainly in the weights which they attach to the individual relative prices or quantities and the particular form of average used, whether it is arithmetic, geometric, harmonic, etc. The most widely-used in the compilation of volume changes in national accounts are Laspeyres and Paasche indices, of which the geometric mean is the ideal Fisher index. The disadvantages of the Fisher are that it is demanding in its data requirements, its results are not easy to be interpreted and is not additive consistent. This means that the Fisher index is not easily applicable in an accounting framework where additivity is an important issue.

The Laspeyres indices are weighted with a base period; they represent an arithmetical weighted mean over the current quantities (or prices) divided by quantities (or prices) in the base period, in which the values from base period are weighting coefficients.

Laspeyres price indices are presented by the equation (2) and the volume ones are presented by the equation (3):

$$L_P = \sum_{i=1}^{n}\left(\frac{p_i^t}{p_i^0}\right)s_i^0 = \frac{\sum_{i=1}^{n}\left(\frac{p_i^t}{p_i^0}\right)p_i^0 q_i^0}{\sum_{i=1}^{n} p_i^o q_i^0} \equiv \frac{\sum_{i=1}^{n} p_i^t q_i^0}{\sum_{i=1}^{n} p_i^0 q_i^0} \quad (2)$$

$$L_Q = \sum_{i=1}^{n}\left(\frac{q_i^t}{q_i^0}\right)s_i^0 \equiv \frac{\sum_{i=1}^{n} p_i^0 q_i^t}{\sum_{i=1}^{n} p_i^0 q_i^0} \quad (3)$$

Paasche indices are weighted with the current period; they represent an arithmetical weighted mean over the current quantities (or prices) divided by quantities (or prices) in the base period, in which the values from the current period are weighting coefficients.

The Paasche price and volume indices are represented in equation (4), irrespectively (5).

$$P_P = \left[\sum_{i=1}^{n}\left(\frac{p_i^t}{p_i^0}\right)^{-1} s_i^t\right]^{-1} \equiv \frac{\sum_{i=1}^{n} p_i^t q_i^t}{\sum_{i=1}^{n} p_i^0 q_i^t} \quad (4)$$

$$P_Q = \left[\sum_{i=1}^{n}\left(\frac{q_i^t}{q_i^0}\right)^{-1} s_i^t\right]^{-1} \equiv \frac{\sum_{i=1}^{n} p_i^t q_i^t}{\sum_{i=1}^{n} p_i^t q_i^o} \quad (5)$$

The Laspeyres and Pasche indices are symmetric: a price index of one of them multiplied with a volume index of the other one gives a value index. This is why the combination of Paasche price indices and Laspeyres volume indices is preferred in practice. It can easily be proved that this combination of indices fulfils the requirements mentioned above.

In order to obtain a system of price and volume indices to compile annual national accounts in prices of the previous year, available indices must be often processed into Laspeyres volume indices and Paasche price indices, even by national accountants.

The index of the change in monetary values between two periods, which is:

$$I_V = \sum_{i=1}^{n} v_i^t \Big/ \sum_{i=1}^{n} v_i^{t-1} \qquad (6)$$

reflects the combined effects of both price and quantity changes. When Laspeyres and Paasche indices are used, the value change will decompose exactly into a price index times a volume index only if the Laspeyres price index is matched with the Paasche volume index ($L_P x\, P_Q = I_V$) or the Laspeyres quantity index is matched with the Paasche price index ($L_Q\, x\, P_P = I_V$). For example, a price index, 1.05 representing a 5 per cent change multiplied by a volume index of 1.08, an 8 per cent change, yields a value change index of 1.134, a 13.4 per cent change.

In general, a Laspeyres index tends to register a larger increase over time than a Paasche index, that is, in general:

$L_P > P_P$ and $L_Q > P_Q$

From this relationship it can be easily noted whenever the relative prices and quantities (weighted by values) are negatively correlated, that is, as prices go up, the purchased quantities go down, or vice versa. Such negative correlation is to be expected for price takers, including consumers and firms purchasing intermediate inputs, which react to changes in relative prices by substituting goods and services that have become relatively less expensive for those that have become relatively more expensive.

A positive correlation would be expected for price setting firms that substitute output towards goods and services that have become relatively more expensive. In such circumstances the inequalities in the equation would be reversed.

For comparisons over longer periods of time, the Laspeyres volume indices and the Paasche price indices are calculated first in relation to the previous year and then the chain indices are determined. Chained indices present the drawback that they lead to volumes having no additivity so that they cannot be used in the balancing procedures of products based on supply and use tables. The non-additive volume data calculated with chain indices are to be published without any adjustment. This method is transparent and indicates to users the extent of the problem.

1.2.3 Principles

The main principles that price and volume measurement follow are:

1. In the measurement of price and volume a *detailed level of aggregation of products shall be used*. This is because price and volume changes of non-homogeneous goods must generally be weighted together in statistical practice. At national accounts level, only a single consistent weighting method may be used (the weighting method is described by the three general principles). The aggregation level is defined by the assumption that the indices used are elementary indices, i.e. indices (and/or indicators) which have not been aggregated by the national accounts weighting method. This assumption is most plausible when the level of breakdown is very detailed.
2. *Volume* measures available at the elementary level of aggregation shall be aggregated using the *Laspeyres formula* to obtain the volume measures of all national accounts aggregates. Price measures available at the elementary level of aggregation shall be aggregated using the *Paasche formula* to obtain the price measures of all national accounts aggregates.
3. Volume measures derived at the elementary level of aggregation shall be aggregated using weights derived from the *previous year*.

Box 7.2: A, B and C methods

The methods used for measuring volume in accordance with the output and/or expenditure approach of GDP estimation are classified in three groups:

- A methods: most appropriate methods;
- B methods: those methods which can be used in case an A method cannot be applied; and
- C methods: those methods which shall not be used.

The A/B/C classification is aimed at improvement of current practice. It sets out in what direction improvements can be made. It is therefore important that the criteria for distinguishing A, B and C methods are absolute criteria, i.e. that they do not depend on the present availability of data. In this way, it becomes clear where the biggest problems exist in terms of missing data. It also makes it clear how far current practice is away from good practice. It may well be that in some cases A methods are difficult to attain in practice.

Source: Handbook on price and volume measures in national accounts, Eurostat, 2001

1.3 How to measure price and volume in SNA

Price and volume measures are of major importance in national accounts, but the principal focus of users is on the growth rates of volume measures, rather than prices. The compilation of national accounts in volume and current value terms reflects this priority. Quantities of different products cannot, however, be aggregated without a certain weighting mechanism. For aggregate products, the ***term volume*** is used instead of quantity. Price and volume measures have to be constructed for each aggregate of transactions in products within the accounts. Thus, SNA offers a proper framework to construct a system of price and volume indices and to establish coherence among statistical data.

Three basic methods can be identified for deriving volume measures:

1. **Quantity revaluation** – collect quantity data and revalue it using base year prices. It is essential that homogenous products are identified and measured. In most countries this method is used for agricultural goods and for goods produced for own final use.
2. **Deflation** – divide the current price estimate by a price index to calculate the constant price estimate. Each period current price value is divided by a price index (could be PPIs, CPIs, charge-out rates, unit values, implicit price indices, etc.). Deflation should be done at the most detailed (disaggregated) level as possible. Price indices should be adjusted to take account of quality change. Deflation using a Paasche price index will give the same result as a quantity revaluation. Implicit price deflators (IPDs) are obtained by dividing a current price by its corresponding constant price value.
3. **Volume extrapolation** – the current value in the base year is updated using a volume index (constructed based on inputs or output). True volume indices take account of both quantity and quality changes – if only quantity indices are available, indices should be used at the most disaggregated level as possible to ensure homogeneity, and to be representative for all outputs in question.

With the exception of a situation of hyperinflation, or for products showing rapid quality change (e.g. personal computers) deflation can be expected to give more accurate results than volume extrapolation or quantity revaluation, since the variance in relative prices for a product in a particular month are usually less than the variance in relatives quantities.

In case no deflation can be applied, as recommended, there are several specific methods at the compiler's disposal based on volume extrapolation such as:

1. **Output indicator method**, which relates, in general, to *direct measurement of the volume of output*. This can be the case, for example, for service areas where consumers are implicitly charged for services provided, such as in banking and insurance. In other cases, where there are very homogeneous products without large quality changes and where detailed quantity information is available, it can be equivalent to price deflation. It is not always easy to define exactly what the unit of output is. For individual goods and services it is in principle possible to define the output, since an actual delivery of that output takes place from the producer to the consumer(s). For example, for education, the output is the amount of teaching consumed by a pupil. For hospital services, the output is the amount of care received by a patient. For cultural services, the output is the number of theatre plays attended. For collective services, however, there is no transaction between producer and consumer since these are provided simultaneously to the society as a whole. It becomes therefore very difficult to define the output. It is very difficult to say for example what the unit of output is of defence or police services.

The following criteria can be formulated for the appropriate use of output indicators:

(a) to cover all services produced by the producer that are provided to external users;

(b) to be weighted by the costs of each type of output in the base year;

(c) to be defined with as much detail as possible;

(d) to be quality-adjusted.

2. **Secondary indicators** which are indicators not directly related to the output, used as proxies in cases where there are no indicators for target variables (also called indirect indicators). Where direct measures of output are not available, it may be possible to identify a downstream or upstream activity that can be used as a basis to generate indicators. The methods applied assume ratios based on the benchmark data. Such ratios are more likely to be stable in constant price terms.

For example, the supply of building materials can be used as an indicator of construction activity. Construction is often difficult to measure because of the large number of small-scale seasonal or unofficial contractors, own-account work, and work done without permits. The supply of building materials, on the other hand, can often be obtained from a relatively small number of manufacturers and quarries (with adjustments for exports and imports, if applicable). As long as there is a stable relationship between building material inputs and outputs, this is a suitable indicator that can be obtained with relatively little cost or compilation time. This assumption deteriorates if there are changes in the mix of types of buildings, techniques of building, productivity, and inventories of building materials.

For intermediate consumption, there are usually no specific aggregated deflators, so it is necessary to build them from components of other price indices for the relevant products. Note that even when fixed input-output ratios have been used to derive volume measures for an industry, it is desirable to deflate intermediate consumption and output separately, and then to calculate value added at current prices as a residual, rather than assume fixed input-output ratios at current prices.

3. **Input indicator methods** cover input prices and input volume indicators. In general, they are less preferred methods for volume measures. *Input prices* is a method that takes prices of inputs (e.g. the price of labour or a weighted average of prices of intermediate inputs) as an approximation for the price of the output. However, if the output has a different path from the input, e.g. due to productivity changes, this method will have a clear bias and should be avoided. *Input volume indicators* used when

indicators on the volume of inputs (e.g. the number of employees or the volume change of intermediate inputs) are used to approximate the volume of output. Using this assumption makes it impossible to analyse changes in productivity, and will wrongly estimate the true output change if this is different from the change in inputs. As an example, one can take the number of employees. It is simply assumed that twice as large a public service would mean twice as much output, irrespective of how those additional personnel were deployed. The advantage of the method is the ease of implementation, and the ready availability of data. This method however ignores all changes in productivity due to e.g. improved equipment (for example increased use of PCs) or more efficient procedures.

1.4 Main sources for price and volume measures

The deflation and extrapolation methods used for the volume measurement in national accounts request several indices at a very detailed level, elaborated within the statistical system of country.

The following price indices are the minimum required for deflation:

1. **Producer price indices (PPIs)** which cover both goods and services. PPIs are indices of ***basic prices*** in SNA terminology. The most widely-compiled and widely-used is the industrial production price indices. PPIs for services are more difficult to estimate. PPIs are calculated for agriculture products, measuring the change over time of the prices received by farmers for the sale of their products.
2. **Consumer price indices (CPIs):** the price reflects the actual payments by households. It is the SNA purchasers' price, and may also include imputed expenses, such as for owner-occupied housing. In many countries, only transactions in urban areas are considered in the calculation of CPIs, which may not be representative of price changes in rural areas. Using CPIs for output deflation must rely on knowing the weight of the final consumption in total output, and the differences of changes in the price and structure in the intermediate and final use of the output.
3. **Construction price index** which provides measures of price changes in either inputs to, or outputs of construction activity.
4. **Import and export price indices:** price indices measure the change over time in transaction prices (the market sale price) of goods and services exported from or imported into a country. Those prices are measured c.i.f., including duties, freight and insurance costs. Export prices are measured f.o.b. excluding duties, freight and insurance costs.

Chapter 4: *Statistical infrastructure for National Accounts*, Section 2.2.4: *Price Statistics* presents the main price indices in detail.

In principle, separate prices of intermediate goods and gross capital formation at purchasers' prices can also be collected but are in fact rarely collected because of costs and also because the volume measurement of GDP can be computed by using PPIs instead.

Box 7.3: Support to price statistics in the context of cooperation

The cooperation unit within Eurostat deals with several statistical aspects to support the cooperation with developing countries and regions in the world via its Statistical Information Systems tools. One of the fields of interest where support is needed in developing countries is the production of robust price statistics.

One of the main goals in most developing countries is the achievement of their regional economic integration. Several regions target explicitly a common currency, which implies the harmonisation of price statistics. Even in the absence of this requirement, price statistics are quite important for all developing countries. Also in the framework of the ICP (International Comparison Programme), there is an important demand of reliable price statistics and analytical skills.

In this context, EUROSTAT is analysing the possibility to provide support on this matter, focusing on tools supporting the establishment, harmonisation and analysis of price statistics. Eurostat is aware of the following tools to assist the measurement and harmonisation of price statistics:

- CHAPO (Calcul Harmonisé des Prix par Ordinateur) – At the origin the software was developed by Eurostat to support UEMOA's harmonisation of price statistics;
- PHOENIX, a software developed by Afristat for UEMOA region, taking into account the experience won from CHAPO;
- a software from the Portuguese NSO (INE Portugal) used in some African Portuguese speaking countries (PALOP); this tool also takes into consideration some experience won with the CHAPO tool;
- a tool from WB/IMF, used in some African countries;
- a tool used by the African Development Bank for the International Comparison Programme;
- a tool used by South Africa.

Eurostat will take into account the experience won by different countries and organisations to develop a new price tool, based on the latest IT technology to support the national statistical offices and the sub-regional organisations of developing countries for the production of reliable and comparable price (CPI and ICP).

Other price indices frequently collected are **labour cost indices** for compensation of employees, where the unit is: labour hour by type of occupation/job and industry.

Box 7.4: Synthesis of main price indices uses

Price indices	Used to:	Comments
Consumption Price Indices (CPI)	CPIs are designed to measure changes over time in average retail prices of a fixed basket of goods and services taken as representing the consumption habits of households. CPI is used mainly to deflate household consumption expenditure, but not the total household consumption; specific components are used to deflate the relevant sub groups of household consumption.	Are normally constructed using Laspeyres formula
Producer Price Indices (PPI)	PPIs provide measures of average movements of prices received by the producers of commodities. In principle, PPIs exclude transport costs and consumption taxes PPI is used to deflate: - domestic production (for this purpose it is weighted together with an export price index); - intermediate consumption (for this purpose it is weighted together with an import price index).	Are normally constructed using Laspeyres formula
Construction Price Indices	Construction price indices provide measures of changes in the prices of either the inputs to, or outputs of, construction activity. Is used to deflate the output and the intermediate consumption of construction activity.	Are normally constructed using Laspeyres formula
Price indices for import/export	An import price index measures changes in the prices of imports of merchandise into a country. The index numbers for each reference period relate to prices of imports landed into the country during the period. An export price index is an index calculated for the price(s) of one or any specified group of commodities entering into international trade using, ideally, f.o.b. export prices. They are used to deflate exports and imports.	Are normally constructed using Paasche formula
Unit Value Indices for import and export (UVI)	UVI are used to deflate imports and exports of goods. UVI for imports good can also be used to deflate the imports of capital goods, as part of GFCF.	Can be constructed using Laspeyres or Paasche formula

2. GDP volume measures

2.1 Production approach

GDP represents the sum of value added, valued at market prices with taxes less subsidies on products at constant prices.

GDP (at market prices) = Sum of Gross value added (Output – Intermediate consumption)

+ Sum of taxes on products

- Subsidies on products

Value added is therefore a balancing item in the system of national accounts. There is conceptually no price or volume component of value added, since it is essentially an income concept. However, if GDP volume growth is calculated according to the production approach, the value added of all branches is summed, meaning that it is necessary to have a measure of value added volume.

The variety of the methods used to compile the volume measures of value added are divided into two categories:

1. ***Single indicator methods*** use a single variable (only one time series), which is assumed to be correlated with the movement of value added. In this case, an output or input indicator is directly applied to value added. Single indicator methods are classified according to whether the indicator is from output volume indicator methods or input indicator methods, according to whether deflation or extrapolation is used and according to the variable chosen as a proxy for measuring volume changes in value added. So, there are:

   (a) *Single output indicator methods,* classified into two variants:

   – Direct deflation of current price value added by an output price index, a consumer price index, or its relevant components;

   – Direct extrapolation of base year value added using an output volume index or physical quantity output index.

   (b) *Single input indicator methods,* classified into:

   – Direct deflation of current price value added by a price index of intermediate consumption or by a wage rate index;

   – Direct extrapolation of base year value added by input related indicators such as: price index or volume index of intermediate consumption, index of deflated compensation of employees by a wage rate index, an index based on physical quantities of inputs other that labour, an index of numbers employed, an index of man-hours worked eventually adjusted for change in productivity, etc.

The volume index for output is preferred to one based on inputs, which has greater bias because the number and variety of outputs are smaller than the number of intermediate goods and services consumed in the production process and the commodity composition of inputs is more variable over time.

2. ***Double indicator methods*** take into account changes in both output and intermediate consumption, value added being obtained as a residual. Estimation methods encompass, besides deflation, methods that are based on volume extrapolation.

Double indicator methods are, from a theoretical standpoint, superior to single indicator methods, but the availability of source data for certain activities is limited. According to applied estimation methods, there are three possible situations:

(a) Double deflation: current price output and intermediate consumption are both deflated by price indices. In general, output is deflated by PPIs or CPIs but adjusted to the correct price base for rates of trade and transport margins, and for taxes and subsidies on products basic prices. This method is preferred, but presents the disadvantage that quality changes are not easily taken into account.

(b) Double extrapolation: base year values of output and of intermediate consumption are extrapolated using volume or physical quantity indices, and derive constant price value added by subtraction. This method presents the advantage of taking into account both elements which are used to define value added. However, it presents the disadvantage that quality changes are not easily taken into account.

(c) Extrapolation/deflation: consists in deriving constant price value added from an extrapolated series of base year estimates of output using output volume or physical quantity indices, and a deflated series of current price intermediate consumption using price indices (or vice-versa, though this is more rarely the case).

The choice to be made between the use of a single indicator method (which may yield biased results) or a double deflation method (which may yield volatile results) must be based on judgment. The same choice need not be made for all industry groups.

In general, market output is estimated in constant prices using double indicator methods. Non-market output is usually estimated in constant prices using single indicator methods because of the difficulty in isolating price changes. Table 7.1 presents a synthesis of possible methods applied to estimate volume measures of output.

Table 7.1: Overview of output volume measures methods and deflators, by industries/ products

ISIC rev4/ CPC Ver.2	Specification	Methods (not exhaustive)	Deflator (if applicable)
A	*Agriculture, forestry and fishing*	- Direct estimation based on (exhaustive) volume and price data	Unit value of products
B	*Mining and quarrying*	- Deflation with PPIs, and/or extrapolation with industrial production volume indices (IPIs)	PPIs
C	*Manufacturing*	- Deflation with PPIs, and/or extrapolation with IPIs - Input indicator method	PPIs CPIs detailed data adjusted to basic prices
D	*Electricity, gas, steam and air conditioning supply*	- Deflation with PPIs, and/or extrapolation with IPIs - Extrapolation with quantity data available on products sufficiently detailed	PPIs
E	*Water supply; sewerage, waste management and remediation activities*	- Deflation with PPIs, and/or extrapolation with IPIs - Extrapolation with quantity data available on products sufficiently detailed	PPIs
F	*Construction*	Deflation	Constructions price index Indices of construction costs Hourly rates or quotes for 'model' jobs – for repair/maintenance
G	*Wholesale and retail trade; repair of motor vehicles and motorcycles*	*Trade:* - Output indicator: implicit index obtained from the ratio of the value index for total output and a quantity index based on total trade margins – at detailed product breakdown *Maintenance and repair of motor vehicle:* Deflation	PPIs CPIs adjusted to basic prices for repairs
H	*Transportation and storage*	*Passenger transport* – by forms of travel (transport via railways, other land transport, water transport and air transport): - Deflation - Output volume indicator method (as passenger-kilometres) *Freight transport* – by mode of transport (via railways, other land transport, transport via pipelines, sea and coastal water transport, inland water transport and air transport): - Deflation - Output volume indicator methods based on tonne-kilometres transported) *Storage:* - Deflation with prices set according to time (and volume) of unit price - Output volume indicator methods (as cubic metre-days) *Postal services:* - Deflation - Output volume indicator methods (as number of letters broken down by different postage rate)	PPIs CPIs adjusted to basic prices for services provided to households UVIs for post and courier
I	*Accommodation and food service activities*	- Deflation - Output volume indicator methods (as bed-nights/ meals sold) - Input volume indicator methods (as number of clients)	PPIs CPIs adjusted to basic prices

ISIC rev4/ CPC Ver.2	Specification	Methods (not exhaustive)	Deflator (if applicable)
J	*Information and communication*	- Deflation by prices reported by producers/production companies - Output volume indicator methods for full range of output (e.g. programming broken down by categories)	PPIs CPIs adjusted to basic prices for services provided to households UVIs for homogenous products
K	*Financial and insurance activities*	*Financial intermediation* *FISIM:* - Output indicator methods: number of banks accounts/ loans and deposits etc. by business and consumer markets - Implicit deflator obtained using the 'interest margin' and the quantity index given by the amounts of stocks of loans and deposits deflated with the GDP deflator or implicit price deflator for domestic final demand *Financial intermediation outside FISIM:* - Average of the consumer price and business services deflator - Output volume indicator methods (e.g. using number of transfers for transfer of funds, etc.) *Insurance:* - Output volume indicator methods (e.g. using acquisition and administration of policies and claims) *Service auxiliary:* - Deflation - Output volume indicators	Implicit index for domestic final demand Implicit index of output prices PPIs CPIs adjusted to basic prices for services provided to households
L	*Real estate activities*	- Deflation - Output volume indicators methods (e.g. number of houses sold by types of houses)	CPIs adjusted to basic prices House pricing Price index of investments in new dwellings Charge-out rates
M	*Professional, scientific and technical activities*	- Deflation - Output volume indicator methods - Input indicator methods	Indices of actual prices CPIs adjusted to basic prices Charge-out rates/hourly fees
N	*Administrative and support service activities*	- Deflation - Output volume indicator methods - Input indicator methods	Indices of actual prices CPIs adjusted to basic prices Charge-out rates/hourly fees
O	*Public administration and defence; compulsory social security*	- Output indicator method - Input indicator method	Price indices of inputs
P	*Education*	*Market output:* - Deflation - Output indicator method in detail (e.g. using pupil-hours indicators) *Non-market output:* - Output indicator method in detail (e.g. using pupil hours/number of pupils indicators) - Input indicators methods (e.g. teacher-hours)	PPIs CPIs adjusted to basic prices
Q	*Human health and social work activities*	*Market output:* - Deflation - Output indicator method in detail *Non-market output:* - Output indicator method in detail - Input indicators methods	PPIs CPIs adjusted to basic prices

ISIC rev4/ CPC Ver.2	Specification	Methods (not exhaustive)	Deflator (if applicable)
R	*Arts, entertainment and recreation*	*Market output:* - Deflation - Output indicator method in detail *Non-market output:* - Output indicator method in detail - Input indicators methods	CPIs adjusted to basic prices
S	*Other service activities*	- Deflation - Output indicator methods (as number of members by types)	CPIs adjusted to basic prices
T	*Activities of households as employers; undif-ferentiated goods- and services-producing activities of households for own use*	- Deflation - Input indicator methods (e.g. number of staff)	- Deflation - Input indicator methods (e.g. number of staff)

Box 7.5: Example of volume estimates for Hotel output

The volume index and volume estimates for the **Hotels industry** are presented below. To make these estimates, it is required to know:

– value of output in year t and year t+1 (columns 1 and 2);

– 'thousand bed-nights' by several types of accommodation, from specific surveys, for the years t and t+1 (columns 3 and 4)

Based on the data, the volume and price indices are calculated (columns 5, 6, 7 and 8); Ip is resultant Paasche price index, and Iq is resultant Laspeyres volume index.

Type of accommodation, specific to Country Y	Turnover Year t (thou. currency)	Turnover Year t+1 (thou. currency)	Bed-nights Year t (thou.)	Bed-nights Year t+1 (thou.)	Unit cost Year t (currency)	Turnover Year t+1 in prices of the Year t (thou. currency)	Ip (%)	Iq (%)
0	1	2	3	4	5=1/3	6=4*5	7= 2/6*100	8= 6/1*100
TOTAL	**16282**	**16865**				**16118**	**104.6**	**99.0**
1. Hotels	14400	14910	720	710	20	14200	105	98.6
2. Hostels	96	104	12	13	8	104	100	108.3
3. Motels	270	282	30	31	9	279	101	103.3
4. Tourists villas	624	644	48	49	13	637	101	102.1
5. Urban tourist houses	600	628	60	61	10	610	103	101.7
6. Rural tourist houses	200	200	25	24	8	192	104	96.0
7. Bungalows	32	36	8	9	4	36	100	112.5
8. Tourists houselet-type units	60	61	12	12	5	60	102	100.0

Intermediate consumption, the second element of value added includes the value of goods and services (domestically produced and imported) consumed as inputs by a production process (excluding the use of fixed assets). Deflating intermediate consumption is necessary when double deflation is used to measure value added in constant prices or when price and volume measures are estimated in a system of supply and use tables.

Intermediate consumption should be deflated product-by-product. This requires, first of all, a breakdown by product of intermediate consumption in current prices. The total volume of intermediate consumption for each individual branch is derived by adding up the volumes of inputs of all products (this of course only works in a Laspeyres volume framework because this is additive).

Ideally, genuine price data on intermediate uses, collected from the purchasers (and reflecting purchasers' prices), should be used to deflate. Such data is rarely collected, however. As an alternative, intermediate consumption of domestically produced products can be deflated using the same methods as described for the output of that product, taking into account that intermediate consumption is valued at purchasers' prices (i.e. adding back changes in taxes and subsidies on products where appropriate). Intermediate use of imported products should be deflated by import price indices or the alternative methods (unit value index).

Taxes and subsidies on products are part of the difference between the basic price of a product and its purchasers' price. They are added to the total of gross value added at basic prices to obtain GDP from the output approach.

Chapter 3: *Basic concepts,* Section 1: *Fundamentals for national accounting* outlines the price system in national accounts.

Taxes and subsidies on products may be of two basic forms: based on the value of products (known as ad valorem) or based on the quantity of products. Within the ad valorem category, VAT is a special case. A detailed breakdown by products and information on each type of tax/subsidy (rates) should be available in order to properly apply the volume measures of various taxes and subsidies on products at country level.

A basic distinction must be made between quantity-based and value-based taxes (and subsidies). The volume of taxes on products is measured by applying the base-year taxation prices (amount levied per unit of taxed products) to the quantities of taxed products or by applying the base-year tax rates to the value of the taxed products at the base-year prices. In every case, the tax deflators then describe changes in taxation rates, and changes in the composition of the tax base and any price changes affecting it (for value-based tax).

How the calculation is carried out in practice depends on the type of tax and the data available. Where relevant, a distinction is made between taxation of imported and of domestically produced goods. So, taxes' volume estimation should take into account their direct link with the production or the import. Thus, the price index calculation is based on the production price index (or import price index), adjusted by an indicator that reflects the evolution of the share of the default tax in production from year to year.

The calculation for subsidies is carried out in the same manner.

To find out more…

For more information about constant price estimates of taxes and subsidies, see Chapter 10: Price and Volume Measures - Section "Specific problems in application of the principles", of Regulation (EU) –No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32013R0549:EN:NOT

2.2 Expenditure approach

2.2.1 Final consumption expenditure

1. Final consumption expenditure of households

Final consumption expenditure of households is primarily made up of goods and services purchased in the market but also includes consumption of household production for own final use, such as consumption of goods produced within households for the households' own consumption, the services of owner-occupied dwellings, and goods or services received as income in kind. It does not include social transfers in kind, intermediate consumption or gross capital formation, acquisitions of non-produced assets, payments to NPISHs, taxes other than taxes on products, or voluntary transfers.

Methods based on deflation of household expenditure using appropriately detailed CPIs (valued at purchaser prices including VAT) are recommended. PPIs adjusted for valuation differences, import/export prices, or volume indicators could also be used, where no CPIs are available.

The volume measure of some specific components of final consumption expenditure of households is estimated as follows:

(a) *Consumption of own-produced goods and services* is not included in the CPI calculation; the general rule here is that products produced for own-consumption should be valued at the prevailing basic price for equivalent products, or at costs of production if market prices are not available. Where output for own final use is a significant part of total consumption of a certain product, it will be necessary to separately deflate it by a suitable basic price index; otherwise use of the CPI is appropriate.

(b) *Goods and services received as income in kind* are valued at basic prices if they are produced by the employer, and at market prices if the employer has to purchase them from a third party. If the former types of products are significant, then deflation should be undertaken using a suitable basic price index.

(c) *Goods and services purchased abroad by resident households* is not included in the CPI calculation, because it covers all purchases made by resident and non-resident

households on the economic territory of a country. If purchases abroad by residents represents a significant part of total household consumption, and prices are evolving differently from domestic prices, one method that can be undertaken to deflate the prices is to use the CPI data from countries where the purchases are usually made. Adjusting for exchange rates would imply that the effects of exchange rate movements feed through into prices fully and immediately.

(d) Services of owner-occupied dwellings is a special case of the products for own consumption and represent a high proportion of final consumption of households. The recommended method for deflating this element in national accounts is by a suitable index of actual rent levels.

