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OECD Short-Term Economic Statistics Expert Group

Short-term Economic Statistics Expert Group (STESEG):
Task Force on Data Presentation and Seasonal Adjustment

Draft metadata and reporting manual

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Foreword

[To be prepared]

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1. INTRODUCTION AND OVERVIEW

1.1 Need for data and metadata reporting and presentation standards

The need for the dissemination of international guidelines and recommendations in the one comprehensive document for both the reporting of data and metadata by national agencies to international organisations and, the presentation of data and metadata by both national agencies and international organisations, has been recognised for some time. With the demand for closer integration and co-ordination of the work of the various international organisations, the need for agreement and adoption of a common set of data reporting and presentation practices has become even more pressing. For this demand to be met, agreement on a basic set of practices and guidelines is required not only between international organisations but also by national agencies, the initial source of almost all data and metadata entering the international environment.

Greater economic integration between the major trading blocks around the globe has led to user demand for greater comparability of data between countries. There is also parallel demand for greater data comparability over time within the same time series within the one country. The major causes of real differences in data have been identified (Eurostat 2002a, p. 35) as:

- the use of different variable definitions, concepts, units and classifications; and
- differences in data collection and processing (transformation) practices.

However, even where differences from these factors are minimal, data disseminated by different countries, etc. may actually look different because of the use of different data reporting and presentation practices. Similarly, data for identical statistical domains disseminated by various international organisations, although coming from the same national source, may also appear different due to variation in presentation practices and data transformation processes used at the international level.

There are two broad imperatives relevant at both the national and international levels that justify the need for the articulation of a comprehensive set of standards for the reporting and presentation of data and metadata. These concern the need to improve data quality and to minimise the reporting burden in the provision of data and metadata to international organisations. These imperatives are discussed in more detail in Section 2.1 below, together with current international initiatives designed address them (Section 2.2). The relationship between these initiatives, both to each other and to the reporting and presentation standards outlined in this Manual are highlighted in Section 2.3.

1.2 Scope of reporting standards referred to in this Manual

Data and metadata reporting and presentation covers a broad range of issues and topics and before proceeding further it is worthwhile outlining the fairly limited scope of the data reporting and presentation issues covered in this Manual. The Manual makes the distinction between data presentation standards involving table layout, font, type faces, readability, graphical presentation, etc, used by both international organisations and national agencies and standards for the reporting of data by national agencies to international organisations. The boundary between “presentation” and “reporting” issues is often very fuzzy and although the main focus of the Manual are standards for data reporting and exchange between organisations it necessarily touches on issues that could be considered as presentation.

This Manual provides a number of specific recommendations covering the two broad dimensions in which all data may be reported, namely:

- Types of data – absolute figures, indices, growth rates, ratios. Absolute figures may be either stock series which are measures at a point in time, or flow series which comprise measures during periods of time. One of the main differences between stock and flow series is that the latter can contain effects related to the calendar, such as trading day effects. Indices, growth rates and ratios are further transformations of absolute figures. Absolute figures may be presented either in:

  – terms of physical units (numbers, tonnes); or

  – in value terms expressed at current or constant prices.

  The dissemination of absolute figures is common for statistics published at annual or less frequent intervals, though such data are also disseminated for many short-term indicators such as monthly or quarterly data on motor vehicle registrations, construction permits, etc. It is more common to disseminate short-term statistics in the form of indices or growth rates which more readily allow conclusions to be made on changes over time in economic phenomena. As will be shown in Sections 3 and 4.3 below, there are a number of different types of growth rates.

- Form of data – raw (original or non-seasonally adjusted series), working day adjusted, seasonally adjusted, trend-cycle.

Section 6 of this Manual emphasises the need for national agencies and international organisations to prepare and disseminate adequate metadata describing concepts, collection and processing practices as well as data reporting and presentation practices. Such metadata must also be readily accessible and understood by users with different degrees of statistical expertise. The metadata presentation and dissemination guidelines discussed in Section 6 draw heavily on current and previous work of the a number of international initiatives, in particular, that of the UNECE – Eurostat – OECD Work Session on Statistical Metadata (METIS).

Ideally, metadata should be expressed by different organisations within different countries on the basis of a common terminology. The importance of the use of common terminology is discussed below in Section 1.5. The Glossary at the end of this Manual contains a comprehensive set of definitions for concepts related to data and metadata reporting and presentation.

In addition, there are a small number of key data reporting practices that also have a significant impact on data interpretability and where different approaches currently used by national and international agencies complicate comparisons of national data. These include different:

- data revision presentation practices;
- reporting practices for the presentation of series breaks;
- practices for the reporting of sampling and non-sampling errors;
- base years in the presentation of indices;
- data and metadata citation practices.

This Manual outlines key recommendations and/or good practice with regard to these. Such practices are consistent with sound governance in statistics encompassed, either implicitly or explicitly, in the UN *Fundamental Principles of Official Statistics* (UNSC 1994) and the UN *Handbook on the Operation and Organisation of a Statistical Agency* (UNSD 2001). The range of reporting practices outlined initially in this version of the Manual could be expanded in subsequent versions to include others. Such good practices are also outlined in the IMF's Reports on the Observance of Standards and Codes (ROSC) (IMF 2003a)

which summarise the extent to which countries observe internationally recognised standards including those related to data dissemination[1].

Another dimension relevant to the development data reporting and presentation guidelines and recommendations is the data dissemination medium or format (on-line database, internet web pages, CD-ROM, paper publication or press release) used to disseminate data. The reality is that different forms of data reporting and presentation are more suited to different means of data dissemination.

1.3 National and international publishing manuals and guidelines

Almost all agencies at both the national and international levels have publishing manuals or guidelines containing technical guidelines that touch on a very wide range of issues such as organisational standards concerning data presentation, layout of tables, graphs, maps, fonts and type faces, etc., for use by authors involved in the preparation of both paper and electronic statistical dissemination. In the main, such manuals tend to focus on corporate policy on the publication preparation process and data and metadata presentation. However, they also frequently deal with some of the reporting issues discussed in this Manual such as revision, citation, presentation of sampling and non-sampling errors, etc. Ideally, key elements of international guidelines on data and metadata reporting included in this Manual should also be imbedded in publishing manuals at both the national and international levels and/or be linked to it.

Although some of the guidelines and practices included in publishing manuals prepared by both national agencies and international organisations may be relevant only in the context of a specific institution or country, the desirable objective of increasing the transparency of internal publication guidelines and processes to external view would be achieved if these manuals were placed on the Internet. At the moment, only a very small number of such manuals are accessible to external readers via the web.

1.4 Existing international reporting standards

Where available, the recommendations and guidelines presented in this Manual draw on the extensive range of existing international statistical standards that have been developed by international organisations in co-operation with national agencies ((UNSD 2002a) and (Eurostat 2003b)). The focus of these standards are primarily conceptual and encompass definitional issues, classifications, coverage, etc, though some standards also outline best practice for the collection of data. However, in the main, international standards are largely silent, or give only brief mention to a limited range of reporting and presentation issues and practices, though there are exceptions. For example:

- The European Commission's Short-term Statistics Regulation (European Commission 1998) specifies the reference period, type and form of data to be transmitted to Eurostat, e.g. absolute values, indices, non-seasonally adjusted, trend-cycle, etc. However, the Regulations do not tend to go into presentation in any detail and specify the provision of data to Eurostat through file transfer. The Eurostat manual on short-term business statistics cites the need for greater harmonisation of EU Member state presentation of indices and growth rates which it believes would assist Eurostat in checking that data disseminated by Eurostat are consistent with nationally released series (Eurostat 2002, p. 135).

- The IMF Special Data Dissemination Standards (SDDS) (IMF 2003b) touches on a number of key presentation issues such as the provision of metadata to enhance interpretability and the adoption of good practice with respect to data revision. The guidelines and recommendations on data revision

[1] In the main, the good practice described in ROSCs relevant to the data reporting practices described in this Manual are restricted to data revision and the availability of appropriate metadata.

presented in Section 7.1 of this Manual draw extensively and directly from text prepared by the Fund in the context of the SDDS and IMF Reports on the Observance of Standards and Codes (ROSC).

- The work of METIS on the presentation of statistical metadata on the internet and terminology on statistical metadata published by the UN in 2000 (UNSC and UNECE 2000 & 2000a).

- Work undertaken by the Committee for the Coordination of Statistical Activities (CCSA) on rebasing and citation prepared by UNCTAD and UNESCO respectively in 2003, and presented below in Sections 7.4 and 7.6.

This Manual provides a single comprehensive international source document on reporting standards that bring together these and other existing international guidelines and recommendations. Where necessary, it provides a focus for the evolution of new standards on topics/issues not covered at the moment. The recommendations and practices included this Manual could either be imbedded in future international statistical standards for other statistical domains, or be linked to it.

Because such practices may differ according to the dissemination medium used, guidelines will be provided for a range of dissemination media such as on-line databases, data disseminated on websites, in paper publications and other electronic products. Also, because of their increased importance in recent years, consideration is also given to the presentation of data in press releases.

1.5 Importance of use of common terminology

A factor complicating the development of international reporting and presentation standards has been the use of different terminology, particularly with regard to the various forms of growth rates used by different countries, and in the same country for different series. The use of inconsistent labels frequently leads to misunderstanding. Problems associated with the inconsistent application of terminology also apply more generally to both data collection and the actual preparation of metadata text containing definitions, outlining national practices with respect to data collection, manipulation, etc. Such inconstancies severely limit the use of much existing metadata in comparing national data.

1.5.1 Glossary systems

Statistical agency clients often comment on the different terminologies used to describe the same thing in different publications and databases. Sometimes, even the same publication contains different terms for the same phenomenon. There are two ways of looking at this: the first is to say that because so many institutions use slightly different terms to describe the same phenomenon, it is acceptable to use different terms interchangeably. The second approach is to say that terminology should be consistent across institutions so that the question of ambiguity does not arise.

Assuming that users of statistical information can be grouped into the three broad categories of general public, informed users and analytical users, there is a need to consider how the requirements of these different categories of users are affected by terminology that is unclear. While the general public may not understand what is meant by say, “sampling error”, the informed user and the analytical user will probably have a reasonable understanding of the term. Even if they do not have such an understanding, glossaries such as the OECD Glossary of Statistical Terms contain definitions that can explain terms which are of interest only to the more informed user of statistical data.

In recent years the importance of national agencies and international organisations adopting common definitions for variables, concepts, etc, based on international standards has received greater recognition as a precondition for the compilation and dissemination of comparable data. As mentioned above, there is

also a similar need to adopt common terminology in the preparation of metadata that can be used to compare national practices and concepts. To promote the use of common terminology and an understanding of concepts and definitions many national and international organisations have compiled glossaries that provide definitions of key concepts and statistical domain specific variables, etc. However, in the main these glossaries have been domain (or issue) specific and as a result there are many instances of different and inconsistent definitions being disseminated in multiple glossaries containing same concepts within the one organisation and country.

To help overcome this problem, a number of international organisations have developed extensive glossary databases containing definitions of key concepts and variables covering a wide range of statistical concepts, etc. The OECD Glossary of Statistical Terms (OECD 2002a) is one example of such a glossary database, though others have been developed by Eurostat (Eurostat 2003a) and the United Nations Statistical Division (UNSD 2002b). The definitions included in these databases have by and large been drawn from existing international statistical guidelines and recommendations.

The process of compiling these extensive glossary databases has entailed the confrontation of inconsistent definitions covering the same concept that previously resided in different glossaries with narrower coverage. In effect, the extensive glossary databases developed by the OECD, Eurostat and UNSD facilitate the preparation of sub-glossaries covering more specific statistical domains with consistent definitional content. In the OECD context, the OECD Glossary of Statistical Terms can be used to derive a number of sub-glossaries, including the:

- Metadata Common Vocabulary (MCV)) being developed in the context of the Statistical Data and Metadata Exchange (SDMX) initiative (refer Section 2.2.1 below);

- SNA Glossary;

- Data and Metadata Reporting and Presentation Glossary provided in this Manual. Many of the definitions in this Glossary are also to be found in the MCV.

1.5.2 Data reporting and presentation terminology

The adoption of common terminology by national agencies and international organisations is also an important element of the data reporting and presentation recommendations embodied in subsequent Sections of this Manual. Where appropriate, recommended definitions and terms are provided (in “boxes”) in some Sections to ensure a common understanding of the concepts and issues described. Issues of terminology are particularly important in the discussion of growth rates (Section 4.3) and in guidelines for the reporting of different forms of data (Section 5).

A comprehensive consolidated Glossary of key data presentation terms is provided in Section 8 below. This Glossary includes the source of each definition and in some instances further context information. The definitions in this Glossary are also available in the OECD Glossary of Statistical Terms referred to above.

2. LINKS TO OTHER INTERNATIONAL INITIATIVES

As mentioned in Section 1.1 above, there are two broad imperatives relevant at both the national and international levels that drive the need for the articulation of a comprehensive set of standards for the reporting of data and metadata. These concern the need to improve data quality and to minimise the data reporting burden in the provision of data and metadata to international organisations. Several international initiatives that are currently underway that impact on these imperatives are described in Section 2.2 below. This is followed (in Section 2.3) by brief notes highlighting the relationships both between the initiatives described and the guidelines and recommendations on data and metadata reporting and presentation outlined in this Manual.

2.1 Imperatives driving need for articulation of data and metadata reporting standards

2.1.1 Improved data interpretability and coherence

The first imperative relates to the need to improve the quality of statistics presented to users at both the national and international levels, in particular, with respect to interpretability and coherence (within datasets, across data-sets, over time and between countries). These are important dimensions of quality imbedded in one form or other in all quality frameworks that have been developed by national agencies and international organisations (such as by Eurostat [insert reference], the IMF (IMF 2003c), OECD (OECD 2003e), Statistics Canada (Statistics Canada 2002), etc). However, beyond stating the case for improvement, such frameworks seldom go into much detail about how these quality dimensions would be implemented in the context of data and metadata reporting.

Interpretability reflects the ease with which the user may understand and properly use and analyse the data. The adequacy of the definitions of concepts, target populations, variables and terminology underlying the data, and information describing the possible limitations of the data largely determines the degree of interpretability. Interpretability is assisted through the presentation of metadata which is appropriate to the needs of a range of different users and uses of the data and which is both well structured (readable) and readily accessible.

With respect to coherence, users are often confronted by the problems outlined in Section 1.1 above when comparing statistics compiled over time within the one agency and by agencies in different countries and by different international organizations. This Manual focuses on the third issue, namely different practices in the reporting of data. Such differences include: the type of data reported (absolute figures, indices, growth rates); the form of the data (raw, seasonally adjusted, trend-cycle); the presentation and dissemination of metadata; and a range of other reporting practices such as revision practices, presentation of information about series breaks, reporting of sampling and non-sampling errors, use of different base years, and inadequate citation. The Manual is an initial attempt to present the main reporting practices in the context of a framework, together with draft recommendations, guidelines and best practice for use by both international organisations and national agencies in their various forms of disseminated output.

2.1.2 Minimisation of reporting burden

The second imperative refers to the need to minimise the reporting burden of national agencies in their provision of data and metadata to international organisations. Emphasis here is on the development of more efficient practices and processes for such reporting. In this context, discussions at recent international forums (such as the 2002 CES (OECD/IMF 2002) and the 2003 meeting of the OECD High Level Group for Statistics (OECD 2003a)) outlined the benefits of using a data sharing model in the transfer of data and

its associated metadata between national sources and the various international organisations. Such a model envisages the extraction of common data requirements by international organisations from data located on national agency websites.

The evolution of new technologies over the last five years, particularly web-based technologies, has provided the technical possibility for the implementation of the data sharing model. Prerequisites for such adoption involve not only the resolution of a number of technical IT issues but also agreement between national agencies and international organisations on a number of data "content" issues including:

- Identification of a set of common data requirements for key statistics. A brief outline is provided below in Section 2.2 below on a number of related initiatives designed to further the co-ordinated collection of data and metadata by international organisations from national sources, and either directly or indirectly contribute to the evolution of the data sharing model referred to above.

- Agreement on key data reporting and presentation practices that would facilitate both the identification of identical series disseminated by national agencies and international organisations and the dissemination of consistent data, in particular, by international organisations.

The need for further international work on data presentation was also highlighted in a presentation (Solans 2003) by Eugenio Domingo Solans, a member of the Governing Council and Executive Board of the European Central Bank at the 54th Session of the International Statistical Institute in Berlin in 2003. Solans acknowledged the impact of modern website technology in improving timely access to official statistics, and also emphasised the need for IT developments to be accompanied by the development and implementation of standards for data presentation, citing specific issues such as growth rates, revision policy, provision of quality indicators, etc.

The development of the required guidelines in these and other areas is the responsibility of international organisations in co-operation with national agencies. Obviously, the implementation of the data sharing model will only occur with the active participation of national agencies in whose databases the shared data and metadata will reside. Data sharing implies a fundamental change in data dissemination with respect to co-ordination between international organisations and the role of national agencies in disseminating data to international organisations through their implementation of data and metadata reporting guidelines that are designed not only to improve the interpretability and coherence of data but also to facilitate dissemination of data, and ultimately minimise their reporting burden.

The need for articulation of a set of guidelines and recommendations was reinforced in the fifth review of the IMF's data standards initiatives discussed by the Fund's Executive Board in July 2003 (IMF 2003d), particularly in relation to the Data Quality Assessment Framework and Data Quality Program. The Fund's Data Quality Assessment Framework – General Framework (IMF 2003e) touches on issues of data presentation in several instances, namely:

Quality dimensions	Elements	Indicators
1. Assurances of integrity	1.2 Transparency	1.2.4 Advanced notice is given of major changes in methodology, source data, and statistical techniques.
3. Accuracy and reliability	3.3 Statistical techniques	3.3.2 Other statistical procedures (e.g. data adjustments and transformations, and statistical analysis) employ sound statistical

		techniques.
	3.5 Revision studies	3.5.1 Studies and analyses of revisions are carried out routinely and used internally to inform statistical processes (see also 4.3.3).
4. Serviceability	4.2 Consistency	4.2.2 Statistics are consistent or reconcilable over a reasonable period of time.
	4.3 Revision policy and practice	4.3.1 Revisions follow a regular and transparency schedule.
		4.3.2 Preliminary and/or revised data are clearly identified.
		4.3.3 Studies and analyses of revisions are made public (see also 3.5.1)
5. Accessibility	5.1 Data accessibility	5.1.1 Statistics are presented in a way that facilitates proper interpretation and meaningful comparisons (layout and clarity of text, tables and charts).
	5.2 Metadata accessibility	5.2.1 Documentation on concepts, scope, classifications, basis of recording, data sources, and statistical techniques is available, and differences from international accepted standards, guidelines on good practices are annotated.
		5.2.2 Levels of detail are adapted to the needs of the intended audience.

2.2 Key international initiatives

There are several initiatives currently underway at the international level that would benefit either directly or indirectly from the development and adoption (by international organisations and national agencies) of a common set of data reporting practices. The four initiatives described in this Manual are brought together in the development of the data sharing model. As stated in Section 1.2 above, the data reporting standards described in this Manual are a key element of the implementation of this model, the aims of which are to:

- avoid duplication and enhance efficiency in the transfer of data between systems whilst at the same time reducing the reporting burden of national agencies; and

- ensure the consistency of data disseminated by different international organisations.

The international initiatives on metadata standards also seek to enhance the interpretability of data presented to users.

2.2.1 Statistical Data and Metadata Exchange (SDMX) project

The Statistical Data and Metadata Exchange (SDMX) project[2] is a consortium of seven international organizations (BIS, ECB, Eurostat, IMF, OECD, UNSD, World Bank) working to develop a set of common business practices in the field of statistical information that would allow more efficient processes for exchange and sharing of data and metadata within the current scope of their collective activities. The aim of the project is to explore common e-standards and ongoing standardisation activities that could allow them to gain efficiency and avoid duplication of effort in their own work and possibly the work of others in the field of statistical information. This would be achieved by taking advantage of existing and emerging:

- exchange protocols, such as GESMES/CB which was implemented by central banks for exchanging time series;
- data dissemination formats, such as that implicit in the IMF's Dissemination Standards Bulletin Board (DSBB); and
- e-standards, such as Extensible Markup Language (XML).

The new standards developed by SDMX seek to take advantage of new web-based technologies and the expertise of those working on the business requirements and IT support for the collection, compilation, and dissemination of statistical information.

Four projects, three of which bring "under the SDMX umbrella" work that is already ongoing in several institutions, are currently underway:

- maintaining and advancing existing standards for time series data exchange;
- creation of a common vocabulary for statistical metadata;
- development of a framework for metadata repositories;
- a practical case study on emerging e-standards for data exchange.

One of the four current SDMX projects is the development of a glossary (the Metadata Common Vocabulary (MCV)) (OECD and Eurostat 2003) as a tool to help ensure the consistency of metadata prepared by authors at the national and international levels, both with respect to content and the range of methodological issues covered by the metadata. The MCV is designed to include the range of metadata terms used in the different metadata models that have been developed by national and international agencies. In the context of the SDMX project, particular care is being taken to ensure MCV coverage of terms in the IMF SDDS metadata dissemination model, though it is also intended to be relevant for metadata models developed by other international organisations and national agencies.

The MCV is again referred to again in Section 6 below in the context of guidelines for the reporting and dissemination of metadata.

[2] More detailed information about SDMX and the four projects currently underway under the umbrella of SDMX are available on the SDMX website (BIS, ECB, Eurostat, IMF, OECD, UN 2003)

2.2.2 Development of common lists of variables at the international level

There are several examples of common data requirements that have been identified by international organisations, the primary purposes of which are to reduce the reporting load of national agencies and the dissemination of consistent data at the international level.

The most notable example is the questionnaire used by the OECD, Eurostat, IMF, World Bank, IMF and UNSD for the collection of annual national accounts data[3]. The questionnaire comprises a very detailed common set of national accounts variables that have been specified to meet the requirements of international agencies. These variables are identified in an extensive set of Excel spreadsheets by means of a common code and specific presentation format (e.g. in national currency at current price/constant prices). The questionnaire forms the basis of the National Accounts World Wide Exchange (NAWWE) project described below.

There is still considerable scope for international organisations to reach agreement on common lists of variables for other fields of structural and short-term statistics that require common on-going collection. For short-term economic indicators, the OECD, Eurostat and others have independently developed lists of variables that could be used as starting points for the formulation of a common list of variables in a key area of reporting burden of particular concern to national agencies. These lists comprise:

- The extensive OECD list of "target" indicators sought for inclusion in the monthly Main Economic Indicators (MEI) database. The main purpose of this list is to provide a focus for OECD requests to Member country agencies and other international organisations for MEI data and methodological information. Such focus is necessary to ensure the collection of a range of indicators "common" to as many Member countries as possible. The list is revised at regular intervals as priorities change and new topics of interest to users emerge. No one OECD Member country compiles all the indicators in the list. A current version of the MEI target indicators is provided in Annex 1 of this Manual.