2. Final consumption expenditure of government and NPISHs

The principles applied in the general government sector and to NPISHs sector are similar. By convention, the final consumption expenditure of general government and NPISHs consists of:

(a) The value of non-market goods and services produced by government or NPISHs other than own-account capital formation and sales;

(b) Purchases by general government and NPISHs of goods and services produced by market producers that are supplied, without any transformation, to households as social transfers in kind.

Final consumption expenditure consists of both individual and collective consumption, whose value is measured by convention as the sum of costs. The collective consumption is characteristic only to government, and is called 'actual final consumption'.

Final consumption of non-market goods and services in volume measures is usually obtained using the input indicators method (as the output is compiled as sum of costs), by deflating the value of inputs by suitable deflators. For individual services, the recommended methods are output indicator methods (such as 'pupil-hours' or 'patient treatments by type').

For social transfers in kind consisting of goods or services purchased by government from the market, deflation is made by suitably detailed CPIs, adjusted for:

(a) any discounts which the Government may have negotiated directly with suppliers;

(b) Any contributions which are payable by those receiving the transfers.

2.2.2 Gross capital formation

1. **Gross fixed capital formation**

Gross fixed capital formation (GFCF) covers both tangible and intangible fixed assets which represent a wide range of products. GFCF could be measured from either supply or demand side. The supply side approach is more used, because of the general availability of necessary data: domestic output less exports plus imports of capital goods, at a detailed level.

The availability of appropriate price indices for GFCF varies considerably between different types of asset:

(a) For *new dwellings* CPIs are used, and for new buildings and structures PPIs are used. The costs of *ownership transfer* should be deflated separately. The current value and volume estimates are usually derived from separate estimates of the constituent parts, legal fees, transport and installation costs etc.

(b) For standard products such as *machinery and equipment*, PPIs are likely to be available but a lot of capital formation is specific to the purchaser and appropriate indices may have to be developed using the best information available. Price indices for equipment vary considerably in their growth rates (such as, for example, the case of computers, whose prices have fallen rapidly year after year, whereas the prices of transport equipment have increased). It is necessary in such cases that the different types of equipment are deflated separately using the matching price indices (or, equivalently, an appropriately weighted Paasche price index is used to deflate the aggregate).

(c) Software included in GFCF represents, in a large proportion, own-account production; the deflation could be done by choosing between a pseudo-output price index and an input price index, obtained by weighting together price indices of the inputs. However, input volume estimates used as a proxy for output do not reflect any productivity growth and so this is not recommended. In the absence of a better alternative, the most obvious option is to use the price index for custom made software.

(d) Research and experimental development (R&D) is another activity that is often undertaken on own account. However, given the heterogeneous nature of R&D, the choice for deflation lies between deriving pseudo-output price indices and using input price indices.

The matter of **new products** has particular importance in the Gross fixed capital formation matter, and not only. Many capital goods are produced only as a single item and thus appear as new products. This is also the case of many services which are never provided in exactly the same way, e.g. research and development services. There are two types of approaches in cases of new products for estimating the price for the previous year:

1. the first supposes that the price of the new product changes like the price of similar products using a price index calculated on the basis of a sample of homogeneous products existing in both successive years,
2. the second is the hedonic method which consists of de-

termining the price of a product on the basis of its main characteristics and the input method which uses the cost of a product to calculate its price

The large range of different products calls for estimating GFCF volume at the detailed product level to ensure good quality estimates. The following list of products should be considered to be the minimum acceptable:

(a) construction products: Dwellings; Other buildings and structures including Buildings other than dwellings, Other structures, Land improvements;

(b) machinery and equipment: Transport equipment as: Aircraft, Ships, Railway trains and carriages, Other transport equipment; ICT equipment; Other machinery and equipment;

(c) weapons systems;

(d) cultivated biological assets, e.g. trees and livestock;

(e) costs of ownership transfer on non-produced assets like land, contracts, leases and licences;

(f) intellectual property products: Research and development; Mineral exploration and evaluation; Computer software and databases; Entertainment, literary and artistic originals; Other intellectual property products.

2. **Changes in inventories**

The calculation of changes in inventories in volume terms is particularly important due to the impact in the GDP size, but it is in the same time, a challenging task. Changes in inventories can take positive, negative or zero values; in these conditions, a chain index could not be derived directly. Chain volume estimates of changes in inventories should be derived by first deriving chain volume estimates of the opening and closing stocks of inventories and then taking the difference.

Volume measurement of changes in inventories is linked to the estimation of output and intermediate consumption. Moreover, the transaction is a difference between two phenomena: entries and withdrawals, considering also the value of any gains/recurrent losses of goods held, thus volume indices are not economically significant. The estimation methodology for change in inventories both at current and constant prices is highly dependent on the kind of information on inventories that is available. Hypothesis and assumptions should be made.

There are four types of inventories: materials and supplies; work-in-progress (includes livestock raised for slaughter); finished goods; and goods for resale. It is important to note that change in inventory represents part of the output and intermediate consumption calculations as follows:

Output = sales + changes of inventory of finished products + change in work-in-progress (7)

Intermediate consumption = purchases - changes of inventory of materials and supplies (8)

For a wholesale or retail trader:

Output = sales - purchases (of goods for resale) + changes of inventory of goods for resale (9)

Closely related to the calculation of changes in inventories are holding gains. Holding gains are the results of price changes during the period for which the inventory is held. Such gains are not part of output. Holding gains can be negative, in which case they are called holding losses. If there are no price changes during the accounting period, the holding gain is zero. Holding gains can be calculated using the following identity:

Value of inventory at end of accounting period

- value of inventory at beginning of accounting period

= change in inventory + holding gains (10)

Ideally, information on quantities and values of stocks should be available. In general, only information on values of stocks at the beginning and the end of the year (period), by type, is available according to enterprises' bookkeeping systems. These accounting systems value inventories according to historic cost systems, *LIFO* (last in - first out), or *FIFO* (first in - first out) systems, etc.

According to information obtained from the bookkeeping systems of enterprises, or based on assumptions, the values of the levels of inventories can be deflated with:

(a) Available prices and quantity data are obtained. The change in quantity (between the beginning and the end of the period) has to be multiplied by the average price of the desired year to obtain volume change of the inventories.

(b) A price index that describes the price development of the stock according to the known or assumed bookkeeping practice and the value of changes in inventories in constant prices is obtained directly. This should then be reflated with an average price index according to national accounts valuation rules to determine changes of inventory at current prices.

The price indices should be in accordance with the *four kinds of inventories,* by products:

(a) for inventories of finished products: PPIs at basic prices;

(b) for inventories of materials and supplies, similar indices as used for intermediate consumption (genuine intermediate consumption prices, or PPIs adjusted to purchasers' prices);

(c) for inventories of goods for resale: PPI (for retailers, strictly speaking, a PPI should be adjusted for wholesale trade margins);

(d) for works-in-progress: deflation carried out in a consist-

ent way with the deflation of output, i.e. with output price indices at basic prices.

In case no information is available for stocks, changes in inventories are compiled based on 'commodity flow method', but the residual result will reflect measurement errors in the various aggregates.

2.2.3 Imports and exports

Exports and imports consist of both goods and services, valued when change of ownership between a resident unit and a non-resident owner takes place and include or exclude transportation costs according to whether the supplier does or does not include transportation to the purchaser in the amount charged.

Foreign transport and insurance services between the importer's and the exporter's frontiers should not be included in the value of goods, but recorded as services. However, it is not always possible to obtain f.o.b. values at the detailed product level and details of foreign trade are then shown valued at the importer's frontier. In this case, all transport and insurance services to the importer's frontier are included in the value of imports, referred to as cost, insurance and freight (CIF). This is the valuation used for imports in the supply and use tables. Where the price of exports and imports includes an element of transport or insurance service, these need to be dealt with correctly in the price and volume measures.

A correct estimation of import and export volume implies considering goods and services separately.

There are a number of methods suitable for goods volume estimation such as:

1. *Actual export and import prices*

Export and import price indices can be compiled based on the prices actually charged by exporters of goods (exports), or paid by consumers (imports). The main advantage is that they cope better with the problem of heterogeneous products as the price index is constructed to reflect a fixed specification that allows price effects to be isolated and quality changes to be controlled. Disadvantages are: (i) as a result, they are costly to produce and represent a burden on respondents; (ii) they can have an incomplete coverage of the actual exports and imports of products to which they are applied as deflators; (iii) price indices may also reflect inadequately the actual prices paid by purchasers. The price indices are compiled using data from surveyed establishments on the prices of representative items exported and imported. The surveyed prices will be of items that are defined according to detailed specifications so that the change in price of the same item specification can be measured over time.

2. *Unit value indices (UVIs)*

UVIs are readily available from trade statistics being derived as the ratio of value to volume (weight or quantity). They do not generally control for changes in the product mix within one item, leading to quality changes mistakenly included in the price component. Their coverage of products is generally complete, but even at the most detailed level of trade classification they can often include a range of different products and the homogeneity is not realistic. It may be possible to construct more homogeneous UVIs if the country of origin (or destination) is also taken into account. UVIs are clearly unsuitable for products that are unique or change quickly in specification.

It could be also a mixed approach that involves compiling establishment survey-based price indices for some product groups and customs-based unit value indices for others.

3. *Adjusted PPIs*

It is possible to use domestic PPIs to deflate current price estimates for exports and imports in the same way that actual export and import prices may be used. PPIs reflect prices on the domestic market and may not be a good reflection of the prices charged for exports or imports in some circumstances, where competition between domestic producers and imports exists. However, there may be little difference between domestic prices and those of imports or exports where these compete directly with each other in the market. In these conditions, the use of PPIs for exports or imports may be acceptable.

A way of improving the domestic PPIs to make them more representative of exports and imports would be to adjust them in some way to reflect better the actual export and import prices. Such an adjustment could be made in a number of ways:

(a) by taking account of exchange rate movements between the domestic currency and that of the countries to which the exports are going to or the imports coming from;

(b) by estimating an adjustment factor based on some other variable like UVIs; this represents a ratio between UVIs of a selected group of products (stable in evolution) and the PPIs of the same products applied to a PPI that represents a range of products present in the export or import estimates for which other more suitable price or volume indicators are not available.

4. *Export prices of a foreign country*

The export prices from a foreign country are used to deflate imports, broken down by product group and country (a process necessary to make best use of this method). This approach is most suited to unique products of a specialised nature. Adjustments may be done:

(a) by accounting for exchange rate movements, on the assumption that movements in exchange rates impact directly and immediately on the price of the imports;

(b) by taking account of other factors that affect prices between the exporting and importing countries, such as

transport margins.

Exports and imports of services consist of a large range of different ***services***. The current data sources for price indices for international trade in services are less comprehensive than in other areas, and methods to estimate price and volume are less well developed.

If actual prices are available for exports and imports of services, they can be readily used to derive the required volume estimates. If they are not, methods for exports and imports of services should be guided by those recommendations for similar domestically produced or consumed services. Methods to be used for domestically produced services are, in general, the same as those used for market output of services: charge-out rates, output indicator methods, input indicator methods. For example:

1. volume estimates of freight transport services could be derived using PPIs according to the form of transport;
2. volume estimates of accommodation services could be derived using the appropriate CPIs;
3. for other imported services, price indices of the countries exporting the services, adjusted for changes in the exchange rate, may have to be used.

Actual price indices are the preferred method for deflation. For exports and imports, these prices need to reflect the actual prices charged in the case of exports and the prices paid for imports. These prices will differ from those in the domestic market because of exchange rate influences and potentially different pricing policies in the case of domestic and export sales. A further difficulty associated with the collection of export and import prices is the identification of the sampling frame necessary for the collection of prices.

2.3 About PPPs

Countries have different price levels and currencies posing the problem of interspatial comparisons of prices and volumes. Nominal exchange rates are not suitable conversion factors in such comparisons, because they do not adequately reflect price level differences, and because they are not sufficiently stable over time.

The solution is to apply purchasing power parities (PPPs). A PPP is defined as the number of units of country B's currency that is needed in country B in order to purchase the same quantity of goods and services that one unit of country A's currency will purchase in country A. PPPs can thus be interpreted as the exchange rate of an artificial currency commonly referred to as the purchasing power standard (PPS). If the expenditures of countries A and B expressed in national currencies are converted into PPS, the resulting figures are expressed in the same price level and the same currency, allowing a meaningful comparison of volumes. PPPs for market goods and services are based on international price surveys. Such price surveys are carried out simultaneously in all participating countries, based on a common product sample.

The resulting set of transitive PPPs for all countries and all basic headings (the lowest level of aggregation for which numerical weights are available) are aggregated up to the level of total GDP using expenditures from national accounts as weights. The aggregate PPPs at the level of GDP or any other category can be applied in, for instance, the calculation of real expenditures and spatial volume indices. A PPP divided by the nominal exchange rate between two countries produces a price level index (PLI), that can be used in analyses of countries' comparative price levels.

The European Commission (Eurostat) is responsible for calculating PPPs for the Member States in accordance with Regulation (EC) No 1445/2007 of the European Parliament and of the Council of 11 December 2007 establishing common rules for the provision of basic information on Purchasing Power Parities and for their calculation and dissemination (OJ L 336, 20.12.2007, p. 1). In practice, these PPP calculations are embedded in a wider PPP program coordinated jointly by Eurostat and OECD.

3. Concluding remarks

The direct measurement of GDP can be obtained from the output and expenditure sides and is the results of the measures of its components. The income approach cannot be used to measure GDP volume, since one of its components, the operating surplus, cannot be measured directly at constant prices.

It is important to compile one unique measure of GDP volume growth. Although one may argue whether or not conceptual differences may exist between GDP volume from the output and expenditure approaches, in practice, it would be highly undesirable to publish two different GDP growth rates.

In many countries, the measurement of GDP volume growth is currently based heavily on only one of the two approaches. This can be either the output or the expenditure approach, depending on the strengths and weaknesses of the data sources, which can vary greatly between countries. As an example, in some countries, data on household consumption expenditure might be regarded as less reliable than output data, so that generally the output approach is preferred.

Table 7.2 presents an overview of the methods to compile volume measures in national accounts, and recommended deflators of these methods.

Table 7.2: Overview of methods for volume measures and deflators by SNA aggregates

SNA aggregates	Methods (not exhaustive)	Deflators - recommended
Output, market	- Deflation - Output indicator method - Secondary indicator method - Input indicator method	PPIs CPIs detailed data adjusted to basic prices Charge-out rates
Output, non-market	*Individual:* - Output indicator method - Input indicator method *Collective:* - Input indicator method - Volume indicators	Price indices of inputs
Output for own final use	- Deflation, - Output indicator method - Secondary indicator method - Input indicator method	PPIs of similar products on market CPIs detailed data adjusted to basic prices Output price indices of fixed assets
Intermediate consumption	- Deflation product-by-product	Price indices data from purchasers Same prices applied for output of that products
Value added – direct	- Output indicator method - Input indicator	
Final consumption expenditure by households	- Deflation - Volume indicators - Secondary indicator	CPIs (detailed) PPIs adjusted for valuation differences Import/export prices
Final consumption expenditure by government and NPISHs	- Output indicator method, input indicator method (as for non-market output) - Deflation for social transfers in kind (purchases from the market)	CPIs suitably detailed for social transfers in kind
Gross fixed capital formation	- Deflation by types of assets - Deflation for related services - Input methods	Genuine investment price indices PPIs adjusted to purchasers' prices Charge-out rates Import prices
Changes in inventories	- Deflation - Commodity flow method - Secondary indicators	PPIs CPIs Implicit price deflators
Acquisition less disposals of valuables	- Deflation	PPIs for an industry producing valuables
Exports and imports of goods and services	*Goods:* - Deflation - Input indicator methods	Actual export or import prices UVIs Suitable PPIs (adjusted, when the case) Export prices of a foreign country
	Services: - Deflation - Input indicator method	Actual export or import prices Suitable PPIs (adjusted, when the case) Export prices of a foreign country
	Expenditure of non-residents on the domestic territory: - Deflation *Expenditure of domestic residents abroad:* - Deflation	CPIs for country CPIs for visited country adjusted for exchange rates

The main recommendations for national accounts estimation in volume terms could be summarised as follows:

1. Volume estimates of transactions in goods and services are best compiled in a supply and use framework, preferably in conjunction with, and at the same time as, the current value estimates.
2. The estimations could be made at the most detailed level of products as data sources and resources permit; it is important to develop a comprehensible system of price statistics.
3. The method recommended to measure volume in national accounts is deflation. It is better to deflate the current value with an appropriate price index, rather than constructing the volume estimates directly.
4. If it is not practical to derive estimates of value added in real terms from a supply and use framework and either the volume estimates of output and intermediate consumption are not robust or the latter are not available then satisfactory estimates can often be obtained using an indicator of output, at least in the short term. An output indicator derived by deflation is generally preferred to one derived by quantity extrapolation.
5. The preferred measure of year-to-year movements of GDP volume is a Fisher volume index; changes over longer periods are obtained by chaining, that is, by cumulating the year-to-year movements.
6. Chain indices that use Laspeyres volume indices to measure year-to-year movements in the volume of GDP and the associated implicit Paasche price indices to measure year-to-year inflation provide acceptable alternatives to recommended Fisher indices.

3.1 Questions for practitioners

1. Are estimations of price and volume made in your country?
2. Which price indices (from those necessary) are available? How is the quality of the data? Which price indices should be collected in addition? Are the weight updates of price indices applied regularly?
3. What methods are used for volume estimates? Are single deflators used?
4. Which output activities do you consider poorly measured in your country? Are there any plans for improvements?
5. Is the compilation level detailed enough to ensure the quality of estimates? If not, are there plans to improve the compilation practice to get a more disaggregated level? Are there enough resources to implement the plans?

4. Recommended reading

- *The 2008 SNA* (Chapter 15 – Price and volume measures) European Commission, IMF, OECD, UN, World Bank, 2009;
- *Handbook on price and volume measures* - Eurostat, Office for Official Publications of the European Communities, Luxembourg 2001;
- *National Accounts: A practical introduction,* Studies in Methods, Serie F, No.85, UN 2003; chapter XV:Price and volume measurement;
- *Producer Price Index Manual: Theory and Practice,* (the International Labour Organisation, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, Economic Commission for Europe and the World Bank, 2004);
- *ESA 2010, Chapter 10 – Price and Volume Measures* - Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union;
- *Sources and methods Construction Price Indices,* OECD, Eurostat, 1998;
- *Export and Import Price Index Manual,* Theory and Practice, ILO, IMF, OECD, Eurostat, UNECE, World Bank, 2009;
- *System of National Accounts 1993 Training Manual,* SADC, 1993.

8

Supply and Use Tables

The chapter in brief

Supply and use tables offer a detailed picture of the economy by providing the elements of the production process, the use of the goods and services (products) and the income generated in that production. The elaboration of these tables is a complex and challenging process, but it offers great benefits for many reasons. The aim of this chapter is to present the methodology, the main procedures and the data sources necessary to start and to improve the compilation of supply and use tables.

1. Why we need supply and use tables

1.1 Supply and use tables within 2008 SNA

The Implementation Programme for the 2008 System of National Accounts and Supporting Statistics represents the current global statistical initiative and has two main objectives in assisting countries in developing their statistical and institutional capacity:

1. to make the conceptual changes from the 1968 or 1993 SNA to the 2008 SNA;
2. to improve the scope, detail and quality of the national accounts and supporting economic statistics.

Three main dimensions need to be taken into account for determining implementation goals and for monitoring the progress of implementation of the 2008 SNA:

1. scope of the accounts
2. compliance with the SNA concepts
3. quality issues.

The guidance to countries that are considering expanding the scope of their national accounts coverage in line with the recommendations of the 2008 SNA and the framework to measure the level of national accounts development at different points in time are based on the milestones approved by the Commission at its twenty-ninth session[(1)] (see Annex 1). The supply and use tables are linked with Milestone 1 and it is important to recall that they form one of the recommended tables under the 'minimum requirement data set', (MRDS) included in the scope of the compilation of 2008 SNA tables and accounts (see chapter 2 of the present handbook: Building the SNA).

The supply and use tables describe, in a collection of matrices, how supplies of different kinds of goods and services originate from domestic industries and imports and how those supplies are allocated between various intermediate or final uses, including exports. These tables involve the compilation of a set of integrated production and generation of income accounts for industries. The compilation of supply and use tables is a natural step towards the 2008 SNA implementation, with positive impact on all phases described within the present Handbook.

To find out more…

The 2008 SNA, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 14: The supply and use tables and goods and services account.

1.2 Benefits of supply and use tables

Compiling supply and use tables requires exploiting all available data and information from the economy and society, in a logical way. The end result is a reliable and balanced set of national accounts, including the estimation of key aggregates like GDP in current prices and in prices of the previous year.

The main advantages of compiling supply and use tables are summarised as follows:

1. Integration of GDP estimation approaches

Supply and use tables offer an ideal framework for the integration of the three approaches to calculating GDP.

> More information about GDP estimation methods is presented in Chapter 3: *Basic concepts*, Section 2: *Accounts and main aggregates.*

The supply and use framework enhances the accuracy of both production and expenditure approaches of GDP estimation, as it is consistent not only for the overall economy, but also at each individual product level. Estimating GDP through supply and use tables is the best way to make sure that both results for GDP (estimated by the production approach and by the expenditure approach) are equal since there is no room for a statistical discrepancy. Compilation of these tables involves balancing uses and supplies at a detailed commodity level and in this process the accuracy of both GDP calculations (by production and by expenditure) are enhanced.

The supply and use tables are weaker with respect to the income approach of GDP estimation; operating surplus and mixed income are usually estimated by using a residual result from the other two approaches. To respect the income approach to calculating GDP, data from the profit and loss accounts of companies can be added, based on the reconciliation of information between industries and sector accounts (see below Table 8.1).

(1) Report of the ISWGNA at the twenty-ninth session of the UNSC, document E/CN.3/1997/12.

Table 8.1: Table reconciling the supply and use tables and the sector accounts

	INDUSTRIES (NACE)				Total
	1	2	...	n	
INSTITUTIONAL SECTORS					
1. Non-financial corporations					
Total output					
Market output					
Output for own final use					
Other non-market output					
Intermediate consumption					
Gross value added					
Compensation of employees					
Other net taxes on production					
Consumption of fixed capital					
Operating surplus, net					
Gross fixed capital formation					
2. Financial corporations					
Total output					
:					
Gross fixed capital formation					
3. General government					
Total output					
:					
Gross fixed capital formation					
4. Households					
Total output					
:					
Gross fixed capital formation					
5. Non-profit institutions serving households					
Total output					
:					
Gross fixed capital formation					
6. Total					
Total output					
:					
Gross fixed capital formation					

Source: *Eurostat Manual of Supply, Use and Input-Output Tables*, Eurostat, European Communities, 2008

2. Goods and services account, production account and generation of income account included

Supply and use tables also enable the first three accounts to be compiled: Goods and Services Account, Production Accounts by industry and sector, and Generation of Income Accounts by industry and sector.

Box 8.1: Links between institutional sectors and supply and use tables

The link between institutional sectors and the supply and use table is illustrated in a numerical example.

The institutional sector accounts for one economy are presented in Tables 1, 2 and 3:

Table 1. External account of goods and services

	USES		RESOURCES
Institutional sectors:	Exports of goods and services	Balancing item: External balance of goods and services	Imports of goods and services
S.2 Rest of the world	126	-9	117

Table 2. Production account

	USES		RESOURCES
Institutional sectors:	Intermediate consumption	Balancing item: Gross value added:	Output
S.11 Non-financial corporations	277	173	450
S.12 Financial corporations	5	5	10
S.13 General government	22	38	60
S.14 Households	40	90	130
S.15 NPISHs	2	3	5
TOTAL	346	309	655

Table 3. Generation of income account

	USES			RESOURCES
Institutional sectors:	Compensation of employees	Other taxes less subsidies on production	Balancing item: Gross operating surplus/ mixed income	Gross value added
S.11 Non-financial corporations	114	-4	63	173
S.12 Financial corporations	3	1	1	5
S.13 General government	30		8	38
S.14 Households	1		89	90
S.15 NPISHs	2		1	3
TOTAL	150	-3	162	309

The resources and uses elements of each institutional sector are separated by industry. In the example, the industries are grouped into the three main categories:

1. Primary sector, which includes agriculture, forestry and mining;
2. Secondary sector, which includes manufacturing, construction and production of electricity and other utilities;
3. Tertiary sectors where services are included.

The link between institutional sector accounts and industries is presented in the following two tables (Table 4 and 5):

Table 4. Resources

Specification:	Output matrix, by industry:				Imports of goods and services	Taxes less subsidies on products	Trade and transport margins	CIF-FOB corr.	TOTAL Resources
Institutional sectors:	Primary sector	Secondary sector	Tertiary sector	TOTAL Output					
S.11	10	290	150	450		34			484
S.12			10	10		1			11
S.13	3	7	50	60					60
S.14	100	10	20	130					130
S.15			5	5					5
S.2					117				117
TOTAL, of which by products	113	307	235	655	117				
Product A	110	20	5	135	10	2	1		148
Product B	2	210	10	222	90	25	29		366
Product C	1	77	220	298	20	8	-30	-1	295
CIF-FOB					-4			1	-3
Territorial correction					1				1

Table 5. Uses

Specification:	Intermediate consumption, by industries:				Final consumption	Gross capital formation	Exports of goods and services	TOTAL Uses
Institutional sectors:	Primary sector	Secondary sector	Tertiary sector	TOTAL				
S.11	4	195	78	277		198		475
S.12			5	5		6		11
S.13	1	3	18	22	24	14		60
S.14	30	6	4	40	80	10		130
S.15			2	2	2	1		5
S.2							126	126
TOTAL, of which by products	35	204	107	346	106	229	126	807
Product A	20	23	10	53	22	70	3	148
Product B	10	137	60	207		159		366
Product C	5	44	37	86	85		124	295
CIF-FOB							-3	-3
Territorial correction					-1		2	1

The production account and the generation of income account data are aggregated by industry and presented in the Table 6.

Table 6. Production and generation of income account, by industry

	Primary sector	Secondary sector	Tertiary sector	TOTAL
Output	113	307	235	655
Intermediate consumption	35	204	107	346
Gross value added	78	103	128	309
Generation of income account, by industry				
Compensation of employees	5	80	65	150
Other taxes less subsidies on production	-3	1	-1	-3
Gross operating surplus/ mixed income	76	22	64	162

Based on the previous data, the final supply and use tables (Tables 7 and 8) are estimated.

Table 7. Supply table

SUPPLY									
Specification:	Output				Imports of goods and services	Taxes less subsidies on products	Trade and transport margins	CIF-FOB corr.	TOTAL Resources
Products:	Primary sector	Secondary sector	Tertiary sector	TOTAL Output					
Product A	110	20	5	135	10	2	1		148
Product B	2	210	10	222	90	25	29		366
Product C	1	77	220	298	20	8	-30	-1	295
CIF-FOB					-4			1	-3
Territorial correction					1				1
TOTAL	113	307	235	655	117	35	0	0	807

Table 8. Use table

USES								
Specification:	Intermediate consumption, by industry				Final consumptions	Gross capital formation	Exports of goods and services	TOTAL Uses
Products:	Primary sector	Secondary sector	Tertiary sector	TOTAL Output				
A	20	23	10	53	22	70	3	148
B	10	137	60	207		159		366
C	5	44	37	86	85		124	295
CIF-FOB							-3	-3
Territorial correction					-1		2	1
TOTAL	35	204	107	346	106	229	126	807
Output	113	307	235	655				
Gross value added	78	103	128	309				
Compensation of employees	5	80	65	150				
Other taxes less subsidies on production	-3	1	-1	-3				
Gross operating surplus/ mixed income	76	22	64	162				

More information about institutional sector accounts is presented in Chapter 3: *Basic concepts,* Section 2: *Accounts and main aggregates.*

3. Integrator framework

The estimation of national accounts is based on various statistical and administrative data sources. The framework proposed by the supply and use tables enables an efficient analysis and comparison of data. Inconsistencies between the different primary sources, lack of information for some indicators, or poor quality of data used for GDP compilation can be detected and improved by integrating these factors in the detailed common framework provided by the supply and use tables. The approach provides a firm basis for making the appropriate corrections and adjustments to the information from primary sources in order to obtain consistent estimates of GDP. Making estimates by residuals (estimating a variable by first estimating all other variables included in one identity presented in the supply and use tables) for some specific products or by extrapolating figures for periods in which less reliable information is available are two examples of the methods applied in the framework provided by the supply and use tables.

In the same way, the supply and use tables contain the full framework for establishing the connection between the various valuation concepts used in national accounts. The distribution of margins, taxes and subsidies on products are included since they are used to pass from basic prices to producers' prices and finally to purchasers' prices.

The relationships between different valuation concepts in national accounts are presented in Chapter 3: *Basic concepts*, Section 1: *Fundamentals for national accounting.*

4. Basis for further developments in the statistical system

Detailed supply and use tables offer the best framework for the calculation of GDP in current prices and in the prices of the previous year following the 2008 SNA recommendations. The inconsistencies between supply and use elements highlighted in the framework represent the ways for further improvements and developments of data sources. An example is presented in Box 8.2.

Box 8.2: Inconsistency, base for further improvements

Let us consider the identity for the product 'shoes' in a given economy A.

For this product, based on data sources presented in column 2, elements of the supply and use tables are estimated.

Aggregates:	Data from:	Initial figures	Corrected figures
		Thou. currency	Thou. currency
1	2	3	4
Import of goods	External trade in goods statistics	100	100
Output:	Structural surveys in enterprises	120	120
Taxes on products (import duties and VAT):	General government budgetary statements	1	1
Trade and transport margins:	Structural surveys in enterprises	9	9
Total Resources:		230	230
		≠	=
Intermediate consumption:	Structural surveys in enterprises and I/O coefficients	20	20
Final consumption expenditure of Households	Household budget survey	60	90
Exports of goods	External trade in goods statistics	80	80
Changes in inventories	Structural surveys in enterprises	30	40
Total Uses:		190	230

An inconsistency can be observed between the supply and the use of this product. To eliminate this inconsistency and to ensure the base identity of the supply and use tables, a deep analysis of the data sources and indicators calculated is required. In economy A, it is known that the quality of the structural survey is acceptable for some indicators, but cannot provide good information concerning change in inventories; external trade statistics provide a sound data source especially for goods. In these conditions, it is necessary to analyse the data obtained from other sources, and the attention is focused on the Household Budget Survey (HBS). The comparative analysis of the sources based on the inconsistency of the data highlights its weaknesses. In the example presented, it is assumed that the HBS is the weak source because the results provided are not relevant for the entire population and the non-response rate is very high. It is one of the sources that have an impact on the quality of the indicators.