- The list of variables specified in the European Commission Short-term Statistics Regulation which specifies both the reference period and the form of data to be transmitted to Eurostat by EU member states. The variables specified in this Regulation (and the Regulation on Labour Costs Indices) are listed in Annex 2 of this Manual.

  A further list containing a subset of priority short-term economic indicator requirements for the European Statistical System (ESS), the Principal European Economic Indicators (PEEI) was set up in 2001[4]. The list, which will be refined over time, also includes target release dates and other quality objectives. Eurostat compiles and releases PEEIs based on member state contributions on a common dissemination platform accessible via the Euroindicators site covering both EU/Euro area and national indicators compiled according to EU standards. A current version of the PEEI is provided in Annex 3.

There is a need to identify a <u>common</u> set of short-term economic indicator variables akin to the annual national accounts questionnaire by all relevant international organisations. This need was recognised at the June 2003 meeting of the OECD High Level Group on Statistics which called for international organisations to work together to develop such a list for short-term statistics. This list would include

[3] Others include: co-ordination arrangements between the OECD and UNSD on merchandise trade statistics; OECD use of structural economic statistics from Eurostat; joint Eurostat – OECD questionnaire for foreign direct investment statistics, etc.

[4] There are equivalent national lists of principal economic indicators for (primarily) short-term statistics, for example the US Principal Federal Economic Indicators (Fedstats 2003)

variable requirements and, ideally, the form in which such data should be reported in the context of a data sharing model.

2.2.3 National Accounts World Wide Exchange (NAWWE) project

The 2002 meeting of OECD National Accounts Experts (OECD 2002c) proposed an experiment to test the implementation of the data sharing model for annual national accounts between national agencies and the OECD. The idea behind the NAWWE project is to implement a model in which data are not necessarily transferred across organisations but, rather, published on the web in a form that users could extract them by simply using country and variable references. The OECD has set up a demonstration model of this kind of data extraction for two Member countries (Australia and Canada). This pilot study starts from the Excel tables already produced by national agencies for transmitting annual national accounts data to international organisations referred to above but the idea is that the necessary XML files should be created directly from the national statistical organisation's on-line databases.

Another objective of the NAWWE project is to have the data collected by international organisations to be the data officially disseminated by national agencies. The two advantages of this model are that the burden of reporting to international organisations would be minimised, and for data quality to be maximised for the international statistical community since the data they would use would be those officially disseminated and not specially compiled for and transmitted to international organisations.

2.2.4 UNECE-Eurostat-OECD Workshop on Statistical Metadata (METIS)

The METIS forum on statistical metadata organised jointly by UNECE, Eurostat and the OECD has met about every 18 months since 1995. The major objectives of the forum, attended by delegates from around ten international organisations and 30 countries, are to exchange experiences on the development of corporate statistical metadata environments and to develop international standards in this area. The discussion at METIS covers a combination of IT and metadata "content" issues, the latter comprising terminology, metadata models and corporate metadata governance.

The February 2004 meeting of METIS noted the existing wide variation in metadata practices in both international organisations and national agencies and that the evolution of metadata content standards has not kept pace with infrastructure developments, especially web-based technologies. One way of addressing this variation was to ensure that existing and future metadata standards were presented in the context of a framework. One of the issues raised which highlighted the need for such a framework was the apparent fragmented and seemingly unconnected nature of metadata standards developed over the last few years by various initiatives and agencies including METIS, METANET, the Neuchatel Group, Eurostat, IMF, ISO, OECD, etc.

Over the ensuing 18 to 24 months METIS has undertaken to draft and publish a framework that would provide links and context to current and previous metadata standards initiatives together with comparisons of selected examples of current best practice at the national and international levels (UNECE, Eurostat and OECD 2004, para. 7). The framework and links to recommended practices would be developed along a number of key themes such as:

- processes for metadata collection;
- terminology;
- metadata and data interchange entailing identification of common models between international organisations to which national agencies could map;
- migration strategy from existing fragmented metadata environments;
- metadata dissemination and its relation to dissemination of statistics;

- metadata governance and corporate management issues;
- incorporation of usability concerns in metadata management

[Identify other relevant international initiatives]

2.3 Relationship between international initiatives and data reporting and presentation

There are close interrelationships both between the four international initiatives outlined and the reporting and presentation standards described in this Manual. For example, the SDMX initiative shows HOW data and metadata can be exchanged more efficiently, particularly through the implementation of the data sharing model. The NAWWE project is a pilot study for the implementation of data sharing for the annual national accounts domain which could subsequently be applied to other statistical domains.

The various initiatives undertaken by international organisations to identify a set of their common data needs and requirements essentially describe WHAT data is to be exchanged both between themselves and from national agencies.

The work of METIS seeks to develop international standards, identify good practice, etc, to improve the INTERPRETABILITY of the data to be exchanged.

Finally, the reporting standards, etc, outlined in this Manual aim at maximising both the INTERPRETABILITY of data exchanged and the CONSISTENCY of data disseminated by both national agencies and international organisations. The need for such consistency is particularly relevant in an environment where users have ready on-line access to databases maintained at both the national and international levels, often with overlapping content.

4. GUIDELINES FOR THE REPORTING OF DIFFERENT TYPES OF DATA

4.1 Absolute figures

[To be prepared]

4.2 Indices

[To be prepared]

4.3 Growth rates

4.3.1 Introduction

Growth rates (or rates of change) express the change in values of a time series between two different periods of time[5]. For this reason growth rates are often a feature of press releases, analyses and newspaper reports concerning economic activities (such as movements in prices or output) and both national agencies and international organizations use a number of different forms of growth rates in their disseminated output.

The main issues for growth rates from the perspective of data reporting entail inconsistent use of terminology by different agencies to label the different types of rates and the appropriate use of the different growth rates in different circumstances. Although there may not be an absolutely "correct" form of growth rate, there are instances where some are more appropriate than others. Any particular form of growth rate can be useful depending on the specific needs of analysts.

Recent work by the OECD Short-term Economic Statistics Expert Group (STESEG) task force on data presentation and seasonal adjustment sought to identify best and appropriate practice for the use of growth rates for different short-term statistical indicators or analyses. Issues examined in the context of growth rate presentation include (Eurostat 2002a, p. 135):

- the form of the data, i.e. whether or not the data are working day adjusted, seasonally adjusted or trend-cycle;
- whether such rates should be based on a given month or should the data be smoothed through, for example, the use of a moving growth rate of the latest three months over the three months before;
- the time horizon that should be referred to. For example should comparisons be made in relation to the previous month ((t/t-1), the previous quarter (t/t-4) or for the same month of the previous year (t/t-12)?

The task force also formulated recommendations on terminology for growth rates.

As will be shown below in this Section and in Section 5, the form of data (seasonally adjusted, trend-cycle, etc) and the time horizon are closely linked. For example, if a growth rate of a month in relation to the same month of the previous year is calculated then it would be inappropriate to use seasonally adjusted or trend-cycle data as the purpose of seasonal adjustment is to facilitate comparisons of different months in the same year – refer Section 4.3.3 below.

4.3.2 Recommended terminology for growth rates

As mentioned above, there is considerable inconsistent use of labels attached to the various forms of growth rates by different agencies, particularly with respect to "annual growth rates", "annualised growth rates", "year-on-year change". In order to minimise the risk of misunderstanding the OECD task force has formulated the set of standard terminology presented below. These definitions are also presented in the Glossary in Section 8.

[5] For example, the percentage change of a time series value *Xt* from *Xt-d* is expressed as *Xt / Xt-d * 100 - 100.*

Terminology

Annual change

Refer *Annual growth rates*

Annual growth rates

Annual growth rates (annual changes) are rates of change expressed over the previous year. Such rates (changes) may be expressed as Y_t/Y_{t-1}-1 (Y_t-Y_{t-1}).

Annualised growth rates

Annualised growth rates show the value that would be registered if the rate of change measured for a month or quarter were maintained for a full year, i.e. $[((Q_t/Q_{t-1})^4)-1]$, $[((M_t/M_{t-1})^{12})-1]$. Such rates facilitate comparison of data for different time periods (e.g. years and quarters).

The term "Annualised growth rates" is sometimes used to describe the quarterly growth rate multiplied by four as opposed to compounding the quarterly growth rate. This is more appropriately referred to as "Linear approximation of the annualised figure".

Annualised figure, linear approximation

Refer *Annualised growth rates*

Monthly growth rates

Monthly growth rates are rates of change expressed over the previous month. Such rates may be expressed as M_t/M_{t-1}-1.

Quarterly growth rates

Quarterly growth rates are rates of change expressed over the previous quarter. Such rates may be expressed as Q_t/Q_{t-1}-1.

Year-on-year change

Refer *Year-on-year growth rates*

Year-on-year growth rates

Year-on-year growth rates (changes) are rates expressed over the corresponding period (month or quarter) of the previous year. Such rates (changes) may be expressed as Q_t/Q_{t-4}-1 or M_t/M_{t-12}-1 (Q_t-Q_{t-4} or M_t-M_{t-12}).

4.3.3 Recommendations for the reporting and presentation of growth rates

The OECD task force undertook a comprehensive review of the issues involved in the presentation of the different types of growth rates for short-term indicators in the dissemination of indicators in press releases, in tables posted on the website of statistical institutions, etc. Any particular rate of change can be useful depending on the needs of a specific analyst. The focus of the task force were the most suitable ways of presenting economic indicators to the general public, in order to prevent misunderstandings in their reading of economic events.

Rate of change with respect to previous period

Monthly or quarterly growth rates (with respect to the previous period) for raw series are not very informative unless seasonal effects are negligible. This is the reason why statistical agencies seldom use them in their releases of indicators affected by seasonal fluctuations. The growth rate on seasonally adjusted series (or for raw data where seasonal factors are of no significance), conveys the most recent

information contained in a time series (trend-cycle and irregular movements) and is the best way of presenting short-term developments, even if the irregular component is relatively large. To deal with irregular movements that blur the trend-cycle the rate of change based on two or three month's worth of values[6] can be utilised. This practice, which is customary in some countries, seems a very convenient (and transparent) way of quantifying the short term movements averaging out a reasonable part of the irregular component.

Percentage changes based on the trend-cycle component should be avoided if presenting current developments, since the trend-cycle values at the current end of the series are usually estimated by extrapolating the underlying trend of the recent past and therefore can convey misleading information. Although seasonally adjusted time series are also revised over time, they reveal sooner the cyclical movements at turning points than raw or trend-cycle series.

Recommendation 1

For rate of change with respect to previous period, seasonally adjusted data is the best way of presenting information about a time series (trend-cycle and irregular movements) and for presenting short-term developments, even if the irregular component is relatively large. To deal with irregular movements that blur the trend the "rate of change based on two or three month's worth of values" can be utilised. Percentage changes based on the trend-cycle component should be avoided if presenting current developments, since the trend-cycle values at the current end of the series are usually estimated by extrapolating the underlying trend of the recent past and can therefore convey misleading information about the true current movement. Though seasonally adjusted time series also are revised over time, they reveal sooner the cyclical turning points than raw or trend-cycle series.

Rate of change with respect to the same period of previous year

The change from previous year (referred henceforth as year-on-year change (YoY)) can be misleading in assessing the cyclical movements of an indicator, due to the compounding of movements over a 12 month span. However, its utilisation is very common in the current practice of users and media. Where necessary, special effects contained in the base period should be highlighted when presenting YoY changes (base effect).

YoY changes should be applied to raw data and to data adjusted for calendar effects if the latter are available. In this way the trading day effects are made clear. Technically, it would not be incorrect to advise against the utilisation of YoY changes on seasonally adjusted data. In particular, when the seasonal component is not deterministic, the rate of change on raw and seasonally adjusted data can be different, conveying conflicting signals, leading the general public and even some informed users to question the validity of the results. However, YoY change calculated on seasonally adjusted series is a very common practice. This is a point that deserves some discussion, maybe advising against this practice and recommending instead YoY changes on raw and calendar adjusted data.

Recommendation 2

For rate of change with respect to the same period of previous year the year-on-year changes should be applied to raw data and to data adjusted for calendar effects if the latter are available. Where necessary, special effects contained in the base period should be highlighted when presenting YoY (base effect).

[6] For example, $(X_t + X_{t-1}) / (X_{t-2} + X_{t-3}) * 100 - 100$ or $(X_t + X_{t-1} + X_{t-2}) / (X_{t-3} + X_{t-4} + X_{t-5}) * 100 - 100$.

Annualised growth rates

Extreme caution should be exercised when annualising changes that occur within the space of a year, and data should only be annualised on the basis of seasonally adjusted and calendar adjusted time series which contain minor irregularities. This means that annualising the growth rate of a single month can result in misleading signals. In turn, proposing a minimum length for the period to be annualised (for instance, six months), while correct in principle, seems not very worthwhile in practice, as press releases and other dissemination formats seldom allow for such a kind of data transformation.

Recommendation 3

For annualised growth rates, data should only be annualised on the basis of seasonally adjusted and calendar adjusted time series which contain just minor irregularities. This means that annualising the growth rate of a single month can result in misleading signals. If special effects result in problems when annualising, the limited informative value of these annualised growth rates would have to be indicated separately.

5. GUIDELINES FOR THE REPORTING OF DIFFERENT FORMS OF DATA

5.1 Introduction

The different forms of time series data discussed in this Manual are: raw; working day adjusted; seasonally adjusted; and trend cycle data. There is a wealth of references about the compilation of the different forms of data and a detailed explanation of methodological issues arising out the different approaches to, for example, seasonal adjustment, is outside the terms of reference of this Manual. The focus of this Section is rather the reporting and presentation of the different forms of data and the brief introduction below is merely intended as a lead in to reporting and presentation issues.

The main reason for compiling high frequency series such as monthly or quarterly indicators is to form a time series which may be used to monitor level changes and the volatility of those series over time. Time series are of interest to analysts because they are useful tools in the identification of economic/business cycles and, more specifically, turning points in those cycles. An original time series (also known as "raw data") may be decomposed into three basic components:

- Trend-cycle: the underlying path or general direction reflected in the data over the longer term, i.e. the combined long-term (trend) and medium-to-long-term (cycle) movements in the original series.

- Seasonal variations: include seasonal and other systematic effects. Seasonal effects are reasonably stable in terms of annual timing, direction and magnitude. The causes of such effects are natural factors, administrative or legal measures and social traditions. Other effects on time series may be due to variations in the number of working days or trading days in a period, or events that occur at regular intervals such as pay days for large groups of employees, pension payments, etc. Both the seasonal and other effects represent persistent, predictable calendar-related effects.

- Irregular variations: are effects that are unpredictable in terms of timing, impact and duration. These may be the result of sampling and non-sampling errors (refer Section 7.3 below), unseasonable weather changes, natural disasters, strikes and socio-economic changes.

It should be emphasised that seasonal adjustment and trend-cycle estimates represent an analytical massaging of the original time series. Both seasonally adjusted data and trend-cycle estimates complement the original data and can never replace the original series. The non-seasonally adjusted data shows the actual changes that have taken place and the seasonally adjusted and trend-cycle estimates represent an analytical elaboration of the data showing the underlying developments (IMF 2001, para. 8.12). The various packages available for seasonal adjustment or trend-cycle analysis will not remove any underlying deficiencies that may be inherent in the basis data[7]. Such elaborations should therefore not be built into the original data compilation process but should be undertaken after the original data has been compiled.

In their *Quarterly National Accounts Manual – Concepts, Data Sources, and Compilation*, the IMF further states that the compilation of seasonally adjusted data exclusively represents a loss of information to the user. Furthermore, there is no unique solution on how to conduct seasonal adjustment and that seasonally adjusted data are also subject to revisions as future data becomes available even where the original series are not revised. Finally, the IMF states that although errors in source data may be more readily detected in seasonally adjusted series, the source of the error and their correction may be easier through working with unadjusted data (IMF 2001, para. 8.12).

[7] Such as deficiencies in coverage, classifications and definitions, collection practices, compilation practices.

5.2 Terminology

The following terminology for terms relating to different forms of data are provided in order to ensure a common understanding of the concepts described in subsequent Sections of this Manual. The terminology presented flows out of the recent work of the OECD Short-term Economic Statistics Expert Group (STESEG) task force on data presentation and seasonal adjustment.

Terminology

Calendar adjustment

Calendar adjustment refers to the correction for calendar variations other than seasonal factors, e.g. number of days in the calendar period, the accounting or recording practices adopted or the incidence of moving holidays (such as Easter).

The terms "calendar adjustment" and "working day adjustment" are often used interchangeably. However, there is a subtle difference between the two terms as working day adjustment is merely *one type* of calendar adjustment, along with an adjustment for say, new recording practices.

Calendar effects component

The Calendar effects component is the component that represents the calendar variations in a time series, such as trading days, moving holidays and other calendar effects (such as leap year). The effects of the normal length of a month are assigned to the seasonal component.

Cycle (in time series)

The cycle in a time series refers to smooth variations around the trend revealing a succession of phases of expansion and recession. The cyclical component can be viewed as those fluctuations in a time series of periods which are longer than 1½ years but shorter than those attributed to the trend.

Irregular component

The irregular component is what is left of a time series after the trend-cycle and seasonal components, as well as calendar effects have been removed; it corresponds to the high frequency fluctuations of the series.

Moving average

A moving average is a method for smoothing time series by averaging (with or without weights) a fixed number of consecutive terms. The averaging "moves" over time, in that each data point of the series is sequentially included in the averaging, while the oldest data point in the span of the average is removed. In general, the longer the span of the average, the smoother is the resulting series.

Context

Moving averages are used to smooth large fluctuations in time series or to identify time series components, such as the trend, the cycle, the seasonal, etc.

A moving average replaces each value of a time series by a (weighted) average of p preceding values, the given value, and f following values of the series.

If p = f the moving average is said to be centred.

The moving average is said to be symmetric if it is centred, and if for each k=1, 2, …, p = f, the weight of the k-th preceding value is equal to the weight of the k-th following one.

The moving average is not defined for the first p and the last f time series values. In order to compute the moving average

for those values, the series must be backcasted and forecasted.

Seasonal adjustment

Seasonal adjustment is a statistical technique to remove the effects of seasonal calendar influences operating on a series. Seasonal effects usually reflect the influence of the seasons themselves either directly or through institutional factors or social conventions.

Other types of calendar variation occur as a result of influences such as number of days in the calendar period, the accounting or recording practices adopted or the incidence of moving holidays (such as Easter).

Seasonally adjusted component or series

The result of the extraction of the seasonal component and the calendar effects component from a time series. If neither seasonal nor calendar influences are present in the raw data, the seasonally adjusted series is given by the raw data. For series with no identifiable seasonal variations but with identifiable calendar variations, the seasonally adjusted series is given by the calendar adjusted series.

Seasonal variation (seasonal component)

The seasonal variation is that part of the variations in a time series representing intra-year fluctuations that are repeated more or less regularly in the same period year after year.

Tendency

The term tendency is used in business tendency surveys where the respondent is asked for a judgment on the direction of changes (e.g. up/down/same).

Sometimes the word “trend” is used interchangeably with “tendency” but this does not appear to give rise to difficulty in understanding.

Time series

A time series is a set of time-ordered observations on a quantitative characteristic of an individual or collective phenomenon taken at different points of time.

Trend

The trend is the component that represents the long-term variations in a time-series. Trend can be viewed as those variations of very low frequencies.

Trend-cycle

The trend-cycle is the component that represents the variations of low frequencies in a time series, the high frequency variations having been filtered out. This component can be viewed as those variations with a period longer than a chosen threshold (usually 1½ years). In practice, statistical agencies estimate trend-cycle by filtering the seasonal and irregular component.

Trend estimates

Trend estimates are derived from seasonally adjusted estimates via an averaging process which attempts to remove the irregular component of the time series. This allows the underlying direction of a time series to be identified.

Trend Fitting

The general process of representing the trend component of a time series. A trend may be represented by a particular curve form, e.g. the logistic, or by a particular form of the general class of polynomial in time, or by a moving average.

Working day adjustment

Refer *Calendar adjustment*

5.3 Working day adjusted data

Many monthly time series contain variations which result from calendar-related systematic effects that are not stable in annual timing and are caused by variations in the calendar from year to year. Such calendar variations include (IMF 2001, para. 8.7) the:

- trading day effects which result from variations from year to year in the number of working days or trading days and the week day composition of a particular month or quarter relative to the "standard" for that particular month or quarter. Such differences arise from different lengths of months and the number of number of Saturdays and Sundays in a month; and

- the effects of events that occur at regular intervals but not necessarily at the same time each year such as official holidays and regional official holidays, in particular, moving holidays such as Easter, Chinese New Year and Ramadan. Other similar events include paydays for large groups of employees, pension payments, etc.

Variations due to these factors can have a significant impact on a time series and may obscure important movements in the series and should be adjusted for. However, working day and trading day effects are part of the overall seasonal variation in a time series and any adjustment of a series for them should be regarded as an integral part of the seasonal adjustment process and not as a separate process (IMF 2001, para. 8.30).

5.4 Seasonally adjusted data

Most infra-annual time series show intra-year variations which recur regularly every year, possibly slowly evolving. In order to gain insight into the current developments measured by a seasonally varying time series, it is necessary to correct it for these regularly repeating intra-year variations. For example, if a monthly time series decreases every July because of holidays, there is little to be gained by noting that it decreased once more last July as it always does. Analysts are interested in whether the last decrease itself was larger or smaller than usual.

Another issue concerning analyses of time series subject to seasonal influences is that of obtaining statistically meaningful comparisons of different periods within the same year; for example, comparing January sales levels to say that of September. Seasonal variations, irrespective of their causes, are a reflection of the fact that each period has its own basis of comparison across the years that differ from those of the other periods. Hence, direct comparisons of periods of the same year for seasonal time series is generally not statistically meaningful. Hence the need for seasonal adjustment.

There are numerous seasonal adjustment methods which vary in sophistication. At one end is the simple year-on-year change (or percentage change), and at the more sophisticated end are techniques such as X-12 RegARIMA (Findley et al. 1998) and Tramo-Seats (Gomez and Maravall 1996), BV4, SABLE, DAINTIES, etc. For the majority of time series, only the more sophisticated techniques can produce series adequately seasonally adjusted for most purposes. However, because seasonal adjustment can only be achieved through a model of the seasonal behaviour of the series to be adjusted, and since each of the best seasonal adjustment methods encapsulates a broad but restricted family of seasonal models, there is not a unique method that would be applicable to all series.

Almost every national statistical agency and international organization compile or at least disseminate seasonally adjusted data for many of their infra-annual time series, though practices vary with regards to

how such series are presented to users and the amount and content of metadata describing the treatment of the series. The work of the OECD STESEG task force on data presentation and seasonal adjustment focused on the issue of how to report seasonally adjusted data, and which information on the seasonal adjustment method and what kind of specification details should be disseminated or made available to users.

The framework of task force work was set by the differentiation of three types of users: public, informed users, analytical users. The needs of each group are very different and to meet them statistical agencies need to provide differentiated sets of metadata. The information required by each group entails:

- general public – require "basic" metadata on seasonal adjustment, i.e. a layperson's explanation of the adjustment. Such users are generally not interested in more technical information (such as diagnostics of the procedure);

- informed users - need detailed information on how the statistical program performing the seasonal adjustment was carried out, as well as statistics on the validity of the adjustment for specific series. For this category of users, statistical agencies generally provide at least one comprehensive document per statistical program;

- analytical users - need some of the results of the statistical program to reprocess them for their own use(s). In other words they should be supplied with all the relevant parameters needed to replicate the official seasonal adjustment, and to modify it if they wish.

5.5 Trend-cycle data

The trend component of a time series referred to briefly in the introduction to in Section 5.1. above refers to the long term movements of a series. The trend reflects the underlying level of the series and is typically due to influences such as population growth, price inflation and general economic development. For the purposes of seasonal adjustment both the long-term trend and medium-term cycles are treated as the trend component of a time series. For this reason, the trend component is sometimes referred to as the trend-cycle (ABS 2001, Section 2.1).

The main issues with respect to the reporting and presentation of trend-cycle data centre on whether or not to produce trend-cycle series for certain types of indicators, rather than to which techniques should be used to produce them. The following points are considered relevant:

- Should trend-cycle estimates be released for volatile series, or not at all (i.e. filtering should be left to users)?

- How to deal with revisions derived from filtering techniques (and with the related end-point problem)?

- If volatility is the key feature to discriminate among indicators, perhaps a standard should be set in order to define volatility.

National practice varies considerably across countries with regard to the availability of trend-cycle estimates. For example, Australia, in addition to raw data and seasonally adjusted data, releases trend data for all series where the irregular component has been filtered out of the seasonally adjusted data. The German Federal Statistical Office publishes the trend-cycle component and the irregular component of the industrial production index. The Korean National Statistical Office produces trend-cycle series as reference material for Composite Indices of Business Indicators. In Italy, ISTAT does not release filtered time series

for any indicator although in some press releases, three-term moving averages are added to graphs but with no values or comments. Other countries such as France do not publish trend-cycle data at all.

Much of the discussion on trend-cycle analysis focuses on the end-point problem. Significant differences can arise following revisions to provisional data from which trend data are derived. Data can even change from positive to negative values or vice versa.

5.6 Recommendations for the reporting and presentation of different forms of data

This Section commences with a discussion on how to present seasonally adjusted data, then discusses the usefulness of some of the more common transformations applied to seasonally adjusted figures, and finally what information should be provided about seasonal adjustment for each of the three categories of users identified above.

5.6.1 How to present seasonally adjusted data

The presentation of seasonally adjusted data concerns, in the main, members of the general public. Since the most appropriate seasonal adjustment techniques are very sophisticated statistical transformations, it is not reasonable to expect the general public to have the ability to perform these transformations on their own.

Therefore, the general public should expect from statistical agencies that the main sub-annual indicators that appear in press releases, etc, to be seasonally adjusted appropriately when needed.

Recommendation 1

When seasonality is present and can be identified, sub-annual indicators should be made available in seasonally adjusted form. The level of detail of indicators to be adjusted should be chosen taking into account user demand and cost-effectiveness criteria. The adjustment should be applied appropriately using the method chosen as a standard by the agency. The method used should be explicitly mentioned.

Members of the general public cannot be expected to be familiar with all the intricacies of seasonal adjustment. One such subtlety is the distinction between the adjustment for seasonal variations per se, and the other adjustments such as those for trading-days and variable holidays such as Easter. Within the statistical community, it is generally understood that "seasonally adjusted" includes all these adjustments unless otherwise specified, not just those for seasonal variations. This definition is also the most widely used by statistical agencies. One exception is found at INSEE, where it is specified that the monthly Index of Industrial Production, for example, is adjusted both for seasonal variations and trading-days: "… l'indice CVS-CJO de la production industrielle …"(INSEE 2003). Although quite laudable, this is not as user-friendly as simply stating that the series are "seasonally adjusted". Also, by providing some details on what the series are adjusted for, it begs the question as to whether other adjustments, such as moving holidays, are included.

Recommendation 2

When series are adjusted for seasonal variations, including trading-day effects and other regular calendar variations if present, they should be referred to as "seasonally adjusted".

The above recommendation raises the issue as to whether a series with no discernible seasonal variations but some identifiable calendar variations, such as trading-days, should be so adjusted and if adjusted, how should it be referred to? Given that trading-day variations will likely be the most important source of regular calendar variations in many non-seasonal series, and that users are often interested in year-over-year comparisons, but that these comparisons could be distorted by the trading-day variations, it is recommended that such series be adjusted for such calendar effects and be referred to as being "seasonally

adjusted", consistent with Recommendation 2. Although series of this kind are uncommon, and the recommended treatment is implicit in the previous recommendations, it is worth while to provide a specific recommendation about it.

Recommendation 3

Series with no identifiable seasonal variations but with identifiable regular calendar variations, such as trading-days, should be so adjusted with the most appropriate techniques, and should be referred to as "calendar adjusted**".** When no seasonal effects are contained in the raw series, the seasonally adjusted results are equal to the calendar adjusted figures. When no calendar effects are present in the raw series, the calendar adjusted results are equal to the raw data.

Accordingly, for the remainder of this Section, unless otherwise specified, seasonal adjustment includes all calendar adjustments, including those for trading-days, and variable holidays.

The question now arises as to whether or not the unadjusted data be presented together with the seasonally adjusted figures in data disseminated to the general public, e.g. in press releases? The proponents for presenting the two versions generally point out that many users are interested in seeing the actual numbers. Those who do not favour presenting together the adjusted and unadjusted versions assert that there is a possibility for users to be confused about what is the correct information. The OECD task force supported both points of view. It noted however that if centre stage is given to the seasonally adjusted figures, the risk of confusion is greatly reduced.

By the same token, if any of the intermediate components of a seasonally adjusted series is presented (e.g. the series only adjusted for trading-days) in addition to the unadjusted and seasonally adjusted versions, then the risk of confusing the general public is very real. In addition, it is likely that the statistical agency would then have to provide some explanations about the intricacies of seasonal adjustment with the release, increasing the risk of burying the essential information.

Recommendation 4

When applicable, the focus of press releases (or similar releases to the general public) concerning the main sub-annual indicators should be on their appropriately seasonally adjusted version. Where there is a user demand, the agency may also disseminate intermediate components of the seasonal adjustment process (e.g. series adjusted for calendar effects) but it should be clearly indicated that the focus is on the seasonally adjusted data.

In some countries the levels of some seasonally adjusted flow figures are presented at "annual rates", being multiplied by 12 (for monthly series) or 4 (for quarterly series). Examples of datasets presented in this way are for Canada: the sub-annual estimates from the Canadian System of National Accounts, including monthly GDP by industry, prepared by Statistics Canada, and the number of housing starts prepared by another Canadian federal agency, Canada Mortgage and Housing Corporation. All other seasonally adjusted flow series prepared by Statistics Canada are not presented at annual rates. The only other OECD Member countries following this practice for their sub-annual SNA estimates are Japan, Mexico and the United States.

The main advantage of this practice is that it facilitates the comparison between series of different periodicities (monthly, quarterly and annual). However, given its limited use, it is more of a hindrance

when comparing seasonally adjusted figures from different programs within a centralized statistical system such as Statistics Canada. The OECD task force therefore recommend that this practice not be followed.

Recommendation 5

For sub-annual data expressed in levels, seasonally adjusted figures should be presented in sub-annual form; i.e. seasonally adjusted sub-annual data expressed in levels should not be grossed up and presented in annual terms.

A somewhat related issue is the question as to whether the sum of the sub-annual seasonally adjusted figures should be forced to agree with the annual totals of the raw series. The answer to this question depends on the significance of these annual totals. Many sub-annual series are benchmarked to annual information that is considered more reliable than their own annual totals.[8] In such cases, the sub-annual raw series become "distributors" of the better annual totals, and hence their seasonally adjusted version should also be viewed under the same light.

When no benchmark annual totals are available, there is no guarantee that the sum of the raw sub-annual values is in any way better than the sum of the seasonally adjusted sub-annual values. In addition, the benchmarking procedure applied to seasonally adjusted figures preserves the sum of the sub-annual periods, even if the seasonal model is multiplicative. In such instances, benchmarking is not formally correct, although the differences between a formally correct procedure and the current one will generally be of no great importance.

The task force noted that if the annual totals of the raw series do not coincide with those of the seasonally adjusted version, it would only affect the informed users. Any such discrepancies will not be seen by the general public, whereas analytic users will generally be in a position to address the situation in a manner appropriate to their needs. These discrepancies often become a major annoyance for informed users when comparing annual figures derived from sub-annual information with other annual sources, but they do provide an indication of the quality of the seasonal adjustment.

5.6.2 The analytical transformations

The statistical information reported in press releases and similar forms of data dissemination is of necessity limited, and concentrates on the meaning of the results of a statistical program. In order to help the public at large assimilate this information, some simple transformations are generally presented such as period-to-period growth rates. In the following, the adequacy of some of the most common such analytical transformations is discussed.

The most common and useful analytical transformations on seasonally adjusted flow series are the period-to-period growth rates and the period-to-period changes in their levels. If neither of these transformations is present, users will of necessity compute them. Hence the recommendation:

Recommendation 6

Press releases presenting seasonally adjusted flow series should at the minimum provide the period-to-period change in levels and, where space permits, the period-to-period growth rate for the latest period.

[8] See chapter 6 of Bloem, Dippelsman & Mæhle (2001) for a description of various benchmarking methods.

However, should the period-to-period growth rate be annualized?[9] In Canada, the practice of annualizing the growth rates is followed only for the quarterly estimates of GDP based on the income and expenditure approaches. The monthly growth rates of GDP by industry, the other major sub-annual program that is part of the Canadian System of National Accounts, are not. This practice is also not widespread among the OECD Member countries. In addition, even among countries presenting annualized growth rates there is a notable difference in the focus given to them. For example, in the United States the Bureau of Economic Analysis emphasizes the annualized quarterly growth rate of GDP in its press releases.[10]

In Canada by contrast, it is the quarterly growth rate itself that is emphasized. In addition, in recent releases of the Canadian quarterly GDP a table such as that shown in Figure 1 is presented.[11] Given that three growth rates are presented for each quarter in Canada, it could be posed whether this excess of information for the general public defeats its purpose of shedding light on the statistical results.

Figure 1

Real gross domestic product, $ chained 1997[1]

	Change	Annualized change %	Year-over-year change
First quarter 2002	1.4	5.8	2.5
Second quarter 2002	0.9	3.8	3.2
Third quarter 2002	0.7	2.7	4.0
Fourth quarter 2002	0.4	1.6	3.5
First quarter 2003	0.6	2.6	2.7
Second quarter 2003	-0.1	-0.3	1.6

[1] *The change is the growth rate from one period to the next. The annualized change is the growth rate compounded annually. The year-over-year change is the growth rate of a given quarter compared with the same quarter in a previous year.*

Considering first the annualized growth rates, there are perhaps two justifications for their use. The first is that it provides a forecast for the annual growth rate. The other is that it provides a rate that is interpretable on an annual basis similar, say, to the unemployment rate or an interest rate. Clearly, the first justification as forecasts is to be rejected as it is only applicable to the first period of the year; once the growth rate of the first k periods (r_i, i=1(1)k) in a year are known, a "better" forecast for the whole year is obtained by compounding these first k growth rates with the latest period's growth rate compounded for the remaining periods of the year; i.e. letting r_a denote the forecasted annual growth rate, the better forecast is obtained as:

$$r_a = (1+r_1)(1+r_2) \ldots (1+r_k)(1+r_{k+1})^{p-k}.$$

[9] The annualized growth rate for data (x_t) of periodicity *p* is defined as $(x_t/x_{t-1})^p - 1$. One finds instances where the linear approximation $p(x_t-x_{t-1})/x_{t-1}$ is used. Although it is an acceptable approximation for quick back-of-the-envelope calculations when the period-to-period growth rate is small, the linear approximation should not be used in official releases.

[10] See http://www.bea.gov/bea/newsrel/gdp103a.pdf.

[11] See http://www.statcan.ca/Daily/English/030829/d030829.pdf.

The second interpretation does however reflect a genuine need on the part of users. But annualizing has a very negative aspect in that it exaggerates the volatility of the period-to-period growth rates. It is for this reason that annualizing monthly growth rates is very rarely seen, and is not appropriate.[12]

Another transformation that is frequently used and which also provides an annual rate is the year-over-year growth rate. This appears as the third column of Figure 1.[13] It has two drawbacks as an indicator of "annualized" rate. The first is that the year-over-year growth rate provides a better picture of what was occurring six months ago than what is happening currently.[14] The second drawback is that it is subject to "base effects". A base effect occurs when the year-ago data are at a level inconsistent with the current one. For an explanation of the base effect as given to the users of statistical information, refer to the November 2003 release of the Canadian Consumer Price Index (CPI).[15] Note that despite its drawbacks, the year-over-year growth rate is the official measure of growth of the Canadian CPI that is monitored by the Bank of Canada, Canada's central bank, to assess one of the aspects of the inflation situation in the country.

Computing the growth rate over a shorter time span and annualizing the result would provide a more current "annualized" rate than the year-over-year growth rate, with lesser ad-hoc accidental variability than the period-to-period growth rate annualized. A whole sequence of annualized growth rates extending from the annualized period-to-period growth rate to the year-over-year growth rate can be obtained by letting k run from 1 to p in the following formula, where p is the periodicity of the time series:

$$r_t^{(k)} = (x_t/x_{t-k})^{p/k} - 1. \qquad (1)$$

In formula (1), $r_t^{(1)}$ is the annualized period-to-period growth rate, whereas $r_t^{(p)}$ is the year-over-year growth rate. As k increases from 1 to p, the growth rates $r_t^{(k)}$ become less volatile, but their actuality diminishes as they better reflect the actual growth k/2 periods before the current period. This reduction in actuality is called the phase. There is thus a trade-off to achieve.

One possible trade-off would be to select a time-span such that the phase is about a quarter of a year. For monthly time series this would mean selecting k = 6 months in formula (1), whereas for quarterly series it would mean selecting k = 2 quarters.

Figure 2 below compares the monthly growth rates with their annualized version and the actual annual growth rates for Canada's GDP by industry since January 1998. It clearly shows the inappropriateness of annualizing the monthly growth rates. Figure 3 compares the year-over-year growth rates with the actual annual ones and with the ¼-year phased growth rates for the same indicator over the same period. As expected, the ¼-year phased growth rates are more volatile than the year-over-year growth rates, but are quicker to pick-up changes in economic activity. The ¼-year phased growth rates are much less volatile

[12] An example for Canada appeared in the Winnipeg Free Press of May 1, 2003: "Gross Domestic Product expanded by 0.2 per cent in [February 2003] after gaining 0.5 per cent in January, [Statistics Canada] said yesterday. (…) The February rate projected to an annual figure would mean growth of 2.4 per cent." This article failed to note that had the January rate been projected to an annual figure, it would have "projected" an annual growth of 6.0 per cent.

[13] The year-over-year growth rate is often used on unadjusted data to provide a quick-and-dirty seasonally adjusted growth rate. It is far from adequate however, as trading-day variations generally make months a year apart not directly comparable.

[14] Technically speaking, the year-over-year growth rate is phase-shifted by about six months. See *inter alia* Rhoades & Elhawary-Rivet (1983) for an explanation.

[15] See http://www.statcan.ca/Daily/English/031119/d031119a.htm.

than the annualized monthly growth rates however; note the change in scales between Figure 2 and Figure 3.

Figure 2

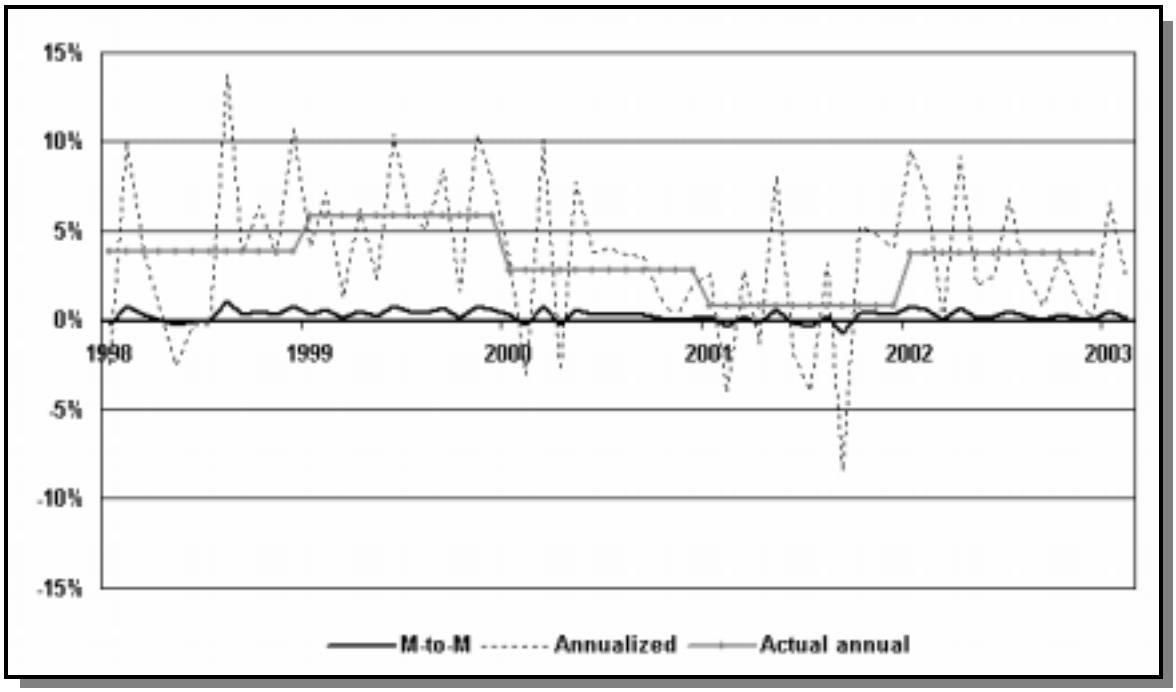


Figure 3

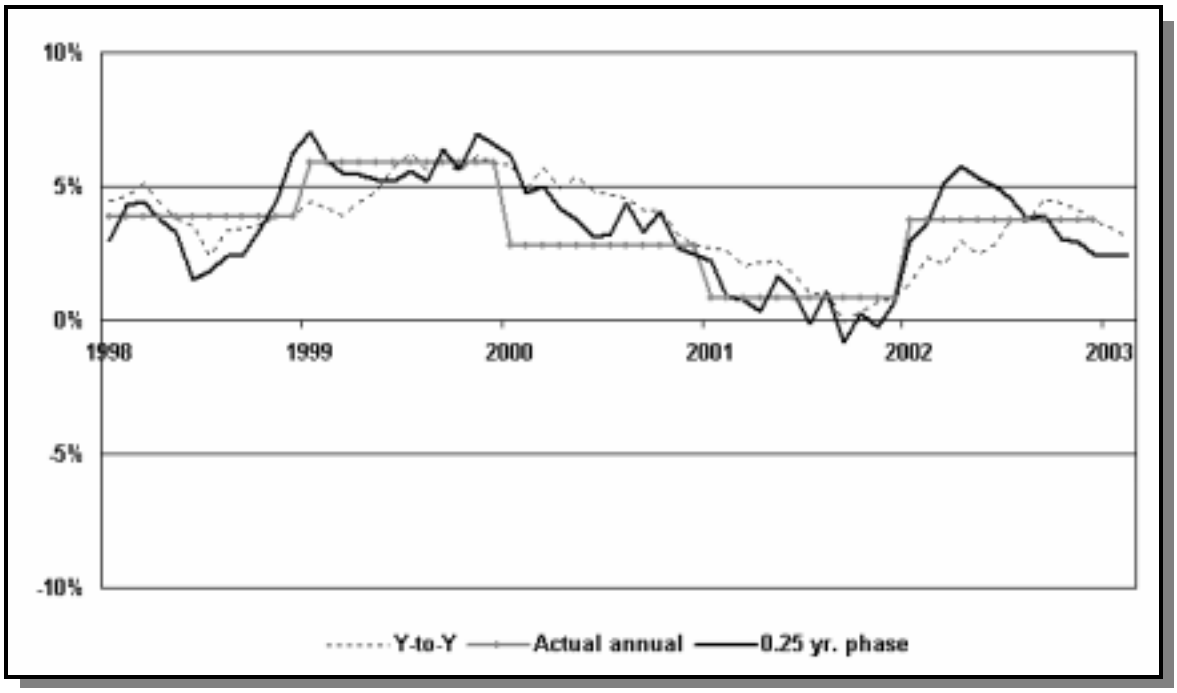


Figure 4 compares the quarterly growth rates with their annualized version and the actual annual growth rates for Canada's GDP derived from the Income and Expenditure Accounts from the first quarter of 1998. Figure 5 shows the year-over-year growth rates with the actual annual ones and with the ¼-year phased growth rates for the same indicator and period. Figure 4 and Figure 5 both show the same behaviour noted in Figure 2 and Figure 3.