Based on the inconsistency detected and the analysis of sources, the statistical institute has reason for putting in place actions for improving these statistics; based on the example presented, the further activity should be oriented towards improving the quality of the HBS.

What should a national accountant do in the situation described above? He/she cannot wait for the improvements, which would take two to three years to filter through the system. Based on the other information (e.g. turnover of retail sale companies or agriculture data) and applying the commodity flow method, indicators of final consumption expenditure of households are corrected. Also knowing that the quality of the change in inventory estimation using the structural survey is weak, this data is changed based on additional information. The final results are presented in column 4. This column represents the row of the product 'shoes' in the supply and use tables.

For the benefit of the countries in the early phases of 2008 SNA implementation, one must stress that a substantial amount of resources is required to build an integrated supply and use framework for the first time. This work involves establishing all the individual product balances, the development of appropriate techniques for incorporating the primary sources, and new software for handling the supply and use system. The investment may lead to considerable changes in working processes and may provide significant progress towards a better integration of activities. In this respect, the supply and use tables help the national accountants as well as the management of the statistical system to understand the data requirements for national accounts compilations and to correspondingly assess the gaps and weaknesses in the information system.

Compilation of supply and use tables on a regular basis not only helps to improve national accounts, but also to improve the statistical capacity of the countries that use these tables.

Chapter 2: *Building the SNA*, Section 2: *The 2008 SNA implementation strategy*, presents the main aspects related with the compilation of a national accounts strategy.

5. Supply and use tables, benefits for users

The data presented in the supply and use tables form the basis for the estimation of other indicators, as well as for economic analysis and forecasting:

(a) the International Comparison Program (ICP) is a worldwide statistical partnership to collect comparative price data and compile detailed expenditure values of countries' gross domestic products (GDPs), and to estimate purchasing power parities (PPPs) of the world's economies. Using PPPs instead of market exchange rates to convert currencies makes it possible to compare the output of economies and the welfare of their inhabitants in real terms (that is, controlling for differences in price levels). The Global Office of ICP 2011 recommends the use of the supply and use tables framework by the countries for compiling and providing values of GDP expenditures;

To find out more…

World Bank: **http://siteresources.worldbank.org/ICPEXT/Resources/ICP_2011.html**

(b) supply and use tables are used as a tool for economic analysis and forecasting. The tables provide different information about the cost of the production, the structure of these costs, the structure of the capital formation, final consumption, the needs for imports, the export competitiveness, etc. For example, if the government decides to build a new high-speed railway, it is necessary to know the impact this will have on various branches of the national or regional economy. For the construction proposed, the construction company will need steel for the rails, electric pylons and also pre-stressed concrete for the bridges and other major construction works. The result will be an increase in demand for the products of the steel and concrete industries. But this is not all. The firm will also need to buy new excavators and cranes not produced within the country, hence the imports of these items will increase (additional financial resources will be necessary to cover these imports). The framework of supply and use tables can provide the information necessary to build the development strategy in the respective field.

In order to serve more specific purposes, supply and use tables can be developed by introducing alternative and/or supplementary classifications:

1. more detailed product or industry classifications in line with national conditions and requirements;
2. more detailed geographical breakdown for imports and exports;
3. classification of compensation of employees by some criteria (level of education, if employee is working part-time or full-time, etc.).

2. Basis for building supply and use tables

2.1 Structure of supply and use tables: aggregates and accounting identities

Supply and use tables represent matrices describing the domestic production processes and the transactions in products of the national economy, by product and industry. These tables show:

1. the structure of the costs of production and the income generated in the production process;
2. flows of goods and services produced within the national economy;
3. flows of goods and services with the rest of the world.

The elements of a **supply table** are:

1. domestic output by industry;
2. imports: goods, services, purchases of residents abroad (no adjustment needed if included in the balance of payment statistics);
3. trade margins;
4. transport margins;
5. taxes on products,
6. subsidies on products.

The elements of a **use table** are:

1. intermediate consumption by industry;
2. exports: goods, services, purchases of non-residents in the domestic economy (no adjustment needed if included in the balance of payment statistics);
3. household final consumption expenditure;
4. final consumption expenditure of NPISHs;
5. government final consumption expenditure: individual consumption and collective consumption;
6. gross capital formation: gross fixed capital formation, change in inventories, valuables.

Simplified supply and use tables are presented in Table 8.2.

In the supply and use tables, the resources (another name for 'supply') are equal to the uses, by definition. Thus, the following three accounting identities (in a general form) must be fulfilled by each product/commodity entering into the classification of supply and use tables:

1. Identity by industry:

   Output by industry = Input by industry.

   For each industry: Output = Intermediate consumption + Gross value added.

2. Identity by product:

   Total supply by product = Total use by product.

This identity is only valid when supply and use are estimated in the same prices (purchasers' prices or basic prices). For each product the supply and use are estimated in purchasers' prices.

Supply at purchasers' prices = Output at basic prices + Imports at basic prices + Trade margins + Transport margins + Taxes (less subsidies) on products.

Use at purchasers' prices = Intermediate consumption + Exports + Final consumption expenditure + Gross capital formation.

3. Identity for gross value added(GVA)

   Total GVA = Σ GVA of each industry

where the GVA = Output – Intermediate Consumption of each industry.

When adding the table of Value added allocation in the supply and use framework, one must complete another accounting equation (by industry).

Output – Intermediate consumption = Value added = Compensation of employees + Other taxes on production, net + Operating surplus/mixed income.

More information concerning the estimation of GVA is presented in Chapter 3: *Basic concepts*, Section 2: *Accounts and main aggregates.*

Table 8.2: A simplified supply-use framework

		Products			Industries			Final uses			Total
		Agri-cultural products	Industrial products	Services	Agri-culture	Industry	Service activities	Final con-sumption	Gross capital forma-tion	Exports	
Products	Agricultural products Industrial products Services				Intermediate consumption by products and by industry			Final uses by product and by category			Total use by product
Industries	Agricultural products Industrial products Services	Output of industries by product									Total output by industry
Value added					Value added by component and by industry						Total value added
Imports		Total imports by product									Total imports
Total		Total supply by product			Total output by industry			Total final uses by category			

= not applicable

Source: ***Eurostat Manual of Supply, Use and Input-Output Tables***, Eurostat, European Communities, 2008

The compilation of the supply and use framework dataset cannot be seen as being independent from the compilation of the other accounts of the system. Here, the goods and services account, the production account, and the generation of income account by industry are integrated.

Supply and use tables are the central framework for all kinds of tables by industry, e.g. those on output, value added, compensation of employees, employment, operating surplus/mixed income, taxes (less subsidies) on production, gross fixed capital formation, consumption of fixed capital and capital stock.

Information from supply and use tables is the starting point for constructing the symmetric input-output tables. The industry by product information in the supply and use tables can be converted into symmetric tables. A symmetric input-output table is a product-by-product or industry-by-industry matrix describing the domestic production processes and the transactions in products of the national economy in great detail; it rearranges supply and use tables in a single table. The major conceptual difference between a symmetric input-output table and supply and use tables is the fact that the former presents statistics concerning products by product or industries by industry. So, in a symmetric input-output table either a product or an industry classification is employed for both rows and columns.

As the supply and use tables are one of the recommended sets of data necessary for the 2008 SNA implementation, this chapter will not present the input-output table methodological aspects.

2.2. Classifications

Supply and use tables integrate all main classifications used in national accounts statistics.

> Detailed information concerning the statistical classifications is presented in Chapter 4: *Statistical infrastructure for National Accounts*, Section 1: *The basis: business register and statistical classifications.*

The main classifications used in the supply table are summarised in the following list:

1. For domestic products (which is the preferred term used for 'commodities'): CPC Ver.2, or a national/regional classification compatible with CPC Ver.2;
2. For industries: ISIC Rev.4, or a national/regional classification compatible with ISIC Rev.4;
3. Imports must be classified by product in a manner consistent with that used for domestic production. Since imports (and exports, too) are classified based on the HS or SITC and not according to CPC, this correspondence is not easily ensured. Finding a level of aggregation of the trade data that is sufficiently detailed but also consistent with domestic production may be a factor in determining the level of detail to be adopted in the supply and use tables. The detailed correspondence table between SITC, CPC and ISIC must be used for this purpose.

The level of detail by industry/product is established by each country, according to its economic specificity. Also, the following elements could have a significant impact on the level of available details included in the supply table:

1. availability and quality of primary sources data;
2. importance of industries/products to the country and its cultures;
3. current national accounts compilation practice;
4. staff resources;
5. time schedules for production and publication of the tables.

However, the guiding factor for establishing the detail of the supply and use tables is that there is generally a direct relationship between the size of the tables and the quality of data provided. Therefore, countries have to choose the size of supply and use tables on the basis of the factors presented above.

Box 8.3: Detail level of supply and use tables

The detail level of supply and use tables is usually much greater for the working version than for the published version. The European Transmission Programme of Member States of the European Union, in force in 2012, requires the classification by 64 industries/products based on the NACE Rev.2 classification. At the working level, it is recommended to use the classification at least by division level, which implies the use of 88 industries/products.

Within each country, a principal decision has to be made whether to compile a square or a rectangular supply and use system. In a square system the number of products equals the number of industries. In a rectangular system the number of products can be substantially higher than the number of industries, thus showing for each industry not only one primary product. For example, 94 industries and 153 commodities were used in the 1999-SUTs of South Africa.

In the Netherlands, the final estimate of supply and use tables consists of around 250 industries by 800 product groups. Due to confidentiality, not all data can be published to the general public, so only a supply and use table of around 150 activities and 600 product groups is publicly available. The provisional estimates are made with 100 industries and 250 product groups. (Source: *'Supply and use tables in current and constant prices for the Netherlands: an experience of fifteen years'* Sake de Boer, Wim van Nunspeet and Taeke Takema, Voorburg/Heerlen, 1999).

In the use table, there are some specific classifications:

1. Final consumption expenditures are estimated using classifications by purposes: COICOP for households, COPNI for NPISHs and COFOG for general government. The transition from these classifications to product classification (CPC Ver.2) is made internally by national accountants using correspondence tables and the supply and use tables balancing framework.
2. Gross fixed capital formation is initially obtained by type of assets, with the 2008 SNA classification by assets being the recommended classification. They are integrated into use tables based on a conversion into CPC Ver.2 classification, the one used to balance the supply and use of each product.
3. The allocation of exports by product requires the same conversion between SITC or HS codes and CPC classification, as for the allocation of imports.
4. The four types of inventory identified in the 2008 SNA (materials and supplies, work-in-progress, finished goods and goods for resale) are classified by product based on the classification used for each one of them (CPC Ver.2 or the national classification). This allocation is relatively difficult, especially for goods for resale or for materials and suppliers and is carried out during the exercise of balancing the supply side with the use side for each product.

The elements of Output, Intermediate consumption and Value added are classified by industry, using ISIC Rev.4, or the national classification compatible with the international one.

2.3 Valuation issues

The main identity of supply and use tables is their equilibrium by product. In order to obtain this and to balance total supply with total use, both supply and use must be evaluated in the same way. The most usual way to achieve this is to raise total supply to purchasers' prices, taking into account the use of the estimation of components.

The purchaser's price is the amount paid by the purchaser, excluding any deductible VAT or similar deductible tax, in order to take delivery of a unit of goods or services at the time and place required by the purchaser. The purchaser's price of goods includes any transport charges paid separately by the purchaser to take delivery at the required time and place.

The correlations between the three types of prices are presented in Chapter 4: *Basic concepts*, Section 1: *Fundamentals for national accounting.*

The basic data used to compile the supply and use tables have different valuations:

1. Production/output data are valued at basic prices.
2. Intermediate consumption and final uses are usually valued at purchasers' prices.
3. Imports are valued at CIF prices – price of goods delivered at the frontier of the importing country, or the price of a service delivered to a resident, before the payment of any import duties or other taxes on imports or trade and transport margins within the country – Cost Insurance and Freight.
4. Exports are valued FOB – price of goods at the frontier of the exporting country, or the price of a service delivered to a non-resident, including transport charges and trade margins up to the point of the border, and including any taxes less subsidies on the goods exported – Free On Board.

In these conditions, supply and use tables cannot be balanced and made consistent if their elements are valued using different prices.

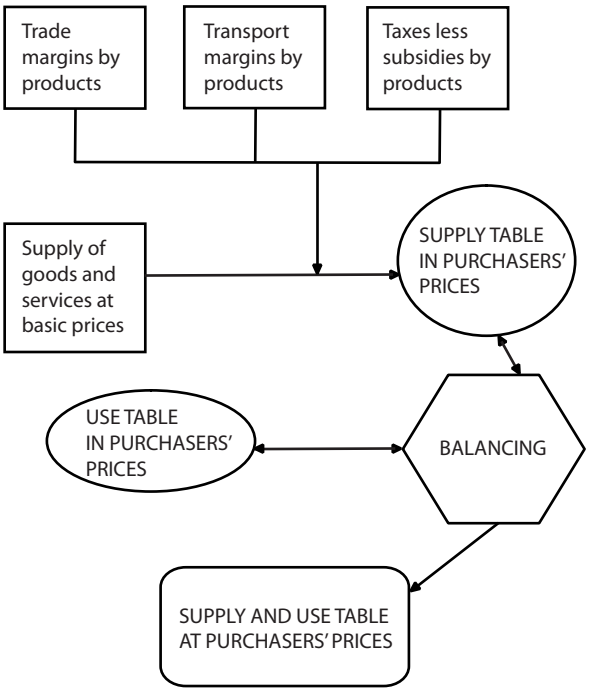
The transition from supply at basic prices to purchasers' prices requires:

1. reallocating trade margins;
2. reallocating transport margins;
3. adding taxes on products (except deductible VAT);
4. deducting subsidies on products.

A similar transition is applied to transform use at purchasers' prices into use at basic prices. The estimation of transitions in both types of prices is an important part of the balancing process. In practice, both types of balances may be needed to build a supply and use table. Both alternatives deal with or require similar kinds of adjustments, i.e. for taxes less subsidies on products and trade and transport margins by product.

In order to pass from one price to another, the valuation matrices play an important role. These matrices bridge the gap between the valuation of purchasers' prices and the valuation at basic prices and vice-versa. The valuation matrices comprise all flows that are related to the supply and use of trade and transport margins and the supply and use of taxes less subsidies on products. The supply-side valuation matrices are needed to balance supply and use at purchasers' prices and the use-side valuation matrices are needed to transform the use data from purchasers' prices into basic prices. Figure 8.1 shows the valuation matrices and their role in the compilation of the supply and use framework in purchasers' prices.

Figure 8.1: Valuation matrices in the supply and use tables



2.3.1 Trade margins

Wholesalers and retailers are treated as supplying services to their customers by storing and displaying a selection of goods in convenient locations and making them easily avail-

able for customers to buy. Their output is measured by the total value of the trade margins realised on the goods they purchase for resale.

Definition:

A trade margin is defined as the difference between the actual or imputed price realised on a good purchased for resale and the price that would have to be paid by the distributor to replace the good at the time it is sold or otherwise disposed of.

Source: *The 2008 SNA*, European Commission, IMF, OECD, World Bank, 2009, Chapter 6: The production account.

The margins on some goods may be negative if their prices have to be marked down. They must also be negative on goods that are never sold because they go to waste or are stolen. The concept of trade margins can be applied for specific goods, for trading activities of a statistical unit, for the trading activities of industries, and for the total trading activities of the economy.

In practice, the output of a wholesaler or retailer is given by the following identity:

output	=	value of sales,
	+	value of goods purchased for resale and used for intermediate consumption, compensation of employees, etc.,
	–	value of goods purchased for resale,
	+	value of additions to inventories of goods for resale,
	–	value of goods withdrawn from inventories of goods for resale,
	–	value of recurrent losses due to normal rates of wastage, theft or accidental damage.

More information concerning wholesale and retail distribution is presented in Chapter 6: The production account of *The 2008 SNA*, European Commission, IMF, OECD, World Bank, 2009.

Trade services are usually distinguished between wholesale and retail sale; an important distinction with respect to the allocation of the trade margins of the use categories:

1. wholesale is the resale (sale without transformation) of new and used goods to retailers, industrial, commercial, institutional or professional users, or to other wholesalers;
2. retail sale represents the resale (sale without transformation) of new and used goods, mainly to the general public, for personal or household consumption.

Trade margins are the measurement concepts of trading activities in the system, regardless of whether this is done by traders, as their main activity, or by other industries, as part of their secondary outputs. The estimation of the trade margin is made, usually, based on data from structural business statistics or from specific trade surveys. These sources provide data on total trade margins by industry, which then need to be transformed into data by product. Based on the valuation prices of the supply and use tables, the compilation of trade-margin matrices can start either from the supply side or from the use side.

2.3.1.1. Trade-margin matrices on the supply side

Usually, available data sources provide information concerning the trade margins by industry. In order to use this information in the supply and use tables, it should be transformed into data by product.

Special attention should be paid to the level of detail at which the trade-margin matrices are compiled. It is preferable for the product level in estimations to be more disaggregated than the level of detail of the final supply and use tables. This is in order to meet the needs of the commodity-flow method, to allow the use of different product-margin ratios, and to provide desirable details for the compilation of certain use data (e.g. to allocate the products and their margins to the purpose categories of private consumption expenditures).

As a general working procedure, the main steps to estimate the trade margins in the supply table are as follows:

1. *To separate trade turnover into wholesale and retail sale trade turnover*

In structural business statistics, a distinction between wholesale and retail trade turnover is often surveyed in trade industries but not in other industries (this depends on the quality of the surveys). However, in such cases the value of products purchased for resale need not distinguish between wholesale and retail sale. This means that some adjustments should be made based on the characteristics of the economy and the kind of industry concerned. As an example, the bakery industry may be considered: the trade of small bakeries is likely of retail sale type, whereas the trade of large bakeries is almost certainly of wholesale type.

2. *To estimate the trade turnover by product*

Two trade turnover matrices of industries by product are estimated, one for wholesale and one for retail trade turnover. The information required for this step is usually very poor and plausible assumptions must be made. For example, it would not be wrong to assume that hotels are trading in souvenirs, newspapers, journals and food and beverages, and that museums are trading in books, multimedia products and so on. For trade industries, the estimation of the margins by product is very difficult, taking into account the large variety of products sold in the shops. Based on the economic charac-

teristics and the use of all available information, assumptions are made and applied to split the trade turnover by product. In order to validate the results, it is essential to check them with the supply of the goods (domestic production and imports) and to analyse the relationship between wholesale and retail trade turnover.

3. *To estimate the trade margin matrices by product*

The trade margin-matrix can be estimated by multiplying the trade turnover matrices (elaborated in step 2) by the assumed product-margin ratios. Margin ratios represent the share of a trade margin in relation to the trade turnover at the product level (product groups) or at the industry level, which would give information on the average margin of that industry. For this transformation there are, in principle, two options:

(a) for each industry the average margin ratio of that specific industry is applied for all the products traded (based on the industry technology);

(b) a specific product-margin ratio is applied to all trade turnover of that product irrespective of the industry (product technology). It should be stressed that all the estimations are made separately for wholesale and retail trade.

The results obtained by product are checked with the total trade margins by industry. The differences are then analysed and, based on the information available, adequate adjustments are operated.

2.3.1.2 Trade-margin matrices on the use side

Data availability to estimate trade margins by product in use tables is much poorer than for the supply-side; for the buyers (such as households or government), it is impossible to know the share of the trade margins in the price they have paid. All the distribution channels before the final seller are certainly totally unknown to the buyer.

For these reasons, the calculation of the use-side trade-margin matrices is based on plausible assumptions and is balanced with the estimated total supply of the trade margins. It could be assumed that in intermediate consumption only wholesale trade services are involved (at least for some industries and for the others, a share of the wholesale as source for the consumption is estimated). In the case of private consumption expenditures, the retail margins may be allocated, with some exceptions, when consumers have access to the wholesale channel directly. Some of the products bought in retail trade might have been delivered from wholesalers, whereas others are delivered directly from the producers of the goods.

Similar assumptions may be made for capital formation, for which mostly the wholesale channel is more important although to a very small extent the retail sale channel is also significant (e.g. products bought by private households when constructing their own dwellings or making major repairs). In inventories only wholesale margins can be involved, but not retail sale margins. However, the problem is that, for obvious reasons, one cannot allocate margins to changes in stocks, but only to stock data, more specifically stock data at the end of the period. In practice, this means that trade margins will be allocated only to increases in stocks. For exports one can assume that only wholesale margins are involved; also with some exceptions, the most important relates to the goods bought by non-resident travelers (tourists).

The procedure of trade-margin allocation to single use elements starts with the flows for which the best quality information is attained or the assumptions that seem to be the most plausible. For the trade-margin estimation in the use table, the details available from the supply-side should be utilised as much as possible; this refers particularly to the details of products. The resulting use-side trade margin matrices should also be checked for overall plausibility, both with regard to the relationships between allocated wholesale and retail trade margins, as well as to the relationships between the use data at purchasers' prices and the allocated trade margins.

2.3.2. Transport margins

Transport margins, another valuation component in the supply and use tables, represent freight transportation services of products when paid by the buyer of the product or when invoiced separately by the seller.

Transport margins include the following cases in particular:

1. the invoiced value of the transport of goods from the place where they are manufactured or sold to the place where the purchaser takes delivery of them. The transport is made by a third party and the amount is invoiced separately to the purchaser;
2. the transport of goods arranged by the manufacturer or by the wholesale or retail trader in such a way that the purchaser has to pay separately for the transport costs even when the transport is done by the manufacturer or the wholesale or retail trader himself.

So, if the producer agrees to deliver the product to the purchaser without explicit charge, the cost of delivery is included in the basic price. Only if the purchaser is explicitly invoiced for the delivery is there a specific transportation margin that is part of the purchaser's price.

Based on this definition, all of the following transportation costs are not recorded as transport margins, because they do not contribute to the valuation difference between basic prices and purchasers' prices:

1. if the manufacturer or trader transports the goods himself, these transportation costs are not included in the basic price of the manufacturer's or trader's output and represent an ancillary activity of the unit;

2. if the manufacturer arranges for the goods to be transported without a separate invoice for the transport services, these transport costs are included in the basic prices of the manufacturer's output;
3. if wholesale and retail traders arrange for goods to be moved from where they take delivery of them to where another purchaser takes delivery, these costs will be included in the trade margin if no separate charge is made for transportation to the purchaser (i.e. these costs will be part of the intermediate consumption of the wholesale and retail traders);
4. if a household buys goods for final consumption and pays for transport to a third party, these transport costs are recorded as final consumption expenditure on transport services and not included in some trade or transport margin;
5. if a domestic carrier transports goods form country A to country B through the domestic territory (transit transport), this is not considered a transport margin because it does not relate to goods that form part of domestic supply and use; these transportation services are recorded under export of services;
6. transportation services of domestic carriers outside the domestic territory are not part of the transport margins, but rather export of services;
7. freight transportation of used goods, scrap and waste, earth and similar freight connected with construction projects are also not part of transport margins as these goods are not considered products.

The complexity of the transport margin is important, not only because of the different kinds of margins (for each type of transport: road, railway, water, air, pipeline) but also because of the definitions themselves. Also, the data availability gives rise to many practical elaboration problems. The relationship between the supply of goods and the transport margins connected with them is much looser than in the case of trade margins. Several reasons can be given for this fact: the transport costs are usually not related to the value of the goods transported; a lot of transportation is done as ancillary activity; and the way transportation costs are paid might differ from product to product and from transaction to transaction.

As in the case of trade-margin matrices, it is recommended to start the estimation of the transport-margin matrices with the supply-side for the same reason: there is no direct information on the amount of transport margins included in the purchasers' prices of the uses. The main steps of the estimation procedure are similar to those for trade-margin matrices.

The quality of transport-margin data depends very much on available data sources; usually there are data from transport statistics (in physical terms, providing data on the transport distance, whether domestic, cross-border or transit transport, the transport volume in terms of weight and ton-kilometers, and the kinds of goods transported and covered by different modes of transport). The physical data have to be multiplied by appropriate transport tariffs (transport prices). Such tariffs vary between the goods transported, transport distance and by different kinds of transport vehicles.

Another important data source is the structural survey (for more information concerning statistical sources, see Chapter 4: *Statistical infrastructure for National Accounts*, Section 2: *Statistical data sources*). Structural surveys can provide detailed information concerning the transportation costs paid by the seller or the value of the invoiced transport services, by type of goods transported.

To find out more…

The 2008 SNA, European Commission, IMF, OECD, World Bank, 2009, Chapter 14: The supply and use tables and goods and services account.

2.3.3. Taxes and subsidies on product matrices

The 2008 SNA defines three types of product taxes:

1. value added type taxes (VAT);
2. taxes and duties on imports, excluding VAT;
3. taxes on products, except VAT and import taxes.

Other taxes on production are included in the basic price measurement of output and other subsidies on production are excluded so do not feature in the adjustment for taxes that converts a valuation at basic prices to purchasers' prices.

When output is at basic prices, the taxes column contains total non-deductible VAT on products, taxes and duties on imports excluding VAT, export taxes and taxes on products excluding VAT, and import and export taxes. When output is at producers' prices, the taxes column includes only taxes and duties on imports (excluding VAT), plus total non-deductible VAT on these products.

The compilation requirement of the taxes and subsidies matrices refers to the elaboration of the column vector in the supply table. The taxes less subsidies are shown *by product*. In the first step of the estimation process, it is necessary to classify the different product taxes/subsidies according to the product classification used; such as, for example, the sugar taxes are attributed to group 235 of CPC Rev.2, tobacco products to group 250 and so on, or to the appropriate more detailed level of the classification in use. The same has to be done for the product subsidies.

The *second compilation step*, with respect to the product taxes/subsidies, refers to the allocation of the product taxes/subsidies on the use side (intermediate uses and final uses)

at purchasers' prices. For those product categories for which product taxes/subsidies have been allocated, the share of the tax/subsidy component in the purchaser's price has to be calculated. This step needs to be based on the appropriate taxation basis according to the tax legislation of each country.

Subsidies are recorded as if they were negative taxes on products or negative taxes on production. Only subsidies on products (if any) are entered into the column for the tax adjustment to the valuation of supply; they appear with a negative sign to indicate they reduce the value of purchasers' prices rather than increasing it.

2.4. Statistical unit and data sources

The statistical unit and data sources are linked in the sense that the data collected from various sources could match directly or must be adjusted based on supplementary information in order to meet the methodological requirements of the supply and use tables.

The 2008 SNA recommends the use of *local kind-of-activity units*, as this type of unit presents all the characteristics necessary for the analysis of technical and economic relationships. In consequence, institutional units must be partitioned into smaller and more homogeneous units with regard to the kind of production. Local kind-of-activity units are intended to meet this requirement as the best practice-oriented operational approach.

Chapter 3: *Basic concepts*, Section 1: *Fundamentals for national accounts* outlines the relationships between enterprise, local unit and establishment.

The quality of supply and use tables depends on the level of disaggregation used for their compilation, availability of data sources, and human resources. The construction of supply and use tables following the 2008 SNA methodology is very data demanding and uses information available in the statistical system from all sources namely censuses, surveys, administrative data, various studies and expert judgments. The data requirements for constructing supply and use tables go beyond those required for preparing goods and services accounts in national accounts, because the data needs to be at the individual product level.

For compiling high-quality supply and use tables, it is necessary to have detailed and independently available data at product level for each component of the tables. Only in these conditions it is possible to mix and confront different sources of data through the supply and use framework, so that weaknesses in the data systems, including their conforming to national accounts concepts, are identified and appropriate adjustments are applied for the estimation of indicators.

In reality, the data sources available (especially, in developing countries) is much less than ideal, and this has a direct effect on the quality of supply and use tables. However, supply and use is the ideal framework (with its built-in cross-checks and balances) to maximise the quality of national accounts, even with limited source data. Therefore, it is all the more important to use the supply and use framework for national accounts compilations (and in particular for GDP) when source data is incomplete. In such situations, countries may be required to adopt commodity-flow approaches, or use auxiliary data sources such as studies or ratios from neighboring countries or similar economies.

The main data sources required for the compilation of supply and use tables can be summarised in the following way:

1. Classifications:
   (a) Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC, Rev.4)
   (b) Central Product Classification Version 2 (CPC, Ver.2)
   (c) Standard International Trade Classification (SITC, Rev.4)
   (d) Classification of individual consumption by purpose (COICOP)
   (e) Classification of the functions of the government (COFOG)
   (f) Institutional sectors, e.g. non-financial corporations, general government, households, etc.
2. Registers
   (a) Statistical Business Register.
3. Data sources for supply tables:
   (a) agriculture, livestock, forestry and fishing:
      – agricultural censuses, annual agricultural surveys on crop and livestock production,
      – specific agriculture surveys: area and yield crop production, prices in agriculture, land use statistics/surveys, household income-expenditure surveys etc.,
      – administrative data: administrative statistics on agriculture, livestock, forestry and fishing, administrative data maintained by local and regional traditional authorities, imports and exports of agriculture products, data from veterinary authorities.
   (b) mining, manufacturing, construction, services:
      – economic census, annual enterprise surveys covering all non-agricultural economic activities,
      – specific statistical surveys: manufacturing industry surveys on turnover and number of employees and on product production, construction and/or

investment surveys, labour force surveys, wholesale and retail trade surveys, data on indicators of output of services (freight-ton kilometers, passenger kilometers, number of vehicles on road, etc.), price statistics surveys,

- administrative data: administrative data on utilities (electricity, gas and water supply, post and communications, transport, airlines, mining, etc.), construction permits, government budget statements on revenues and expenditures, financial statements of non-financial units (companies/corporations government owned and private), tax data disaggregated by product, financial statistics from central banks, reports from regulatory agencies of insurance companies.

(c) taxes and subsidies on products:

- administrative data: VAT value, other taxes provided by tax authorities, subsidies data.

(d) imports:

- statistical data: special surveys for imports (such as on electricity),
- administrative data: imports of goods provided by customs, balance of payment.

4. Data sources for use table:

(a) final consumption expenditure:

- statistical data sources: Household income-expenditure surveys, retail trade surveys, price statistics surveys,
- administrative data: Government budget statements (revenues and expenditures), tax data on selected products such as alcohol, tobacco, motor vehicles, financial statements of NPISHs.

(b) gross capital formation:

- economic census, annual enterprise surveys covering all non-agricultural economic activities, annual agriculture survey,
- specific statistical surveys: construction and/or investment surveys, capital expenditure and inventory surveys,
- administrative data: construction building permits, government expenditures on investment, financial statements of non-financial and financial units and of NPISHs.

(b) exports:

- statistical data: special surveys for exports (such as electricity),
- administrative data: exports of goods provided by customs, balance of payment.

5. Other data:

(a) prices: consumer price, producer's price, import price, export price.

More information concerning statistical business register, classifications and statistical data sources is presented in Chapter 4: *Statistical infrastructure for National Accounts*; the administrative data sources use for national accounts compilation are presented in Chapter 5: *Administrative data sources*.

The administrative and statistical data sources presented are indicative, and may differ from country to country, but they provide an image of the enormous and exhaustive data needed for the compilation of supply and use tables. In some countries, especially in developing countries these sources may not be available. These countries may have to resort to a combination of these sources, collecting the data from a mix of different sources and applying commodity flow approaches, in order to compile the supply and use tables. At the same time, the lack of the necessary data for supply and use tables represents a starting point for further developments.

Chapter 2: *Building the SNA*, Section 2: *The 2008 SNA implementation strategy* presents the main phases of national accounts implementation strategy and development.

The available data sources and the economic interest and development of one country may restrict the estimation of the components of the supply and use tables, only at broad commodity level (for example, cereals, food products, fuel, personal services, tourism, travel, energy consumption, etc.), rather than at an individual product level; in such cases, a further breakdown of broad product-level expenditures into detailed product levels can be made on the basis of small surveys or even using ratios from neighboring countries with similar economic structure and combining this with expert opinions.

3. Compilation of supply and use tables

The methodological concepts and methods that are used in national accounts are also required for the compilation of supply and use tables. Examples of such methods are the commodity flow method, the balancing method or the double deflation method. In addition to the general compilation methods of national accounts, specific estimation procedures are needed and applied in the elaboration of supply and use tables.

3.1 Compilation steps

The compilation of the supply and use framework dataset fol-

lowing the 2008 SNA methodology is a very complex process depending on the full integration of the current accounts and accumulation accounts. This forms a set of interrelated tables that is fully compliant with all other accounts of the national accounts system. The balancing of the supply and use tables ensures the consistency between the various parts of the national accounting system.

The supply and use frame consists of several tables:

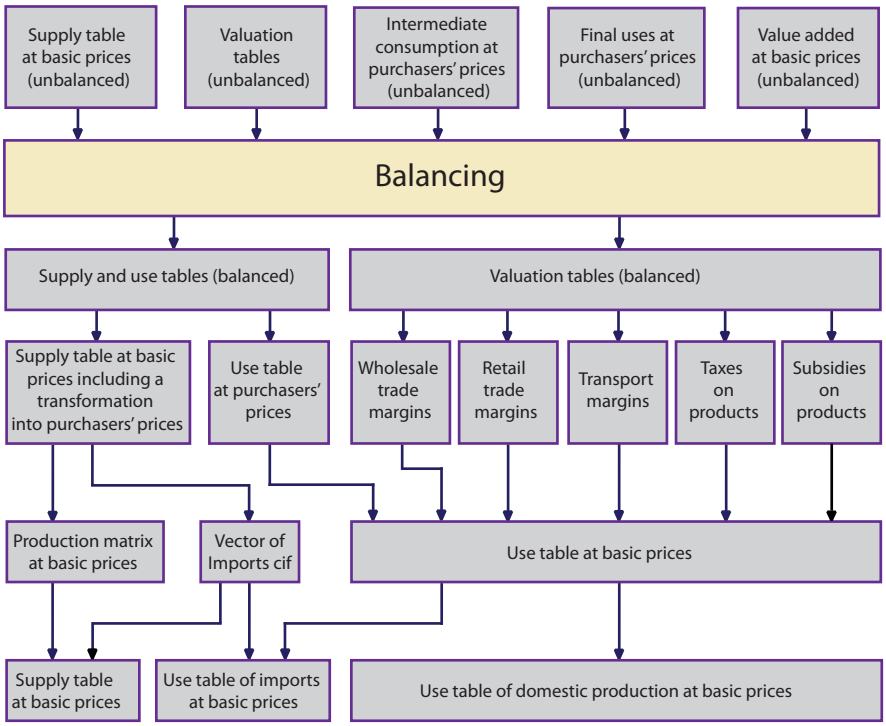
1. Supply table at basic prices, which consists of two sub-matrices: the table of domestic output and the table of imports.
2. Valuation tables, which comprise information on taxes less subsidies on products, trade margins and transport margins. These valuation tables allow the transformation of total supply at basic prices into total supply at purchasers' prices.
3. Table on intermediate consumption at purchasers' prices presenting the input requirements of goods and services for the production of the outputs of each industry.
4. Table on final uses at purchasers' prices (unbalanced), which includes: household final consumption expenditure, general government final consumption expenditure, final consumption expenditure of non-profit institutions serving households (NPISH), gross fixed capital formation, changes in valuables, changes in inventories and exports of goods and services.
5. Value added at basic prices by industry: compensation of employees, other net taxes on production, consumption of fixed capital and net operating surplus.

The compilation of these tables and their integration in a coherent framework is based on three main steps:

1. *The first step* is the compilation of the five tables presented above, based on available data sources, in current prices and in the prices of the previous year.
2. *The second step* is the analysis and balancing of these five tables in order to ensure the consistency of the system. The balancing procedure is an iterative procedure and it involves:
   (a) balancing the supply and use tables at purchasers' prices,
   (b) compiling the valuation matrices,
   (c) transforming the supply and use tables into basic prices,
   (d) balancing the supply and use tables at purchasers' prices and at basic prices.
3. *The final step* is the final balancing in both current and constant prices (at previous years' prices). The result is the supply and use tables, balanced, in purchasers' prices or in basic prices (the valuation matrices which allow the estimations of tables in these different prices are balanced, too).

The compilation steps are presented in Figure 8.2.

Figure 8.2: Compilation steps for supply and use tables



Source: *Eurostat Manual of Supply, Use and Input-Output Tables*, Eurostat, European Communities 2008

The non-balanced tables presented in the first step of the compilation procedure based on the available data sources, allow starting the balancing of the supply and use and input and output. Balancing is necessary in order to achieve identity between supply and use for each product, and to establish the identity between output and input for each industry. At the same time, balancing allows to identify inconsistencies of basic data and estimation methods used for the national accounts indicators included in the supply and use tables. It should be noted that it is recommended in order to achieve full consistency if the system is to balance the supply and use tables simultaneously in current prices and in the prices of the previous year.

3.2 Methods

Elaboration of supply and use tables requires specific methods. The main concern in the process of the compilation of supply and use tables is the collection of coherent and consistent data provided by different statistical and administrative sources. Besides the specific methodology used for the compilation of each component, further estimation methods have to be considered in order to be able to estimate each element of the supply and use system in the condition of weak, insufficient or missing data.

Usually, the data available are insufficient and not comprehensive enough in order to meet the supply and use methodological requirements; or, it can be the case that certain key data cannot be collected at all. In general, there are several aspects of dealing with difficulties in the compilation of supply and use tables: missing data, coherence of the supply and use system, consequences, and documentation.

1. *Missing data*

Certain data necessary to compile indicators of supply and use tables are not available in the official statistics or administrative system. In order to obtain them from other providers, or to access some additional information useful to develop assumptions and work hypotheses, several options could be followed:

(a) Use of information coming from private companies in charge of observations of a specific part/aspect of the economy for which there are no data in statistical or administrative systems. For example, when intermediate data on advertising costs are not available as separate items in business surveys one could probably base the estimates on data from private marketing or research companies observing the advertising market, even though the data are often not comprehensive enough, or the classifications used differ from the official ones.

(b) When monetary data are not available, some physical data related with the respective flow, can be used. One example of this is the number of private households connected to the internet which may serve as a basis for an estimate of the payments by private households for internet fees.

(c) Studies or expert advice from research institutes, chambers of commerce, trade associations, or other similar organisations may serve as proxies, indirect indicators or for checking certain estimates.

(b) Use of information from the 'big players' in some specific industries. For example, telecommunication companies, including radio and television, may provide their revenue data by branches of their customers, supermarket chains may be asked about data on their sales by product, railway companies have detailed data on the goods they transport, etc.

2. *Coherence of the supply and use system*

Estimates of some components, even when data sources are available, are based on the identities and coherence principle of the supply and use framework. The application of the commodity flow method adheres to this principle. All products presented in the supply side are correlated with the uses components and vice-versa. Constructing product balances almost always requires the compilers to use their judgment about the relative reliability of individual components of supply and use, and to make assumptions to fill data gaps.

Commodity flow is based on the identity by product:

Resources = Uses

The commodity flow method presents a clear advantage in identifying many flows. For many products, by their nature, it is possible to identify whether they are current or capital goods, and even where they are used. For example, an aircraft or a tractor can only be capital goods that are used in transport services or in agricultural sectors respectively; haircut services go to the final consumption of households. A detailed structure of supply and use tables provides a better possibility to use expert knowledge to supplement data sources in allocating products to different uses.

For example, the estimation of construction as an element of final consumption of households based on the commodity flow method is presented in Box 8.4.

Box 8.4: Example of commodity flow method

The commodity flow method is applied for the product 'wheat' in the economy A. Table 1 presents the available data source and value of indicators used.

Table 1: Data sources and indicators used

Current number	Available information	Data sources:	Thou. currency
1	Domestic production of agriculture enterprises:	Structural survey	4500
2	Imports:	External trade statistics	1000
3	Taxes on product:	General government budgetary statements	0
4	Exports:	External trade statistics	3000
5	Purchases by General Government:	General government budgetary statements	100
6	Purchases by agriculture farms:	Agriculture survey	3000
7	Purchases by food industry enterprises:	Structural survey	5000
8	Purchases by households:	Household budget survey	300
9	Change in inventories reported by domestic producers	Structural survey	500
	Valuation items:		
10	Transport margins	Special survey	550
11	Trade margins 30%*(1+2+10)	Estimates	1815

Data collected are included in the accounting equation by product, specifically for the supply and use tables. The first estimations are presented in Table 2.

Table 2: First estimations of supply and use for 'wheat'

	Initial data
Output	4500
Import	1000
Taxes on products	0
Transport costs	550
Trade margins	1815
Total Supply (1)	**7865**
Intermediate consumption	8100
Household final consumption expenditure	300
Change in inventories	500
Total Use (2)	**8900**
Discrepancy Supply-Use = (1)-(2)	**-1035**

The discrepancy must be removed and the first step towards doing this is the analysis of the data sources in order to identify the strongest sources that allow the calculation of indicators in line with SNA methodology. The example presented uses the commodity flow method by analyzing the data sources described below.

- The reliable data are for intermediate consumption, household consumption expenditures, imports and exports and transport margins.
- Output includes only the production of the enterprises estimated based on the structural survey, so the output of household farms is not covered.
- Less reliable data are for change in inventories because the stock of wheat available to the household producers is not included (in this case because there is no other information for these figures available).

The existing discrepancy is due to the fact that the household production of wheat and its change in inventory are not included in the estimations. Taking into account that no other information is available, the commodity flow method is applied. In order to simplify the example, it is assumed that the household production is consumed by households for their own consumption and that no trade activity is involved. This means that it is not necessary to adjust the trade margins already calculated.

The difference will be attributed to two elements, from different tables. In the example presented, it is assumed that the entire household production was consumed and there are no changes in inventory. So the discrepancy was considered to represent the household production of wheat and its value is the balancing item.

The adjusted data are presented in Table 3.

Table 3: Adjustment of supply and use for 'wheat'

	Adjusted data
Output	5535
Import	1000
Taxes on products	0
Transport costs	550
Trade margins	1815
Total Supply (1)	**8900**
Intermediate consumption	8100
Household final consumption expenditure	300
Change in inventories	500
Total Use (2)	**8900**
Discrepancy Supply-Use = (1)-(2)	**0**

The example presented illustrates one specific situation in which the source of the discrepancy between the supply and use tables for one product was identified and eliminated using the commodity flow method. In practice, the compilation process of supply and use tables reveals many different situations and any general method to eliminate the inconsistency between the two tables can be applied. The analysis of data sources and of methods used for the estimation of supply and use elements in relation with the 2008 SNA requirements provides the right way to ensure the identity between the tables.

When a certain flow is adjusted based on the analysis made, this obviously affects other flows that are closely associated with it either as suppliers of input or as consumers. To make the adjustments more systematic based on the commodity flow approach, it is necessary to take into account inter-industrial relationships; separate blocks of sectors should be set up and assigned in relation with the elements included. A block should include industries that are closely related in terms of input requirements. For example, cement, ceramic tiles, and windows and doors would definitely be required in construction, therefore these products can be used to cross-check estimates of construction, particularly for the household sector in developing countries. Some of these blocks of sectors may be:

(a) agriculture, fishing, manufacture of food products and beverages, hotels and restaurants, household final consumption;

(b) metal and machinery industries, construction, gross fixed capital formation;

(c) quarrying and non-metallic mineral products, construction;

(d) manufacture of textile and textile products, footwear, household final consumption;

(e) chemical industries, including plastic products, etc.

When the block of sectors is established, a deep analysis of the characteristics of the economy in the country, as well as the technical relations between industries is required.

3. *Documentation*

The compilation of supply and use tables is a complex process; for this reason, documentation of the basic data and the methods that can be used, the problems encountered, and the results achieved is highly recommended. Such an inventory is important for building a special process of supply and use compilation.

Documentation is useful, in particular, for the following purposes:

(a) obtaining information on the sources and methods of estimations for each single supply and use component; in the case of non-identity between supply and use, the information is used to understand the difference and to identify the element with a low quality of estimation which can be adjusted in the balancing procedure,

(b) evaluating the quality of the data and outlining the strategy for balancing,

(c) avoiding the repetition of changes and destruction of already balanced data,

(d) identifying the missing data issues and problems (data quality).

A documentation system for the compilation of supply and use tables should be integrated in the framework of the overall documentation system of national accounts. An essential feature is the documentation of all stages of the compilation of 'hard' data in terms of sources and 'soft' data in terms of estimates and adjustments, for each cell of the supply and use system.

Links between survey data and final national accounts data should be maintained in the system, in particular for survey data, coverage adjustments, conceptual and valuation adjustments, quality adjustments and balancing and coherence adjustments.

To find out more…

Methods to estimate supply and use tables components are presented in:

- *Handbook of input-output table compilation and analysis*, Studies in Methods, Series F, No. 74, UN 1999, Part two: Compilation of SNA supply and use tables;
- *Eurostat Manual of Supply, Use and Input-Output Tables*, Eurostat, European Communities, 2008.

The methods presented above illustrate three aspects:

1. Due to the coherence of the accounting framework, it is possible to calculate data indirectly by using the identities of supply and use.
2. It is very important to work on a detailed product classification level in order to allocate supply or use flows correctly.
3. It is necessary to be armed with specific additional information of exogenous or independent data and information useful to improve the estimates or at least to be able to perform cross-checks. If only supply data are taken into account for estimating the use figures, it would not be possible to evaluate basic data and check consistency.

3.3. Balancing

One central feature of the SNA is the balancing process of the system. Balanced macroeconomic data can be derived on a more aggregated level by applying the production, income and expenditure approaches. However, the better option is to balance the system at the same time for the sector accounts and the supply and use tables at a much deeper level of products and industries. In an ideal situation, supply and use tables would be based on perfect knowledge and the two sides would present a perfect balance for each commodity. But of course, in the real world, both the supply and use tables contain many estimates because the sources for almost all commodities are incomplete and the two sides will usually not be perfectly balanced.

Balancing is not just necessary in order to achieve identity between supply and use for each product, and identity between output and input for each industry. Balancing also allows for tracing inconsistencies of basic data and estimation methods used. It is useful to have the balancing of the supply and use system both at current prices and constant prices, simultaneously.

The balancing procedure starts when an estimate is available for every component of the supply table, the use table and the valuation matrices based on all available administrative and statistical sources, on supplementary assumptions and information. The analysis of data with respect to the main identity of the system *(Supply = Uses)* underlines the inconsistencies in the estimates. The differences can be caused by inaccuracies and inappropriate methods in the preceding estimates, errors in the specification items or in the classification of products, or simply calculation errors. The main task of the compilers of supply and use tables is to detect these inconsistencies and solve them.

Because of a huge amount of data and information used in the supply and use tables, detailed by tens, hundreds or sometimes even thousands of products, it is very important to follow a systematic approach to solve the problems. Fortunately, a number of useful instruments are available in a supply and use system to tackle the problems.

1. Ensuring the *basic identities* for current and constant prices. Any difference between total supply (including margins and taxes) and total use (at current and constant prices) for any product points to an inconsistency. This observation is the starting point for going back to the data and analyzing the problem in detail.
2. *Checking plausibility and credibility*, represents a search for unexpected ratios among data. If something appears to be implausible, one has to look for an acceptable explanation by analyzing the underlying sources and discussing the data with experts in the concerned area. Some examples of plausibility checks are:
   (a) comparing the share of each supply component in the total supply (the same for use table components),
   (b) comparing the share of the use categories with total supply, over a set period of time,
   (c) comparing price indices used on the supply side and the main use categories,
   (d) comparing volume indices of output, intermediate consumption and value added,
   (e) comparing price indices of output and price indices of intermediate consumption elements.

   All the checks on plausibility and credibility are established based on the type of inconsistency detected in the supply and use tables. Inconsistencies may be caused by errors and inconsistencies in the data provided by statistical units (enterprises, establishments, households etc.) and by administrative sources, or errors created by the employees who work in the compilation of supply and use tables (poor experience, lack of statistical and economic knowledge, etc.). As the resources for national accounts are limited, a systematic approach is required for balancing. In this process of balancing, it is evident that large inconsistencies require more attention than smaller ones.
3. *Automatic procedures* for balancing are essential in the preparation and management of the supply and use system. The computer plays different roles in the compilation process, from the calculation in the preparation stage to the development of appropriate solution for supply and use balancing. The most widely used method of automatic balancing is called the RAS method[(2)]. It is used to revise the internal entries in a matrix so that they agree with the margin totals. RAS is used when the margin totals – total supply/use of commodities, or total gross output by kind of activity, for example – are believed to be correct but the breakdown inside the matrix is not consistent with the margin totals. When a benchmark supply and use table is being compiled, manual balancing should be carried out until the remaining differences have been reduced to a minimum (a general rule is that the row and column totals should sum to within ±5% of the known correct marginal figures). RAS and similar procedures will produce a balanced matrix even if the discrepancies are large but the resulting table may be very misleading. Automatic balancing methods cannot judge the reliability of the numbers they are adjusting. That is the task of the national accountants.

(2) *The iterative proportional fitting procedure (IPFP, also known as biproportional fitting in statistics, RAS algorithm in economics and matrix raking or matrix scaling in computer science) is an iterative algorithm for estimating cell values of a contingency table such that the marginal totals remain fixed and the* estimated *table decomposes into an outer product.* Source: http://en.wikipedia.org/wiki/Iterative_proportional_fitting.

To find out more…

- *Handbook of input-output table compilation and analysis*, Studies in Methods, Series F, No. 74, UN 1999, Chapter 9: Updating input-output tables: RAS methods;
- *Eurostat Manual of Supply, Use and Input-Output Tables*, Eurostat, European Communities, 2008, Chapter 14: Updating and projecting input-output tables.

One established piece of software used for constructing supply and use tables is ERETES; it provides assistance in compiling National Accounts that comply with the international standards such as the 1993 or 2008 SNA. In particular it has been designed to produce two important outputs namely the supply and use tables and the Integrated Economic Account Table.

To find out more…

- ERETES website: **www.eretes.net**;
- *Handbook on Supply and Use Table: Compilation, Application and Practices Relevant to Africa*, ACS, UNECA, 2012.

4. *Error-search procedures*. Based on the countries' experience in balancing supply and use tables, it is advisable to split up the supply and use system into smaller parts covering a limited number of rows and to search for the main errors at this level. Sector experts will be responsible for the smaller packages of the supply and use system. An integration system must be as simple in its operation as possible. At the same time, it is necessary for the experts working on balancing to have access to the common database and the files containing the complete supply and use system. In addition, automatic procedures can help to eliminate the small discrepancies between supply and demand. This is often done with the help of proportional corrections. Experience shows that the combination of manual and automatic statistical techniques and procedures is the best workable solution to establish a supply and use system.

In summary, the **main steps** of compiling balanced supply and use tables are the following:

1. To collect all information on target totals and the values that can be entered directly into the system as predetermined. Here it is assumed that these have already been prepared and that all data from sub-systems that produce input to the balancing process have already been compiled.
2. To create an initial version of the product balances. This version can be compiled using automatic processes, but at this stage a number of unsolved problems will remain: for some products supply will not equal uses, or for most categories of use the totals will usually differ from their targets. This step will be referred to as 'Automatic balancing'.
3. To manually adjust the product balances. The unsolved problems are closely examined and solutions are applied. This step will be referred to as 'Manual balancing'.
4. The differences between target totals of the indicators and the values are removed, except where such differences are considered acceptable. In this step, trade and transport margins, and VAT are finally adjusted to their targets. This step will be referred to as 'Final balancing'.

To find out more…

Eurostat Manual of Supply, Use and Input-Output Tables, Eurostat, European Communities, 2008, Chapter 8: Balancing Supply and Use.

3.4. Supply and use tables at current and constant prices

The 2008 SNA requires the compilation of supply and use tables at current prices, as well as at constant prices.

Supply and use tables provide an excellent compilation framework for constant price estimates because:

1. the tables include an available overview of the extensive set of transaction data, price indicators, and volume indicators;
2. they provide a check on the numerical consistency, reliability, and plausibility of supply and demand;
3. due to the accounting framework, they require volume indices and deflators of several variables, at different levels of aggregation, interrelated in a systematic way;
4. in a supply and use system at current and constant prices, the whole data set can be balanced taking into account the uncertainties of the underlying estimates;
5. the supply and use tables give the opportunity to compare the constant price estimates of values at basic prices with those at purchaser's prices, in relation to the valuation elements, such as trade and transport margins, and taxes on products.

The compilation of supply and use tables in current and constant prices can be carried out in two ways:

1. *The sequential approach*: first, completing the compilation process at current prices (data collection, adjusting the data and balancing); second, deflating these tables; and finally, the values at constant prices are balanced.
2. *The simultaneous approach*: compiling supply and use tables in both prices (current and prices of the previous year) and balancing them 'at the same time'. At the end

of the compilation process, tables at current as well as at constant prices are available.

For the compilation of supply and use tables, it is recommended to follow the simultaneous approach. Its main advantage is that it gives the possibility of analyzing value, price and volume indices in relation to each other. The result of this analysis is an improvement of estimates, not only in constant prices, but in the current prices, too. This approach offers the opportunity to check the data by comparing price and volume indices, and the simultaneous balancing at current and constant prices may result in a better allocation of corrections than separately balancing the tables at current prices or constant prices.

A country compiling supply and use tables for the first time will normally start with the estimates in current prices. After that, for the next exercise, it is recommended to organise the compilation procedure of current and constant prices at the same time. Where there is a lack of data sources or their quality is poor, the insufficient prices data can be adjusted based on a simultaneous analysis of resources and uses of products in the economy in current and constant prices. In this way, some of the questions encountered while compiling a constant price table are answered in the inconsistency of data in current prices, and vice-versa.

The compilation process of supply and use tables is summed up in a column-row-column scheme, irrespective of the approach adopted (sequential or simultaneous):

1. Filling the *columns* of the tables (industries and final consumption categories) with data from various sources, adjusted to national accounts concepts,
2. Balancing process performed on the *rows* meaning that the supply and use tables are balanced at product level. The decisions made during this step have an effect on production and intermediate consumption of the industries and, as a result, on their value added,
3. *Analyzing* the results obtained by column, more specifically the value added by industry. The unacceptable values mean going back to the analysis by rows and making the necessary corrections.

To a certain extent it is an iterative process.

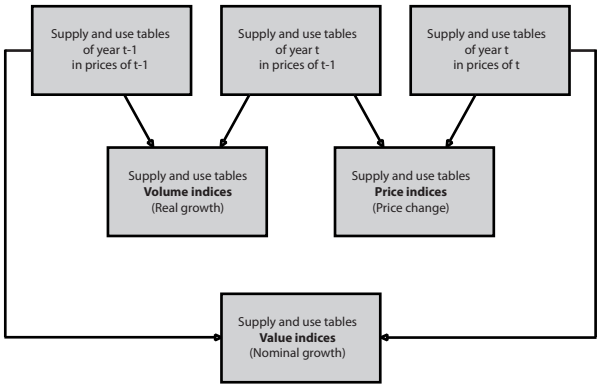
Applying the simultaneous approach to the compilation of supply and use tables imposes special requirements on the data set. The data at current prices are included in the system after they are deflated so an important step is estimating data in prices of the previous year. Every transaction, output, and intermediate and final consumption must be described in terms of the product at current prices and in prices of the previous year. The methodology applied in the supply and use tables for the estimation of indicators in current and constant prices follows the 2008 SNA requirements.

Chapter 7: *Volume measures* presents the conceptual background of price and volume measures in national accounts, the main data sources and methods used for the annual estimates.

In order to calculate indices, it is necessary to have values at current prices of the previous year. For every entry in the supply and use table, three values must be available: a value for the year t at prices of t-1, and a value at current prices for years t-1 and t. This set of data allows the national accountant to carry out the double check of data consistency; even if the results at current prices look plausible, analysis of the volume and price data can presents serious problems. When prices change rapidly, it is evident that analysis in volume terms is to be preferred.

When the balancing phase has been completed, the users have at their disposal a system of tables containing consistent and detailed data on values, volume changes and price changes of goods and services. In addition, this system includes detailed information on levels and trends in primary incomes and final demand in both nominal and volume terms. The links between these tables are presented in Figure 8.3.

Figure 8.3: The link between supply and use tables at current and constant prices



Source: *Eurostat Manual of Supply, Use and Input-Output Tables*, Eurostat, European Communities 2008

To find out more…

- *Handbook of input-output table compilation and analysis*, Studies in Methods, Series F, No. 74, UN 1999, Chapter 11: Input-output tables and production accounts in constant prices;
- *Eurostat Manual of Supply, Use and Input-Output Tables*, Eurostat, European Communities, 2008, Chapter 9: Supply and use tables at constant prices;
- *The 2008 SNA*, European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 14: The supply and use tables and goods and services account.

4. Concluding remarks

The compilation of supply and use tables for the first time in order to meet the objectives of Milestone 1 of the 2008 SNA implementation is very laborious, requires a large investment of human resources and is time consuming. This investment, although costly, is necessary to ensure the quality of the national accounts estimates and to provide useful and coherent information to the users.

The supply and use tables have a special role in the compilation of national accounts, by providing the framework that guarantees the consistency of all indicators, in current and constant prices. Their elaboration represents an important part of the national accounts compilation process; in general terms, the main advantages are the following:

1. supply and use tables are the most efficient way to incorporate all basic data, be it administrative or statistical, aggregated or detailed, in a systematic way, in order to estimate national accounts;
2. supply and use tables achieve consistency in the national accounts indicators at a detailed level, thereby ensuring their quality in the framework of the supply and use tables;
3. the framework of the supply and use tables includes the components of the production, income and expenditure approaches to measuring GDP, thereby enabling a coherent and balanced estimate of GDP both in current prices and constant prices;
4. the balanced supply and use tables provide consistency and coherency between the first three accounts of institutional sectors: Goods and Services Account; Production Accounts by industry and sector; and Generation of Income Accounts by industry and sector.

The implementation of the supply and use tables in the current practice of the statistical office is a crucial decision and is based on:

1. availability of data sources supporting their implementation;
2. capacity of the unit in charge with the compilation of supply and use tables;
3. needs of users and advantages for the national accounts and statistical system development.

After the decision has been taken, the strategy for the implementation is elaborated. All phases of the 2008 SNA strategy presented in Chapter 2: *Building the SNA* of this handbook should be completed with a special part dedicated to the compilation of the supply and use tables. Special attention should be paid to the organisation of the national accounts department, which is responsible for the elaboration of the supply and use tables. Setting the tasks and the work flow inside the department is based on the number of experts and their professional capacity because development of the supply and use tables is a complex process and requires not only a very good knowledge of national accounts methodology, but also a deep understanding of all economic and social indicators existing in the statistical and administrative system as well as the economic phenomena of the country.