Figure 4

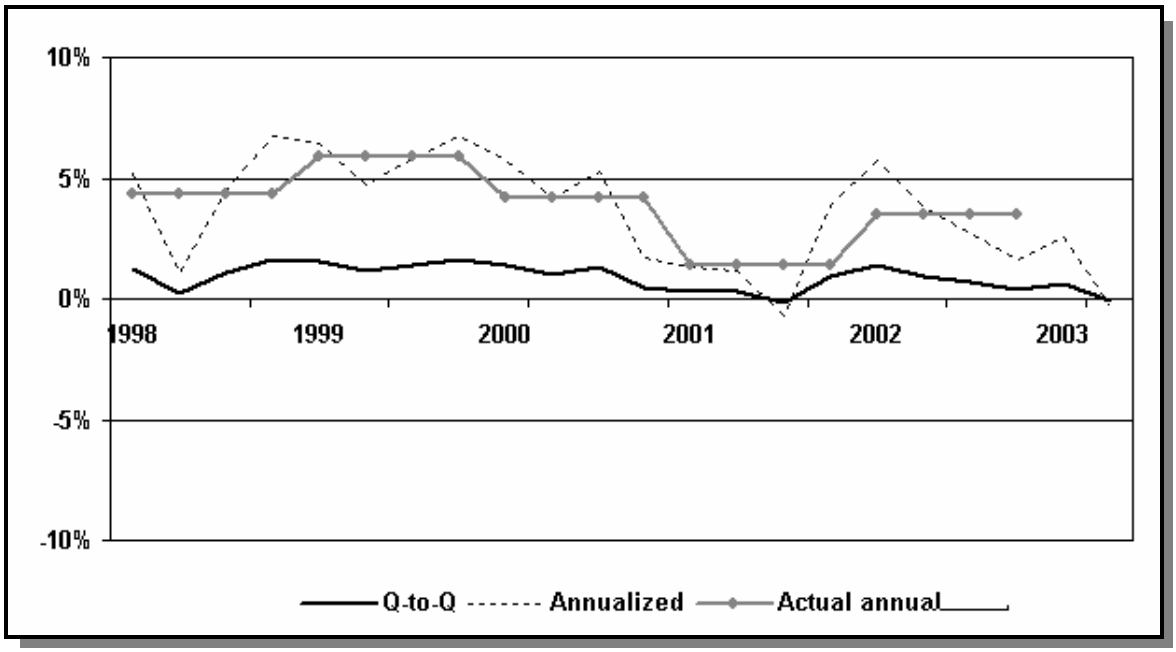
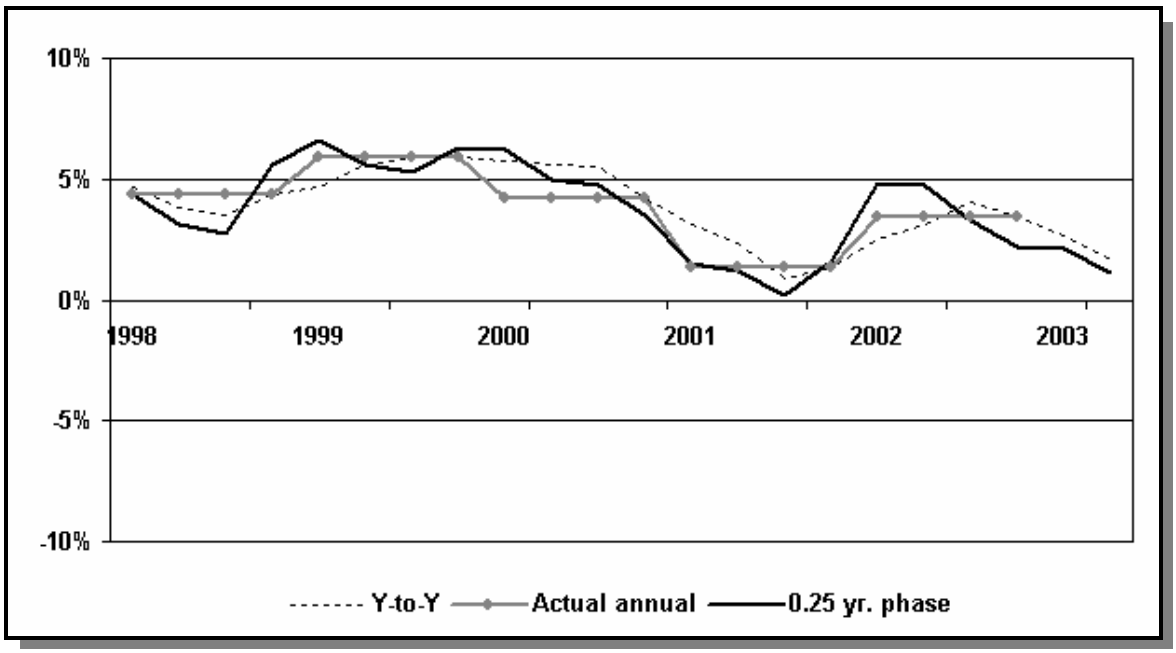


Figure 5



From this short analysis, the task force concluded with the following recommendations.

Recommendation 7

To present quarterly or monthly growth rates at annual rates, annualized period-to-period growth rates should not be used; the year-over-year growth rates are preferable.

Recommendation 8

It is recommended that the annualized semi-annual growth rates should be considered instead of the year-over-year ones as they react more quickly to current economic conditions, and as they are much less volatile than the annualized period-to-period growth rates.

5.6.3. What to provide about seasonal adjustment

The general public has an interest in understanding what seasonal adjustment is all about. However, given the sophisticated nature of seasonal adjustment methods, it is not reasonable to expect the general public to possess the mathematical and statistical background for understanding a technical description of any particular adjustment method.

Accordingly, statistical agencies should provide "popular" metadata on seasonal adjustment, i.e. a layperson's explanation of this adjustment. Two examples are provided by the U.S. Bureau of Economic Analysis[16] and by Statistics New Zealand,[17] the latter being more technical than the former.

Recommendation 9

Statistical agencies should disseminate a non-technical explanation of seasonal adjustment and its interpretation for the benefit of and aimed at the general public.

For the second group of users, i.e. the informed users, the Statistics New Zealand's description of seasonal adjustment appears appropriate. However, the more relevant questions with respect to their needs are: which components, if any, of the seasonal adjustment decomposition should be included in a detailed publication, and which statistics describing the quality of seasonal adjustment should be included?

Given the above definition of informed users as those requiring more detailed results than those provided to the general public, or requiring specific information about how the statistical program was carried and its reliability, the need for other components than the raw and seasonally adjusted estimates is limited. However, precisely because of their information needs about the reliability of the results, they require statistics describing the quality of the seasonal adjustments performed.

A good starting point is provided by the U.S. Bureau of the Census publication, *Manufacturers' Shipments, Inventories, and Orders*.[18] No matter which seasonal adjustment method is used, one can obtain the

[16] See http://www.census.gov/mcd/mcdfaqs.html

[17] See Seasonal adjustment in New Zealand.

following fundamental seasonal decomposition model from which pertinent quality statistics can be computed:

$$O = C + S + Td + X + I$$

where

O is the original unadjusted series;
C is the trend-cycle;
S is the seasonal component;
Td represents the trading-day, variable holidays and other specific calendar variations;

X represents the correction for the extreme observations identified during the seasonal adjustment process; and
I is the irregular component (excluding the extreme observations).

Following Ladiray & Quenneville (2003, p. 169*ff*), denote by $\overline{\mathbf{A}}$ the average absolute period-to-period change (or percentage change) in series A, i.e. let:

$$\overline{\mathbf{A}} = (\mathbf{n} - \mathbf{1})^{-1} \sum_{t=2}^{n} \left| \mathbf{A}_t \; \boldsymbol{op} \; \mathbf{A}_{t-1} - \boldsymbol{xbar} \right|$$

where

op is "-" for an additive model, and "÷" for a multiplicative one, and
xbar is 0 for an additive model, and 1 for a multiplicative one.

Also, let $\%\overline{\mathbf{A}}$ represent the relative contribution in percent of the absolute variations of A in the absolute variations in the original series, i.e.:

$$\%\overline{\mathbf{A}} = 100\overline{\mathbf{C}}^2 \,/\, \overline{\mathbf{O}'}^2$$

where $\overline{\mathbf{O}'}^2$ is the sum of the the relative contributions of all components, as described in Ladiray & Quenneville (2003, p. 171).

The pertinent quality statistics related to the above seasonal decomposition are then:

$\overline{\mathbf{O}}$ the average absolute period-to-period (percentage) change in the original series;
$\%\overline{\mathbf{C}}$ the relative contribution of the trend-cycle in the original series;
$\%\overline{\mathbf{S}}$ the relative contribution of the seasonal component;
$\%\overline{\mathbf{Td}}$ ..the relative contribution of the trading-day, variable holidays and other calendar variations;
$\%\overline{\mathbf{X}}$ the relative contribution of the extremes;
$\%\overline{\mathbf{I}}$ the relative contribution of the irregular component;
M7 is the value of the combined test for the presence of stable and moving seasonality as described in Ladiray & Quenneville (2003, p. 178); and
Q is the overall quality statistic for seasonal adjustment as described in Ladiray & Quenneville (2003, p. 179).

Note that all these statistics can be set out in one table and all can be obtained from the standard output of X-11-Arima and X-12-Arima. Hence the following recommendation:

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[18] Available at: http://www.census.gov/indicator/www/m3/bench/bench.htm. See the accompanying document ***Pages from m3-01 on seasonal adjustment.pdf*** .

Recommendation 10

For the benefit of users requiring information about the validity of the seasonal adjustment applied, statistical agencies should provide a minimum standard of information facilitating an assessment of the reliability of each seasonally adjusted series.

Finally, for analytic users, the task force believed that no additional elements than those listed for informed users and presented in the publication (whatever its format) dedicated to the statistical program need be added. But for analytic users, metadata is of paramount importance.

The main elements of this metadata could include the following: a short standardize descriptor of the method used, all the main parameters of the adjustment (e.g. additive versus multiplicative decomposition model), and some of the derived information (e.g. the trading-day weights). The principle to be followed is that the metadata should be of sufficient extent to enable an analytic user to seasonally adjust in a consistent way other series from the same statistical program which may not have been adjusted, or to compare the results obtained from using different options or methods for seasonally adjusting the same series.

The task force noted that, to a large extent, the knowledge of which software was used and of the parameters specified for the seasonal adjustment of a particular series is generally sufficient to replicate the process. However, this information does not need to be disseminated given its limited use. Nonetheless, it should be available upon request.

The task force concluded with the following recommendation.

Recommendation 11

Statistical agencies should maintain metadata on seasonal adjustment of sufficient extent to enable outside users to seasonally adjust in a consistent way other series from the same statistical program that may not have been seasonally adjusted.

6. GUIDELINES FOR THE REPORTING AND DISSEMINATION OF METADATA

6.1 Introduction

In recent years greater emphasis has been given to the importance of ensuring that statistics published by international organisations, national statistical institutes and other agencies are accompanied by adequate methodological information or metadata[19]. The need for such methodological information arises from a desire to lend transparency to the data so that the typical end-user can make an informed assessment of their usefulness and relevance to his or her purpose. However, in reality, the typical end-user seldom requires or uses detailed metadata. Such users of metadata are generally depicted as falling into two broad groups: producers of statistics responsible for designing data collections, actual data collection, processing and evaluation of data, and data dissemination; and end-users of statistics comprising policy analysts, media, academics, students, etc (UNSC and UNECE 2000). The statistical functions of international organisations often fall somewhere in the middle of these broad groups, in that they also perform the role of disseminators of data to internal or external end-users. International organizations also use metadata in evaluations and assessments of data comparability between countries.

In many instances the requirements of users for metadata overlap between those located in national government agencies, users in the private sector, in national statistical agencies and in international agencies. Pursuing the location of users and even the types of uses of metadata may not be all that helpful in that metadata are often being presented to an unknown audience of users. The approach used in this Manual is to differentiate between the amount of metadata detail required for data interpretation by different users and how varying levels of metadata detail is best presented.

An approach commonly used by national and international agencies entails the presentation of metadata as layers within a pyramid. Using this approach, for any specific statistical domain (e.g. CPI, PPI, industrial production index, unemployment rate, etc.) methodological information describing the data becomes more detailed as one moves down from the apex of the pyramid. For example:

- Table headings and footnotes – that are generally immediately adjacent to the data are an integral part of each statistical table and are essential for an understanding of the data.

- Explanatory notes – generally provided in the same "publication" and which provide a brief general description of the statistics, definitions, key issues that can impact on the use of the data. In an international context, in the main, explanatory notes do not provide much detail on individual country methodology/practices.

- Summary metadata on national practices, sources and definitions – provide a brief outline of current national practices for each country.

- Detailed methodological information disseminated by national statistical agencies and international organisations in publications and/or on websites. These are potentially the source of the most detailed methodological information available. Some (though not all) statistical agencies publish very detailed concepts, sources and methods for a number of their key annual and infra-annual statistics. The need

[19] The International Standards Organisation (ISO) definition of metadata is "data that defines and describes other data". Metadata in the context of this Manual is more akin to the term statistical metadata defined by UNSC as "….. information on data – and about processes of producing and using data. Metadata describe statistical data and – to some extent – processes and tools involved in the production and usage of statistical data.".

for provision of more extensive methodological information, and its accessibility to users through dissemination on the web, is now receiving greater recognition. However, practices in this area vary considerably with regard to the amount of methodological detail provided on their websites and other dissemination media (even in the national language), frequency of updating, its proximity to the statistics it describes and ease of access by users.

Metadata disseminated by statistical agencies can therefore be categorised on the basis of both the amount of information provided and its proximity to the statistics it describes. Most users of methodological information disseminated by the statistical agencies in the context of the dissemination model outlined above, merely access the top layer. If they require more detailed information on specific methodological aspects to determine the relevance of the data to their requirements, they may have to search through succeeding layers where more detailed methodological information is provided. The normal role of the statistician, in relation to statistical methodological information, primarily entails its compilation and dissemination. To this should be added the key task of giving it structure and providing a clear path that enables users to dig as deeply as necessary without being buried in enormous amounts of text.

The primary responsibilities of national and international agencies regarding metadata are therefore to:

- ensure that statistics disseminated are accompanied by appropriate metadata; and to
- provide efficient facilities for the dissemination of appropriate metadata detail to users.

International organizations have a specific additional responsibility to minimise the reporting burden of national agencies supplying both metadata and data.

6.2 Need for metadata content standards

As stated above, there are significant differences between statistical agencies when it comes to the organisation and structure of metadata for statistics which are increasingly becoming accessible via a wider range of dissemination media, in particular, on-line dissemination on the web (in html or databases). The evolution of statistical metadata content standards has not really kept pace with IT infrastructure developments. From the perspective of content standards, there are two broad sets of issues:

- accessibility of the metadata. In the context of internet dissemination issues here involve the actual availability of metadata on websites, organisation on the web, provision of search facilities, linkage to data and the financial cost to the user to access the required metadata; and
- significant differences between countries in the actual statistical methodological elements described in metadata for the same statistical domains. In some instances the problem is merely one of terminology where the same term can have different meanings or different terms can have the same meaning. In other cases, the actual metadata is different. From the viewpoint of an international organisation, where there is a frequent need to compare practices used by a number of countries, different metadata content posted on websites or published elsewhere makes any meaningful methodological comparisons a time consuming and costly exercise. The need to compare statistics across countries is by no means restricted to users working in international organisations.

6.3 Recommended good practice

The four key elements of good practice in the compilation and dissemination of metadata relate: to <u>where</u> metadata should be disseminated by international organisations and national agencies; providing <u>access</u> to

metadata; the methodological items (or metadata elements) that should be incorporated in metadata disseminated; and the use of a common set of terminology. Each of these elements of good practice are discussed below.

6.3.1 Where metadata should be disseminated

All statistical agencies should:

- provide access to the metadata required for users to understand the strengths and limitations of the statistics it describes.

- disseminate such metadata via a range of different media – paper publications, CD-ROMS, etc, however, it is important for all metadata to be available to users on the internet, given that the web provides the most accessible medium for obtaining the most up-to-date metadata. It is also good practice for metadata to be structured in such as way as to meet the needs of a range of users with different needs and/or statistical expertise. In this context a layered presentation of metadata is recommended, progressing from summary metadata to more detailed metadata;

- keep their metadata up-to-date, incorporating the latest changes in definitions, classifications and methodology, etc;

- disseminate their metadata free of charge on the web. There is strong support for the notion that metadata describing statistics has a high public good component and should therefore be disseminated free of charge on the internet even if the actual statistics they describe and paper publication versions, etc, are subject to an organisation's price regime.

6.3.2 Access to metadata

National agency and international organisation practices vary significantly with respect to the visibility of metadata they disseminate, in particular, for metadata located on websites. In some instances metadata is easily located by users unfamiliar with the site and in others considerable time and effort is required to navigate through the website to obtain the required information, particularly where metadata for a number of different statistical domains are sought. Key recommendations in this area include:

- active linkage of metadata to the statistical tables and graphs they describe and vice versa;

- structuring the metadata for different statistical domains on the basis of some hierarchic classification. Consideration could be given to the adoption of the UN Administrative Co-ordination Committee's (ACC[20]) Classification of Statistics and Statistical Activities as the international standard for metadata. The classification is available at http://unstats.un.org/unsd/methods/statact/acc-class.htm;

- provision of a local search engine based on free text search;

[20] Now known as the Committee for the Co-ordination of Statistical Activities (CCSA) which is a body of representatives from all UN and non-UN international organisations involved in statistical activity. The CCSA normally meets once a year.

- good practice for ensuring either the stability of URLs (Uniform Resource Locators) or providing links between the old and new URLs that will redirect users to the new address. This is a key issue given the importance of links between websites[21].

- providing the names of contact persons or email addresses where further information about concepts, definitions and statistical methodologies may be obtained.

6.3.3 Adoption of a set of common metadata items

This issue, together with the adoption of common terminology, is at the heart of current problems and difficulties of comparing methodologies used by different countries in the compilation of the statistics they disseminate. Also, there is a need for international organisations to minimise the metadata reporting burden of national agencies. In addition to a perceived lack of co-ordination between international agencies, national agencies faced with the burden of providing metadata to different international agencies, often comment on their use of different metadata templates for the same statistical domains. They also comment on how much easier life would be if different international organizations used the same metadata model (or at least a common core template) so that one set of metadata compiled by the national agency would meet the needs of many/all/most international organisations. Another form of co-ordination would involve the linkage of metadata held on various national and international repositories in lieu of direct collection and/or duplicate storage on different databases.

The notion of a minimum core set of metadata required for the correct interpretation of statistics has been discussed at numerous forums on metadata and indeed such a list is included in the UNSC/UNECE guidelines (UNSC/UNECE 2000, p. 5). Similarly, the more comprehensive and hierarchic metamodel for the IMF's SDDS, which is currently being revised, provides another such core list.

Options for improvement in this area would either entail the international agencies agreeing on the use an existing template or developing a new one. The latter could take some time. It would perhaps be preferable not to become involved in a lengthy process of developing a new template and instead use an existing template(s) such as those developed by the IMF for the detailed methodological summaries posted on the DSBB. Metadata provided on such a basis would meet almost all metadata user requirements. International (or national) agencies requiring a more detailed template could consider developing models that are at least consistent with the IMF template or other generally accepted standards in this area.

6.3.4 Adoption of a common set of terminology for metadata preparation

Considerable resources are often expended by international organizations in verifying text, etc, to ensure that methodological descriptions are as consistent as possible between countries. Not only does the process of metadata verification entail a duplication of effort but it also results in dissemination of different methodological terminology, especially where translation of methodological text into another language is necessary. Ideally, methodological descriptions of the same national statistical collections published by different international organizations should be identical with regards terminology. A mechanism for achieving this would be the rigorous use of terminology imbedded in the various international statistical guidelines and recommendations. This could be facilitated by the use of glossaries published by international organizations which contain definitions derived from those standards. Examples of such glossaries are those maintained by the OECD, Eurostat and UNSD referred to in Section 1.5 above.

[21] The World Wide Web Consortium (W3C) document "Cool URIs don't change" (available at http://www.w3.org/Provider/Style/URI) outlines the case for maintaining stable URLs and best practice for designing URLs.

The Metadata Common Vocabulary (MCV) developed by Eurostat and the OECD under the umbrella of the SDMX initiative is specifically aimed at identifying commonly used terms to describe the different types of metadata (SDMX 2003). It is intended to be used by international organizations and national statistical agencies. The MCV contains a core set of metadata items and their related definitions and is designed to improve the standardization of metadata content for the purposes of data exchange and to promote the use of common nomenclatures that can foster international comparability of international data. The current version of the MCV (available on the SDMX website at www.sdmx.org) contains several fields – term, definition, source, URL to definition source where available, related terms and context.

7. GUIDELINES ON KEY REPORTING PRACTICES

As mentioned in the Introduction to this Manual (in Section 1.2), there are a small number of data reporting practices where different approaches used by national agencies and international organisations can and do complicate the process of comparing data, both between countries and within an individual series over time. This Section provides a brief background on a number of key reporting practices, identifies existing international standards (if any) and specifies good practice for implementation by both national agencies and international organisations.

7.1 DATA REVISION

The following discussion on data revision and the need for the formulation by national agencies and international organizations of a comprehensive and transparent revisions policy draws directly and extensively from an IMF document (IMF 2003b) presented at the August 2003 International Statistical Institute (ISI) and the 2nd session of the Committee for the Coordination of Statistical Activities in September the same year.

The basic premise of the IMF document is that a sound revisions policy contributes inter alia to good governance in official statistics. It notes that many countries have not yet set out a well-articulated revisions policy. In recent years, however, revisions policy is receiving more emphasis. For example, the *Quarterly National Accounts Manual*, Chapter XI provides a discussion of revisions policy. The Ecofin Council of the European Union, in February 2003, included a section on revisions in its "Code of Best Practices on the Compilation and Reporting of Data in the Context of the Excessive Deficit Procedure." In addition, the IMF's Data Quality Assessment Framework specifies good revision practices.

The purpose of the IMF document presented in 2003 is to work toward outlining a more comprehensive and internationally accepted set of good practices that would together constitute a sound revisions policy that are generally applicable. These are derived from a discussion of user needs, resource issues, and maintenance of credibility. More specifically, they derive from a selection of examples of good practices in place in various countries that are included in an extensive set of appendices attached to the document. These are drawn from national accounts, prices, government finance statistics, monetary statistics, and balance of payments statistics.

7.1.1 Typology and terminology

Revisions are defined broadly as any change in a value of a statistic released to the public by an official national statistical agency. The statistic may be a level, such as the value of a flow (for example, GDP) or of a stock (for example, of financial assets), or a change in level, such as the rate of price increase. Revisions can be classified in at least two ways. One way is by the reason for the revision, and another way is by the timing of the revision. It is especially useful to catalogue these in order to establish a common language.

Revisions classified by reason

Revisions may take place for at least eight reasons. In reality, some of the distinctions are blurred because two or more kinds of revisions may be made at the same time. Aside from correction of mistakes, the last item in the list, the reasons tend to break into three groups. The first group is the incorporation of more complete or otherwise better source data, encompassing the first three reasons. The second is routine recalculation, encompassing the next two reasons, and the third is improvements, encompassing the next two reasons.

- Incorporation of source data with more complete or otherwise better reporting.
- Incorporation of source data that more closely match the concepts.
- Replacement with source data of judgment or of values derived largely by statistical techniques.
- Incorporation of updated seasonal factors.
- Updating of the base period.
- Changes in statistical methods.
- Changes in concepts, definitions, and classifications.
- Correction of errors in source data and computations.

The first reason, incorporation of source data with more complete reporting, cause revisions across a wide spectrum of statistics. At one end of the spectrum, a first report on credit aggregates may be based on the largest financial institutions and then the aggregate is revised when reports from all institutions, including the slower ones that have less sophisticated reporting or are from outside major cities, become available. At the other end of the spectrum, data from monthly samples may be replaced in national accounts components with data from more comprehensive annual samples. Two other reasons for revisions are related. Updating of weights, as for price indexes, brings in information from more recent surveys. Incorporation of audited results, as for budgetary figures and data from financial reports, to replace early results in effect brings in "better" data.

The second reason, the incorporation of source data that more closely match the concept, is most likely to occur in datasets that piece together many data sources in a mosaic that represents a comprehensive picture of some aspect of the economy. The national accounts and balance of payments are prime examples of such datasets. For example, if production is to be measured, source data that represent sales (plus some adjustments) may provide a first estimate and then the estimate is subject to revision as data more closely matching production become available.