4.1. Questions for practitioners

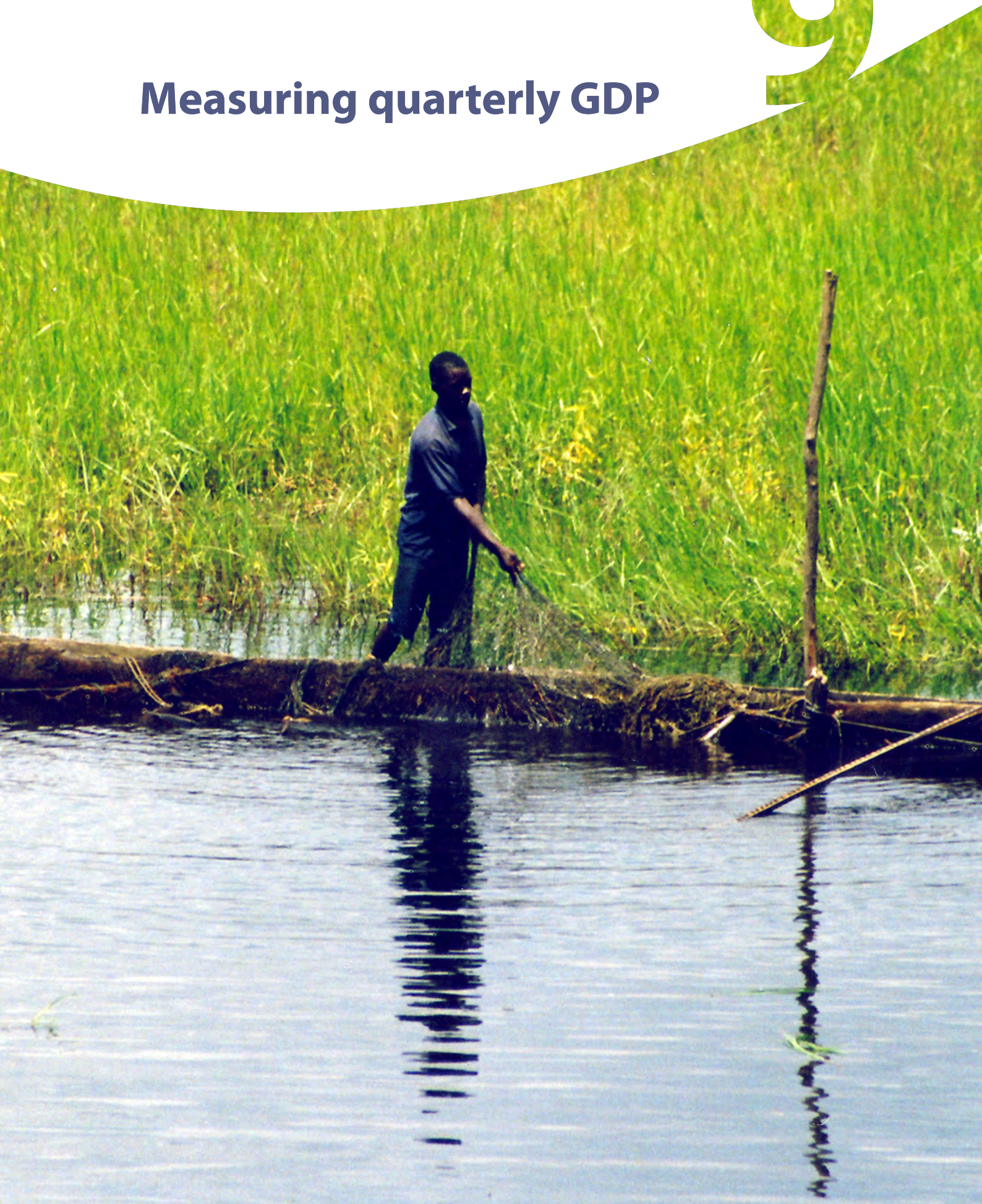
1. Do you intend to compile supply and use tables in your country? When will you be able to provide the first estimations?
2. Has a strategy been developed for the implementation of the supply and use tables?
3. Is there demand for supply and use tables in your country from the government, economists, etc.? Is the statistical office prepared to respond to these demands?
4. If you have supply and use tables, to what extent are they used in the economy and by whom? Does the statistical office provide methodological support to the users in order to get familiar with the methodological requirements?
5. What are the main problems encountered in the process of supply and use table compilation? How have they been solved? Are they integrated in the general strategy of the statistical system development?

5. Recommended reading

- *The 2008 SNA,* European Commission, IMF, OECD, UN, World Bank, 2009, Chapter 14: The supply and use tables and goods and services account;
- *ESA 2010, Chapter 9: Supply and Use Tables and the Input-Output Framework* - Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union;
- *Eurostat Manual of Supply, Use and Input-Output Tables,* Eurostat, European Communities, 2008;
- *Handbook of input-output table compilation and analysis,* Studies in Methods, Series F, No. 74, UN 1999;
- *Handbook on Supply and Use Table: Compilation, Application, and Practices Relevant to Africa* (Draft version of 25 January 2012) The African Centre for Statistics (ACS) United Nations Economic Commission for Africa (UN-ECA);
- *Eurostat's ESA 95 manual on Input-Output: Valuation matrices* (First complete draft) Norbert Rainer, paper presented 13th International Conference on Input-Output Techniques 21-25 August 2000, Macerata, Italy.

9

Measuring quarterly GDP



The chapter in brief

The 2008 SNA implementation represents a complex process with several phases. One of the milestones of the 2008 SNA implementation's six phases calls for the compilation of quarterly national accounts. In addition, the recent economic and political context has brought about an increase in the demand for accurate indicators that provide timely, comprehensive information about the evolution of the economy on a short-term basis. Users obtain this information from quarterly national accounts. In keeping with the objective of the handbook, the present chapter describes the main methodological aspects of quarterly national accounts implementation and development, focusing on quarterly GDP (QGDP). The data sources and methods used for its compilation each quarter, based on two approaches (production and expenditure), are presented, along with numerical examples of estimation procedures. This handbook omits the income approach to calculating quarterly GDP due to a widespread lack of availability of data sources.

1. What are quarterly national accounts and why do we need them?

1.1 General scope

Quarterly national accounts (QNA) serve two main purposes; namely, to provide information about the evolution of the economy in a *more timely* manner than annual data, and *more comprehensively* than individual short-term indicators. Timely, coherent, accurate, comprehensive and reasonably detailed quarterly national accounts serve as a framework for assessing, analysing and monitoring current economic developments.

Definition

Quarterly national accounts are national accounts whose reference period is a quarter. They provide a comprehensive accounting framework within which economic data can be compiled and presented in a format that is designed for purposes of economic analysis, decision-taking and policymaking, on a quarterly basis.

Source: *European System of Accounts (ESA 2010)*, Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013, Chapter 12: *Quarterly National Accounts*

Compilation of quarterly national accounts is based on the 2008 SNA and other manuals devoted to this task (see the *Recommended reading* section of this chapter). The 2008 SNA contains no chapter specifically addressing quarterly national accounts issues, but the same principles, classifications, definitions and overall coverage as for annual national accounts apply. The European System of Accounts (ESA 2010) includes a chapter dedicated to this issue.

There are two important requirements for quarterly national accounts. Quarterly national accounts must be: available as soon as possible after the end of the reference period; and as accurate as is feasible to require as little subsequent revision as possible.

A conflict between the two requirements thus arises, as more timely quarterly estimates may require greater subsequent revision. A balance between timeliness and accuracy must therefore be struck, depending on the interests of users of the national accounts data in each country.

The main characteristics of quarterly national accounts are the following.

1. Their purpose is to present the short-term movements of the economy, providing a coherent measure of such movements within the methodological framework of national accounts. In contrast with annual estimates, quarterly data focuses on growth rates and their temporal characteristics such as acceleration, deceleration or changes in sign.
2. In quarterly accounts, the same standard classification as in annual accounts applies, albeit at a higher level of aggregation. This is because the purpose of quarterly accounts is to give an overall picture of the short-term macroeconomic situation and evolution, rather than to provide the structural details about the economy, which is the domain of annual accounts.
3. Due to variations in the intensity of economic activity throughout the year, quarterly indicators are compiled in raw (non-seasonally adjusted) and in seasonally adjusted forms.
4. Quarterly national accounts have to be reconciled to annual accounts values (i.e. annual estimates and the sum of the four quarterly estimates should be equal).
5. Quarterly national accounts revisions are more substantial and occur more frequently than for annual accounts because of the characteristics of data sources and compilation methods.

Countries all around the world are interested in setting up a system of quarterly national accounts, or in improving their existing systems, to take advantage of the benefits of having such a system in place. These benefits include the following. Quarterly national accounts:

1. Provide a timelier picture of the economy in a coherent accounting framework, and offer a means of detecting the phase of the economic cycle, highlighting peaks and troughs. Business cycle fluctuations are successfully captured by quarterly national accounts because the average period of the cycle generally coincides with quarters.
2. Incorporate into a common framework the available short-term indicators—which are often incomplete and cover only a specific aspect or sector of economic activity—using a range of classifications, and disseminate these

indicators in various ways.

3. Supply a pool of useful information for monitoring the economy and suggesting directions for policies concerning the main short-term target variables. Monitoring the short-term movements of major economic flows is possible based on quarterly national accounts data, using indicators such as the output, GDP, private consumption, government consumption, gross fixed capital formation, change in stocks, exports, imports, wages, profits, taxes, and lending and borrowing of the main institutional sectors, with an emphasis on the government sector. Quarterly national accounts record the flows of goods and services at both current and constant prices, which provides insight into the growth dimension of the flows.
4. Support on-going economic policy decisions, which require prompt information about the economy over the short term.
5. Offer information for other purposes such as econometric modelling, including structural econometric models and multivariate time series models. These models represent a tool for economic policymaking and business cycle evaluation, and an instrument for structural economic analysis and forecasting.
6. Offer the framework for further improvements to the entire statistical system. Quarterly national accounts provide a coordinated conceptual framework for designing surveys and collecting economic and social statistical data, as well as a framework for identifying major gaps in the range of available short-term statistics.

Box 9.1: Role of QGDP

'In looking for momentum, quarter-on-quarter real GDP growth rates are more important. The year-on-year rates can be inadequate in identifying the current trend in economic activity, as they could indicate, for example, that an economy is still in recession when it has actually been recovering for some time. In other words, a year-long span is too broad and insensitive to quarterly (or monthly) growth reversals: e.g. a yearly growth can be negative due to the fact that the current observation is below its counterpart one year ago, but monthly or quarterly trend movements may have been in growth for many months or quarters. In sum, year-to-year rates of change are not suitable for business cycle analysis, and analysing the economy on the basis of these rates of change can have an adverse impact on the soundness of macroeconomic policy.'

Source: Paper 'A Background Note on Uses of National Accounts Estimates at ADB' - OECD/ADB/ESCAP Workshop on Quarterly National Accounts, 17-21 June 2002, Bangkok

1.2 Coverage

Quarterly national accounts adopt the same principles, definitions and structure of annual national accounts, and cover, in principle, the entire sequence of accounts and corresponding aggregates, as well as the supply-and-use framework based on the methodology of the 2008 SNA.

The progress of the 2008 SNA implementation in each country is evaluated at the international level against the Standard Minimum Requirement Data Set (MRDS) and the milestones set out by the United Nations.

Chapter 2: *Building the SNA*, Section 2: *The SNA implementation strategy* presents the scope and content of MRDS for annual accounts.

The set of data required to meet the criteria for SNA implementation in the field of quarterly national accounts is presented in Table 9.1.

Table 9.1: Scope of implementation of 2008 SNA related to quarterly national accounts

NAQ Table Number	Indicators	Quarterly accounts
	GDP, value added and employment	
	Nominal and volume measure of GDP by industry or by expenditure components	Minimum requirement
1.1	GDP expenditure at current prices	Optional minimum requirement
1.2	GDP expenditure at constant prices	Optional minimum requirement
2.1	Value added and GDP in current prices by industry	Optional minimum requirement
2.2	Value added and GDP in constant prices by industry	Optional minimum requirement
2.3	Value-added components by industry, current prices	Recommended
	Employment by industry	Recommended
	Integrated accounts and tables, including integrated satellite accounts	
1.3/4.1	Accounts for the total economy (until net lending)	Minimum requirement
	Supply and use table	Desirable
	Institutional sector accounts (until net lending)	
4.2	Rest-of-the-world accounts (until net lending)	Minimum requirement
4.3	Non-financial corporations sector accounts	Recommended
4.4	Financial corporations accounts (until net lending)	Recommended
4.5	General government sector accounts (until net lending)	Recommended
4.6	Household sector accounts (until net lending)	Recommended
4.7	Non-profit institutions serving households sector accounts (until net lending)	Recommended
	Financial accounts	
4.1–4.7	Financial accounts for all sectors	Desirable
	Balance sheets and other changes in asset accounts	
	Balance sheets, revaluation and other volume changes in asset accounts for all sectors	Desirable

Note:

Minimum requirement: adequate implementation of the 2008 SNA, where relevant.
Recommended: recommended for compilation by all countries.
Desirable: Useful statistics that should be compiled, if possible. Tables shown without a number are not included in the annual United Nations Questionnaire (NAQ).
For the institutional sector accounts, the household accounts and the non-profit institutions serving households may be presented together.
Source: Report of the Inter Secretariat Working Group on National Accounts (ISWGNA) to the forty-second session (2011) of the United Nations Statistical Commission
http://unstats.un.org/unsd/statcom/doc11/2011-6-NationalAccounts-e.pdf

In practice, not all the requested data are compiled; the availability of data sources, the coverage of annual accounts, and the lack of human resources reduces the scope and the coverage for quarterly national accounts. Many countries therefore only provide the main aggregate and the GDP, along with some details from the production and expenditures approaches.

Section 2: Accounts and main aggregates of Chapter 3: *Basic Concepts* presents the three approaches of annual GDP compilation.

1.3 Some conceptual issues

Some compilation considerations are particularly important for quarterly estimates; namely, the point at which transactions are recorded, their consistency and the meaningfulness of the estimates.

1. ***Time of recording***

The 2008 SNA defines the time of recording of flows in national accounts and the systems used to do so. Examples of such systems are:

1. cash accounting system: transactions are recorded when

'cash' (the payment) is received or tendered;

2. full accrual accounting system: transactions are recorded when the underlying economic events occur, regardless of the timing of the related payments;
3. due for payment: transactions are recorded when a commitment—a liability to make a payment—occurs (e.g. pension liabilities in the public sector, tax payment).

Detailed information concerning the recording of the transactions in national accounts is presented in this handbook in Chapter 3: *Basic concepts*, Section 1.4.2: *Time of recording*.

The choice of system may affect results, especially when the recording period is shorter than one year, as is the case with quarterly accounts. To obtain a record of flows on an *accrual basis*, as required by the 2008 SNA, some data adjustments are necessary. The process starts with an in-depth analysis of the sources, to gain an understanding of the recording time of the transactions, and continues with adjustments for the current period. For example, if VAT declarations are used for the output estimation, adjustments should be made, taking into account that quarterly data from tax authorities do not refer to the production of the quarter; instead, this data usually has a one-month lag. This means that the value of turnover declared for VAT purposes in April represents the results of the activity carried out in March, thereby requiring adjustments to the data.

2. ***Consistency in recording and work-in-progress***

The main issues, especially for quarterly accounts, are to ensure consistency in the records for:

1. Production of goods or services produced over lengthy periods. Unfinished production from one quarter is recorded as inventory of a work-in-progress so as to ensure consistency with the compensation earned by the employees for this production.
2. Services produced over lengthy periods. At present, there is growing evidence of producers with activity in the business and financial services industries producing services over lengthy periods. In this respect, quarterly business surveys need to capture incomplete service production, such as inventories of work-in-progress at the end of each quarter, as these surveys would for goods.
3. Data for the variables that appear in the accounts by different institutional sectors, and within or between components of the three GDP approaches.

3. ***The meaningfulness of the quarterly data***

In the compilation process of quarterly GDP, a specific issue that needs addressing is meaningful estimation using data from production, expenditure and, possibly, incomes. Some examples of problems that may arise are the following:

1. interest payments may occur twice a year or annually;
2. payments of taxes on operating surplus may be concentrated in one or two quarters of the year;
3. taxes on land and buildings, which may be seen as an annual tax, may be paid irregularly over the course of the year.

Solutions to these problems should be based on the analysis of the phenomena and annual data. For example, to determine the quarterly profile of non-seasonally adjusted data for taxes on operating surplus, an appropriate tax rate from the annual estimates should be applied to the corresponding series of the operating surplus.

2. Data sources and methods used for QGDP compilation

2.1 Data sources

The link between available data sources and methods used for GDP compilation is obvious. Ideally, the three GDP approaches should also be applied for compiling quarterly data, starting from the very preliminary phase of compilation. In reality, however, very few data sources are timely enough for this purpose. In these circumstances, it is necessary to make maximum use of available sources, and establish suitable methods to compile quarterly GDP. In general, none of the three approaches is more reliable than any other because the quality of the sources and the institutional context have an important impact on the accuracy of the estimates. In many countries, the estimates of QGDP by the production approach are considered to have the highest reliability, although good estimates from the income side are only available in a few countries. One of the compilation process steps involves determining the most reliable sources, the appropriate approach or approaches for the estimates based on available sources and, ultimately, the optimal method for reliable QGDP compilation.

In very few cases, a data source is available in a form that enables its direct use for QGDP estimation with little or no adjustment. In most cases, the indicators offered by the existing data sources differ from user needs in some way, and so require adjustments. These adjustments may typically be established for one or a small number of *main benchmark years* for which additional sources, such as the results of more comprehensive and detailed surveys or censuses, may be available. In these cases, the annual and quarterly time series are anchored to these main benchmark years and the regular source data are *used as indicators* to update the benchmark estimates. As the annual estimates provide the benchmarks for quarterly indicators, they should be the starting point in selecting and developing quarterly data sources.

Statistical and administrative data sources used for QGDP compilation differ from one country to another, due to:

1. the capacity of the statistical system to provide short-term indicators that cover the main economic activities;
2. the availability of administrative data, their coverage and the access of national accountants to this data;
3. the structure and size of the economy.

Chapter 4: '*Statistical Infrastructure for National Accounts*,' Section 2: *'Statistical data sources'* and Chapter 5: *'Administrative Data Sources'* include information about data sources used for annual GDP compilation.

The **statistical data sources** cover a variety of economic fields that should be integrated into the QGDP compilation process. At the international level, however, it is necessary to harmonise the basic statistics in order to facilitate theoretical and practical comparability. Thus, the greater the degree of harmonisation in classifications, prices, and so forth in different countries' statistical systems, the more comparable the corresponding national accounts statistics (both annual and quarterly) between nations will be.

For QGDP compilation, the most important statistical sources available within the national statistical system are the following (they are part of the '*ideal*' data set).

1. Short term business surveys, which provide:

   (a) appropriate *general* information on: sales/turnover; purchases from market, GFCF by principal assets type, inventories by types, foreign trade in services, compensation of employees and employment;

   (b) *specific* information on: monthly index of production and the monthly (or quarterly) index of retail sales, quantity indicators for hotels and restaurants (overnight stays), transport (tonne km, passenger km), etc.
2. Household budget survey (HBS), offering information on household income and expenditures on goods and services. In order to be used for quarterly estimates, it is essential to have an appropriate sample, representative for the period of time, that is sufficiently large to ensure accurate estimates.
3. Price statistics, covering the consumer price indices (CPI), producer price indices (PPI) for goods (including agriculture), producer price indices for services, export and import price indices and the construction cost index.
4. Foreign trade statistics providing data on imports and exports of goods and services.

The **administrative sources** generally used for QGDP compilation provided by public authorities or institutions are the following:

1. government expenditures and revenues, available on a monthly basis;
2. financial statements of financial and non-financial enterprises, which may be available quarterly or twice a year;
3. tax declarations, which provide information concerning the turnover and the value of VAT paid;
4. balance of payments (BoPs), available monthly;
5. building permit issued (data taken from an identifiable public authority);
6. registration of vehicles (data taken from an identifiable public authority);
7. employment data (e.g. employment register, social security system, etc.).

In the absence of statistical or administrative data, **other sources** should be sought and used for the compilation of quarterly national accounts indicators. Data from industry associations, industry experts, or leading enterprises in a particular industry may help with the calculation of quarterly indicators. These can be grouped as follows:

1. data from research institutes, news agencies, etc. (e.g. opinion surveys and other qualitative data);
2. data from professional unions and industry bodies (e.g. information relating to doctors, dentists, lawyers and pharmacists);
3. quarterly company reports or special, tailored surveys of a few very large private and public corporations (e.g. utilities and transport usage).

One of the objectives of quarterly national accounts is to provide as much accurate data as possible following the annual methodology and data. For this reason, national accountants should ensure an adequate use of all available sources. It is crucial that they have a good understanding of the indicators these sources provide, their definitions and coverage, how the data are derived, their accuracy, and possible biases. Establishing the ways in which the data sources are used is an on-going exercise. Basic data need continuous monitoring because new issues may emerge at any time. In this respect, national accounts compilers should endeavour to develop a *good working relationship* with their data suppliers to get the best possible support from these agents and to avoid complications in the compilation process.

The data sources should be assessed for accuracy, reliability and timeliness for several reasons:

1. to determine whether a specific data source is suitable for QGDP compilation;
2. where more than one data source is available for a particular indicator, the selection of one source should be based on coverage, content, etc.;
3. when data from different sources are in conflict, this assessment will lead to a choice on where to make adjustments;

4. to identify areas for data source improvement;
5. to allow national accountants to inform data users about the quality of the estimates and expected future revisions of the quarterly time series.

In practice, in many cases, there will be little or no choice about sources in the short term. Nonetheless, it is still necessary to assess the data sources and the indicators that may be used based on information from the data providers.

The most important criterion for the assessment of the accuracy of quarterly sources is the extent to which they are able to *indicate annual movements*. This follows the main requirement of keeping QGDP consistent with annual accounts. The accuracy of the short-term source statistics as indicators of the annual movements depends on definitions and specifications of the variables, and on issues such as coverage, units and classifications. The timeliness of the quarterly source data also has considerable implications for how early QGDP estimates can be disseminated. Usually, the first estimates are based on an incomplete set of data; for some indicators, only two months of the last quarter may be available, while data for other series may be missing completely. In this situation, provisional estimates of QGDP are made based on a simple trend extrapolation, or on alternative indicators that are more timely but less accurate.

It is important to underline that the assessment of the source data may also help identify *areas for improvement*, both for the quarterly and annual national accounts, with respect to coverage, definitions, units, sources, methods, and so on. In establishing priorities for improvements, the relative importance of an indicator is a key consideration. For many components, the basic data are so poor that refinement of methods would be of doubtful benefit.

Box 9.2: Assessment of indicators and compilation methods

1. Relationship to the sources and methods used in the annual estimates
   - Are the same sources available quarterly?
   - Are other sources/indicators available quarterly?
   - Are several alternative sources/indicators available for the same item?
2. Compilation level
   - As detailed as possible?
   - At the level of the main aggregates?
3. Coverage
   - What parts of the annual national accounts can be covered?
4. Assessment of sources and methods
   - Accuracy in predicting annual changes
   - Systematic bias or noise
   - Individual and aggregated tracking exercises
   - Definitions of source data
     - Coverage
     - Units
     - Classifications
   - Reliability (revision of indicators)
     - Systematic bias
     - Noise implied by irregular changes
   - Timeliness
     - Reliability of preliminary estimates
     - Amount of gap filling and guess estimation
5. Do the annual sources and methods need to be changed?

Source: *Quarterly National Accounts Manual- Concepts, Data Sources, and Compilation*, By Adriaan M. Bloem, Robert J. Dippelsman, and Nils Ø. Mæhle, IMF, 2001

The development of QNA methods, including QGDP compilation, also leads to improvements in annual accounts. The regular process of reviewing quarterly estimates brings to light outdated or unrealistic methods and assumptions used for annual accounts, and can contribute to a better compilation of annual data.

2.2 Methods for QGDP compilation

As stressed above, QGDP must be closely linked to annual estimates to ensure consistency between short-term and long-term movements. Through the quarterly figures, national accounts seek to provide accurate estimates of unknown future annual GDP. Thus, because in quarterly accounts the emphasis is on relative movements rather than absolute levels, the selection of indicators for quarterly estimates is based on how well these reflect changes in annual national accounts.

The strategy for establishing QGDP compilation and dissemination is based on several **steps**.

1. *Consultation* with the data users in order to identify their needs, the coverage and details of quarterly data, and the dissemination deadline.
2. Performing an *inventory* of data sources and methods in the statistical system, such as:
   (a) analysis of available annual and quarterly data sources;
   (b) assessment of annual compilation methods;
   (c) identification of the possible links between quarterly and annual data sources and methods.
3. *Assessment* of indicators provided by quarterly data sources, concerning:
   (a) definition (coverage, units, classifications);
   (b) accuracy in indicating quarterly movements;
   (c) revision of sub-annual indicators;
   (d) timeliness (available within at least one month after the end of the quarter).
4. *Designing* compilation methods and procedures based on:
   (a) availability of sources and relevance of indicators on a quarterly basis;
   (b) relations between sources and methods used in annual and quarterly estimates;
   (c) coverage of quarterly estimates, including which parts of the 2008 SNA will be implemented;
   (d) the level of detail of the compilation (two or three digits of the product and industry classifications);
   (e) selection of the integrated or separate annual and quarterly national accounts compilation system;
   (f) the compilation schedule, including dissemination and revision policy.
5. *Reviewing* the quality of data sources and methods of compilation:
   (a) analysing the correlation between annual and quarterly data;
   (b) analysing the revisions of quarterly national accounts aggregates, based on historical data;
   (c) revisions to the quarterly compilation methods based on new data sources or improvements in annual accounts estimation methods.
6. *Generating time series of QGDP* data for past years ('back series') and benchmarking them to the time series of annual data. This should be done:
   (a) for a sufficiently long time series;
   (b) at the most detailed compilation level.
7. *Revision* of quarterly national accounts in line with annual results so as to keep data up to date and include new or improved information when available.
8. *Compilation* of the current quarterly GDP based on available data sources by:
   (a) linking monthly and quarterly source data for the current quarters with estimates for the back series;
   (b) extrapolating with indicators;
   (c) benchmarking the time series of quarterly source data to the time series of annual data;
   (d) filling the information gaps.
9. *Dissemination* of the results: *first release* and *revised data*.

An important step of the implementation strategy is to decide on the compilation method (Step 4). The QGDP compilation system may be *separate* from the annual accounts compilation system or *integrated* into it. Separate systems are commonly found in countries with a comprehensive, detailed annual system that includes annual SUTs, which involve a cross-sectional reconciliation of national accounts indicators. Integrated annual and quarterly accounts compilation systems are typically found in countries not using the SUTs framework for their annual data, which makes it easier to use the same system for annual accounts and QGDP. In an integrated system, the data storage and calculation functions for both annual and quarterly data are carried out within the same processing system, although the level of detail differs (i.e. more details for annual accounts). In this situation, QGDP sources and compilation methods may be benchmarked to annual sources and methods.

The choice of the compilation method depends on the conditions in each country and the specifics of annual and quarterly national accounts, bearing in mind that:

1. annual data are subject to a detailed reconciliation process that cannot be applied each quarter;
2. quarterly data have a time series dimension; the annual system follows a year-by-year calculation method.

Another important aspect that should be taken into consideration when the methods of product and industry for quarterly national accounts compilation are defined is the recommendation to compile them *simultaneously* in current and constant prices, and at the most *detailed level* possible. For this procedure, three options exist:

1. to obtain the value at constant prices, and then to inflate the result to obtain the value at current prices;
2. to obtain the value at current prices, and then to deflate the result to obtain the value at constant prices;
3. to produce independent estimates of the indicators in current and constant prices.

Ideally, the quarterly data sources and the methods should be the same as for annual accounts. In reality, however, this is usually unfeasible. Therefore, simpler methods that differ from those for annual NA compilation are developed to produce QGDP. In general, there are two main **approaches** for QGDP compilation:

1. the *direct approach*, which is based on the assumption that the basic quarterly data and the corresponding data from the annual accounts are quite consistent, at least in terms of growth rates;
2. the *indirect approach*, which employs statistical techniques to quantify the relationship between a time series of annual data (from the annual accounts) and the available quarterly indicators in order to generate quarterly estimates of the national accounts variables.

As the methods used for the estimation of national accounts are determined by the availability of data, the *recommended approach* for the compilation of quarterly national accounts aggregates is based on the best use of the existing data sources. This may be described as a '*pragmatic*' approach. The vast majority of countries use a combination of direct and indirect methods, depending on the availability of source data. For example, when no quarterly indicator is available, national accountants fill gaps in the QNA by looking at the available alternatives to ensure comprehensive estimates of the national accounts aggregates. After choosing a suitable alternative, compilers can use historical patterns in the annual data for the chosen variable as a guide. If a series is volatile and relates to the economic cycle, growth rates of the rest of the economy may be a suitable indicator. Extrapolation on the basis of past trends is generally undesirable, as this approach tends to mask current trends. In the absence of a suitable indicator, a simple, transparent method may be more appropriate than one that is time-consuming and complicated without necessarily providing clear benefits.

Figure 9.1 shows a schematic representation of the main approaches to estimate QGDP based on the available data sources. The figure depicts the thought process that national accountants should follow to find the most appropriate method for estimating national accounts variables.

Stages 1 to 5 below apply when working with some available data that are conceptually related to the QGDP variable.

Stage 1: The basic data are used directly with no amendments required for measurement or for coverage of indicators, although some classification changes for the level of disaggregation of indicators may be admissible. This is most commonly the case when the quarterly data sources meet the national accounts requirements.