In some situations no current data may be available, and a first estimate is based on judgment or statistical techniques. A revision may then occur when data become available. Such situations may arise for quarterly national accounts. The United States uses judgmental extrapolation for the first quarterly estimate for several components, including domestic services and improvements on owner-occupied housing. Subsequently, data become available that can be incorporated.

These first three reasons often appear together, for example, in national accounts and balance of payments. In monetary and government finance statistics, the reasons often boil down to completing institutional coverage and incorporating the outcomes of audited reports.

Incorporation of updated seasonal factors relates closely to the incorporation of additional source data, and some lists of reasons for revisions do not list the two separately. Seasonal factors, such as those that are derived from a moving average of experience or from the most recent year (concurrent seasonal factors), can change as the new experience comes into, and older experience drops out of, the calculations. Some countries rarely revise the consumer price index to bring in new or additional price observations, but do revise once a year to incorporate updated seasonal factors. For example, the U.S. Bureau of Labor Statistics, with the release of the January index, each year recalculates the seasonal adjustment factors to reflect price movements in the just-completed year. This routine annual recalculation may result in revisions to seasonally adjusted indexes for the previous five years.

Updating of the base year of an index - that is, the year set equal to 100 - is also often a routine reason for revision. This may be carried out as a separate step, but usually it is done when new data underlying the weights for the index are introduced.

Incorporation of changes in statistical methods is sometimes not listed separately because such changes often go hand in hand with changes in source data. However, they can also occur independently. For example, revision studies may reveal that a particular method can be improved or replaced by another to achieve greater accuracy or timeliness. In the last few years, this source of revision has become more prominent as countries moved from fixed-weighted volume and price measures to chain-weighted measures. Changes in concept, definitions, and classifications, often stimulated by the adoption of new international guidelines, are yet another source of revision, for example, when a country moved from following the fourth to the fifth edition of the *Balance of Payments Manual*. Major efforts have been devoted to reaching internationally agreed classifications in recent years. The Classification of the

Functions of Government (COFOG) and the Classification of Individual Consumption by Purpose (COICOP) are cases in point. The introduction of new classifications is often undertaken when new concepts and definitions are introduced, but sometimes on its own.

In addition, changes in presentation of statistics should be mentioned. They do not, strictly speaking, fit the definition of revision as a change in a value of a statistic. However, they often take place at the same time as revisions, especially revisions caused by changes in concept, definitions, and classifications. Changes in presentation are also often implemented to respond to the analytical needs of users, for example, the experience of Australia reporting financial derivative asset and liability positions on a gross basis rather than on a net basis.

Finally, revisions occur as errors are corrected. Errors may occur in source data or in processing. For example, reporting institutions may discover after submitting the data that some components are missing or outdated seasonal adjustments may have been inadvertently applied.

Revisions Classified by Timing

With regard to timing, some revisions are made in the weeks or months shortly after a first release. These are "current revisions" because they affect the current weekly, monthly, or quarterly data. "Annual revisions" are made after data for all the months or quarters of a year become available. Audits are usually undertaken for a calendar or fiscal year's data, although the results may not be available for some time after the close of the year. Both current and annual revisions usually stem from the first four reasons: incorporating source data with more complete reporting; incorporating source data that more closely match concepts; replacing judgment and statistical techniques; and incorporating updated seasonal factors. Annual revisions often affect several years of data - perhaps three or four years, so an annual estimate may be subject to revision more than once. For example, in the U.S. national accounts, there are three such revisions, as important additional annual source data arrive in each of three years.

Less frequent revisions, often four or more years apart, may be called "comprehensive," "major," "historical," or "benchmark" revisions. Typically they are occasions for major changes in statistical methods and changes in concepts, definitions, and classifications. Often these revisions are carried back, or backcast, for a number of years. Revisions that correct error, of course, have no predictable timing.

7.1.2 Context of revisions

The context of revisions can be analyzed from three main points of view: user needs, resource issues, and maintenance of credibility.

User Needs

As documented in the data modules of the IMF Reports on the Observance of Standards and Codes (ROSCs), surveys and meetings with users from a wide range of countries confirm their concern about revisions and revisions practices. User needs with respect to revisions fall into the following four categories, the:

- *timeliness* of first release of data and timing of subsequent revisions;
- *accuracy* of first release of data and subsequent revisions;
- *consistency* of data over time;
- *documentation* for the revisions that is provided to users.

Timeliness

Some users, such as policymakers, investors, international organizations, and the media, put strong emphasis on the timeliness of statistics. A key aspect of timeliness is the early release of economic data for them to be relevant to users' particular needs. For a central bank to conduct monetary policy effectively, it will need to analyze data on inflation and growth of monetary aggregates that are as up-to-date as possible. For investors and financial markets to make informed decisions, they also need timely data. For international organizations to monitor adequately economic developments and their funded programs in member countries, it requires the latest data at the earliest possible date.

Another aspect of timeliness that concerns users is that the timing of first release of data and subsequent revisions is predictable and relatively stable from year to year. In addition, the timing of the release may need to be coordinated with preparing important official policy documents, such as government budgets.

Accuracy

While policymakers place a high premium on timely data, they also need a degree of accuracy. The consequences of inaccurate data can be just as serious as late or delayed data, because inaccurate data can cause policymakers to make wrong decisions. Similarly, although investors want timely data on which to base their investment decisions, they do not want to take a decision based on data that are likely to change substantially in the next month or next quarter. Among users, researchers and the academic community place perhaps the highest priority on accuracy, as timely data are less important to them than an accurate and comprehensive time series of data. The needs of researchers and policymakers are related, as researchers use the economic data to test empirically and validate economic theory, which is at the basis of policymakers' decisions.

The importance placed by users on accuracy clearly requires that they be able to judge the accuracy of preliminary data and subsequently revised data. To make informed judgments, revised data must be clearly identified and documentation provided. The documentation should include information on the sources and methods used to prepare data, on changes to be incorporated in upcoming major revisions, and, post-revision, on the sources of the revision. Some indication from statistical agencies of how accurate preliminary or estimated data are would also be useful to researchers, as they may decide not to use these data in their time series if they are outside a certain degree of accuracy.

Consistency

Many users, particularly those engaged in research and forecasting, require consistency of data over time. While they realize that revisions will yield more accurate data, they are concerned that revisions that are frequent or large may disrupt their databases and cause inconsistencies unless the revisions are backcast over a sufficient number of years. As well, users who work with several datasets will be concerned that revisions be carried out in a coordinated way to avoid lengthy periods when one dataset is revised and others are still on the old basis.

Documentation

To lessen the trauma caused by the revisions, users would want clear documentation. Basic documentation should include identifying in statistical publications data that are preliminary (or provisional or estimated) and revised data, explaining the sources of revisions, and explaining breaks in series when consistent series cannot be constructed.

Documentation is particularly important when changes in concepts and definitions are involved because such changes can seriously affect the interpretation of various statistical applications (for example, forecasts) and empirical tests of the validity of economic theory. Meetings and consultations with users arranged by the statistical agency can also be helpful in explaining the reasons for and content of revisions, particularly in advance of the revisions so that users can prepare better to deal with them. It is also important for users that the revised data are as easily accessible as possible, preferably with electronic release of the complete revised time series with explanatory documentation attached.

Resource Issues

Resources affect countries' revisions policies in several ways. On the one hand, there are specific issues of cost effectiveness (that is, is the increased accuracy gained from a revision worth the cost?). On the other hand, there are questions about the basic design of the statistical compilation system itself, which has fundamental implications for the costs of revisions. How effectively a statistical agency addresses the resource issues that it faces will depend in large part on the quality of its management. Effective management of resources is a critical element of the good governance of statistical agencies.

As described in Section 7.1.1 above, revisions are driven primarily by the arrival of source data. Typically a core set of source data are available for the first estimates that are released to satisfy the timeliness needs of users. Then, as more detailed and comprehensive source data arrive, the first estimates are revised to improve the accuracy of the statistics. In designing the statistical compilation system and defining the surveys and administrative data to be used as source data, it is important to bear in mind the cost implications of alternative designs and definitions. A poor country that tries to implement surveys and administrative data in as much detail and breadth as rich countries may well find that it does not have the means to compile and revise these data in a timely manner. It is not uncommon for poor countries to have compilation systems and sample surveys based on industrial country models that result in piles of collected data sitting unused or never finalized for months and even years. In such countries, an appropriate balance may well require that official statistics rely on less detailed and comprehensive source data that are as representative and timely as the resources of the country will allow.

Statistical agencies of all countries, both rich and poor, must operate within limited budgets and make efforts to ensure the cost effectiveness of their programs, including revisions. Again, it is a matter of balancing, balancing not only timeliness against the accuracy needs of users, but also balancing both timeliness and accuracy needs against the marginal costs of achieving improvements in both areas. Costs are incurred not only by the statistical agencies, but also by the respondents who must take the time and effort to complete the questionnaires and data submissions necessary to comply with data release and revisions policies. A kind of "cost benefit analysis" must be done in order to take realistic and sustainable decisions with respect to the timeliness and frequency of data releases and revisions. It should be conducted in a way that balances needs and costs across different types of data users and different data sets. Unfortunately, no mathematical formula exists to conduct this type of analysis. It must, in effect, be must be accomplished in a less precise way through the difficult process of consultation and coordination among statistical agencies and users, as well as with the political authorities who control the agencies' funding.

In many countries, particularly poor countries, statistical agencies are often seriously under-resourced both in absolute terms and relative to other government agencies. In these circumstances, it will be important that statistical agencies undertake efforts to raise the consciousness of the political authorities to the serious consequences of neglecting to build adequate statistical capacity. International organizations have an important role to play in this arena. With respect to revisions, both statistical agencies and international organizations must impress on the political authorities of countries the critical importance of adequate resources to allow for the timely release and revision of official statistics.

Maintenance of Credibility

Confidence in the figures effectively must be built on confidence in the statistical agency disseminating them. Fundamental to achieving trust in, or credibility of, statistical agencies is *integrity*. Integrity is a central element in the IMF's Data Quality Assessment Framework and is also prominent in the U.N. Fundamental Principles of Official Statistics (UNSC 1994). Providing assurances of integrity involves, at the broadest level, enacting effective statistical legislation and ensuring the professional autonomy of statistical agencies. But establishing a sound revisions policy is also a key element necessary to gain the trust of users.

It is not unusual, even in industrialized countries, for a distrust of government (or the political party in power) to be translated into distrust of official statistics, or at least a healthy degree of skepticism. Revisions can be particularly sensitive if statistical agencies handle them in an unprofessional manner. At the extreme, users may even suspect the government is intentionally misreporting for its own political or financial motives. For example, investors might suspect the government is intentionally delaying or misreporting data on international reserves to prevent capital flight. Or the media may suspect the government is manipulating statistics to avoid criticism of its policy record. Or an international organization may worry that a government is misreporting to comply with a policy target.

What are the needs of users with respect to revisions and the credibility of official statistics? With respect to the release of first estimates, users need to be able to make informed judgments about the quality of these estimates. How accurate are they? What is the likelihood of further revision, and by how much and in what direction? When will the data be "final"? For the revisions themselves, users need to be informed about the causes of the revisions, as well as have access to complete documentation on methodology and procedures. Users will also be reassured if they see that revisions take place within the framework of an overall policy and according to a predetermined schedule. If the policy, procedures, and schedule are published, it will be evident that revisions are not ad hoc and for political interests, and that adequate safeguards exist to prevent abuses in this area. Finally, when mistakes are discovered, it is critical that the statistical agency report them to the public as soon as possible and provide satisfactory explanations to reassure users and enable them to distinguish honest mistakes from cases of "misreporting."

7.1.3 Recommended good practices for data revision

This Section identifies eight main revisions practices. They are consistent with the general principles of good governance in statistics, such as they appear in the Fundamental Principles of Official Statistics and in the *Handbook on the Operation and Organization of a Statistical Agency*. In fact, the revision practices identified can be seen as making explicit the application of these principles about, for example, integrity, responsiveness to users' needs, and professionalism in the context of revisions.

Consultations with users elicit views about revisions practices

Preliminary to elaborating a country's revisions policy, it is important to consult the main users of official statistics to identify needs and priorities specific to the individual countries. Their views could be sought, for example, about their particular needs for timeliness of data, problems they experience because of revisions, and their priorities about balancing timeliness with accuracy and consistency.

A clear, short summary statement of when to expect revisions and why is readily accessible to users

Most revisions fall under a "revisions cycle." Cycles typically incorporate current (for example, quarterly) and annual revisions as defined in Section 7.1.1 above and less frequent comprehensive or benchmark revisions that usually relate more to the two "improvements" reasons listed in Section 7.1.1.

The current revision cycle is relatively stable from year to year

Current and annual revisions are done broadly to incorporate more complete or otherwise better source data. The following practices relate to the timing of current and annual revisions, the:

- revisions are timed to incorporate new source data;
- revision schedule takes into account the timing for preparing important official economic policy documents;
- revision schedule takes into account the timing of revisions in other datasets.

Stability of the revision cycle from year to year is at the heart of good revisions policy. Users place great importance on a revision schedule that is regular. Fortunately, for countries that decide to establish a revisions policy, it is not difficult to ensure that its timing is stable over time. Indeed, it is a logical outcome and one that promotes efficient implementation. The most common basis for stability is the timing of arrival of source data, which then triggers their incorporation into revised data. Occasionally, a balance must be struck between maintaining the stability of the cycle and making unpredictable but important revisions outside the cycle. Coordinating timing with important official economic policy events can also be useful. For example, Italy times the release of national accounts to coincide with the annual presentations to their parliaments on the economic situation. It is also important to coordinate with other macroeconomic sectors to ensure consistency, for example, coordinating revisions of balance of payments statistics with national accounts.

Major conceptual and methodological revisions are usually introduced every four to six years, balancing need for change and users' concerns

Major conceptual and methodological revisions relate mainly to the two "improvements" reasons for revisions outlined in Section 7.1.1 above —to incorporate new statistical methods and new concepts, definitions, and classifications—all super-imposed on changes in the structure of the economy. These revisions are typically more far-reaching and complex than current revisions, and can be disruptive and problematic for users if they occur too often or take place in a confusing or unpredictable manner. A reasonable guideline for regular timing would be every four to six years. Timing such as this balances the need to avoid unnecessary disruptions to time series with the need to maintain the quality of statistics in line with international best practices and the changing institutions and structure of the economy.

Although individual countries do not control the timing of major changes in international statistical methodologies (for example, the appearance of *1993 SNA* and the *BPM5*), a four-to-six-year cycle can generally accommodate these changes without undue delays and disruptions. Incidentally, it is also possible and can be helpful to users to coordinate the timing of methodological improvements with the current cycle of revisions timed for the arrival of better source data. Countries do have control, however, over the timing of methodological and classification changes that they undertake to reflect institutional and structural changes in their own economies. These kinds of changes can be accumulated, studied, and prepared for during the four-to-six-year intervals before they are finally published.

Revisions are carried back several years to give consistent time series

To maintain the serviceability of data following major revisions, data should be revised back as far as is reasonable based on a balancing of user needs, costs, and availability of source data. The revised time series should be released simultaneously with the revised current data or soon thereafter, preferably in easily accessible electronic format. The revised series should be of sufficient detail and not so aggregated that users are not able to detect the sources of the changes. Clearly, some revisions are more difficult than others to revise backwards. Among these are data from surveys that have changed, data affected by legal constraints, and data constrained by accounting principles (for example, government finance statistics). Lack of resources also constrains the extent of backward revisions, especially for poor countries. Various second-best approaches are possible, such as the U.S. practice described where GDP series are revised back to the last benchmark (usually five years) and further back for selected series that are particularly important.

Documentation on revisions is readily available to users

Preliminary (or provisional or estimated) data and revised data are identified as such

While this practice may seem obvious, it is not uncommon to find in many countries that preliminary and revised data are not clearly identified. This is especially likely in countries where revisions are not made according to a consistent or clearly stated revisions policy. It also occurs more often for government finance statistics and monetary statistics, where statistical principles may not be as much at the forefront as in national statistical offices. Serious confusion and misunderstandings by users could easily arise from neglect to identify changes in data.

Terminology

Data revisions

Data revisions are defined broadly as any change in a value of a statistic released to the public by an official national statistical agency.

Preliminary data / Provisional data

Some statistical agencies use the term “Preliminary data” to describe the first released version of a series and “Provisional data” to describe subsequent versions prior to final amendment. However, the two terms are often used interchangeably though users in general should have no great problem in understanding that data labelled either “preliminary” or “provisional” are subject to revision provided this is clearly highlighted by the agency in the release. Clearly informing the use that the data is subject to revision is more important than the term used to describe such data.

Advance notice is given of major changes in concepts, definitions, and classification and in statistical methods

Users should be alerted in advance of major conceptual and methodological revisions to help them prepare for and understand better the reasons for and nature of the changes. An example is the Australian Bureau of Statistics efforts to prepare users for revised balance of payments statistics according to *BPM*. The Bureau provided a description of the new standard and its benefits in advance, including illustrations of sample draft data tables to begin to acquaint users with the changes. Consultations with key users dealt with the implementation of the new standard, and a number of changes were made in the implementation strategy and schedule as a result. Various reports and discussion papers published in advance of the revision analyzed and described the effects on Australia’s statistics.

The sources of revision are explained when the revised series are released

Breaks in series are documented when consistent series cannot be constructed

Complete and transparent documentation of revisions allows users to understand the sources of revisions and, if needed, adjust their analysis of the data. Perhaps even more importantly, complete documentation serves to promote trust in the credibility and integrity of the data and the institutions responsible for compilation and dissemination. Key parts of the documentation are about the sources of the revisions, including the main flows of source data from the preliminary estimates to the revised data. It is also important that breaks in the series be clearly identified when consistent time series cannot be constructed. Documentation can be available to users in hard copy publications, websites, press releases, and dedicated Seminars.

Users are reminded of the size of the likely revisions based on past history

It is particularly important for users who make decisions on the basis of preliminary estimates, such as policymakers and investors, to be able to make an informed judgment about the reliability and accuracy of the preliminary, provisional, or estimated data. How much confidence should they have in the first estimates? Accordingly, it is good practice for statistical agencies to conduct periodic analyses of revisions (or "revision studies") and to make them available to users. Today's IT environment makes such studies less demanding than in the past. The following two good practices for revision studies have been identified:

- periodic analyses of revisions investigate the sources of revision from earlier estimates and statistical measures of the revisions (for example, dispersion and bias);

- the analyses are published for major aggregates to facilitate assessment of the reliability of the preliminary estimates

Measures of the direction and dispersion of revisions are the main topics of most revision studies. With respect to measures of the direction of revisions, if a study shows a systematic bias in the revisions, users can adjust appropriately their interpretation of the preliminary estimates. Alternatively, the discovery of bias by a study may lead to changes in procedures, and these can be announced with the study results. Revision studies can also be used to fine tune the timing revisions within the cycle. Measures of dispersion of the revisions provide users with an indication of the accuracy of the preliminary estimates and enable them to assess the likely size of future revisions.

It is important to report to users not only the statistical analysis carried out in the revision studies, but also the basic data flows from the first estimates through all the revisions. The main conclusions of the studies should be clearly stated. Providing the basic data to users allows them to conduct their own studies of revisions if they wish.

When a mistake in reporting or processing is made, the revision is made in a transparent and timely manner

Many different types of mistakes occur in official statistics, from simple mathematical and recording errors to misclassifications and mistakes in coverage. The mistakes may be by the statistical agency, or by the reporters of source data. It is critical for the integrity of a country's statistical system that any errors are not only reported to users as soon as possible, but also explained in a way that gives assurance that the mistakes were not politically motivated. Explanations for mistakes are much easier when users are already well informed by complete metadata and related documentation on the compilation procedures and sources

and flows of data used by the statistical agency. In such a transparent environment, it is just as likely that users will detect errors as the statistical agency, or will at least quickly understand the source of the error.

7.2 PRESENTATION OF SERIES BREAKS

7.2.1 Introduction

A time series is a set of time-ordered observations of a quantitative characteristic of an individual or collective phenomenon taken at different points of time. Normally, time series are a set of observations of a given variable in sequential order, at constant intervals (months, quarters, years, etc). The continuity of a time series not only implies that the observations are continuous over time but also that the same definitions, classifications, processes, etc, have been applied in the collection and compilation of each observation.

The application of inconsistent definitions and classifications, etc, for each observation over time, in theory, constitutes a series break. However, in reality not all changes to concepts, etc, constitute a break in series that has a significant impact on their use. In practice, statistical agencies responsible for the collection of data frequently apply changes to questionnaires, registers, concepts, to their monthly, quarterly and annual collections, many of which have no appreciable impact on the continuity of the series. Changes to annual collections, in particular, are a fact of life.

Statistical agencies, analysts and government agencies use time series data for economic research and business cycle analysis to interpret current economic events. Statistical agencies require long time series to carry out seasonal adjustment and calendar effect correction.Time series are also fed into models to produce projections and forecasts about future economic conditions. For these reasons users in national agencies and institutions and international organisations attach very high importance to time series continuity. In fact, such continuity within a series is often of greater importance than comparability between countries.

However, the uses of time series statistics outlined above are frequently hampered by series breaks or shortness of the series length. The main causes of series breaks are similar to some of the reasons for revising data described in Section 7.1.1 above, such as:

- changes to the base year which may co-incide with updating of the weighting system which in turn may involve changes in the sample of respondents and the sample of products; and
- the implementation of changes in concepts, definitions and classifications, methodology, sampling, estimation.

To a large extent these factors derive from within the statistical agency responsible for the initial compilation of the data and are usually intentional (US Bureau of Labour Statistics 1996). However, some changes stem from external influences that may be outside the control of the statistical agency, in particular, where the data are derived from administrative sources. These include changes in laws or administraive procedures, changes in the organisational structure of business through mergers, etc.

7.2.2 Approaches to minimising the impact of time series breaks

National statistical agencies normally attempt to minimise the frequency of series breaks, and when they occur, use a number of approaches to reconstruct series based on the new concepts, classification, etc.

- The most commonly used approach involves the compilation of the series using both the old and new methods, classifications, etc., for a specified period around the time of implementation. The high cost of compling dual series severely restricts their availability and length.

  The availability of dual information enables an objective measure of the impact of change to be assessed and perhaps a concordance between the new and old series at the time of the series break. The concordance “coefficient” so calculated may be used to splice or link the series break. Caution is

required in the application of such coefficients to the historic time series as it is only really applicable over the time dual series were compiled. It may not reflect the economic reality of the entire historical series (US Bureau of Economic Analysis 1993). The difficulty is determining when or how far back the conversion coefficient ceases being accurate.

- Alternatively, agencies may refer back to highly disaggregated data (or even unit record information) and recompile the series based on the new methodology, etc. In practice however this approach is very labour-intensive and may only be possible for key highly aggregated series (OECD 2000). Finally, historical estimates may be made on the basis of a related indicator that exhibits the same or similar changes over time as the series where the series break occurred.