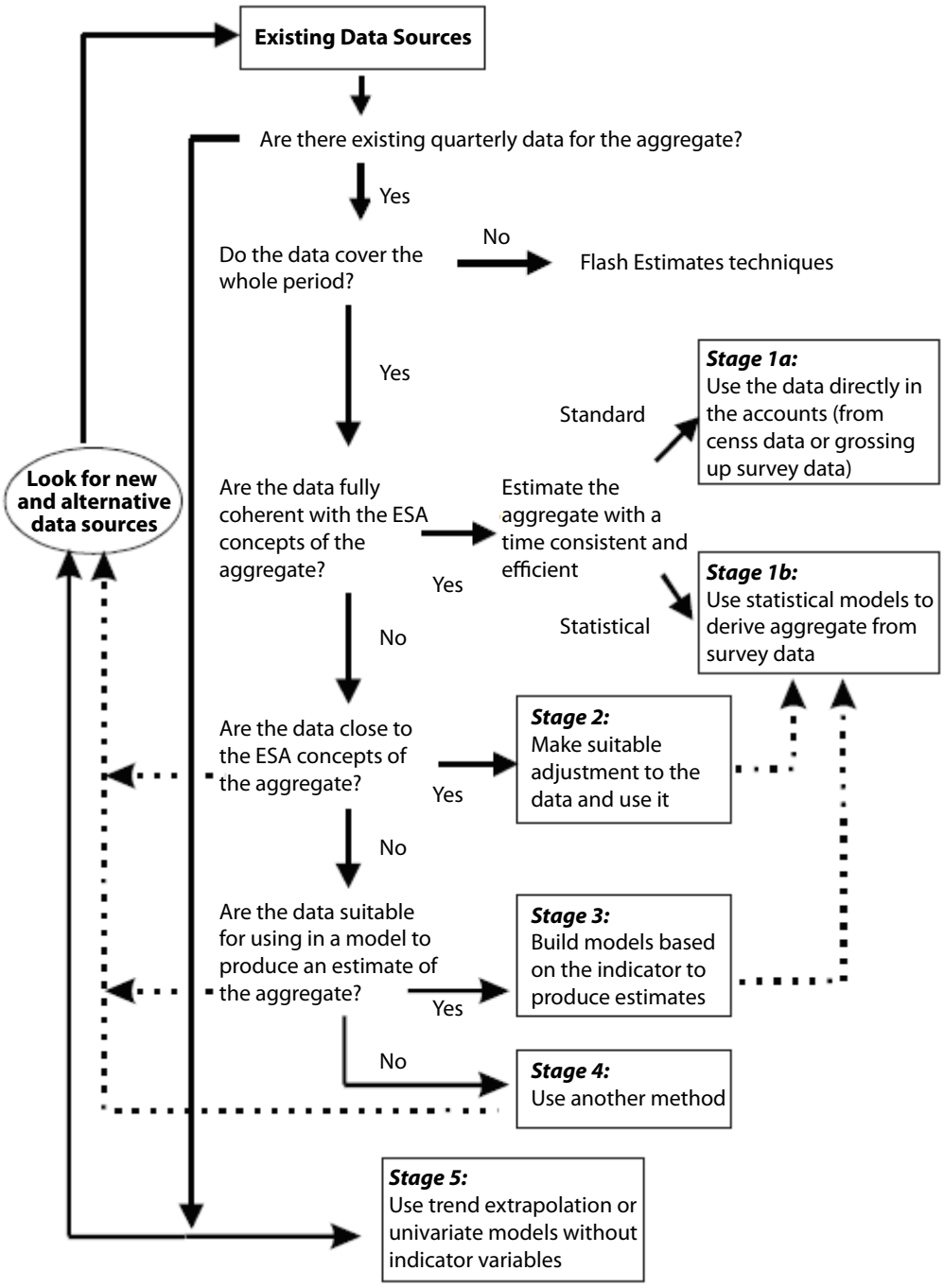
Stage 2: If the data fails to meet the SNA requirements, some adjustments are necessary, such as conversion from cash to accruals or adjustments, or amendments regarding the coverage. These techniques are not mathematical nor use a statistical model, but instead are based on the basic data being close to the definition given by the 2008 SNA. The adjustments are relatively small and have a methodological foundation.

Stage 3: Data from sources fail to meet national accounts requirements, but serve a purpose as indicators in a statistical model to estimate the QGDP variables.

Stage 4: Applying some other (non-mathematical and non-statistical) approach, often qualitative, to estimate the path of the QGDP variable using knowledge of the series and of the principal influences upon its level and growth.

Stage 5: In some instances, data sources for quarterly estimates are unavailable, and the only information comes from annual national accounts. In this case, quarterly estimates are derived either by a weighted disaggregation of the available annual data according to some purely mathematical criterion or by using time series models. These methods are not recommended—they are a last resort—and national accountants should do their utmost to obtain and use quarterly sources for the estimates.

Figure 9.1: Use of information in the estimation of a single aggregate



Source: Handbook on quarterly national accounts, Eurostat, European Commission, 2013

The general objective of quarterly national accounts implementation is to be able to apply an estimation method that fits into the first or second stage of the process. Movements among stages depend on availability, quality and timeliness of data sources, the degree of adherence to the 2008 SNA methodological requirements, and the philosophy upon which a country basis its accounts compilation.

The basic national accounts relationships between supply, use and income categories are supposed to hold at the quarterly level, too. Nevertheless, the QGDP is often compiled using an indirect approach at a much higher aggregate level than the annual estimates. This approach may generate divergent results for related values of the aggregate, and, for this reason, it is advisable to check the consistency for the following metrics at least: value added in construction versus gross

fixed capital formation (GFCF), investment versus imports of capital goods, production of general government versus final consumption of government, value added of the retail trade versus VAT in volume, and the QGDP deflator versus household consumption deflator.

2.3 Benchmarking

Quarterly national accounts estimates, including QGDP, should be consistent with annual national accounts data estimates, where the annual data provide the benchmarks. This consistency is obtained by a separate process of so-called 'benchmarking'. Generally, the annual indicators provide the most reliable information at the overall level and long-term movements in the series, while the quarterly estimates provide information about the short-term movements in the series. Benchmarking issues also arise in annual data (e.g. for the estimation of SUTs when a special survey is only conducted every few years).

The benchmarking process is seen as a way of improving the quality of the quarterly data and of the accounts overall, through what might be termed 'retrospective' alignment. In other words, a set of quarterly accounts has been established at a given moment in the past, with these estimates being consistent with the corresponding annual set of figures at the time of compilation. When the annual figures are improved by integrating more information from data sources that become available later, the quarterly accounts have to be aligned with the new annual data.

Discrepancies between quarterly and annual estimates should be corrected in order to ensure consistency. Such discrepancies are removed by benchmarking the quarterly data against the annual estimates, which, due to the accuracy of data sources and methodology, provide more reliable data. As a result, the time series of quarterly and annual data for the same phenomenon are consistent, while accuracy and quality of the quarterly estimates improve (so they may form the basis for forecasts of annual data).

The benchmarking procedure must simultaneously:

1. preserve, as much as possible, the short-term movements in the quarterly data source under the restrictions provided by the annual data;
2. ensure, for the forward series, that the sum of the four quarters of the current year is as close as possible to the unknown real future annual data.

It is important to preserve the short-term movements in the source data because the short-term movements in the series are the QNA's key contribution, with the indicator providing the only available explicit information on these movements.

Benchmarking has two main uses for quarterly estimates:

1. *quarterisation* of annual data to construct time series of historical QGDP estimates ('back series') and revise preliminary QGDP estimates to align them with new annual data when they become available;
2. *extrapolation* to update the series from movements in the indicator for the most current period ('forward series').

To understand the relationship between the corresponding annual and quarterly data, it is useful to analyse the ratio between the annual benchmark and the sum of the four quarters of the indicator (referred to as the annual benchmarking indicator ratio), which highlights any inconsistencies between the long-term movements of the indicator in the annual and quarterly data. These inconsistencies can help identify areas for improvement in the annual and quarterly data sources.

The standard, basic method for benchmarking, at least for most variables, is the *uniform proportional adjustment* (i.e. taking the difference and allocating it proportionally over the four quarters), a method that may sometimes be unsuitable. For this reason, various other approaches may be more appropriate for benchmarking.

1. Manual approach

The simplest approach is to adjust the quarterly data manually; that is, 'by eye'. This procedure involves combining direct knowledge of the series with an ability to smooth the series manually. This may be appropriate when the differences between the annual and quarterly data are small, and when few series require adjusting.

2. Ratio approach

The *pro rata distribution* refers to the allocation of an annual total of a flow series to its four quarters. A *pro rata* distribution splits the annual total according to the proportions indicated by the four quarterly observations. Below, two algebraically equivalent equations, presented differently, are shown:

1. Distribution presentation:

$$X_{q,\beta} = A_{\beta} \cdot \left(\frac{I_{q,\beta}}{\sum_{q} I_{q,\beta}} \right)$$

2. Benchmark-to-indicator (B–I) presentation:

$$X_{q,\beta} = I_{q,\beta} \cdot \left(\frac{A_{\beta}}{\sum_{q} I_{q,\beta}} \right)$$

Where, in both cases: $X_{q,\beta}$ is the level of the QNA estimate for quarter q of year β;

$I_{q,\beta}$ is the level of the indicator in quarter q of year β; and

A_β is the level of the annual national accounts estimate for year β.

Extrapolation with an indicator is another ratio approach. For the quarters of the current year or even the most recent year, independent estimates of annual data may be unavailable. QNA estimates for these periods should be consistent with the QNA estimates for previous periods that are benchmarked against the annual data. Movements in the quarterly indicator are used to extrapolate or update the QNA estimates (i.e. benchmarked to the annual data) to derive the QNA estimates for quarters with no annual accounts values.

1. Extrapolation presentation, moving from last quarter of the last benchmark year:

$$X_{4,\beta+1} = X_{4,\beta} \cdot \left(\frac{I_{4,\beta+1}}{I_{4,\beta}} \right)$$

2. Benchmark-to-indicator (B–I) presentation:

$$X_{4,\beta+1} = I_{4,\beta+1} \cdot \left(\frac{X_{4,\beta}}{I_{4,\beta}} \right)$$

Where, in both cases: $X_{q,\beta}$ is the level of the QNA estimate for quarter q=4 of year β; and

$I_{q,\beta}$ is the level of the indicator in quarter q=4 of year β.

In the ratio approaches, the **step problem** arises because of discontinuities between years. If an indicator is growing more slowly than the annual data that constitute the benchmark, then the growth rate in the QNA estimates needs to be higher than in the indicator. For example, with the *pro rata* distribution, the entire increase in the quarterly growth rates is attributed to a single quarter, while other quarterly growth rates are left unchanged. The significance of the step problem depends on the size of variations in the annual B–I ratio.

3. Mathematical and statistical techniques

A third approach refers strictly to mathematical and statistical techniques. The quarterly figures are like preliminary estimates that do not match annual estimates. The resulting discrepancies have to be distributed according to some criteria. As shown above, the ratio approach brings with it the step problem. Various time series methods that avoid steps exist, but all have the same purpose: to keep the ratio of movements of the short-term benchmarked series to those in the original series as stable as possible over time.

Examples of the benchmarking procedure are presented on the paper Quarterly National Accounts, part 1: Main issues available at the following link: **http://circa.europa.eu/irc/dsis/snabuildingthebasics/info/data/website/index.html**

The authors of the paper aim to expand on the methodological concepts of the 2008 SNA implementation presented in the handbook, and to provide practical examples.

Widely known and applied, the proportional Denton method uses a least squares technique to minimise the difference in relative adjustment to neighbouring quarters, subject to an annual total binding constraint, thus avoiding the step problem. In mathematical terms, according to the basic version of the proportional Denton technique, the benchmarked series X_t is the solution of the following minimisation problem:

$$\min_{(X1,\ldots X4\beta,\ldots\ldots X)t} \sum_{t=2}^{T} \left[\frac{X_t}{I_t} - \frac{X_{t-1}}{I_{t-1}} \right]^2, \; t \in \{1,\ldots(4\beta),\ldots T\}$$

under the restriction that, for the flow series,

$$\sum_{t=4y-3}^{4y} X_t = A_y, \; y \in \{1\ldots\beta\}$$

where:

t is the time (e.g. t = 4y – 3 is the first quarter of year y, and t = 4y is the fourth quarter of year y and may be T);

X_t is the derived QNA estimate for quarter t;

I_t is the level of the indicator for quarter t;

A_y is the annual data for quarter y;

β is the last year for which an annual benchmark is available; and

T is the last quarter for which quarterly source data are available.

Using the proportional Denton method implies that the B–I ratio for the fourth quarter of the last benchmarked year is used to prepare the forward QNA series. The B–I ratios for quarters with annual data are usually different and change smoothly, depending on the movements in the annual B–I ratios.

The benchmarking procedure is highly dependent on revisions. When annual national accounts data for previous years are revised, the QNA data for those years are benchmarked to the revised annual data.

To find out more…

- *Quarterly National Accounts Manual- Concepts, Data Sources, and Compilation,* Adriaan M. Bloem, Robert J. Dippelsman, and Nils Ø. Mæhle, IMF, 2001, Chapter VI: Benchmarking;
- *Handbook on quarterly national accounts, Eurostat, European Commission, 2013,* Chapter 5: Statistical methods for temporal disaggregation and benchmarking;
- *Benchmarking a system of time series: Denton's movement preservation principle vs a data based procedure,* European Commission, Eurostat, 2005:
- *The use of benchmarking techniques in the compilation of the European quarterly national accounts: situation and perspectives,* Roberto Barcellan, European Commission, Eurostat 2005.

Benchmarking can be applied automatically using the following custom ***software***:

1. *BENCH (Statistics Canada, 1994)*—now integrated in SAS;
2. *ECOTRIM (Eurostat, 2001)*—new version under development;
3. *MATLAB library (Bank of Spain, 2009),* and other *ad hoc* implementations: *Modeleasy+, Gauss, R;*
4. *XLPBM (IMF, 2012)*—an excel add-in implementing Denton PFD with enhancement for extrapolation.

2.4 Seasonal adjustment methods

Seasonal adjustment serves to facilitate an understanding of the evolution of the economy over time, and the direction and magnitude of changes that have taken place. To achieve this aim, it is necessary to compare the results of one period with those of the previous periods obtained in the same conditions. Seasonal adjustment (SA) corrects for seasonal or calendar effects, which means working under the assumptions that the temperature is exactly the same in winter as in the summer, there are no public holidays, religious holidays (e.g. Christmas, Ramadan) have no effect on behaviour, people work every day of the week with the same intensity (i.e. no break over the weekend), and so forth. The presence of such effects in a time series makes comparability more difficult. Effects that occur every year in the same period and with the same intensity, however, remain hidden under annual comparisons.

Mathematically, seasonal adjustment means using analytical techniques to break down a series into its components, with the main objective being to identify the components of the time series and thus provide a better understanding of their behaviour. The impact of the regular intra-annual seasonal pattern, the influences of moving holidays, the number of working/trading days, and the weekday composition in each period (the trading-day effect) are removed in the seasonally adjusted quarterly data. By removing the repeated impact of these effects, national accountants can produce seasonally adjusted data that highlight the underlying trends and short-run movements in the series.

Seasonal adjustment is based on the assumption that time series can be ***decomposed*** into unknown components, with the simplest presentation being the following:

$Y_t = f(TC_t, S_t, I_t)$

Where: TC_t is the long-term trend and cyclical movements;

S_t is the seasonal (and calendar-related) effects; and

I_t is the irregular component.

The *trend-cycle Component* (TC_t) is composed of: long-term upwards/downwards (underlying) trend movement observed over decades; medium-term fluctuations, which commonly define the business cycle turning points; and abrupt changes in the level of the long-term trend. The component TCt may also be presented by its two sub-components: trend and cycle.

Seasonality (S_t) can be described as all types of intra-annual events that occur regularly with the same annual timing, with a fairly stable magnitude, and in the same direction. Examples of widely known seasonal events are:

- weather seasons: weather conditions change during the year (e.g. more/less rain, warmer/colder environment);
- institutional conventions: agreement on certain administrative rules such as tax collection, bonus payment, and the like;
- induced seasonality: inherent industry conditions due to a relationship with seasonal activities, such as the canned fruit industry or wrapping paper production.

Seasonality also includes calendar-related effects. Since a solar year is not divided into an exact number of weeks, the occurrence of each day of the week within the same month/quarter may differ (e.g. January 2011 and January 2012 both had 31 days, but in 2011 there were 10 weekend days while in January 2012 there were only 9). If a daily pattern of activity exists within the week, and such differences of days exist, then there will be an impact on monthly/quarterly measures. This is called the *trading (or working) day effect*. A solar year is not exactly divisible by 365 days, the remainder becomes a full day every 4 years; February 2012 had 29 days while February 2011 had 28. This event is called *leap year*.

The *irregular component* (I_t) comprises the remaining non-systematic volatility of the series or its unpredictability. It also contains unusual effects (of unseasonable weather, natural disasters, irregular sales campaigns, etc.) such as outliers. In time series decomposition, as well as for analysis purposes, outliers are very important effects that must be detected and

treated, whether or not their cause is known.

Essentially, the **decomposition of the series** by components is based on an equation with two or three non-observable components, thus resulting in infinite solutions. The decomposition could be either additive or multiplicative. There is no best solution, but several possible decompositions exist. Thus, the trend is also non-unique, depending on the applied decomposition. Knowing the components of the series, seasonally adjusted series may be viewed as:

1. original series from which seasonality and calendar-related effects have been removed; or
2. the trend-cycle of the series, including irregular components.

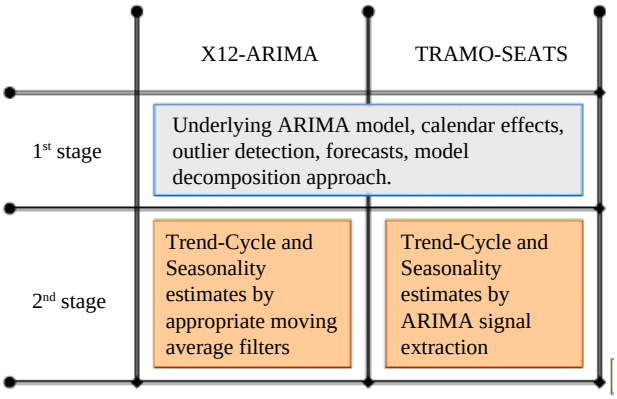
Provided that seasonality and calendar-related effects evolve within certain intervals (known as stable behaviour), seasonally adjusted series contain most of the updates regarding the evolution of the series; namely, changes in trends (shifts), shifts in the cycle (turning points) and irregular effects (outliers).

The two main groups of methods for estimation of seasonal adjustments data are the following.

1. *Moving average-based methods*, which use different kinds of moving average filters. Moving average represents a weighted sum of a certain number of values of a time series comprising the observation under consideration and neighbouring observations. While the number of values in the average is kept constant, the time periods 'move' successively, hence the adjective 'moving'. These methods do not rely on an underlying explicit model and were developed mainly on an empirical basis. The best known moving average-based method is the US Census Bureau's X-11 (and its upgrades), which involves the repeated application of suitable moving average filters. This procedure leads to a decomposition of the unadjusted data into its trend-cycle, seasonal and irregular components. The latest update of the model is X-13 ARIMA, but the upgrade most commonly used is X-12-ARIMA.
2. *Model-based seasonal adjustment methods* estimate the trend-cycle, seasonal and irregular components with signal extraction techniques applied to an ARIMA model fitted to the unadjusted or transformed (e.g. logged) data. Each component is then represented by an ARIMA expression and some parameter restrictions are imposed to obtain orthogonal components. TRAMO/SEATS is one of the best known and most widely used methods of this type. In order to isolate a unique decomposition (i.e. the canonical decomposition), TRAMO/SEATS imposes further constraints. These constraints stipulate that the variance of the irregular component be maximised and, conversely, the other components be kept as stable as possible (compatible with the stochastic nature of the model used for their representations).

Both methods are divided into two stages. In the first stage, the model, the calendar effects, and the outliers are estimated (before adjustments and forecasts); in the second stage, the trend-cycle and the seasonal component are extracted.

Figure 9.2: Two-stage seasonal adjustment methods



Source: Quarterly National Accounts Course, Joint Vienna Institute, August 5 - 16, 2013 - IMF Statistics Department

Box 9.3: Seasonal adjustment using Demetra+

Demetra+ is an IT tool, developed by Eurostat, for seasonal and calendar adjustment. It offers a choice of two seasonal adjustment methods (X-12-ARIMA and TRAMO/SEATS), and provides user-friendly tools to check the quality of results. It is open, free, flexible software that supports a wide range of uses. The .NET version (1.04) of Demetra+ was released in December 2012, and supports the implementation of the 2009 ESS guidelines on seasonal adjustment. A Java version (JDemetra +) was released in December 2012.

As a result of the experience gained with the previous versions of Demetra+, the 2012 release offers multi-processing (i.e. a large number of series can be seasonally adjusted at the same time), more advanced diagnostic tools, and compatibility with .xml files.

Seasonally adjusted official statistics are the headline figures, so it is very important to perform seasonal adjustment well. Accordingly, since the 1990s, Eurostat has played a leading role in the promotion, development and maintenance of freely available seasonal adjustment software that supports established best practices. The adoption of the ESS guidelines and the support for their implementation of Demetra+ takes this advocacy even further.

The ESS guidelines cover all the key steps of the seasonal and calendar adjustment process, and represent an important step towards the harmonisation of seasonal and calendar adjustment practices within the European statistical system and Eurostat. A common policy for seasonal and calendar adjustment of all infra-annual statistics is essential for maximising the quality and comparability of national data, as well as enhancing the overall quality of European statistics.

The ESS guidelines are not restricted to seasonal adjustment *per se*, they also cover the pre-treatment of series, revision policies, quality assessment, documentation, and specific issues related to the limitations of seasonal adjustment. Throughout the document, the reader is presented with a step-by-step process with explanations and reasons for choosing different options when either analysing individual series, or adjusting a large number of series for production purposes.

To download the Demetra+ and the JDemetra+ software, and to access the ESS guidelines and other documents, visit the CROS portal at: **http://www.cros-portal.eu/content/seasonal-adjustment**

Source: *Handbook on quarterly national accounts, Eurostat, European Commission, 2013*

In general, when applying the seasonal adjustment method based on X12-ARIMA/TRAMO-SEATS, NA compilers should follow **eight steps**:

Step 0: Number of observations
It is a requirement for seasonal adjustment that the times series be *at least 3 years long* (36 observations) for monthly series and 4 years-long (16 observations) for quarterly series. Of course, these are minimum values; series should be longer for an adequate adjustment or for the computation of diagnostics on the basis of the fitted ARIMA model.

Step 1: Graph
Compilers should first study the *data and graph* of the original time series before running a seasonal adjustment. Series with possible outlier values should be identified. It is important to check that the outliers are valid and free from sign problems (e.g. erroneous data capture). Missing observations in the time series should be identified and explained. Series with too many missing values will cause estimation problems. If series are part of an aggregate series, compilers should verify that the start and end dates for all component series are the same.

Step 2: Constant in variance
The type of transformation should be used automatically. Confirm the results of the automatic choice by looking at graphs of the series. If the tests for choosing between additive and multiplicative decomposition models are inconclusive, then national accountants may choose to continue with the type of transformation used in the past for consistency between years, or should visually inspect the graph of the series.

If the series has zero and negative values, then this series must be additively adjusted, as in the equation: $Y_t = TC_t + S_t + I_t$

If the series is decreasing with positive values close to zero, then multiplicative adjustment must be used: $Y_t = TC_t * S_t * I_t$

Step 3: Calendar Effects
Analysis should determine which regression effects, such as *trading/working day, leap year, moving holidays* (e.g. Easter) and national holidays, may be affecting the series. If the effects are implausible for the series or the coefficients for the effect are non-significant, then regressors (a kind of 'independent variable' representing the inputs or causes) should not be fitted for these effects. If the coefficients for the effects are marginally significant, then it should be determined if there is a reason to keep the effects in the model. If the automatic test of the model does not indicate the need to include a trading-day regressor but there is a peak at the first trading day frequency of the spectrum of the residuals, a trading-day regressor may be fitted manually. If the series is long enough and the coefficients for the effect are highly significant, then six regressors for the trading-day effect should be used instead of one. The regressors represent the elements of the common trading-day (TD) regression and are calculated as follows:

1t TD = (number of Mondays) – (number of Sundays)
2t TD = (number of Tuesdays) – (number of Sundays)
. . .
6t TD = (number of Saturdays) – (number of Sundays)

where t is the month or the quarter.

Step 4: Outliers
There are two ways to identify outliers. *The first is when identifying series with possible outlier values, as in Step 1.* If some outliers are marginally significant, compilers should check if there is a reason to keep the outliers in the model. *The second possibility is when automatic outlier correction is used.* The results should be confirmed by studying graphs of the series, and any additional available information (economic, social, etc.) on the possible cause of the detected outlier should be used.

A high number of outliers signifies that there is a problem related to weak stability of the process, or that the data are unreliable. Series with a high number of outliers relative to the series' length should be identified. This can result in many interventions (over-specifications) in the regression model. The series should be remodelled by reducing the number of outliers. The outlier regressors that are revised should be considered carefully. Expert information about outliers is especially important at the end of the series because outlier type is unclear from a mathematical point of view, and changing outlier type (e.g. removing a level shift) leads to large revisions at a later date.

Step 5: ARIMA model
Automatic model identification should be used once a year, but re-estimation of the parameters is recommendable upon adding new observations. If the results are implausible, then following the procedure described below is advisable. Non-significant high-order ARIMA model coefficients should be identified. It may be helpful to simplify the model by reducing the order of the model, taking care not to skip lags of AR (autoregressive) models. For moving average (MA) models, it is unnecessary to skip model lags whose coefficients are non-significant.

Step 6: Check the filter *(optional)*
The critical X-11 options in X-12 ARIMA are the options that control the extreme value procedure in the X-11 module, and the trend and seasonal filters used for seasonal adjustment.

National accountants should verify whether seasonal filters are in agreement with the overall moving seasonality ratio. After reviewing the seasonal filter choices, the seasonal filters in the input file should be set to the specific chosen length, so they will not change during production. The SI-ratio graphs in the X-12 ARIMA output file should be studied. Any months with many extreme values relative to the length of the time series should be identified.

Step 7: Residuals
There should not be any residual seasonal and calendar effects in the published seasonally adjusted series or in the irregular component.

The spectral graph of the seasonally adjusted series and the irregular component may be looked at (*optional*). If there is residual seasonality or a calendar effect, as indicated by the spectral peaks, the model and regressor options should be checked in order to remove the residual peaks. If the series is a composite indirect adjustment of several component series, the checks mentioned above in the aggregation approach should be performed. Among others, the tests for normality and Ljung-Box Q-statistics should be studied in order to check the model's residuals.

Step 8: Diagnostic
The stability diagnostics for seasonal adjustment are the sliding spans and revision history. Large revisions and instability indicated by the history and sliding spans diagnostics imply that the seasonal adjustment is not useful.

To find out more…

Practical Guide to Seasonal Adjustment with Demetra+, from source series to user communication, UNECE 2012
http://www.unece.org/fileadmin/DAM/stats/publications/Practical_Guide_to_Seasonal_Adjustment_final_web.pdf;

Programs TRAMOP and SEATS, Instructions for the User, by Victor Gomez, Agustin Maravall
http://www3.istat.it/strumenti/metodi/destag/software/manualdos.pdf;

Presentations of Workshop on Seasonal Adjustment, Ankara, Turkey, 20-23 February 2012, see
http://www.unece.org/index.php?id=28196;

Handbook on quarterly national accounts, Eurostat, European Commission, 2013, Chapter 7: Seasonal and calendar adjustment;

Quarterly National Accounts Manual – concepts, data sources, and compilation, A.M. Bloem, R.J. Dippelsman, N. Maehle – IMF, 2001, Chapter 8: Seasonal Adjustment and Estimation of Trend-Cycles;

ESS Guidelines on Seasonal Adjustment, European Communities, 2009;

Practical Guide to seasonal adjustment with Demetra+, From source series to user communication, UN, 2012
http://www.census.gov/srd/www/x13as/
http://www.bde.es/webbde/es/secciones/servicios/Profesionales/Programas_estadi/Programas_estad_d9fa7f3710fd821.html

TRAMO/SEATS and X-12-ARIMA, together with well-documented and stable interfaces to use these tools, provide a sound basis for seasonal adjustment. The choice between these applications may be based on past experience, subjective preference and characteristics of the time series. These

applications should be reviewed on a regular basis and, if necessary, updated after satisfactory testing. The methods and specifications currently used in seasonal adjustment should be clearly communicated to users.

Seasonal adjustment of QNA is a **specific activity** that requires specific knowledge of econometrics. Both TRAMO/SEATS and X-12-ARIMA provide extensive aids for helping analysts achieve high quality seasonal adjustments, but the range of options and diagnostics may be difficult to understand for newcomers to the field. While both programs can be configured to work automatically, the automated choices made by the software should never be accepted blindly (see steps described above), hence the strong argument for having seasonal adjustment specialists performing the seasonal adjustment for QNA.

An arrangement that has proved to be successful in a number of countries is one whereby a small team of seasonal adjustment specialists meets the seasonal-adjustment needs of the whole NSI. The specialist statisticians, including the national accounts compilers, are responsible for the routine seasonal adjustment of the data each month or quarter. Whatever the arrangements within an NSI, it is imperative to have a pool of individuals responsible for the seasonal adjustment of QNA with a high degree of seasonal adjustment expertise.

3. Production approach to QGDP

The production approach is the most common approach for compiling QGDP, predominantly because of the availability of data within the statistical systems. Following the national accounts methodological requirements, QGDP from the production side should be estimated based on the independent compilation of its main elements: output, intermediate consumption and net taxes on production. In standard practice, however, the quarterly data necessary for intermediate consumption estimates are often unavailable, and estimates of GVA are derived only using estimates of output or a proxy for output.

In order to derive the volume estimates of output or GVA directly, the volume indicators related to output (output-related index) may be used. Such indicators include sales or turnover data, or product quantities. This process allows for extrapolation of the output in the base period. Also, input-related indices such as employment may be used when output indices are unavailable.

> Chapter 7: *Volume Measures, Section 1.3: How to measure price and volume in SNA* presents the basic methods for deriving volume measures.

Compiling the production account (output, intermediate consumption and GVA) at current prices and in volume terms requires detailed information on both output and current expenses, which may be unavailable at a quarterly frequency. Estimation of the missing data must rely on the use of other series as an indicator. Most commonly, output data is available, while data on intermediate consumption is missing. In other cases, data on total intermediate consumption, component(s) of intermediate consumption, labour inputs or capital inputs may be available as indicators. The quality of the estimate depends on the assumption of a stable relationship between the indicator and the target variable.

Relationships between inputs and outputs (input–output ratio or IO coefficients) may change as a result of technological changes, differences in seasonal patterns of outputs and inputs, or variations in capacity utilisation caused by changes in the business cycle. The impact of technological changes is non-significant in the short term, and the benchmarking process is capable of handling such changes if they happen gradually over a long period. It is preferable to use benchmarking rather than fixed ratios.

An implicit ratio of GVA in output (GVA/output ratio) may be established and used in order to compile current and constant price estimates in the absence of other information. These ratios, derived from annual estimates, must be checked and updated continuously. The initial estimates of quarterly GVA by kind of activity for market sector activities may also be based on the assumption that output and intermediate consumption grow with the same rate in volume terms, either from the previous quarter or from the same quarter of the previous year.