7.2.3 Recommended good practice

Recommended good practice with regards to time series breaks breaks entails:

- The compiling agency taking all possible steps to avoid and minimise changes to questionnaires, definitions and classifications used to collect and compile data. Methodologies should be developed to reduce the frequency of revisions. However, there comes a time when the time series may be disrupted even when outdated classifications, concepts and questionnaires are maintained. In such instances a complete break in series may be preferred to series that continue to be collected on the basis of outmoded classifications and concepts that do not approximate reality. There is clearly a tradeoff between costs imposed by breaking a time series on one hand and the benefits from improving the relevance of the time series on the other (US Bureau of Economic Analysis 1993).
- Where changes are unavoidable, users should be given warning well in advance of the implementation of the series break outlining the timing of implementation and a detailed explanataion of the reason(s) for the change. “In advance” is taken to mean not just the time of implemention but sufficient time to enable users to implement modifications to their systems, programmes or databases and to seek further clarification if necessary. A common practice adopted by many statistical agencies is to issue a detailed discussion paper many months in advance of the change.
- Actual breaks in the series should be clearly identified in both the table and any accompanying graphs. A variety of methods are used by national agencies and international organisations use to highlight in tables that a series break has actually ocurred. These include the insertion of a line in the table at the break point, inclusion of a footnote or tabular presentation as an entirely new series. Whichever method is adopted, the main point is that the break is completely clear to users. Consideration will also need to be given to the identification of series breaks (togther with appropriate explanatory information) in data disseminated electronically such as via on-line databases, etc.

  The following information drawn directly from Eurostat guidelines should also be provided (Eurostat 2003c, p. 16):

  - the reference period of the survey where the break occurred;
  - whether or not the difference reported is one-off with limited implications for the time series and/or if the reported change led to harmonisation with any standards;
  - a precise outline of the difference in concepts and methods of measurement before and after the series break;
  - a description of the cause(s) of the difference, e.g. changes in classification, in statistical methodology, statistical population, methods of data manipulation, concepts, administrative procedures with regard data from administrative sources;

- an assessment of the magnitude of the effect of the change, where possible, with a quantitative measure.
- reference period of the survey where

Links and references to more detailed information should also be provided.

- Points in line graphs should not be joined across discontinuities in data. The reason for the break in series should be explained in a footnote accompanying the graph with appropriate links or references to more detailed explanations of the causes of the breaks.
- When methodological changes are introduced, an attempt should be made to revise the historical series as far back as data and available resources permit. Ideally, such backcasting should extend back 2-3 years to reflect the new methodology, etc.

7.3 SAMPLING AND NON-SAMPLING ERRORS

The aim of any statistical agency is to compile and disseminate statistics appropriate to user needs in terms of quality. Quality is commonly defined as "fitness for use" (Statistics Canada 2002, p. 2)[22] and comprises a number of dimensions described in the quality frameworks developed over the last few years by both national agencies and international organisations (referred to briefly above in Section 2.1.1). One of the quality dimensions frequently referred to is "accuracy" which is the degree to which the data correctly estimate or describe the quantities or characteristics they are designed to measure. Accuracy refers to the closeness between the values provided and the (unknown) true values. Accuracy has many attributes, and in practical terms there is no single aggregate or overall measure of it. Of necessity these attributes are typically measured or described in terms of the error, or the potential significance of error, introduced through individual major sources of error.

An aspect of accuracy is the closeness of the initially released value(s) to the subsequent value(s) of estimates. In light of the policy and media attention given to first estimates, a key point of interest is how close a preliminary value is to subsequent estimates. In this context it useful to consider the sources of revision referred to in Section 7.1.1. in the discussion on data revision. Smaller and fewer revisions is an aim, however, the absence of revisions does not necessarily mean that the data are accurate.

The focus of this Section are recommendations on the presentation of information to users on the several types of errors that originate from the processes and methodologies used to collect data. The dissemination of such information to users is an aspect of good metadata reporting referred to above in Section 6 of this Manual. The most widely used typology of such errors involves the distinction between sampling errors and non-sampling errors.

7.3.1 Sampling errors

Background

Sampling errors occur because not all units in a target population are enumerated in a sample survey and only a sample of units are enumerated. As a result, the information collected on the units in the sample may not perfectly reflect the information that could have been collected had the entire population of units been counted. The difference is the sampling error. There are various formulae for estimating the sampling error when probability sampling is applied (Eurostat 2002b).

Survey estimates are subject to two types of errors: bias and variable errors. Bias refers to errors that affect the expected value of the survey estimate, taking it away from the true value of the target parameter. Variable errors on the other hand affect the spread of the survey estimates over potential repetitions of the sample selection process. In the context of sampling errors, bias is minimized through the adoption of adequate sampling procedures, sample size and estimation methods. Therefore the spread is the main aspect of the distribution of the sampling error that needs to be considered. The key parameter describing this spread is the standard error, namely the standard deviation of the sampling error distribution (ENCE 2003).

The provision of information on sampling errors is essential in ensuring the appropriate use of data subject to such error in analyses by users with widely differing levels of statistical expertise. Particular care is required in the publication of data subject to very high sampling error, and appropriate balance is required

[22] The International Standards Organisation defines quality as "the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs." (ISO 8402, 1986)

in deciding whether such information should be disseminated at all, or presenting it in such a way as to make limitations in use apparent to users with only minimal knowledge of statistics. There is a need for agencies disseminating data subject to sampling error to prepare a strategy for estimating and publishing such errors. The current practice in many national statistical institutes is in fact to disseminate data subject to high sampling error on the assumption of user responsibility to use the data wisely. In this context the statistical agency does not accept this responsibility though it does have the professional obligation to attach appropriate warnings and caveats about its use (ABS 2004, Section 11:04:01).

Investigations into national practices regarding presentation of sampling error estimates carried out by the OECD Short-term Economic Statistics Expert Group (STESEG) task force on data presentation and seasonal adjustment in 2003 (Graf 2003) showed that much research has been done on the subject but that often no actual estimates of variance or covariance tends to be published for either annual or short-term statistics, particularly for the latter. A review of relevant current national data sources showed wide variation in national practices, with respect to:

- the amount of information provided about standard errors;
- their presentation in technical notes accompanying statistical data; and
- ease of access and proximity to statistical data.

A detailed study of United States agency reporting practices on sampling error published by the US Office of Management and Budget in 2001 (OMB 2001) further highlighted this variation in practice, not only across statistical agencies but also within the same agency for different surveys. The adoption of different practices even for the same survey published in different dissemination media is a reflection of the different audiences addressed by those media with varying degrees of statistical expertise and need for detailed information on sampling error. The recommendations of good practice in this area included in the US study were highly dependent on the type of dissemination media, though the study emphasized that irrespective of the medium used it was not a question of whether or not information on standard error should be provided but rather how essential information is to be conveyed to users.

Forms of presentation of information on sampling error

From it's analysis of practices across US agencies, the OMB study identified two broad methods of presenting information on the precision of estimates (OMB 2001, p.3-4). These entail:

- Reporting a direct estimate of the error through the presentation of an estimate of sampling error for every statistic in a statistical report. Users are therefore provided with both the statistic and its sampling error at the same time. An obvious limitation of this approach is the expansion of the publication. Another reason for not recommending this approach cited by the Australian Bureau of Statistics in its Publishing Manual (ABS 2004 p. 500) is that it gives the impression that sampling errors are the only or main source of error and that the interpretation of sampling errors is equally important for all statistics.
- The use of indirect estimates of sampling errors. These in turn involve a number of options, namely:
    - The provision of a procedure to enable the user to compute approximate sampling errors for the estimates disseminated. The two major disadvantages of this approach cited in the US report were that sampling errors would not necessarily be presented beside the data and the fact that the procedure used to compute the approximate sampling errors may not provide values as accurate as direct estimates.

- The provision of sampling errors for a selected number of key estimates. An advantage of this approach is the provision of direct estimates of sampling errors close to the data, albeit only for a limited range of data. Users therefore need to extrapolate errors for data for which they had not been compiled directly.

The ABS also recommends the use of some form of notation (e.g. an asterisk) to highlight those statistics subject to very high sampling (or non-sampling) error. Furthermore, the Bureau recommends the presentation of supplementary data and methods for approximating the standards errors of derived statistics such as estimates of change, ratios of different estimates for the same period, changes in ratios over different periods, etc (ABS 2004, p. 501).

Recommended good practice

In the interests of data transparency, and to help ensure the appropriate use of data, statistics derived from all sample surveys should be accompanied by information on sampling errors. Such information should be provided for all dissemination media – online databases, websites, other electronic products, paper publications and press releases. It is also important for the information to be expressed in non-technical terms capable of being understood by the non-specialist user. The required information comprises the provision of the following information in accompanying or clearly linked technical notes outlining (OMB 2001, p. 3-8):

- Alerting users to the fact that data are derived from a random or non-random sample. If the latter then inference implications should be clearly stated.

- Sampling error should be identified as a source of error which should be explained and interpreted for data users through provision of a brief definition of sampling error. For example, strong warnings about the unreliability of data with high sampling error.

- If statistical tests are used in the report, the significance level at which statistical tests are conducted should be stated explicitly.

- Sampling errors for key estimates should be available to the user either in a table in the publication or linked on the internet. Some form of notation should also be placed directly beside estimates with very high sampling (or non-sampling) error.

In order to ensure consistency in the dissemination of this information across the organisation in all published output subject to sampling error, some statistical agencies mandate a standard set of words to be included in all relevant publications.

Where space considerations preclude the inclusion of detailed information either references or URL links to more detailed technical reports or user manuals should be provided. These should:

- identify the specific method used for calculating the sampling error;

- provide sampling error calculations for different types of estimates (e.g. levels, percents, ratios, movements, means and medians);

- contain evaluations of the procedures used for estimating sampling errors.

7.3.2 Non-sampling errors

Background

Non-sampling errors are errors in published data which cannot be attributed to sampling fluctuations (ISI 2003). Non-sampling errors may arise from a wide variety of sources including coverage defects in the frame, deficiencies in the collection instrument or questionnaire, problems in the processing system and difficulties in achieving acceptable response to the enquiry.

Information in the draft UN Handbook on household surveys in developing and transition countries (UNSD 2003, ch. 11) and the Eurostat standard quality report (Eurostat 2003c, pp. 7-11) has been used in the following typology of non-sampling errors. This is merely intended to illustrate the diversity of such errors. In reality, the distinction between some of the different forms of non-sampling error presented may not be all that distinct, particularly with respect to identifying cause.

Non-observation errors	*Coverage errors* – resulting from divergences between the target population and the frame population. Coverage errors comprise: under-coverage; over-coverage; multiple inclusion in the frame; incorrect auxiliary information provided in the frame (incorrect activity, size classification, location, etc).
	Non-response errors – resulting from the failure to obtain data for target units in the census or survey. These comprise: unit non-response when no data are obtained for a target unit; and item non-response when data for some but not all of the collection variables are obtained for a target unit.
Observation errors	*Measurement errors* – that occur during data collection and result in the recorded values of variables differing from the true value. Such errors arise from: imperfections in the survey instrument (form, questionnaire or measuring device) which leads to the recording of incorrect values; respondents consciously or unconsciously providing incorrect data; interviewer influencing answers given by respondents.
	Processing errors – originating from processes used by the statistical agency following receipt of data from the source. These include: coding, data entry; data editing; imputation.
	Model assumption errors – arising from statistical models estimated and used in the estimation phase of a survey. Errors here stem from the selection of the appropriate model, collection of relevant data and estimation of the model's parameters.

The very diversity of non-sampling errors presents a problem in providing users with information about both their existence in published output, and in particular, quantitative measures of magnitude. For this reason data disseminated by both national agencies and international organisations frequently provide very detailed information on sample errors but only general, broad statements on the existence of non-sampling errors. This may convey the misleading impression that sampling errors are far more important than non-sampling errors.

UN Handbook on household surveys in developing and transition countries raises the issue of a lack of standard methods for estimating parameters for the different components on non-sampling error outlined above. It also refers to the absence of a culture within statistical agencies that recognises the importance of such errors and the fact that they should receive as much attention as sampling errors in the provision of information to users. Nevertheless, some national statistical agencies and international organisations (in particular, Eurostat 2003c) do provide recommendations on the presentation of non-sampling errors, and in

some instances how such measures could be quantified. Although quantitative measures of such errors are generally not readily available, there are some that are, e.g. coverage rates, non-response rates.

The absence of readily available quantitative measures for all types of non-sampling error does not remove the professional obligation on the part of organisations disseminating data to provide at least some information. Depending on the nature of the survey, qualitative information indicating the potential main sources of non-sampling error will assist users in their interpretation and use of data disseminated.

Recommended good practice

The focus of the recommended good practice on non-sampling errors outlined below is not the methods by which national agencies minimise their impact but rather guidelines on the type of information on such errors to be reported.

As for the reporting of information on sampling error for all sample surveys, all statistical output disseminated by national agencies and international organisations should be also accompanied by information on non-sampling errors. Such information should be provided for all dissemination media – online databases, websites, other electronic products, paper publications and press releases. It is also important for the information to be expressed in non-technical terms capable of being understood by the non-specialist user. Such information should accompany the data disseminated or at the very minimum be provided in clearly linked technical notes.

Where possible, quantitative measures of non-sampling error should be provided. However, because of the difficulty in quantifying some non-sampling errors agencies will in reality disseminate a mixture of quantitative and qualitative information. The ultimate test will be the provision of information that enables a non-technical user to clearly understand the strengths and limitations of the data. In particular, information on non-sampling errors should clearly convey to the user the fact that such errors, either individually or in total, may have a greater impact on the reliability of the data than sampling error and that the "ready" availability of quantitative measures of sampling error is not necessarily an indication of their relative significance.

With respect to precisely what information on non-sampling errors that should be reported, the ideal recommendation is for national agencies and international organisations to disseminate information on all of the non-observation and observation errors summarised above. The second-best option is the adoption of a more pragmatic approach which entails national agencies using their professional judgement and more detailed knowledge about the data to identify a sub-set of key non-sampling errors that have a significant impact on the reliability of the data. The important thing is for these agencies to develop a culture of critical appraisal of their statistical output and for key strengths and weaknesses to be documented and disseminated.

In this context, the following examples of specific non-sampling error information across the whole range of such errors are merely intended to illustrate the types of information that could be provided. These examples have been drawn directly from Eurostat standard reports for the assessment of quality in statistics (Eurostat 2003c).

Type of non-sampling error	Reporting indicator
Coverage errors	• Information about the frame, reference period, updating actions, quality review actions.
	• Areas of specific strengths and weaknesses of coverage and a qualitative

	assessment of possible bias.
	• Type and size of coverage errors (e.g. coverage rates).
Non-response errors	• Non-response rates.
	• Imputation methods used (if any)
	• Indications of the impact of remaining non-response on disseminated data, areas of possible bias, etc.
	• Indications of the causes(s) of non-response
	• Information about the actions and incentives to minimise non-response
Measurement errors	• Indications about the causes of measurement errors in the published output and their impact (e.g. areas of imperfection in the collection instrument).
	• Actions taken to minimise measurement errors in the design and testing phases.
	• Any quantitative measures (e.g. the mean and variance of measurement error per variable of interest)
Processing errors	• Outline of processes used to minimise processing errors (e.g. staff training, data editing used, use of automated IT processes, etc).
	• Indication of remaining errors and their impact on statistics, possible bias, etc.
Model assumption errors	• Models used in the production of the survey's statistics and the assumptions on which they rely.
	• Evidence about the validity of the assumptions.
	• Statement about the accuracy of any additional data used in the model's estimation.
	• Indication about any remaining (unaccounted for) bias, etc, which could affect the statistics.

7.4 REBASING INDICES

7.4.1 Introduction

Rebasing is the act of establishing a new base year/month for an index and the recalculation (rereferencing) of index numbers to reflect the new base. A long time series of fixed base indexes is usually compiled converting the indices released in the previous base (for example 1995 = 100) into indices expressed in the more recent base (for example 2000 = 100) by a simple transformation (called "rebasing") and linking them with the new indices.

As mentioned in Section 7.2 above in the discussion on series breaks, the usefulness of statistics is frequently diminished by breaks in time series, in particular, when fixed base indexes are involved. One of the main causes of series breaks for indices concerns changes to the base year[23]. Ruptures in the time series in many countries are exacerbated by other changes taking place place concurrently with rereferencing such as updating of the weighting system[24] which may also involve changes to the sample of respondents and the sample of products.

Much of the text in this Section is drawn extensively and directly from a paper written by Anna Ciammola (2003) for the 2003 meeting of the OECd Short-term Economic Statistics Expert Group.

7.4.2 Existing international standards

The only existing international statistical standard providing explicit guidelines and recommendations on the rebasing of indices is the European Commission's 1998 Short-term Statistics Regulation (European Commission 1998) which requires that rebasing should take place every five years (Article 11) and within three years from the end of the base year. For example, rebasing to the 2000 base year should be undertaken by the end of 2003 at the latest.

There is however room for interpretation as to whether this requirement means that indices are compiled in January 2004 (which in the case of monthly data may refer to October or November 2003) must be based on 2000 or whether it is the first delivery of data for the first reference period in 2004 (January or the first quarter 2004) that needs to be in the new base year (Eurostat 2002a, Part 8.5.1, Base years and base year changes).

More recent work in this area has been undertaken by the United Nations Committee for the Co-ordination of Statistical Activities (CCSA) at the end of 2003 in an attempt to harmonise the base years of indices disseminated by international organisations (UNCTAD 2003). The indices currently disseminated by international organisations contain a mixture of practices including the publication of base years as reported by member countries for their national series or national series that are referenced by the international organisation to a common base year for all member countries. A review of current international organisation practices prepared by UNCTAD for the CCSA showed that for most statistical domains a delay of three to six years is usually needed by international organisations to release their rebased index numbers. The reason for this delay is the availability of data on which index numbers are based, either the series themslves or data used as weights in the calculation of indices. In 2003 the current

[23] As Eurostat's Short-term Statistics Guidelines point out, the term base year is used "to describe the year with respect to which the value of all other reference periods are compared. In a series of index numbers it is the year that takes the value 100". Note that the Handbook on price and values measures in National Accounts (NA) contains a different definition of base year. (Eurostat 2002a, Part 8.5.1, Base years and base year changes)

[24] The European Commission Short-term Statistics Regulation requires that a new weighting system is introduced at least every five years and coordinated with changes in the base years. (European Commission 1998)

base years were reported as being 1990 and 1995 and more rarely, 1908 and 2000. In some cases, the weights used for the base year were the average of three years.

The outcome of the CCSA discussion was the need for international organisations to harmonise their base years and to commence rebasing of their index numbers using 2000 as base year with a view to finalisation of a common base year by the end of 2005.

7.4.3 Compiling rebased (fixed) index numbers

The main criteria for the selection of a suitable base year is that it should be "normal" or "average" and not subject to any major usual circumstance or influence. Common international practice involves the updating of base years every five years with the year being one ending in a "0" or "5".

The criterion normally used by statistical agencies to rebase index numbers is that any conversion into a different reference base period must leave month-to-month and year-to-year percent variations (computed on the rebased indices) identical to those characterising the original series, even though the rebased index level changes. Both the approaches described below, the direct and the aggregative approaches, fulfil this criterion.

Direct approach

In the direct approach the indices at each level of the activity classification, coming from a linear combination of the indices at lower levels, weighted by the original weighting system, are rebased independently. The result of this independent rebasing is that the additivity property of fixed-base indices is lost, which implies that indices at more detailed level of activity cannot be aggregated to produce indices at higher and higher levels by means of the original weighting system.

Indirect or aggregative approach

This approach is computationally more expensive than the direct approach and is performed through the following steps:

- rebasing of the elementary indices (i.e. at the most detailed level of product breakdown);
- updating of the previous weighting systems[25];
- aggregating the rebased elementary indices by means of the updated weights.

The Eurostat Short-term Statistics Guidelines refer to the Handbook on Price and Volume Measures in National Accounts, that recommends use of the direct approach and this approach has been adopted by many European national statistical institutes. For instance Italy, Belgium, Austria, Denmark, Ireland used the direct approach after the recent migration to base year 2000, even though the same institutes may have different practices for different indicators.

Rounding policy

Rounding is performed to prepare index numbers for publication and generally data are rounded to the first decimal place. National practices vary considerably with regard to the stage at which index figures are rounded. Some agencies base their calculations on unrounded data that are rounded only at the final stage (as the US BLS does for compiling their producer price index) for dissemination purposes. Others round data at each step, from elementary to the most aggregated indices. The latter practice cannot be replicated for the calculation of retrospective indices, as this may affect month-to-month and year-to-year percentage

[25] Updating of the original weights is carried out to give higher (lower) importance to a certain economic sector or product, when the average level of its index, not rebased, over the new year base is greater (smaller) than the average level of the most aggregated index, not rebased, over the same time span.

changes constrained to be equivalent to those already published. Rounding to the third decimal place in the computation of the rebased indices assures the fulfilment of the above constraint. For dissemination purposes, the rebased data are rounded to a decimal place at the final step. Rebased data have less precision after rounding and the loss of precision due to it is more serious when the rebased index values are smaller than the originally released ones.

7.4.4 Presentation and dissemination of rebased indices

The presentation and dissemination practices of national statistical institutes are very different, though the direct approach is the method usually performed in index rebasing. This depends on the sector breakdown at which index values are released and the impact of a new activity classification and weighting system on the retrospective indices. These issues are discussed below.

Introduction of a new activity classification

When the activity classification system is unchanged, the rebasing might be left to the final users and statistical agencies might maintain the database with the historical weights and indices. This is not the case when a new activity classification is introduced. In fact, it may require the calculation of new index values, especially at the lower activity levels, with a substantial impact on the indices already released (the general index, i.e. the most aggregated level, always remains unchanged). In such situations, statistical agencies have to compute the indices on the previous bases in accordance with the new activity classification and the splicing coefficients, that is, the averages (in the previous base year) of the retrospective indices over the new base year (at each level of the classification). Then, they can:

- provide the users with this set of retrospective index values together with the splicing coefficients;
- rebasing the indices and provide the users with spliced series.

The second solution is widely practised by NSIs as it is more user-friendly than the former.

Historical data, rebased historical data, “linking” year and base year

At each re-base two sets of retrospective indices are available from the first period of the base year onwards (for example, from January 2000 to December 2002, if the indices base 2000 = 100 are presented starting from January 2003). The old indices rebased by means of one of the two approaches described above and the new indices computed according to the new weighting system, sample of respondents, activity classification and so on. This means that statistical agencies may:

- replace the old index values with the new ones over the whole time span (2000-2002 in the example);
- replace the old index values with the new ones starting from the year following the base (the time span 2001-2002);
- maintain the old index rebased until December 2002.