In the process of performing the inventory and assessing the available data sources, an important activity is to separate the information by activities at the classification's chosen detail level to obtain the total GVA as the sum of corresponding values for all activities within the economy.

3.1 Output

Table 9.2 presents indications on what kind of sources or information can be used in the compilations, in general, for both current and constant prices.

Table 9.2: Sources and indicators used for quarterly output estimation

ISIC Rev.4 Sections	*Components*	*Sources/ Indicators*
Agriculture, forestry	Output – Wheat and barley – Other grains – Livestock slaughtering – Whole milk and eggs – Wool production – Animal production (GFCF) – Other crops – Fruits and vegetables – Other horticultural products – Forestry	Indicators: – Marketing boards – Harvesting data – Quantity of meat produced and prices obtained from abattoirs – Numbers of animals slaughtered – Data on deliveries – Quantity data – Stock numbers from agricultural censuses – Allocation of annual estimates – Quantities and values delivered at auctions – Annual turnover from trade associations (allocated to the quarters) – State forestry sales – Labour force in forestry – Quantity of timber felled – Official government estimates
	Intermediate consumption	Administrative data – Statistics on quantities – Indicators: • Costs of marketing, fodder, fuels • Fodder and consumption of fertilizers
Fishing		– Value and size of catches – Sales revenue and quantities – Amount of fish slaughtered on fish farms
Mining and quarrying		– Production information: quantity data, expenditures on mineral exploration; metres drilled, etc. – Data from short term statistics—Indices: IPI and PPI – Turnover from VAT statistics
Manufacturing		– Data from STS – Indices: IPI and PPI – Turnover from VAT statistics
Electricity, gas, steam and air conditioning supply		– Quantity data – Sales provided by specialised units – Data from short term statistics – Indices: IPI and PPI – Turnover from VAT statistics – Consumption on inputs
Water supply, sewerage, waste management and remediation activities		– Quantity data – Sales provided by specialised units – Index of industrial production – Turnover from VAT statistics or business surveys – Consumption on inputs

ISIC Rev.4 Sections	Components	Sources/ Indicators
Construction	Private sector – Residential construction – Non-residential construction	– Data from short term statistics; Building and engineering construction surveys – Turnover from VAT statistics – Administrative data concerning the building permits – Employment figures – Indicators: • Costs of marketing, fodder, fuels • Estimates of work put in place by type of dwelling • Estimates of work put in place by type of structure • Construction surveys
	Public sector construction	– Budget data – Estimates of work done – Employment indicators – Budget data
Wholesale and retail trade; repair of motor vehicles and motorcycles		– Sales from short term statistics and/or VAT statistics – Sales by public market authorities – Output volume indicators – Volume trade index – Sum of calculated trade margins
Transport and storage	Transport – Air transport, pipeline system, water transport, ferry operations, etc. – Transit operations – Road haulage – Taxicab services	– Turnover from VAT statistics and/or short term statistics – Index of industrial production – Volume indicators: • Passenger numbers • Passenger kilometres • Weight/volume kilometres • Volume measures of output of industries relying on road haulage – Employment data
	Postal and courier services	– Turnover from VAT statistics and/or short term statistics – Gross revenue of the postal service – Volume indicators: data for letters and parcels
Accommodation and food service activities	Accommodation	– Turnover from VAT statistics and/ or business surveys – Indicators: • Balance of payments data • Statistics on nights spent by non-residents • Estimation according to total domestic consumption • Nights spent in hotels
	Food service activities	– Turnover from VAT statistics and/ or business surveys
Information and communication	Publishing Motion picture, video and television programme production, sound recording and music publishing activities Programming and broadcasting activities Telecommunication Computer programming consultancy and related activities	– Index of industrial production – Indicators: • Employment indicators • Audience viewing hours • Sample surveys of radio advertising sales • Number of subscribing to cable services – Turnover from VAT statistics and/or business surveys

ISIC Rev.4 Sections	Components	Sources/ Indicators
Financial and insurance services	FISIM	– Stocks of financial assets and liabilities and interest payment flows of financial intermediaries from prudential regulation authorities or central banks
	Other financial services	– Indicators: • Revenue • Stock market volume traded • Issues of stocks and bonds • Mutual fund sales • Hours worked or in employment • Volume indices (e.g. number of current account transactions)
	Insurance services	– Premiums paid obtained from prudential regulation authorities or directly from insurance companies
Real estate activities	Real estate activities with own or leased property Real estate activities on a fee or contract basis	– Turnover from VAT statistics and/or business surveys – Final consumption expenditure of households on dwelling rent – Estimates of end period housing stock – Average rent per square metre – Information about property valuations
Professional, scientific and technical activities	Market sector	– Turnover from VAT statistics and/or business surveys
	Non-market sector	– Budget data – Indicators: • Employment
Administrative and support services		– Turnover from VAT statistics and/or business surveys – Indicators: • Employment
Public administration and defence; compulsory social security		– Budget data – Compensation of employees plus CFC – Employment multiplied by wage cost index
Education	Non-market sector	– Budget data – Compensation of employees plus CFC – Employment multiplied by wage cost index
	Market sector	– Turnover from VAT statistics and/or business surveys
Human health and social work activities	Non-market sector	– Budget data – Compensation of employees plus CFC – Employment multiplied by wage cost index
	Market sector	– Employment multiplied by wage cost index
Arts, entertainment and recreation	Non-market sector	– Budget data – Compensation of employees plus CFC – Employment multiplied by wage cost index
	Market sector	– Turnover from VAT statistics and/or business surveys – Gambling revenue from tax authorities – Labour income
Other service activities		– Turnover from VAT statistics and/or business surveys – Labour income – Employment or hours worked
Activities of households as employers; undifferentiated goods and services producing activities of households for own use	– Activities of households as employers of domestic personnel – Undifferentiated goods- and services-producing activities of private households for own use	– Labour force survey – Domestic service and other household services CPI
Activities of extraterritorial organisations and bodies		– Balance of payments

Source: Handbook on quarterly national accounts, Eurostat, European Commission, 2013; author's own contribution.

A summary of the main methods used for the estimation of quarterly ***output*** by activities appears below.

Agriculture, forestry and fishing

For these activities specific estimates should be made for the output produced and sold in the same quarter (e.g. milk and eggs) and the outputs that extend over a number of quarters, such as:

1. cases of '*one-off*' production, such as annual crops, trees for timber and livestock for consumption. Unfinished output, such as growing crops is classified as work-in-progress.
2. '*continuing*' production, covering, for example, fruit trees, vines, breeding, and dairy cattle. These are unfinished outputs classified as work-in-progress and converted to GFCF when completed.

For these cases, the 2008 SNA requirements recommend that the output of crops and similar production be considered in the same way as for other industries where production spans a number of quarters. Thus, the total value of the output of the crop over the whole period of production is recorded in proportion to the costs incurred in each quarter. The costs considered for inclusion are: material inputs, compensation of employees, a return to the labour and capital of unincorporated enterprises (gross mixed income), and a return to capital of incorporated enterprises (gross operating surplus).

The application of the recommendations raises two major issues: the need to estimate a value for the crop before the harvest is sold; and the imputation of a value for activity (or income) at least two quarters before it actually takes place (or is received). The two main solutions to these problems are the following.

1. First solution:

– in quarters where preparatory work is being undertaken for the harvest and the crop is reaped, output is taken to be equal to the input costs;

– in the quarter(s) in which the crop is sold, output is taken as the difference between receipts in the quarter(s) and the costs incurred in the previous quarters.

2. Second solution:

– the output of crop products at both current and constant prices are compiled on the basis of an estimation of the annual production (harvest) and a distribution on quarterly values in proportion to inputs;

– the output of animal products at both current and constant prices is obtained by extrapolation using indicators based on surveys and agricultural statistics.

To find out more…

More information about the estimation of annual and quarterly agriculture national accounts indicators is given in:

– *Agriculture in Quarterly National Accounts: Allocation of output to non-harvest quarters,* Adriaan M. Bloem , STD/NA 97(3);

– *Manual on the economic accounts for the Agriculture and Forestry, EAA-EAF* (Rev.1.1) European Commission, Eurostat, 2000.

Mining and quarrying

Taking into account the general data sources available for this industry, the methods applied are extrapolation by quantity indicator, and inflation with the output prices, unit value indices and import indices.

Manufacturing

For the manufacturing industry, estimates should be made at the most detailed level possible (i.e. at least at the ISIC rev.4 two-digit level). The extrapolation method can be applied using volume indicators (IPI), deflation of current values with corresponding PPI, or direct estimation based on turnover obtained from VAT statistics.

Estimation of output based on administrative data source is presented in Chapter 5: *Administrative data sources*, Section: 2 *Transition to national accounts*.

Electricity, gas, steam and air conditioning supply

The value of the turnover from specialised enterprises can be used for the estimation of the output. In the absence of reliable information about turnover and other elements necessary for the estimation of the output, volume indicators (number of kwh or m^3 of water) and price index (PPI for electricity, CPI for water supply) can be used. Current prices could be extrapolated on the basis of data from the companies (volume indicators).

Construction

The estimation of construction output on a quarterly basis is a difficult task. Feasibility is limited by the availability of data, as construction enterprises are often small and production may be hard to separate by quarters. Construction output can be measured in various ways, corresponding to different stages in the building process and the availability of source data.

1. The supply of building materials is often the most readily available construction volume indicator. While building companies tend to be small and dispersed, building materials are often produced by a relatively small number of large factories and quarries. Data on exports and imports of building materials are also generally available and may

be important for some kinds of building materials in some countries.

2. Building permits provide information on the location, type of building (building or dwelling), kind of building activities, building costs, content, floor area and estimated building time. This information can be used to calculate, on a monthly basis, the different stages of the building process and to monitor its progress in order to identify the output.
3. Turnover reported by construction businesses to the tax authority or as a result of statistical surveys.
4. Households reports of their own consumption, collected by statistical surveys.

An example for the calculation of the output and intermediate consumption in construction, based on the supply of raw materials, is presented in Box 9.4.

Box 9.4: Example of estimation of construction indicators

Row	Indicators	Data source/Calculation	2009	2010
1	Construction output	row 10 / 65%	435	480
2	Import raw materials	from the BoPs	173	190
3	VAT import	administrative data	24	29
4	Tax duties	administrative data	8	9
5	Export of raw materials	from the BoPs	15	20
6	Net import raw materials	row 2 + row 3 + row 4 - row 5	190	208
7	Trade margins	row6 x 20 / 100	38	42
8	Net import	row6 + row7	228	250
9	Local construction materials	data from manufacturing production	55	62
10	Total raw materials	row 8 + row 9	283	312
11	Other consumption	row 10 x 10%	28	31
12	Total IC	row 10 + row 11	311	343
13	GVA	row 1 - row 12	124	137
14	Ratio IC/O (%)	row 12 / row 1	71	71

Assumptions based on annual accounts:

- the IC represents 65% from the output,
- the value of trade margin represents 20% from the sales,
- other intermediate consumption elements represent 10% from the consumption on raw materials.

Wholesale and retail trade; repair of motor vehicles and motorcycles

Sales data commonly serve as quarterly indicators for the output of wholesale and retail trade. Business surveys or administrative sources (VAT data) may yield sales data; shares of trade margins in the total sales from the previous year serve as indicators for the current price estimation. The constant prices can be obtained by extrapolating the sales based on the turnover volume index (in the absence of this information, the CPI provides an alternative), and deflation of goods bought for resale using PPI for the specific products.

Transport and storage

The compilation of output should be made at a detailed level (at least at the two-digit level of ISIC rev. 4) by kind of transport services. Extrapolation of indicators based on the VAT statistics in combination with a deflator or inflator based on the relevant price index is recommendable. For some activities, volume indicators like tonne km and passenger km can be used.

Accommodation and food service activities

Estimation of the output is based on turnover provided by VAT statistics or business surveys. Turnover value indices are used for deflation and estimation of the output in constant prices. For accommodation services, the extrapolation method is sometimes applied based on available volume indicators (number of beds in hotel, number of nights, etc.).

Financial and insurance services

FISIM is the indirect payment to the financial institutions for intermediary services. The supply of FISIM is produced in resident financial institutions, and is imported by residents who pay interest for loans abroad and by residents who have

deposits abroad. The demand for FISIM is used for intermediate consumption, final consumption expenditure and exports.

On a quarterly basis, it is possible to estimate FISIM directly based on data sources provided by the national central bank. The distribution of quarterly FISIM between users usually relies on some assumptions. For example, intermediate consumption of FISIM can be regarded as a service similar to other consumed services and is thus part of the fixed coefficient estimation of intermediate consumption (see Section 3.2). For imports and exports, the assumption is that FISIM has the same share of interests to and from abroad as in the final version of annual national accounts.

The output of insurance and pension funding at current prices can be compiled by extrapolating an indicator based on the number of employees in the industry. For activities auxiliary to financial intermediation, the value of output at current prices is compiled based on data from VAT statistics. The measure of the volume of these activities on a quarterly basis usually uses the relevant index of average earnings as a deflator.

Other services, including real estate activities; professional, scientific and technical activities, administrative and support services; education, human health and social work activities (market activity); arts, entertainment and recreation (market activity); other service activities

Data from VAT statistics and short-term business surveys (usually monthly) contribute to the estimation of the output.

One element of the real estate activity that requires specific estimation from national accountants is the imputed rent. Data concerning the quarterly own-dwelling services can be estimated by extrapolation on the basis of the number of dwellings. If construction data do not allow estimates of the net increase in the number of dwellings, population may be used as a proxy (preferably adjusted for any trends in the average number of persons per dwelling). Due to the differences in the average rent per dwelling, the quality of the estimation can be improved by doing separate calculations by location and by different dwelling types (e.g. house/apartment, number of bedrooms). Compilers should also consider employing an adjustment factor to account for any shortcomings in this method (e.g. for long-term changes in the size and quality of dwellings). These factors should be estimated for annual accounts, so that their effects are incorporated into the quarterly estimates by the benchmarking process.

The extrapolation using the turnover value indices is advisable for the estimation at constant prices. If these indices are unavailable, the use of CPI represents one option, as long as the methodological requirements are followed.

The estimation of the quarterly imputed rent represents one of the challenges of this process. Based on the availability of data sources, different methods have been developed and may be applied. For instance, the use of the annual data of the previous year and the growth rate of the construction of dwellings is an option for the output estimation.

Public administration and defence; compulsory social security; education, human health and social work activities; arts, entertainment and recreation (non-market activities)

The direct estimation method is applied using data from the government budget. Consumption of fixed capital, as part of the output of non-market output, may be calculated using annual figures, divided by quarter.

Education, human health and social work activities, arts, entertainment and recreation, other service activities (market activities)

For this kind of activity, extrapolation of the output based on the turnover is generally used. Data from the VAT system and from short-term statistics are used.

3.2 Intermediate consumption

For the compilation of intermediate consumption data, few sources are available on a quarterly basis. Some information may be available for purchases (usually for government and sometimes for businesses) or the change in inventory, based on special surveys carried out by the statistics office.

One method for the estimation of the intermediate consumption relies on the assumption that the output and the intermediate consumption growth follow the same trend in terms of volume. Thus, the first step is to estimate intermediate consumption at constant prices using the constant price output as an indicator. This method assumes a stable ratio of the inputs in output (IO ratio), modified by annual trends in the ratio that are incorporated through the benchmarking process. Intermediate consumption at current prices can then be derived by reflating the constant price estimate by price indices that reflect the product composition of intermediate inputs. Because specific producer price indices (PPI) for inputs are non-existent, this should be constructed by weighting together relevant price indices for each component of the intermediate consumption. These indices include the CPI, PPI and foreign trade price indices—for inputs, data are supplied by imports.

The use of a fixed ratio between output and intermediate consumption is a way to make maximum use of the available information, and this method is often valid because the structure of the output and intermediate consumption in terms of volume is slow to change over time. In any event, this method has some weaknesses:

1. it does not take into account the improvement of the efficiency of the production process;
2. the change in volume of goods and services of the intermediate consumption can differ between quarters;
3. for some industries, particularly agriculture, the input–output ratio can fluctuate greatly in the short-term.

Box 9.5: Example of intermediate consumption estimation

Objective: to calculate the intermediate consumption (IC) in the second quarter of 2013 for manufacturing of textiles.

The available information is:

	Quarter II, year 2012	Quarter II , year 2013
Output at current prices	210	214
Output at prices of the previous year	207	211
IC at current prices	130	Should be estimated
IC at prices of the previous year	127	Should be estimated

Estimation procedure:

Step 1: Estimation of the IC for quarter II 2013 at constant prices

Assume that the growth rate of the IC is the same as for the output (the coefficient I/O is constant)
Value of the IC at constant prices:
- I/O ratio = 130/210 = 0.62
- IC at constant prices = output at constant prices x IC/O = 207 x 0.62 = 128

Step 2: Estimation of the IC at current prices

The structure of the IC from SUTs or other sources is presented in the table below. Each element of the IC is reflated with the corresponding price indices.

	Structure of the IC	Value of the IC at constant prices quarter II 2013	Price indices	Value of the IC at current prices quarter II 2013
	(1)	(2)	(3)	(4)
Total IC	100	128		131
Product A	14	18	103.4	19
Product B	47	60	101.9	61
Product C	12	15	102.6	16
Product D	27	35	102.3	35

Calculation:
Column (2) (e.g. Product A) 18 = 14 x 128.0/100
Column (4) (e.g. Product A) 19 = 18 x 103.4/100

3.3 Taxes and subsidies on products

The estimation of taxes on products in current prices is based on revenues and expenditures recorded in government and customs administrative data (excise duties, VAT on imports). Compilers should pay special attention to the application of the accrual valuation principle. For constant prices estimation, the same methods of annual estimation are applied (for more information, see Chapter 7: *Volume measurement*).

The subsidies on products are provided by the Ministry of Finance, but the payments are usually made and recorded in a different quarter from that of the production itself. This is the case for subsidies that may be regarded as essentially annual in nature, and for which the quarterly payments are insignificant. In these cases, estimates should be obtained by relating the subsidy to the economic activity for which it is due.

3.4 Exhaustiveness

The estimation of QGDP should follow the same methodological requirements as for annual data. Adhering to this principle ensures the exhaustiveness of quarterly estimates. Differences in the size of the non-registered economy normally owe to economic and social structures, and the stage of development of the statistical system. The main topics of exhaustiveness that appear in the annual accounts should be included in quarterly GDP, too. These refer, in general, to the following areas:

1. underreporting and non-registration of the activity in order to avoid the payment of taxes and fulfil the legislative requirements;
2. non-coverage of the national accounts indicators due to statistical under-recording;

3. estimation of the informal sector;
4. estimation of illegal activities.

Chapter 6: *The informal sector* includes information concerning the estimation of the non-observed economy and informal sector in annual national accounts.

Estimating the non-observed economy (NOE) for annual national accounts is a difficult task. This difficulty intensifies when compiling quarterly accounts due to the lack of sources and additional information in this area. The methods developed for quarterly estimates take into account the characteristics of the economy and the trend of the quarterly production of specific activities (e.g. the value of the non-observed economy in construction is bigger in the warmer half of the year—April to September in the Northern Hemisphere and October to March in the Southern Hemisphere—due to the increase in activity in these periods).

Usually, the method for estimating the non-observed economy is based on projections because directly measured data are unavailable on a quarterly basis. Thus, the identification of suitable indicators related to the evolution of the non-recorded data represents one of national accountants' key tasks and requires a deep knowledge of this phenomenon, the methods used for annual estimates and the availability of data sources. The use of suitable proxy indicators based on the methodology for annual NOE estimation is common practice.

4. Expenditure approach to QGDP

There exist various data sources and methods for the compilation of components for QGDP using the expenditure approach, which this section expands upon.

4.1 Final consumption expenditure of households

The final consumption of households is usually the largest component of GDP by expenditure. The main sources of data on household consumption on a quarterly basis are:

1. sales/turnover statistics—by 'type of outlet' (wholesale, retail, etc.);
2. household survey on expenditure;
3. value added tax (VAT) systems;
4. business short term statistics—for services rendered to the population.

Apart from the above sources, data on production and foreign trade in consumer products can be used to derive estimates using the commodity flow approach. Statistics on trade and business surveys of other consumer services provided to households are also common data sources for the estimation of household consumption at current prices.

In addition to broad sources such as retail sales, VAT systems and household surveys, there are a range of specific indicators for components of household consumption, which include specialised statistical surveys, major supplying enterprises and regulators. Some information can be collected specifically for QNA, when there are a small number of large suppliers of a particular item, but the data are not currently published. An example of this is the sales of electricity, gas or water to residences, as well as some components of transport and communication. Of course, just like for annual estimates, the quarterly data need to be adjusted to the domestic concept, using information from BoPs.

The commodity flow approach can be used when there are good data on the supply of the products, namely production and imports. This method may be particularly useful for goods supplied by a relatively small number of producers and importers, and data on the supply of the goods are easier to collect than data on sales at the retail level. The household consumption is obtained as a residual from the supply approach, after the intermediate consumption, government consumption, fixed capital formation, and changes in inventories are estimated and deducted.

Table 9.3 lists the main data sources for quarterly estimation of the final consumption expenditure of households, classified by COICOP (the classifications used in national accounts are presented in Chapter 4: *Statistical infrastructure for national accounts*, Section 1: *The basis: business register and statistical classifications*).

Table 9.3: Data sources/Indicators for final consumption expenditure of households by COICOP

COICOP one-digit level	Data sources/Indicators
01-Food and non-alcoholic beverages	– Sales or turnover statistics – Commodity flow method – Household surveys
02-Alcoholic beverages, tobacco and narcotics	– Sales or revenue statistics – Commodity flow method – Household surveys – Tax records of tobacco – Trend extrapolation
03-Clothing and footwear	– Sales or revenue statistics – Commodity flow method
04-Housing, water, electricity, gas and other fuels	– Sales or revenue statistics – Commodity flow method – Household surveys – Trend extrapolation – Housing stock (rents) – Quantity purchased (motor fuel) – Water data, volumes of gas, electricity, etc. provided to households – Revenues statistics from utilities – VAT returns (house repairing)
05-Furnishings, household equipment and routine household maintenance	– Sales or revenue statistics – Employment/earnings in the activity concerned – Commodity flow method
06-Health	– Employment/earnings in the activity concerned – Trend extrapolation – Social security benefits, fees charged – Beds occupied (hospitals) – Medical and hospital insurance claims
07-Transport	– Sales or revenue statistics – Household surveys – Passengers, passengers km – Freight km – Traffic indicators – Stock of vehicles (personal transport) – New motor vehicle registration
08-Communication	– Trend extrapolation – Stock of receivers (radio and TV repairs) – Radio and TV licences (telecommunications) – Minutes spoken (household sector)
09-Recreation and culture	– Sales or revenue statistics – Trend extrapolation – Household survey on tourist services
10-Education	– (Private education) employment/earnings in the activity concerned
11-Restaurants and hotels	– Sales or revenue statistics – Number of overnight stays in hotels
12-Miscellaneous goods and services	– Sales or revenue statistics – Employment/earnings in the activity concerned – Trend extrapolation – Population growth (personal services) – Funeral services (death rate) – Stock exchange transactions (brokerage charges) – Output of the services providers (finance, banking and insurance services)

Source: *Handbook on quarterly national accounts, Eurostat, European Commission, 2013 and author's contribution*

4.2 Final consumption expenditure of general government

Government accounting data showing revenues and expenditures are often available on a monthly or quarterly basis. For quarterly national accounts, the fundamental requirement is to have the expenditures classified by economic type, in particular, consumption of goods and services, capital formation of goods and services, other expenditures.

As already mentioned (see Section 1.3 *Some conceptual issues*), the problem of the time of recording is an issue for government consumption (both individual and collective), due to the tendency to record expenditures and revenues on a cash basis rather than on an accrual basis. One consequence of recording on a cash basis is that the estimates of expenditures in the government account may be inconsistent with the output and income recorded by producers who have supplied goods and services. The degree of potential inconsistency is likely to vary by country, depending on the government recording practices and the nature of the spending.

National accountants should examine the series of government consumption to check whether the data appear erratic or implausible (e.g. where expenditure is much higher in the last quarter of the budget year), and are therefore unlikely to be consistent with the associated figures in the production accounts. In these situations, the national accountants, together with the providers of information, should establish suitable assumptions, and should then identify the best methods to ensure consistency with the other national accounts indicators.

4.3 Final consumption expenditure of non-profit institutions serving households (NPISHs)

Although they could be estimated together with consumption expenditure of households, estimates are often made separately. When this is the case and, unlike for annual estimates, no quarterly data sources exist, the quarterly estimate of NPISHs' final consumption expenditure is often based on the movements in 'indicator' series, such as compensation of employees at current prices and employment at constant prices, or trend extrapolation. In any case, the relationship between the actual figures and the indicator series should be reviewed to verify the inclusion of the most recent annual figures.

4.4 Gross fixed capital formation

The main data sources for annual and quarterly gross fixed capital formation (GFCF) compilation are surveys of capital expenditure by businesses. These surveys, however, are particularly expensive and difficult to conduct on a quarterly basis. The coverage of the enterprises that make investments is difficult to control using the statistical business register. For instance, new enterprises, which may not yet even be in operation, are likely to have higher rates of capital formation than established businesses. At the same time, the target population is all enterprises, although a large number of enterprises will have little or no capital formation in any particular quarter. Consequently, the sample frame needs frequent updating, and the samples have to be relatively large.

Administrative data, such as the VAT system, offers another source for quarterly GFCF estimation. If the system requires enterprises to provide detailed information about the capital and intermediate purchases on these conditions, this yields a useful indicator for capital formation.

Table 9.4: Data sources/Indicators for gross fixed capital formation

Gross fixed capital formation	Sources/Indicators
Dwellings	• Building activity statistics (e.g. value/volume of work done by builders) relating to dwellings • Capital outlays by purchasers of capital goods (improvements to dwellings, public construction) • Number of units sold (brokers' commissions on sale of new dwellings) • Index of construction output or turnover • Number of building permits issued, with adjustments for delay/completion • Production or sale of building products, such as concrete • Labour inputs in physical terms and labour cost
Other buildings and structures	• Building activity statistics (e.g. value/volume of work done by builders) relating to non-residential building • Civil and other engineering construction activity statistics • Capital outlays by purchasers of capital goods • Index of construction output or turnover, other than dwellings • Labour inputs in physical terms and labour cost • Investment intentions • Production or sale of building products, such as concrete
Transport equipment	• Capital outlays by purchasers of capital goods • Product (i.e. commodity) flow approach (using manufacturing output, and export and import data by product) • Estimated commercial share of dealers' sales, new motor vehicle registrations
Dwellings • Other buildings and structures • Transport equipment	• Capital outlays by purchasers of capital goods (corporate sector) • Product flow approach • Average purchase by farms/unincorporated businesses multiplied by estimated number of farms/unincorporated businesses (machinery and equipment)
Weapons systems	• Government finance statistics
Cultivated assets	• Government finance statistics
Intellectual property products, of which: • Computer software • Research and development	• Value/volume of work done by capital goods producers • Product flow approach • Metres drilled (oil and gas exploration well drilling) • Labour inputs in physical terms and labour cost • Turnover from VAT statistics or business surveys (for computer software)

Source: *Handbook on quarterly national accounts, Eurostat, European Commission, 2013*

The largest components of GFCF are construction and equipment, followed by cultivated assets (such as livestock and orchards) and intangible assets (such as mineral exploration, computer software, entertainment, literary and artistic originals, and research and development). The costs associated with the purchase of fixed and other assets are also included, such as transfer costs, architects' fees and installation costs. Own-account production of capital is also important in some cases, notably including construction, computer software or research and development. The estimation of GFCF on construction raises the same problems as for the estimation of the construction output (presented in Section 4.1).

Estimation of GFCF on a quarterly basis is commonly derived from a mix of demand-side and supply-side data. For example, estimates of GFCF of equipment by corporations are commonly derived using data from capital expenditure surveys or imports. The components of GFCF relating to dwellings, other buildings and other structures are commonly derived from data obtained from producers in the construction industry.

4.5 Changes in inventories

Inventories are defined as goods and some services that have been produced or imported but have not yet been used for consumption (intermediate and final), fixed capital formation, or exports. They are explicitly presented only on the expenditure side of GDP, even if they are part of the output and intermediate consumption (see Chapter 5: *Administrative data sources*, Section 2: *Transition to national accounts*).

Although changes in inventories are a small component of GDP, they may vary substantially between strongly positive and strongly negative. Consequently, this component may be a major factor in GDP movements, especially on a quarterly basis, where they are often one of the major quarterly growth factors. Over the long term, the contribution of changes in

inventories to GDP tends to be small because some of the quarterly volatility will cancel itself out over the course of the year.

The estimation of changes in inventories presents some difficulties in terms of valuation, both annually and quarterly. In the financial records of businesses, several varieties of historical costs are used, but none of them matches the national accounting valuation concepts. Measurement practice also varies, from complete physical stock-takes to samples and estimates.

A practical example for the estimation of changes in inventory based on the accounting data is presented in Annex 3.1 of Chapter 3: *Estimation of Changes in Inventory* of the handbook *Quarterly National Accounts Manual – concepts, data sources, and compilation, by Adriaan M. Bloem, Robert J. Dippelsman, Nils Maehle, International Monetary Fund, Washington DC, 2001.*

Some countries derive the changes in inventories in GDP by expenditure as a residual, especially on a quarterly basis. This method is applicable if there is a complete measure of GDP from the production approach and estimates are available for all other expenditure categories. As inventories should also be included in estimates of output and intermediate consumption, measurement issues still need to be resolved. Considering the changes in inventories as a residual means that they include the net effect of errors and omissions incurred in the compilation process. In order to avoid inconsistency in estimates, the changes in inventory should be compiled independently, using the available data sources as much as possible. Table 9.5 shows the main data sources/indicators available for the estimation of changes in inventory.