In the previous cases, the “link” year, i.e. the year at the beginning of which the old rebased index series are linked with the new index series is, respectively, 2000, 2001 and 2003. For presentation purposes, the importance of the “link” year arises because the year-to-year percent changes are computed comparing the index numbers belonging to different structures. All the above are common pratice for statistical agencies. The first is appreciated especially by time series analysts as it removes structural break, introduced at the

beginning of the "link" year, from the end of the series; the third approach leaves unchanged the index percent changes already published.[26]

[26]Among the European national statistical institutes that have already adopted the new base 2000=100, the linking years are: 2003 for Ireland (wholesale price index), 2000 (labour indices) and 2001 (industrial production index) for Italy, 2002 for Spain (industrial production index).

7.4.5 Recommended good practice

It is recommended that rebasing be undertaken every five years and within three years from the end of the base year.

Unless the year was "unusual" it is also recommended that the base year selected be one ending with a "0" or "5".

In order to provide sufficient transparency to users with regards to a re-base it is necessary to ensure that the following metadata accompanies any rebased data, either directly or through the provision of:

- appropriate references or links:
- the methodological approach adopted for the re-base;
- the link year;
- the classification level at which index numbers are re-based and disseminated;
- the rounding policy followed in the rebasing, even though rounding should only be carried out at the very last stage for presentation purposes;
- a transition table from the old to the new classification system, if this is introduced;
- the description of the new weighting system and its impact on the aggregation of lower level indices;
- when the direct approach is adopted, a note of caution is useful to alert users that any aggregation of rebased indices needs the updating of the weights of the previous bases[27.]

[27] If a statistical agency adopts the direct approach to rebase the indices, it does not provide the updated weights to the final users and the original weighting system cannot be used to aggregate the rebased indices (the additivity property is lost when the rebasing is carried out).

7.5 PRESENTATION OF RELATED BUT NOT IDENTICAL SERIES DISSEMINATED BY NATIONAL AGENCIES AND INTERNATIONAL ORGANISATIONS

7.5.1 Introduction

There are numerous examples where users are confronted by several different versions of seemingly the same series published by different national agencies and international organisations. Examples of such series include:

- Series for individual countries that have been transformed by either national agencies or international organisations to improve their comparability. Examples of such series are Eurostat's Harmonised Consumer Price Index (HICP) and the OECD's Standardised Unemployment Rates (SURs) that are frequently published alongside similar, but different national series.

- Other national series published by international organisations that have been transformed by them in some way to improve comparability. In extreme instances the same national data has undergone different transformation processes in different international organisations, resulting in inconsistent output both between themselves and with data published at the national level.

  An example of different transformation processes resulting in different series at the national and international levels is the use of different seasonal adjustment applications by national institutes and the European Commission for business tendency survey data. Other examples are series transformed at the national level specifically to meet the requirements of an international organisation which again results in different data for seemingly the same series being released at the national and international levels.

- The use of different terminology or label for the same concept by different agencies, e.g. "industrial manufacturing" and the heading "intermediate goods".

Recent investigations undertaken by the OECD Short-term Economic Statistics Expert Group task force on data presentation and seasonal adjustment sought to identify a small set of recommendations on practices and processes that would alleviate in the short term at least the impact of such inconsistencies by making users more aware of the differences, and the reasons, between similar but non-identical series. In the longer term the international initiatives outlined in Section 2.2. above aim to eliminate most of these differences altogether.

7.5.2 Recommended good practice

Four broad recommendations of good practice comprise (Friez 2003):

- International organisatons that disseminate national data should always be aware of and clearly state whether or not the precise series they disseminate that are derived from national sources are also disseminated in the country of origin or compiled and/or transformed by national agencies specifically to meet the requirements of international organisations.

- International organizations should clearly describe in their metadata specific details of any transformation processes of national data they make to make the series more internationally comparable. Data transformed by international organizations should be clearly indicated as such,

particularly, but not only where, published alongside different national series for the same statistical domain. The two sets of series must be clearly differentiated in the mind of the user.

- The precise name of the classification used in data disseminated by national agencies and international organizations (especially when transformed to an international classification to enhance international comparability) should always be clearly indicated (for instance, NACE Rev. 1, CITI, MIG or national classification) so that when the same denomination is used in various classifications such as intermediate goods, the user clearly knows which classification has been used.

- When a field of activity is only partially covered (such as MIG-intermediate goods or MIG-consumer goods in the new orders indicators of the European Commission's Short-term Statistics Regulation), it should be clearly indicated for instance with an asterisk or a footnote (for example, in the Eurostat's short-term statistics new orders series, MIG-non durable goods (1) - *(1) Partial ; does not include NACE 151-155, 158, 159, 16, 19, 22, 364-36*6).

7.6 CITATION PRACTICES

This Section draws directly and extensively from a paper prepared by the UNESCO Institute for Statistics (UIS) presented at the 2nd session of the Committee for the Coordination of Statistical Activities (CCSA) in Geneva on 8-10 September 2003. The context of the paper was the need for the adoption of good citation practice by international organisations, though the practices cited are also relevant for national agencies. The focus of the paper was citation of datasets, though brief mention in this Section is also given to text citation.

7.6.1 Reasons for citation

Proper citation is an essential element of data and metadata reporting. Citation refers to the process of acknowledging within the organisation's current database or text the document, database or other source from which information has been obtained. A reference on the other hand refers to the detailed description of the actual source from which information has been obtained. A bibliography is a list of references consulted (Caledonian University 2003).

There are many reasons why citation of data is as important as citation of other published sources of material. These reasons include:

- It helps in the evaluation of the value of datasets to be able to track usage accurately. The inclusion of a feedback and tracking mechanism as part of a data citation policy is very useful in this regard.

- The reliability of the information may be assessed on the basis of its provenance and the context, and additional information provided in the source may permit the reader to go more deeply into the subject and to verify sources and authenticity.

- The importance of giving appropriate credit to the producers of datasets. This is particularly the case in the increasingly competitive academic sector where credit needs to be attached to the production of high quality, well-documented datasets. It is also important in other sectors in an environment where different agencies re-use one another's data.

- It can enable other researchers to locate the exact version of the data used so that they might re-analyze the data to amplify, extend, confirm or refute the author's interpretation of it, all of which is an important part of the scientific process.

- It can enable other researchers to locate current versions of the same dataset or similar datasets from the same source.

- It is important that producers of the data should be able to locate quickly and accurately the exact version of the data supplied so they can answer queries quickly and can also resolve problems with the data.

These reasons underline the fact that an effective citation places an obligation on the data user to follow common citation best practices. To encourage effective citation, an obligation is also placed upon the data provider to provide the necessary information (metadata) in conjunction with the dataset to respect these citation best practices.

There is a more fundamental issue however. Even with all of the problems and challenges mentioned previously, it is possible for users to provide a basic citation for a dataset based on the guidelines that have

been provided in the various citation styles list in Section 7.6.2 below. This basic citation may not address all of the concerns that have been identified as the citation of datasets is not viewed in the same manner as citation of other materials. Unfortunately, the use of appropriate citation practices by both national agencies and international organisations is more the exception than the norm, particularly with respect to providing adequate reference information to statistics accessed from other agencies. The norm in relation to data sourced from databases accessed via websites or other online facilities is merely to cite the name of the organisation and (perhaps) almost generic descriptions of the actual database. There is considerable variation in the amount of citation information provided for data obtained from online sources.

7.6.2 Existing citation standards

There are a number of well developed and effective standards and styles for citation and bibliographic reference of material that been developed over many years. Each of these styles have been updated so that they contain the necessary guidelines to effectively cite many forms of traditional information sources as well as newer information sources, such as the internet.

There are many citation and bibliographic reference styles currently in widespread use. The most popular of these styles include:

APA generally used in psychology, education, and other social sciences

MLA literature, arts, and humanities

AMA medicine, health, and biological sciences

Turabian designed or college students to use with all subjects

Chicago used with all subjects by books, magazines, newspapers, and other publications.

Harvard commonly used in the United Kingdom academia and in the legal profession.

There has also been two ISO standards created in the area of bibliographic references:

ISO 690 Information and documentation – Bibliographic references – Content, form, and structure.

ISO 690-2 Information and documentation – Bibliographic references – Part 2: Electronic documents or parts thereof.

ISO 690-2 specifies the elements to be included in bibliographic references to electronic documents. It sets out a prescribed order for the elements of the reference and establishes conventions for the transcription and presentation of information derived from the source electronic document.

ISO 690-2 is intended for use by authors and editors in the compilation of references to electronic documents for inclusion in a bibliography, and in the formulation of citations within the text corresponding to the entries in that bibliography. It does not apply to full bibliographic descriptions as required by librarians, descriptive and analytic bibliographers, indexers, etc.

Even with all of this work in the area of citation, citation of datasets is still relatively unexplored. The complexity of dataset citation is increasing due to the ease in which data is redistributed and reused so that the original source may be a number of stages back. Data may be transformed accidentally or deliberately at any of these stages. Data may also be delivered embedded in software and will require metadata for informed understanding. Data may also be very dynamic or provided via a database environment, which could make it difficult in the future to reproduce the state of the data at the time that it was cited. In international organizations, how to credit the data sources within countries for the provision of their data is also an issue.

7.6.3 Data management issues

The two of the "Reasons for Data Citation" outlined in Section 7.6.1 above imply that:

- an historical copy is being maintained of datasets in an organization; and that the
- exact version of the dataset can be located based upon the information available to the user at the time they initially accessed the dataset.

In a highly dynamic environment where the data is constantly changing, these issues become very complex. The introduction of databases also complicates the matter. How to effectively cite the information in a highly dynamic environment will depend upon how the organization providing the data can recreate the environment at the time of data retrieval. The notion of recording both the date and time of dataset access, as part of the dataset citation may be exactly what is required. Ultimately however, the recommendation of how to cite this dataset effectively will have to be provided by the organization that provides the dataset. Different technical implementations may require different information be included in the citation.

In addition, datasets are copied and redistributed in many forms to meet the needs of the moment. For Internet dissemination, a dataset may be placed in an online database environment with interactive access to the data. The same dataset may be used as the foundation for analytical papers or may be placed in reference databases, CD-ROMS, or publications. The end result is that there are multiple uses of the original dataset both internal and external to the organization that created the dataset.

The information (metadata) that accurately describes the datasets is important in order to identify that the source dataset in these instances is common and to manage data retention and archival activities.

Organizations need to have an effective data management and data archival policy that will keep an historical record of the datasets. The retention period for various datasets will be different depending upon the data and requirements.

7.6.4 Recommended good practice

Citation of datasets

If citation of datasets is to be taken seriously, a concerted effort must be made by national agencies and international organizations to:

- Place a data citation policy in an obvious place on websites and provide the policy in conjunction with any electronic datasets. This citation policy could be as simple as the following:

Citation Information

In the event that data from the <organization name> are incorporated into your research or publication, please supply the following acknowledgment within your published work: "These data are distributed by the <organization name> <organization website>"

If possible, please e-mail or send us reprints/citations of papers or oral presentations founded on <organization name> data (see below for email and mailing address). This will help us to stay informed of how our data are being utilized.

There are no restrictions for use of data from the <organization name> unless otherwise expressly stated.

If you have any questions, please contact:
<contact information>

- Secondly, encourage a culture of data citation both inside and outside organizations wherever data is being used. This awareness can be raised by contacting all known users of our data, all editors of publications known to use our data, etc. and requesting that they follow the citation policy for the organization in future publications.

A simple but effective citation style for datasets would be to include the:

- unambiguous name of the dataset;
- author of the dataset;
- agency (or part of the agency) responsible for the dataset;
- date of the dataset (or version number);
- contact details for queries;
- address of the archive or other place of storage or system for accessing data;
- publisher (if this is different from the author though for many agencies' publications the author and publisher are the same);
- if appropriate, the paragraph, table or page number.

This citation style should be followed for any data that is published internally or externally as well as for the documentation of any datasets that are created or modified.

Traditionally, a citation only cites the most recent use of a reference even though it may have passed through a number of different organizations since the responsible organization first created it. That is, hypothetically, if UNESCO data was provided to the World Bank who then provided it to another organization, the World Bank would cite UNESCO and the other organization would cite the World Bank thus creating a chain of citations. The rationale is that by following the chain of citations, the original source of the reference and the responsible organization can be found. While this may not be the preferred approach for datasets, it is the most manageable approach. Adhering to this common citation practice would be the recommendation for dataset citations.

The challenge of effectively citing data sources in countries can be addressed by following this common citation practice of citing the most recent source. If the data is simply collected from countries by an international organization, not modified in any way, and put into the dataset, then the country should be cited as the source of the data. If the data is collected as part of a survey or statistical activity, which acts upon the data and subsequently generates a dataset, then the documentation of the survey activity should credit the data sources in the countries for providing all of the data. The dataset itself should reference the survey activity as the source of the data since it has gone through a lot more than simply a collection process. However, if a publication is produced by the same organization that has managed the data collection process, then thanking and providing credit to the countries for the original data would be appropriate.

If an organization takes a dataset and modifies it in some way before redistributing the dataset or in whole or as part of a publication, the citation for the modified dataset must indicate the source or the original dataset but the citation must also indicate that the data was modified from its original state.

In today's statistical environment, there is a lot of focus on metadata and the metadata systems needed to manage it. As the implementation of metadata systems and standards become commonplace, the information needed for a more effective citation of datasets will be more readily available as well. Managing this metadata and making it available will involve changes in both systems and processes. The effective management of metadata however, will become an important component in determining the overall quality of datasets.

Citation of text

The main recommendation for text citation is the systematic use in all metadata of one of the widely accepted bibliographic reference styles cited in Section 7.6.2 above. The two commonly used systems for presenting references in text for a bibliography are the Harvard system and the Numeric system[28]. It is beyond the scope of the current Manual to outline these systems in any detail beyond outlining a number of specific areas in metadata presentation where such systems should be used. These include:

- The provision of references or source for concept or variable definitions used in all published output, e.g. definitions appearing in explanatory notes, glossaries, etc. At the moment it is almost impossible to identify the primary source of concept and variable definitions published by both national agencies and international organisations. In particular, it is seldom possible for the user to identify whether or not a specific definition has been taken directly from existing international statistical standards, is a modified version adapted for a specific use (say at the national level), or an entirely new definition .

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[Insert other specific issues]

[28] Refer: Dee, Marianne (ed.) (1998); and Caledonian University (2003), respectively.

8. GLOSSARY OF DATA AND METADATA REPORTING AND PRESENTATION TERMS

Absolute figures	[definition to be developed]
Annual change	See Annual growth rates
Annual growth rates *(draft definition)*	Annual growth rates (annual changes) are rates of change expressed over the previous year. Such rates (changes) may be expressed as Y_t/Y_{t-1}-1 (Y_t-Y_{t-1}). OECD, "Some proposals for standard terminology relating to data presentation", paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Annualised growth rates *(draft definition)*	Annualised growth rates show the value that would be registered if the rate of change measured for a month or quarter were maintained for a full year, i.e. $[((Q_t/Q_{t-1})^4)-1]$, $[((M_t/M_{t-1})^{12})-1]$. Such rates facilitate comparison of data for different time periods (e.g. years and quarters). The term "Annualised growth rates" is sometimes used to describe the quarterly growth rate multiplied by four as opposed to compounding the quarterly growth rate. This is more appropriately referred to as "Linear approximation of the annualised figure". OECD, "Some proposals for standard terminology relating to data presentation", paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Annualised figure, linear approximation	See Annualised growth rates
Base	A number or magnitude used as a standard of reference. It may occur as a denominator in a ratio or percentage calculation. It may also be the magnitude of a particular time series from which a start is to be made in the calculation of a new relative series – an index number – which will show the observations as they accrue in the future in relation to that of the base period. A Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical.
Base period	The period of time for which data used as the base of an index number, or other ratio, have been collected. This period is frequently one of a year but it may be as short as one day or as long as the average of a group of years. In the System of National Accounts (SNA) 1993, par.16.16, the base period is described as the period that provides the weights for an index. Under the SDDS, this refers to the period when the published index = 100, or the reference period to which the average level and/or constant price series data refer. The International Statistical Institute, "The Oxford Dictionary of Statistical Terms", edited by Yadolah Dodge, Oxford University Press, 2003.
Base weight	The weights of a weighting system for an index number computed according to the information relating to the base period instead, for example, of the current period. The International Statistical Institute, "The Oxford Dictionary of Statistical Terms", edited by Yadolah Dodge, Oxford University Press, 2003.
Business cycles	Business cycles are recurrent sequences of alternating phases of expansion and contraction in the level of a time series. OECD Leading Indicator Website, Glossary, 2001.

Calendar adjustment *(draft definition)*	Calendar adjustment refers to the correction for calendar variations other than seasonal factors, e.g. number of days in the calendar period, the accounting or recording practices adopted or the incidence of moving holidays (such as Easter). The terms "calendar adjustment" and "working day adjustment" are often used interchangeably. However, there is a subtle difference between the two terms as working day adjustment is merely *one type* of calendar adjustment, along with an adjustment for say, new recording practices. OECD, "Some proposals for standard terminology relating to data presentation", paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Calendar effects component	The Calendar effects component is the component that represents the calendar variations in a time series, such as trading days, moving holidays and other calendar effects (such as leap year). The effects of the normal length of a month are assigned to the seasonal component. Ladiray, Quenneville, Kaiser, Maravall, "Springer Lecture Notes in Statistics 2001", Harvey MIT Press 1993, 2nd ed.
Chain index	An index number in which the value at any given period is related to a base in the previous period, as distinct from one which is related to a fixed base. The comparison of non-adjacent periods is usually made by multiplying consecutive values of the index numbers, which, as it were, form a chain from one period to another. In practice chain index numbers are usually formed from weighted average of link-relatives, namely the values of magnitudes for a given period divided by the corresponding values in the previous period. The International Statistical Institute, "The Oxford Dictionary of Statistical Terms", edited by Yadolah Dodge, Oxford University Press, 2003.
Chain linking	Joining together two indices that overlap in one period by rescaling one of them to make its value equal to that of the other in the same period, thus combining them into single time series. More complex methods may be used to link together indices that overlap by more than period. Also known as "chaining". PPI Manual – Glossary of Terms, Draft, Producer Price Index Technical Expert Group, November 2002.
Classification	A classification is a set of discrete, exhaustive and mutually exclusive observations which can be assigned to one or more variables to be measured in the collation and/or presentation of data. The terms "classification" and "nomenclature" are often used interchangeably, despite the definition of a "nomenclature" being narrower than that of a "classification". "United Nations Glossary of Classification Terms" prepared by the Expert Group on International Economic and Social Classifications; unpublished on paper.
Classifications, standard	Standard classifications are those that follow prescribed rules and are generally recommended and accepted. They aim to ensure that information is classified consistently regardless of the collection, source, point of time, etc. "United Nations Glossary of Classification Terms" prepared by the Expert Group on International Economic and Social Classifications, unpublished on paper. In the international context standard classifications include ISIC Rev. 3, ISCO, CPC, etc. Many national statistical systems also have their own versions of standard classifications which in the main are consistent with international standard classifications, though modified to meet national circumstances.
Coefficient of variation	The standard deviation of a random variable divided by the mean.

	The International Statistical Institute, "The Oxford Dictionary of Statistical Terms", edited by Yadolah Dodge, Oxford University Press, 2003. The US Bureau of Census alternatively refers to the coefficient of variation as the ratio of the standard error to the value being estimated, usually expressed in terms of a percentage. Also known as the relative standard deviation. (United States Bureau of Census, Glossary of Selected Abbreviations and Acronyms - refer http://eire.census.gov/cgi-bin/ssd/Glossary<BR< a>
Constant prices	Constant prices are obtained by directly factoring changes over time in the values of flows or stocks of goods and services into two components reflecting changes in the prices of the goods and services concerned and changes in their volumes (i.e. changes in "constant price terms"); the term "at constant prices" commonly refers to series which use a fixed-base Laspeyres formula. SNA 1993 paras. 16.2, 16.71.
Cumulative data	See Year-to-date-data
Current prices	[definition to be developed]
Cycle (in time series) *(draft definition)*	The cycle in a time series refers to smooth variations around the trend revealing a succession of phases of expansion and recession. The cycle in a time series refers to smooth variations around the trend revealing a succession of phases of expansion and recession. The cyclical component can be viewed as those fluctuations in a time series of periods which are longer than 1½ years but shorter than those attributed to the trend. OECD, "Some proposals for standard terminology relating to data presentation", paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Decomposition	The act of splitting a time series into its constituent parts by the use of statistical methods. A typical time series is often regarded as composed of four parts: (a) a long-term movement or trend; (b) oscillations of more or less regular period and amplitude about this trend; (c) a seasonal component; (d) a random, or irregular, component. Any particular series need not exhibit all of these but those which are present are presumed to act in an additive fashion, i.e. are superimposed; and the process of determining them separately is one of decomposition. A Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical.
Deflation	The division of the value of some aggregate by a price index - described as a "deflator" - in order to revalue its quantities at the prices of the price reference period or to revalue the aggregate at the general price level of the price reference period. PPI Manual – Glossary of Terms, Draft, Producer Price Index Technical Expert Group, November 2002
Dissemination, data	Dissemination is the release to users of information obtained through a statistical activity. Statistics Canada, "Statistics Canada Quality Guidelines", 3rd edition, October 1998, page 59. Data dissemination consists of distributing or transmitting statistical data to users. Various release media are possible; for example: electronic format including the internet, CD-ROM, paper publications, files available to authorised users or for public use; fax response to a special request, public speeches, press releases. Dissemination formats. Under the SDDS, the concept of dissemination formats is divided into two

	categories: "hardcopy" and "electronic" publications, which detail the reference documents through which users may access the data described in the metadata and, where relevant, detailed components beyond the minimum prescribed.
Double deflation	Double deflation is a method whereby gross value added is measured at constant prices by subtracting intermediate consumption at constant prices from output at constant prices; this method is feasible only for constant price estimates which are additive, such as those calculated using a Laspeyres' formula (either fixed-base or for estimates expressed in the previous year's prices). SNA 1993 para. 16.5
Filter	Any method of isolating harmonic constituents in a time series; a mathematical analogy of the "filtering" of a ray of light or sound by removing unsystematic effects and bringing out the constituent harmonics. A Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical.
Flow series / data	Statistical series presented as flow series/data are cumulated during the reference period, for example, passenger car registrations, where the figure for the reference period is the sum of daily registrations. Organisation for Economic Co-operation and Development (OECD), "Main Economic Indicators", monthly.
Forecasting	"Forecasting" and "prediction" are often used synonymously in the customary sense of assessing the magnitude which a quantity will assume at some future point of time: as distinct from "estimation" which attempts to assess the magnitude of an already existent quantity. For example, the final yield of a crop is "forecast" during the growing period but "estimated" at harvest. A Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical.
Growth rates	Growth rates are ratios of total change in a specified time reference period to values at the beginning of the period or at a specified earlier time reference. Adapted from Multilingual Demographic Dictionary, English Section, United Nations, 1958, Department of Economic and Social Affairs, Population Studies, No. 29.
Indicator, statistical	A statistical indicator is a data element that represents statistical data for a specified time, place, and other characteristics. Economic Commission for Europe of the United Nations (UNECE), "Terminology on Statistical Metadata", Conference of European Statisticians Statistical Standards and Studies, No. 53, Geneva, 2000.
Index number	An index number is a quantity that shows by its variations the changes over time or space of a magnitude. Important features in the construction of an index number are its coverage, base period, weighting system and method of averaging observations. The above definition relates to the usual meaning of the expression "index number". In full generality, however, the term can also be applied to a series of values which are standardised by being referred to a basic period or area, e.g. if the price of a fixed commodity in a basic year is 40 units and those in succeeding years are 60 and 68 units, the index number of those years would be, on the basis of 100 for the first year, 150 and 170. Such simple cases are, however, usually referred to as "relatives" and the index number is constructed as an average of a number of relatives. The International Statistical Institute, "The Oxford Dictionary of Statistical Terms", edited by Yadolah Dodge, Oxford University Press, 2003.