Table 9.5: Data Sources/Indicators for changes in inventories

Sections ISIC rev.4	Name	Sources/Indicators
A	Agriculture, forestry and fishing	– Business surveys (wool and fruit stocks) – Information from holders of farm stocks – Product flow (agricultural stocks, forestry stocks) – Models (growing crops and maturing livestock)
B,C,D,E	Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities	– Business surveys (mining, manufacturing, energy) – Information from shareholders (oil refineries, bulk petroleum stations, electricity utilities and at car and truck dealerships) – Figures assumed to move in line with unincorporated manufacturing and trade inventories (unincorporated enterprises)
F	Construction	– Business surveys (new housing stocks) – Assumed to move in line with usage of construction materials
G,H,I	Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities	– Business surveys
J	Information and communication	– Business surveys – Employment
K	Financial and insurance activities	– Business surveys – Employment
L	Real estate activities	– Business surveys – Financial records
M,N	Professional, scientific and technical activities; administrative and support service activities	– Business surveys – Employment
O	Public administration and defence; compulsory social security; education; human health and social work activities	– Government finance statistics
R	Arts, entertainment and recreation	– Business surveys – Employment

Source: Handbook on quarterly national accounts, Eurostat, European Commission, 2013

4.6 Imports and exports of goods and services

Data for imports and exports of goods are usually available in all countries. Quarterly data are generally available for exports and imports of services from balance of payments estimates, and are used directly in national accounts compilation. External trade statistics or custom authorities supply data on the imports and exports of goods.

Combining different techniques for compiling GDP can mitigate the weaknesses of each method. Production and expenditure data can be combined based on the commodity flow method. The method is based on the fundamental national accounting identity of goods and services accounts, and supply and use tables (i.e. total supply (by product) = total use).

Detailed presentations of the SUTs are included in Chapter 8: *Supply and Use Tables* of the handbook.

The commodity flow method can be applied on different levels, such as for groups of commodities or for individual commodities. The more detailed the level at which the method is applied, the more accurate the result—detailed information requires fewer assumptions about origin and use.

5. Revisions and dissemination

5.1 Revisions

Revisions are a common characteristic of both quarterly and annual national accounts, but they have particular significance for the quarterly indicators because they tend to be more substantial and occur more frequently. The balance between the statistics office's limited resources on the one hand and the user needs on the other raises a dilemma between timeliness of published QNA, and the guarantee of reliability, accuracy and comprehensiveness. In order to meet user needs, preliminary quarterly data are compiled and are later revised when better source data are available. Good management of the process of revisions relies on a well-established and transparent revision policy.

It is important to emphasise that the revisions are carried out *for the benefit of users*, to provide them with data that are as timely and accurate as possible, while later incorporating new, more accurate information without introducing breaks in the time series. Sometimes, the revisions may seem to reflect negatively on the trustworthiness of official statistics, but the lack of revisions can have a much more detrimental effect. This may indicate that no better information is available to improve the poor first estimates. Finally, attempting to avoid revisions by producing accurate but highly untimely data, and thus of little use to users, is a wasteful use of the available information.

To avoid unnecessary criticism, a well-designed and carefully managed revision policy is crucial. Essential features of a well-designed revision policy are predictability and openness, advance notice of causes and effects along with explanations, and easy access to sufficiently long time series of revised data.

The main factors contributing to accurate quarterly national accounts revisions are:

1. preliminary data sources used for quarterly indicators are revised;
2. seasonally adjusted data are revised when more data allow better estimates to be made of the current seasonal pattern;
3. revisions occur when quarterly figures are benchmarked to more accurate and updated annual figures.

An awareness of two types of revisions is important: revisions applied **by reason** and revisions applied **by scheduling**.

1. ***Revisions by Reason***

Reasons that give rise to revisions to time series data can be broken down into four main categories.

(a) Incorporation of better data sources:

- incorporation of source data with more complete or otherwise better reporting;
- incorporation of source data that more closely match the concepts;
- replacement of judgment or values derived largely by statistical techniques with indicators from available data sources.

(b) Capturing the routine recalculation:

- incorporation of updated seasonal factors;
- updating of the base period.

(c) Reflection of the improvements in methodology:

- changes in statistical methods;
- changes in concepts, definitions and classifications.

(d) Error corrections that may occur in source data and computations.

2. ***Revisions by Scheduling***, also called ***expected revisions***, can be further subdivided, depending on their frequency, into the following groups.

(a) Routine revisions—characterised by their high periodicity and regularity—, which affect the current weekly, monthly or quarterly data. These revisions depend on the statistical characteristics of the estimation techniques adopted by the NSIs, the revisions of the basic statistics used to compile quarterly figures, or on errors made by

national accountants.

The reasons for routine revisions may include the following.

- Timeliness.
- Quarterly data are revised in line with the annual estimates. This introduces a new annual benchmark, not only for the intra-annual quarters, but also for any subsequent quarter.
- 'Annual benchmark' revision when the annual estimates are revised after data for all the months or quarters of a year become available, and whenever more detailed annual surveys become available.
- Seasonal and calendar adjustment.

(b) Major revisions are changes in the published data, often substantial, which happen when:

- a new structural source that is only collected at long intervals (5 to 10 years), such as a census or input-output tables, becomes available;
- a new methodology is developed, such as the 2008 SNA, which incorporates new concepts to be integrated in the current estimates;
- a new legal act is brought into force, such as a new classification by industry or products, or a new international national accounts methodology (e.g. the 2008 SNA).

(c) Ad hoc revisions are revisions that are non-scheduled and are unannounced in advance because they are a result of unforeseeable events, such as errors or accidents, or depend on the lack of a scheduling procedure. Non-scheduled revisions are not pre-announced or reflected in dissemination plans, and they can confuse users and undermine confidence in the quality of statistics. National accountants should strive to avoid *ad hoc* revisions at all costs.

Major revisions affect a large part of the time series, and sometimes even the complete time series.

Usually, the data producers take the opportunity of a forthcoming major revision to introduce methodological improvements, which is good practice because it helps prevent revisions from occurring too often. Therefore, it is common for major revisions to be determined by a combination of factors, rather than one single cause. They are expected and planned well in advance, based on a detailed strategy. The policy for major revisions usually takes into account the following:

1. pre-announcing to users the implementation of a major revision, its calendar and the date of dissemination of the new estimates, and the reasons for doing it;
2. communicating and explaining the elements of the revision in advance, as well as the causes of the revisions;
3. informing the users about the expected magnitude, scope, length and impact.

When considering a revision, it is essential to distinguish between ***revision analysis*** and ***revision policy***. The main purpose of revision analysis is to identify and adjust for any possible bias in the data. Revision analysis is therefore concerned with data quality. Revision policy, on the other hand, is concerned with establishing an approach, possibly a common approach, for introducing revisions.

The purpose of ***revision analysis*** is to reduce revisions in the future by identifying and remedying any possible bias in the initial figures. In addition, it helps with quantifying the scope and nature of revisions so that users are aware of the quality of the data when using them.

Three key aspects are important for the evaluation of the impact of revisions on the overall data quality.

1. *Accuracy* is the proximity of an estimate to its notional true value. An assessment of how accurate the estimates are may involve: analysis of data, analysis of methodology and analysis of the information gained from data confrontation within SUTs. After completing this process, analysts rank the accuracy of the estimates, disseminating this ranking to users.
2. *Reliability* is the extent to which estimates are revised. Consequently, the more the estimates are revised, the less reliable they are. Unlike accuracy, reliability is easily measured. This may be a measurement of the differences between the initial and final estimates of QNA. Initial estimates that are substantially revised are clearly inaccurate, given that the final estimates are the most accurate. In any event, care must be taken with estimates that are highly reliable (e.g. they are subject to few revisions), because they are not necessarily accurate; it may be that initial estimates are highly inaccurate and remain so.
3. *Stability of the estimates* means frequency of revisions, or the number of revisions within a given unit of time. Users appreciate stability in the data, but at, the same time, they want the most accurate statistics possible. This means that national accountants have to strike a balance between making meaningful revisions when new or better data become available, and avoiding minor revisions of little consequence.

Box 9.6: Difference between first release and subsequent estimates – Swedish example

Objective: to calculate the intermediate consumption (IC) in the second quarter of 2013 for manufacturing of textiles.

The available information is:

	2001	2002	2003	2004	2005	2006	2007	2008
Resources								
Value added market producers and producers of own final use	0,5	-0,3	0,4	-0,1	-0,1	0,2	0,2	0,6
Value added central government and social authorities	0,0	0,5	0,3	0,1	-3,5	1,0	0,0	-1,7
Value added local authorities	0,1	-0,1	-1,4	-0,9	-0,4	-0,4	-0,2	-2,1
Value added NPISH	-2,0	0,8	-2,0	1,0	0,6	-0,6	0,6	1,0
Imports of goods and services	0,4	-2,9	-2,8	-1,5	-1,1	0,9	0,3	1,4
Uses								
Household consumption	0,9	1,0	0,6	0,3	-0,3	0,0	-0,2	0,0
General government consumption	1,2	-0,2	-0,7	0,1	-0,2	-0,7	0,0	-1,0
Gross fixed capital formation	-0,3	-4,2	-0,8	-1,1	1,8	0,0	-0,6	-0,3
Changes in inventories	0,4	-0,2	0,0	0,6	-0,2	0,6	0,3	0,2
Exports goods and services	-1,4	-1,4	-1,8	-3,2	-1,1	0,5	0,4	1,3
GDP	0,4	-0,1	0,2	-0,2	-0,1	0,2	0,1	0,0

Note: positive numbers mean that the First Report overestimated the development and negative numbers mean that the First Report underestimated the development.

Source: *Quarterly National Accounts Inventory, Sweden (September 2010)* http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/documents/quarterly_accounts/QUARTERLY NATIONAL ACCOUNTS%20inventories%20Sweden.pdf

Two aspects are important when looking at user needs. First, users appreciate stability in the data. Second, users want the most accurate statistics available.

Following these two requirements, two approaches are suitable for adoption in the revision analysis.

1. *Producer-oriented:* this approach means considering the revision process from the viewpoint of data producers, by:
   (a) assessing the accuracy of preliminary estimates in relation to final estimates;
   (b) improving methods of estimation used to compile preliminary figures.
3. *User-oriented:* this approach means analysing the effects that the revision process may have on users' perceptions of the economic conditions. It concentrates on the nature of the revision in order to verify if preliminary releases satisfy certain desirable features of rational forecasts.

An essential *tool* for revision analysis is a database used to archive data releases, so the revisions between any two releases for any common variables for any common period can be easily identified.

Revision policy consists of establishing a standardised, coordinated and publicised approach for introducing revisions. A basic principle is that the most accurate estimates, using the most up-to-date data source, should be published in every release, but it is advisable to avoid making minor revisions of little consequence. Revisions linked to other data sources used for QNA compilation should be coordinated across statistical domains (e.g. BoPs, Government Finance Statistics).

Box 9.7: Main pillars of the revision policy

1	General policy on data revisions	Each statistical institution within the ESS defines and disseminates a general policy on data revisions applicable to all statistics under its responsibility.
2	Specific revision policies for each statistical domain	For each statistical domain a specific revisions policy compliant with the general policy should be drawn up and implemented by each statistical institution.
3	Documentation and communication of revisions	The general revisions policy as well as the domain specific ones should be documented, publicly available, easily accessible and presented in a form that facilitates proper interpretation by the general public.
4	Consistency and stability of specific revision policies over time and across domain	As far as possible, revision policies should be kept consistent across statistical domains and countries. They also should be kept stable over a sufficiently long time period.

Source: *A proposal for a revision policy of principal European economic indicators (PEEIs),* by Gian Luigi Mazzi and Rosa Ruggeri Cannata, European Commission, Eurostat, June 2008.

When considering the effects of revisions or when performing revision analysis, routine and annual revisions are often grouped together since it is somewhat difficult to quantify their effects separately. There are at least three ways in which the effects of routine and annual revisions may be considered from a policy point of view.

1. Each revision will cause data users to revise existing interpretations of the indicator, and hence possibly change economic forecasts and policy implications. When revision processes are appropriately and clearly documented in a standard form, and are widely disseminated (e.g. via websites), users will be able to qualify their interpretations according to the potential revisions of current and recent observations.
2. The statistical properties of the revision process can give users information about the expected reliability of existing and future values, and hence advise as to the degree of confidence that they may attribute to existing interpretations of the indicator.
3. The statistical properties of the revision process may be used by data producers to monitor the quality of the data production process. In particular, the existence of any revision may indicate some bias in the production of the first estimates. This could be a sign that the production process is in need of further improvement.

Major revisions have an extensive, sometimes even disruptive, effect, especially when they are associated with changes in statistical methods and in concepts, definitions or classifications.

Box 9.8: Revision policy of the Swedish National Accounts (GDP calculations)

Revision policy of the Swedish National Accounts (GDP calculations)

Reference Year	Time of publishing	Q1 Year T	Q2 Year T	Q3 Year T	Q4 Year T	Year T
T	End May	First				
T	Middle September	Revised	First			
T	End November	Revised	Revised	First		
T	End February	Revised	Revised	Revised	First	First sum of quarters
T+1	End May	Revised	Revised	Revised	Revised	Revised sum of quarters
T+1	Middle September					
T+1	End November	Revised	Revised	Revised	Revised	Preliminary annual national accounts
T+1	End February					
T+2	End May					
T+2	Middle September					
T+2	End November	Final	Final	Final	Final	Final annual national accounts
T+2	End February					

Source: Quarterly National Accounts Inventory, Sweden (September 2010) http://epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/documents/quarterly_accounts/QUARTERLY NATIONAL ACCOUNTS%20inventories%20Sweden.pdf

5.2 Dissemination and publication

The dissemination of QNA is similar to the dissemination of annual national accounts and other statistics, and general guidance is available from the IMF's SDDS and GDDS. These standards focus on integrity and other aspects such as avoiding non-statistical interference with the data, simultaneous release to all users, general accessibility of the data and transparency.

The dissemination policy for national accounts is presented in Chapter 2: *Building the SNA*, Section 2.4: *Phase D: Dissemination*.

Taking into account the nature of QNA and their importance for decision-taking, the predominant condition is that the dissemination of the data should be swift. Rather than spending time on preparing and printing a glossy, comprehensive publication, the emphasis should be on releasing the quarterly data as soon as they are available, according to a release calendar available to users. The first release is usually rather limited, focusing on the most important data, which could be the growth rate of GDP and its value in current and constant prices, both seasonally adjusted and non-seasonally adjusted.

As a further extension, a second release may include production and expenditure approach breakdowns.

The ways to disseminate quarterly data is through a press release and via the Internet (i.e. on the statistics office's website). The press release text should be concise (as a rule, no longer than one typed page) and ready for use without rewriting. It is advisable to support the press release with a small table containing the most important data, ideally consisting of content that has been discussed and agreed on with the users.

Box 9.9: Example of first press-release on QNA

CZECH STATISTICAL OFFICE

Czech Statistical Office | Na padesátém 81 | 100 82 Praha 10

NEWS RELEASE

15 May 2013

GDP DECREASE DEEPENED IN Q1 2013

GDP preliminary estimate – the first quarter of 2013

In the Q1 2013 the gross domestic product adjusted for price, seasonal, and calendar effects decreased by 1.9%, year-on-year, and by 0.8%, quarter-on-quarter, according to the preliminary estimate.

In the **Q1 2013** the **gross domestic product** (GDP) adjusted for price effects and seasonally adjusted/* **decreased by 1.9%, y-o-y, and by 0.8%, q-o-q**, according to the preliminary estimate. From currently available partial statistical and administrative data sources it results that the deepening y-o-y and q-o-q GDP decrease was contributed to by basic demand and offer aggregates in a markedly differentiated way.

Demand components

The development of **final consumption expenditure** of households, general government, and non-profit institutions serving households in the last quarter was no longer the main cause of the economic recession. Low inflation supported stabilisation of demand of households especially for non-durable consumer goods. **Fixed capital formation** is affected for a long-term by decreasing willingness of enterprises and general government to invest mainly to dwellings and other buildings and structures. Important turnaround occurred during last months in the **external trade** development and its contribution to the GDP formation. Decreasing external demand due to overall economic recession is gradually reflected in export opportunities of the domestic economy. After three years of growth, domestic export dropped in the last quarter and external trade was no longer a source of the GDP growth.

Structure of the supply

Drop of external demand was reflected mainly in decreased **gross value added** formation of industries oriented on export; among the most affected was production of transport equipment. Decreasing investment activity caused further fall of construction. Year-on-year and especially quarter-on-quarter GDP development were negatively influenced by imbalanced collection of some **taxes on products**. Marked stocking up on tobacco products and related to that high collection of the relevant excise tax in the Q4 2012 were the reasons why the income from the tax was deeply under the average in the Q1 2013.

Next News Release will be published on: 4 June 2013 (national accounts for the Q1 2013

**/ Unless otherwise stated, all data presented in this News Release are adjusted for price, seasonal, and calendar effects.*

Later, when more data are available and the estimation of quarterly accounts improves, the QNA can begin to appear in more comprehensive statistical publications. These publications will provide a more thorough analysis of the data, supported by charts depicting the economic developments in a range of ways.

6. Concluding remarks

The introduction of QNA in statistical practice is part of the 2008 SNA implementation strategy. The need for the type of information provided through QNA may be equally urgent in developing countries as in developed nations, although more efforts are necessary in developing countries to convince users of the importance of the data, and inform them about the limitations of QNA.

Chapter 2: *Building the SNA*, Section 2: *The 2008 SNA implementation strategy* presents the phases and the main steps of this process.

Box 9.10 presents the minimum data set needed for the estimation of QGDP to an acceptable standard. The precise specification of desirable data depends on the economic structure in the country and the importance of various components in the accounts. For instance, if agriculture has a very small contribution to GDP, its compilation may be based on a smaller amount of quarterly information than for a country where the agriculture contribution is significant (i.e. 10–12%).

Box 9.10: Ideal data requirement for QGDP compilation

1. *Quarterly household budget surveys*
2. *Business surveys:*
   (a) sales/turnover
   (b) purchases
   (c) gross fixed capital formation by principal asset type
   (d) inventories
   (e) compensation of employees
   (f) employment
   (g) sectorial and industry breakdown.
3. *Government spending and receipts:*
   (a) data to compile the accounts with respect to the general government sector
   (b) data needed to split government final consumption expenditure into its collective and individual components
   (c) current taxes on income and wealth
   (d) taxes and subsidies on products, and production and imports
   (e) social benefits payable to households.
4. *Balance of payments and international investment position*
5. *Price indices:*
   (a) consumer price indices
   (b) producer price indices for goods (including agriculture)
   (c) producer price indices for services
   (d) export and import prices for goods.

Source: *Handbook on quarterly national accounts, Eurostat, European Commission, 2013, and author's own contribution*

Statistical processing for quarterly data demands data gathering, benchmarking, deflating, seasonal adjustment, aggregation and other calculations. In designing a processing system, it is useful to anticipate the differences and links between the preparatory and operational phases of quarterly national accounts compilation so that the full range of user needs are satisfied. In the preparatory phase, the objective is to compile the data on past years (back series), whereas in the operational phase, the objectives are to update the time series with data for the current quarters and to revise the data for past years based on annual results.

The management of QNA differs from that of annual accounts due to the greater intensity of work and tightness of deadlines. This means that the main problem for QNA is timeliness: their compilation is particularly vulnerable to problems like delays in major data inputs or bugs in computing systems. To deal with such problems, compilers should draw up and follow an efficient work schedule that includes the expected time of arrival of each of the data sources, the period required to carry out each process, and the flow of data from one stage to the next.

At the same time, the compilation of QNA is more 'creative' than the compilation of annual NA, because more assumptions and indirect indicators are used. This implies a need for staff with a solid economic background and strong mathematical skills. A good work plan also covers staff organisation, and allocation of personnel between quarterly and annual activities. Obviously, a smaller number of staff may result in a much more basic quality of estimation, and a lower level of detail and timeliness.

An important organisational choice relates to whether there should be a unit specifically focused on QNA or whether the same unit that works on annual national accounts should compile the QNA. The cycle of peaks in workload is quite different, so peaks in the annual compilation may not crowd out activities in QNA (and vice versa). An advantage of combining both functions is that harmonisation between quarterly and annual accounts is more likely if the same personnel is working on both. Nevertheless, the best choice when setting up the QNA compilation system is to identify a separate team, even if this requires a high level of conceptual ability, and a staff with a good knowledge of national accounts methodology and the annual compilation system.

Another important aspect to organise following the implementation of quarterly accounts is the process of maintaining their compilation. The work plan should take into account the main steps of this process (see Box 9.9) in order to ensure the sustained quality of the data over time.

Box 9.11: Main steps to maintain quarterly national accounts

1. Revise the quarterly estimates for the current year when new quarterly data become available:
   (a) link monthly and quarterly source data for the current quarters with estimates for the back series;
   (b) extrapolation with indicators: benchmark the time series of quarterly source data to the time.
2. Revise the quarterly estimates when new annual data become available:
   (a) revise the quarterly estimates for year y (and preceding years) to incorporate new benchmarking data without introducing steps in the series;
   (b) benchmark the time series of quarterly source data to the new series of annual data;
   (c) revise at the most detailed compilation level.
3. Update the quarterly time series with estimates for the next current year (year y+1):
   (a) compile quarterly estimates for year y+1 by linking monthly and quarterly source data for the quarters of year y+1 with the revised and benchmarked QNA estimates for year 1 to year y;
   (b) extrapolation with indicators: benchmark the time series of quarterly source data to the time series of annual data;
   (c) update at the most detailed compilation level.

Source: *Quarterly National Accounts Manual- Concepts, Data Sources, and Compilation*, by Adriaan M. Bloem, Robert J. Dippelsman, and Nils Ø. Mæhle, IMF, 2001

In the initial stage of QNA implementation, only the estimates of GDP with corresponding components from the production or expenditure side may be produced. With time, it is useful and necessary to revisit the coverage of the QNA in view of changes in the availability of source data and changes in the coverage of annual accounts. The users' need for additional data guides future extension of the statistical system. Once QNA are well established, users will begin to make more sophisticated requests, and will step up their interest in quarterly supply and use reconciliation, institutional sector accounts and balance sheets.

7. Questions to practitioners

1. What is the current stage of QNA estimation in your country? Are QNA currently being implemented? If not, are there plans for their implementation? What are the main problems you currently face as regards QNA estimation?
2. What are the available quarterly data sources in your country and what is their role in QNA compilation?
3. To what extent are administrative data used in the compilation process? Do they meet the methodological requirements of national accounts or are adjustments necessary?
4. What is the quality of the QNA? How big are the differences with annual estimates?
5. Is a strategy for QNA revision in place and agreed on with users? What is the magnitude of the revisions?

8. Recommended reading

- *Quarterly National Accounts Manual – concepts, data sources, and compilation,* Adriaan M. Bloem, Robert J. Dippelsman, Nils Maehle – International Monetary Fund, Washington DC, 2001 **http://www.imf.org/external/pubs/ft/qna/2000/Textbook/index.htm;**
- *Handbook on quarterly national accounts, Eurostat, European Commission, 2013;*
- *European System of Accounts (ESA 2010),* Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union, *Chapter 12: Quarterly National Accounts* **http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:174:0001:0727:EN:PDF;**
- *Agriculture in Quarterly National Accounts: Allocation of output to non-harvest quarters,* Adriaan M. Bloem , STD/NA 97(3);
- *ESS guidelines for revision policy for PEEIs,* European Commission, Eurostat, 2013;
- *Benchmarking a system of time series: Denton's movement preservation principle vs a data based procedure,* European Commission, Eurostat, 2005;
- *Backward recalculation of seasonal series affected by economic crisis: a Model-Based-Link method for the case of Turkish GDP,* Dario Buono and Kocak Alpay (Eurostat) 15 October 2010, MPRA Paper No. 40243, posted 24. July 2012 12:45 UTC;
- *The use of benchmarking techniques in the compilation of the European quarterly national accounts: situation and perspectives,* Roberto Barcellan, European Commission, Eurostat 2005;
- *Quarterly national accounts: Sources and methods used by OECD member countries,* OECD, 2001, **www.oecd.org/dataoecd/57/36/1909562.pdf;**
- *Practical Guide to seasonal adjustment with Demetra+, From source series to user communication,* UN, 2012.

Annexes

Annex 1

Scope of the Implementation of the System of National Accounts 2008: Milestones

Implementation milestones	Complementary data systems	SNA-related data and development
Pre-SNA phases	Basic data on production, turnover, consumption, investment, exports and imports Consumer and producer price indices Balance of payments goods and services account Monetary survey statistics	
Milestone 1. **Basic indicators of gross domestic product (GDP)** **Final expenditures on GDP current and constant prices** **GDP by industry at current and constant prices**	Supply and use table worksheets Balance of payments: current, capital and financial accounts Government finance statistics (GFS) transaction accounts	
Milestone 2. **Gross national income and other primary indicators for rest of the world** **External account of primary incomes and current transfers** **Capital and financial accounts**	Capital stock statistics International investment position GFS transactions and stocks in assets and liabilities Monetary and financial statistics	Quarterly national accounts Regional accounts Satellite accounts for environment and other satellite accounts Input-output analysis
Milestone 3. **Institutional sector accounts: first step:** **1. Production account for all institutional sectors** **2. For general government:** **- Generation of income,** **- Allocation of primary income,** **- Secondary distribution income,** **- Use of disposable income,** **- Capital and financial accounts**	Same as for milestone 2	Same as for milestone 2
Milestone 4. **Institutional sector accounts: intermediate step 1:** **For all institutional sectors:** **- Generation of income** **- Allocation of primary income** **- Secondary distribution of income** **- Use of disposable income** **- Capital account**	Same as for milestone 2	Same as for milestone 2
Milestone 5. **Institutional sector accounts: intermediate step 2:** **For all institutional sectors:** **Financial account**	Same as for milestone 2	Same as for milestone 2
Milestone 6. **Institutional sector accounts: final step:** **For all institutional sectors:** **- Other changes in assets account** **- Balance sheet**	Same as for milestone 2	Same as for milestone 2

Annex 2

Classification of transactions

Transactions in products (P)

P1	Output
P11	Market output
P119	Financial intermediation services indirectly measured (FISIM)
P12	Output for own final use
P13	Non-market output
P2	Intermediate consumption
P3	Final consumption expenditure
P31	Individual consumption expenditure
P32	Collective consumption expenditure
P4	Actual final consumption
P41	Actual individual consumption
P42	Actual collective consumption
P5	Gross capital formation / P.5n Net capital formation
P51g	Gross fixed capital formation
P51c	Consumption of fixed capital (-)
P51c1	Consumption of fixed capital on gross operating surplus (-)
P51c2	Consumption of fixed capital on gross mixed income (-)
P51n	Net fixed capital formation
P511	Acquisitions less disposals of fixed assets
P5111	*Acquisitions of new fixed assets*
P5112	*Acquisitions of existing fixed assets*
P5113	*Disposals of existing fixed assets*
P512	Costs of ownership transfer on non-produced assets
P52	Changes in inventories
P53	Acquisitions less disposals of valuables
P6	Exports of goods and services
P61	Exports of goods
P62	Exports of services
P7	Imports of goods and services
P71	Imports of goods
P72	Imports of services

Distributive transactions (D)

D1	Compensation of employees
D11	Wages and salaries
D12	Employers' social contributions
D121	Employers' actual social contributions
D1211	*Employers' actual pension contributions*
D1212	*Employers' actual non-pension contributions*
D122	Employers' imputed social contributions
D1221	*Employers' imputed pension contributions*
D1222	*Employers' imputed non-pension contributions*
D2	Taxes on production and imports
D21	Taxes on products
D211	Value added type taxes (VAT)
D212	Taxes and duties on imports excluding VAT
D2121	*Import duties*
D2122	*Taxes on imports excluding VAT and duties*
D213	Export taxes
D214	Taxes on products except VAT, import and export taxes
D29	Other taxes on production
D3	Subsidies
D31	Subsidies on products
D311	Import subsidies
D312	Export subsidies
D319	Other subsidies on products
D39	Other subsidies on production
D4	Property income
D41	Interest
D42	Distributed income of corporations
D421	Dividends
D422	Withdrawals from income of quasi-corporations
D43	Reinvested earnings on direct foreign investment
D44	Other investment income
D441	Investment income attributable to insurance policy holders
D442	Investment income payable on pension entitlements D443
D443	Investment income attributable to collective investment funds shareholders
D45	Rent

Current transfers in cash and kind (D.5-D.8)

D5	Current taxes on income, wealth, etc.
D51	Taxes on income
D59	Other current taxes
D6	Social contributions and benefits
D61	Net social contributions
D611 = D121	Employers' actual social contributions
D6111 = D1211	*Employers' actual pension contributions*
D6112 = D1212	*Employers' actual non-pension contributions*
D612 = D122	Employers' imputed social contributions
D6121 = D1221	*Employers' imputed pension contributions*
D6122 = D1222	*Employers' imputed non-pension contributions*
D613	Household actual social contributions
D6131	*Household actual pension contributions*
D6132	*Household actual non-pension contributions*
D614	Household social contribution supplements
D6141	*Household pension contribution supplements*
D6142	*Household non-pension contribution supplements*
	Social insurance scheme service charges (-)
D62	Social benefits other than social transfers in kind
D621	Social security benefits in cash
D6211	*Social security pension benefits in cash*
D6212	*Social security non-pension benefits in cash*
D622	Other social insurance benefits
D6221	*Other social insurance pension benefits*
D6222	*Other social insurance non-pension benefits*
D623	Social assistance benefits in cash
D63	Social transfers in kind
D631	Social transfers in kind - non-market production
D632	Social transfers in kind - purchased market production
D7	Other current transfers
D71	Net non-life insurance premiums
D711	Net non-life direct insurance premiums
D712	Net non-life re-insurance premiums
D72	Non-life insurance claims
D721	Non-life direct insurance claims
D722	Non-life re-insurance claims
D73	Current transfers within general government
D74	Current international cooperation
D75	Miscellaneous current transfers
D751	Current transfers to NPISHs
D752	Current transfers between resident and non-resident households
D759	Other miscellaneous current transfers
D8	Adjustment for the change in pension entitlements

D9	Capital transfers
D9r	Capital transfers, receivable
D91r	Capital taxes, receivable
D92r	Investment grants, receivable
D99r	Other capital transfers, receivable
D9p	Capital transfers, payable
D91p	Capital taxes, payable
D92p	Investment grants, payable
D99p	Other capital transfers, payable

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