Irregular component *(draft definition)*	The irregular component is what is left of a time series after the trend-cycle and the seasonal components, as well as calendar effects have been removed; it corresponds to the high frequency fluctuations of the series. OECD, “Some proposals for standard terminology relating to data presentation”, paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004. Modified definition from Ladiray, Quenneville, Kaiser, Maravall, “Springer Lecture Notes in Statistics 2001”, Harvey MIT Press 1993, 2nd ed.
Level (monthly, quarterly, annual) data	Data expressed as levels are expressed in absolute terms (values, numbers, units) for a given period (month, quarter, year). Organisation for Economic Co-operation and Development (OECD), "Main Economic Indicators", monthly.
Metadata	Metadata is data that defines and describes other data. ISO/IEC FCD FCD 11179-1 "Information technology - Metadata registers-Part 1: Framework", May 2003.
Metadata, statistical	Statistical metadata are data about statistical data. United Nations Statistical Commission and Economic Commission for Europe of the United Nations (UNECE), "Guidelines for the Modeling of Statistical Data and Metadata", Conference of European Statisticians, Methodological material, United Nations, Geneva, 1995. Statistical metadata provide information on data and about processes of producing and using data. Metadata describe statistical data and - to some extent - processes and tools involved in the production and usage of statistical data (UNECE, "Guidelines for the Modeling of Statistical Data and Metadata", 1995).
Monthly average	By analogy with annual averages and moving averages generally this term ought to refer to the average values of a time series occurring within a month, the resulting figure being representative of that particular month. In practice the phrase is sometimes used to denote the averaging of monthly values occurring in the same month, e.g. January from year to year, the object being to provide a pattern of seasonal fluctuation. This is objectionable and a better expression would be “seasonal average by months”. A Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical.
Monthly growth rates *(draft definition)*	Monthly growth rates are rates of change expressed over the previous month. Such rates may be expressed as $M_t/M_{t-1}-1$. OECD, “Some proposals for standard terminology relating to data presentation”, paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Moving average *(draft definition)*	A moving average is a method for smoothing time series by averaging (with or without weights) a fixed number of consecutive terms. The averaging “moves” over time, in that each data point of the series is sequentially included in the averaging, while the oldest data point in the span of the average is removed. In general, the longer the span of the average, the smoother is the resulting series. Moving averages are used to smooth large fluctuations in time series or to identify time series

	components, such as the trend, the cycle, the seasonal, etc. A moving average replaces each value of a time series by a (weighted) average of p preceding values, the given value, and f following values of the series. If p = f the moving average is said to be centred. The moving average is said to be symmetric if it is centred, and if for each k=1, 2, …, p = f, the weight of the k-th preceding value is equal to the weight of the k-th following one. The moving average is not defined for the first p and the last f time series values. In order to compute the moving average for those values, the series must be backcasted and forecasted. OECD, "Some proposals for standard terminology relating to data presentation", paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Non-sampling error	An error in sample estimates which cannot be attributed to sampling fluctuations. Non-sampling errors may arise from many different sources such as defects in the frame, faulty demarcation of sample units, defects in the selection of sample units, mistakes in the collection of data due to personal variations or misunderstanding or bias or negligence or dishonesty on the part of the investigator or of the interviewer, mistakes at the stage of the processing of the data, etc. The International Statistical Institute, "The Oxford Dictionary of Statistical Terms", edited by Yadolah Dodge, Oxford University Press, 2003.
Percentage change	The change in an index [or other] series from one period to another expressed as a percentage of its value in the first of the two periods. Producer and International Trade Price Indexes, Glossary of terms – Australian Bureau of Statistics.
Preliminary / Provisional *(draft definition)*	Some statistical agencies use the term "Preliminary data" to describe the first released version of a series and "Provisional data" to describe subsequent versions prior to final amendment. However, the two terms are often used interchangeably though users in general should have no great problem in understanding that data labelled either "preliminary" or "provisional" are subject to revision provided this is clearly highlighted by the agency in the release. Clearly informing the use that the data is subject to revision is more important than the term used to describe such data. OECD, "Some proposals for standard terminology relating to data presentation", paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Price index	A price index reflects an average of the proportionate changes in the prices of a specified set of goods and services between two periods of time. SNA 1993 para. 16.14 Usually a price index is assigned a value of 100 in some selected base period and the values of the index for other periods are intended to indicate the average percentage change in prices compared with the base period. (PPI Manual – Glossary of Terms, Draft, Producer Price Index Technical Expert Group, November 2002.
Qualitative data	Qualitative data is data describing the attributes or properties that an object possesses. The properties are categorized into classes that may be assigned numeric values. However, there is no significance to the data values themselves, they simply represent attributes of the object concerned. Economic Commission for Europe of the United Nations (UNECE), "Glossary of Terms on Statistical Data Editing", Conference of European Statisticians Methodological material, Geneva, 2000.
Quantitative data	Quantitative data is data expressing a certain quantity, amount or range. Usually, there are measurement units associated with the data, e.g. meters, in the case of the height of a person. It makes sense to set boundary limits to such data, and it is also meaningful to apply arithmetic operations to

	the data. Economic Commission for Europe of the United Nations (UNECE), "Glossary of Terms on Statistical Data Editing", Conference of European Statisticians Methodological material, Geneva, 2000. Strictly, this term, as contrasted with qualitative data, should relate to data in the form of numerical quantities such as measurements or counts. It is sometimes, less exactly, used to describe material in which the variables concerned are quantities, e.g. height, weight, price as distinct from data deriving from qualitative attributes, e.g. sex, nationality or commodity. This usage is to be avoided in favour of such expressions as “data concerning quantitative (qualitative) variables” or “data concerning numerical variables (attributes)”. (A Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical).
Quantity index	A measure reflecting the average of the proportionate changes in the quantities of a specified set of goods and services between two periods of time. Usually a quantity index is assigned a value of 100 in some selected base period and the values of the index for other periods are intended to indicate the average percentage change in quantities compared with the base period. PPI Manual – Glossary of Terms, Draft, Producer Price Index Technical Expert Group, November 2002.
Quarterly growth rates *(draft definition)*	Quarterly growth rates are rates of change expressed over the previous quarter. Such rates may be expressed as Q_t/Q_{t-1}-1. OECD, “Some proposals for standard terminology relating to data presentation”, paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Rates of change	See Growth rates
Rebasing	In the course of time, the pattern of relative prices in the base period tends to become progressively less relevant to the economic situations of later periods to the point at which it becomes unacceptable to continue using them to measure volume measures from one period to the next; it may then be necessary to update the base period, a process which is commonly referred to as “rebasing". SNA 1993 para. 16.31. There is some ambiguity due to ambiguity in the concept of the base year. Rebasing may mean changing the index reference-period of an index number series, or it may mean changing the weights in the index. Both the index reference-period and the weight reference-period may be changed at the same time, but not necessarily so. PPI Manual – Glossary of Terms, Draft, Producer Price Index Technical Expert Group, November 2002
Reference period	In one sense, this is synonymous with base period. It may also refer to the length of time, e.g. week or year, for which data are collected. The International Statistical Institute, “The Oxford Dictionary of Statistical Terms”, edited by Yadolah Dodge, Oxford University Press, 2003. Population, statistical units and variables relate to specific times, which may be limited to a reference time point (e.g. a specific day) or a reference period (e.g. a month, calendar year or fiscal year) (Eurostat, "Quality Glossary").
Relative standard error	See Coefficient of variation
Release calendar	A general statement on the schedule of release of data. International Monetary Fund (IMF), "Guide to the Data Dissemination Standards, Module 1: The Special Data Dissemination Standard", Washington, May 1996.

	An advance release calendar provides a general statement on the schedule of release of data, which is publicly disseminated so as to provide prior notice of the precise release dates on which a national statistical agency, other national agency, or international organization undertakes to release specified statistical information to the public. Such information may be provided for statistical releases in the coming week, month, quarter or year. Advance release calendar information is one of the requirements of the IMF's Special Data Dissemination Standards (SDDS). Such information is disseminated on the Internet on the IMF`s Data Standards Bulletin Board (DSBB) or on national websites.
Revisions, data	Data revisions are defined broadly as any change in a value of a statistic released to the public by an official national statistical agency. IMF, Carson, Carol C., "Revisions Policy for Official Statistics: A Matter of Governance", presented at the 2nd *Session of the Committee for the Coordination of Statistical Activities, Geneva, 8-10 September 2003*, IMF, 2003, Washington DC
Revision policy	A policy or set of policies, aimed at ensuring the transparency of disseminated data whereby preliminary data are compiled that are later revised when more and better source data become available. International Monetary Fund (IMF)," Quarterly National Accounts Manual", Washington D.C., 2001. Providing users with documentation regarding the source data used and the way they are adjusted gives compilers with the possibility to incorporate new and more accurate information into estimates, thus improving their accuracy without introducing breaks in the time series. Data may also be subject to ad hoc revisions as a result of the introduction of new classifications, compilation frameworks and methodologies which result in the compilation of historical data that replaces previously released data. Whether or not such changes constitute an actual "revision" or the compilation of a "new" series is a matter of judgment on the part of the statistical agency. Under the requirements of the Special Data Dissemination Standard (SDDS), an organisation's revision policy for specific statistics is disseminated on the Internet on the IMF`s Dissemination Standards Bulletin Board (DSBB).
Sampling error	That part of the difference between a population value and an estimate thereof, derived from a random sample, which is due to the fact that only a sample of values is observed; as distinct from errors due to imperfect selection, bias in response or estimation, errors of observation and recording, etc. The totality of sampling errors in all possible samples of the same size generates the sampling distribution of the statistic which is being used to estimate the parent value. The International Statistical Institute, "The Oxford Dictionary of Statistical Terms", edited by Yadolah Dodge, Oxford University Press, 2003. Sampling errors arise from the fact that not all units of the targeted population are enumerated, but only a sample of them. Therefore, the information collected on the units in the sample may not perfectly reflect the information which could have been collected on the whole population. The difference is the sampling error (Eurostat, Quality Glossary).
Sampling variance	The variance of a sampling distribution. The word "sampling" can usually be omitted, as being defined by the context or otherwise understood. The sampling variance of a statistic is the square of its standard error. A Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical.
Seasonal adjustment	Seasonal adjustment is a statistical technique to remove the effects of seasonal calendar influences operating on a series. Seasonal effects usually reflect the influence of the seasons

(draft definition)	themselves either directly or through institutional factors or social conventions. Other types of calendar variation occur as a result of influences such as number of days in the calendar period, the accounting or recording practices adopted or the incidence of moving holidays (such as Easter). A slightly modified version of the definition from: An Analytical Framework for Price Indexes in Australia: Glossary and References, Australian Bureau of Statistics, Canberra, 1997. (OECD, "Some proposals for standard terminology relating to data presentation", paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004)
Seasonal adjustment programs	Seasonal adjustment is normally done using off-the- shelf programs—most commonly worldwide by one of the programs in the X-11 family. Other programs in common use include the TRAMO-SEATS package developed by Bank of Spain and promoted by Eurostat and the German BV4 program. The original X-11 program was developed in the 1960s by the U.S. Bureau of the Census. It has subsequently been updated and improved through the development of X-11-ARIMA by Statistics Canada and X-12-ARIMA by the U.S. Bureau of the Census, which was released in the second half of the 1990s. The core of X-11-ARIMA and X-12-ARIMA is the same basic filtering procedure as in the original X-11. Quarterly National Accounts Manual – Concepts, Data Sources and Compilation, IMF, 2001, para. 8.13.
Seasonal variation (seasonal component) *(draft definition)*	The seasonal variation is that part of the variations in a time series representing intra-year fluctuations that are repeated more or less regularly in the same period year after year. OECD, "Some proposals for standard terminology relating to data presentation", paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Seasonally adjusted component or series	The result of the extraction of the seasonal component and the calendar effects component from a time series. If neither seasonal nor calendar influences are present in the raw data, the seasonally adjusted series is given by the raw data. For series with no identifiable seasonal variations but with identifiable calendar variations, the seasonally adjusted series is given by the calendar adjusted series. Ladiray, Quenneville, Kaiser, Maravall, "Springer Lecture Notes in Statistics 2001", Harvey MIT Press 1993, 2nd ed.
Smoothing	The process of removing fluctuations in an ordered series so that the result shall be "smooth" in the sense that the first level differences are regular and higher order differences small. Although smoothing can be carried out by freehand methods, it is usual to make use of moving averages or the fitting of curves by least squares procedures. In fact, the concept is closely tied to that of trend fitting. A Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical
Special Data Dissemination Standard (SDDS)	The Special Data Dissemination Standard (SDDS) was established by the International Monetary Fund (IMF) to guide members that have, or that might seek, access to international capital markets in the provision of their economic and financial data to the public. Subscription to the SDDS was opened in early April 1996. The SDDS identifies four dimensions of data dissemination:

	a) The data: coverage, periodicity, and timeliness; b) Access by the public; c) Integrity of the disseminated data; and d) Quality of the disseminated data. The SDDS prescribes that subscribing members provide a summary description of methodology for each data category, including statements of major differences from international guidelines. The term "methodology" is used in the SDDS in a broad sense to cover the aspects of analytical framework, concepts, definitions, classifications, accounting conventions, sources of data, and compilation practices. International Monetary Fund (IMF), "Guide to the Data Dissemination Standards, Module 1: The Special Data Dissemination Standard", Washington, May 1996.
Standard error	The positive square root of the variance of the sampling distribution of a statistic. It includes the precision with which the statistics estimates the relevant parameter as contrasted with the standard deviation that describes the variability of primary observations. The International Statistical Institute, “The Oxford Dictionary of Statistical Terms”, edited by Yadolah Dodge, Oxford University Press, 2003.
Stock series / data	Statistical data presented as stock series/data are measured at the end of the reference period, for example, money supply data which can refer to an observation on the last working day of the reference period. Organisation for Economic Co-operation and Development (OECD), "Main Economic Indicators", monthly.
Tendency	The term tendency is used in business tendency surveys where the respondent is asked for a judgment on the direction of changes (e.g. up/down/same). Organisation for Economic Co-operation and Development (OECD), "Main Economic Indicators", monthly.
Time series *(draft definition)*	A time series is a set of time-ordered observations of a quantitative characteristic of an individual or collective phenomenon taken at different points of time. Modified version of a definition derived from the following source: Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical. (OECD, “Some proposals for standard terminology relating to data presentation”, paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004)
Time series breaks	Breaks in statistical time series occur when there is a change in the standards for defining and observing a variable over time. Such changes may the result of a single change or the combination of multiple changes at any one point in time of observation of the variable. The specific causes of breaks in a statistical time series include changes in: classifications used, definitions of the variable, coverage, etc. Statistical agencies and users of time series data for economic research to analyse and interpret economic and social events and conditions attach very high importance to the continuity and consistency of data over time. However, it should be emphasised that the occurrence of time series break may not necessarily jeopardise the reliability of a time series. Statistical agencies frequently apply a number of techniques to ensure the continuity of a time series.

	Finally, the impact of a time series break is often a matter of judgement on the part of the user and depends on the use(s) to which the data are put. Statistical Data and Metadata Exchange (SDMX) – BIS, ECB, Eurostat, IBRD, IMF and OECD – Metadata Common Vocabulary, Release 1, December 2003.
Trend *(draft definition)*	The trend is the component that represents the long-term variations in a time-series. Trend can be viewed as those variations of very low frequencies. OECD, "Some proposals for standard terminology relating to data presentation", paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Trend-cycle	The trend-cycle is the component that represents the variations of low frequencies in a time series, the high frequency variations having been filtered out. This component can be viewed as those variations with a period longer than a chosen threshold (usually 1½ years). In practice, statistical agencies estimate trend-cycle by filtering the seasonal and irregular component. Ladiray, Quenneville, Kaiser, Maravall, "Springer Lecture Notes in Statistics 2001", Harvey MIT Press 1993, 2nd ed.
Trend estimates	Trend estimates are derived from seasonally adjusted estimates via an averaging process which attempts to remove the irregular component of the time series. This allows the underlying direction of a time series to be identified. An Analytical Framework for Price Indexes in Australia: Glossary and References, Australian Bureau of Statistics, Canberra, 1997.
Trend fitting	The general process of representing the trend component of a time series. A trend may be represented by a particular curve form, e.g. the logistic, or by a particular form of the general class of polynomial in time, or by a moving average. A Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical.
Volume index	A volume index is most commonly presented as a weighted average of the proportionate changes in the quantities of a specified set of goods or services between two periods of time; volume indices may also compare the relative levels of activity in different countries (e.g. those calculated using PPPs). A major aim of economic analysis is to develop an understanding of changes taking place in an economy over time. This includes the measurement of short-term growth or decline. To achieve this for key economic value aggregates, such as the value of industrial production or the value of retail turnover, it is necessary to distinguish between changes arising solely from price changes and those arising from other influences such as quantity and quality, which are referred to as changes in "volume". SNA 1993 para. 16.11.
Working day adjustment	Refer Calendar adjustment
Year-on-year change	See Year-on-year growth rates
Year-on-year growth rates *(draft definition)*	Year-on-year growth rates (changes) are rates expressed over the corresponding period (month or quarter) of the previous year. Such rates (changes) may be expressed as Q_t/Q_{t-4}-1 or M_t/M_{t-12}-1 (Q_t-Q_{t-4} or M_t-M_{t-12}). OECD, "Some proposals for standard terminology relating to data presentation", paper presented to the OECD Short-term Economic Statistics Expert Group (STESEG), 28-30 June 2004, Paris, 2004
Year-to-date data	Data expressed in cumulative terms from the beginning of the year; sometimes referred to as

	cumulative data. Statistical Data and Metadata Exchange (SDMX) – BIS, ECB, Eurostat, IBRD, IMF and OECD – Metadata Common Vocabulary, Release 1, December 2003

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ANNEX 1

OECD MAIN ECONOMIC INDICATORS (MEI) LIST OF TARGET INDICATORS

(July 2003)

Variable No.	Variable
1	**National accounts**
1.1	GDP (value)
1.2	GDP (volume)
1.3	Implicit price level
2	**Production**
2.1	Industry excluding construction
2.2	Manufacturing
2..2.1	Consumer goods: total
2.2.2	Consumer non-durable goods
2.2.3	Consumer durable goods
2.2.4	Investment goods
2.2.5	Intermediate goods including energy
2.2.6	Intermediate goods excluding energy
2.2.7	Energy
2.3	Construction
2.4	Services
2.5	Rate of capacity utilisation
3	**Commodity output**
3.1	Cement
3.2	Crude steel
3.3	Crude petroleum
3.4	Natural gas
3.5	Commercial vehicles
3.6	Passenger cars
4.	**Manufacturing - sales (volume)**
4.1	Total
4.1.1	Domestic
4.1.2	Export
4.2	Consumer goods: total
4.2.1	Consumer non-durable goods
4.2.2	Consumer durable goods
4.3	Investment goods
4.4	Intermediate goods including energy

Variable No.	Variable
5.	**Manufacturing - new orders (volume)**
5.1	Total
5.1.1	Domestic
5.1.2	Export
5.2	Consumer goods: total
5.2.1	Consumer non-durable goods
5.2.2	Consumer durable goods
5.3	Investment goods
5.4	Intermediate goods including energy
6	**Manufacturing - stocks (volume)**
6.1	Total
6.2	Finished goods
6.3	Work in progress
6.4	Intermediate goods
7.	**OECD composite leading indicator**
7.1	Trend restored
7.2	6-month rate of change (annual rate)
8	**Construction**
8.1	Orders/Permits: total construction
8.2	Orders/Permits: residential
8.3	Work put in place: total construction
8.4	Work put in place: residential
9	**Business tendency surveys**
9.1	Manufacturing
9.1.1	Business situation: present (business climate)
9.1.2	Business situation: future
9.1.3	Production: future tendency
9.1.4	Orders inflow or demand: tendency
9.1.5	Order books: level
9.1.6	Export order books: level
9.1.7	Finished goods stocks: level
9.1.8	Finished goods stocks: future level
9.1.9	Raw material stocks: present situation
9.1.10	Rate of capacity utilisation
9.1.11	Judgement on capacity utilisation
9.1.12	Future judgement on capacity utilisation
9.1.13	Employment: level
9.1.14	Employment: future tendency
9.1.15	Selling prices: tendency
9.1.16	Selling prices: future tendency
9.2	Construction
9.2.1	Business (activity) situation: present
9.2.2	Business (activity) situation: future
9.2.3	Demand/Orders inflow: future tendency
9.2.4	Employment: future tendency
9.2.5	Selling prices: future tendency
9.3	Retail trade
9.3.1	Business (activity) situation: present

Variable No.	Variable
9.3.2	Business (activity) situation: future
9.3.3	Volume of stocks: level
9.3.4	Employment: future tendency
9.3.5	Order intentions or demand
9.4	Other services excluding retail trade
9.4.1	Business (activity) situation: present
9.4.2	Business (activity) situation: future
9.4.3	Employment: future tendency
10	**Consumer opinions**
10.1	Consumer confidence indicator
10.2	Expected inflation
10.3	Expected economic situation
11	**Retail sales**
11.1	Total retail sales (value)
11.2	Total retail sales (volume)
11.3	New passenger car registrations (level)
12	**International trade**
12.1	Imports c.i.f. or f.o.b. (value)
12.2	Exports c.i.f. or f.o.b. (value)
12.3	Net trade (value)
12.4	Imports c.i.f. or f.o.b. (volume)
12.5	Exports c.i.f. or f.o.b. (volume)
12.6	Import prices
12.7	Export prices
13	**Labour**
13.1	Employment: total
13.1.1	Employment: agriculture
13.1.2	Employment: industry
13.1.3	Employment: services
13.2	Total employees
13.2.1	Part-time employees
13.2.2	Temporary employees
13.3	Total unemployment (level)
13.4	Total unemployment (rate)
13.5	Unemployment: short-term index
13.6	Worked hours
13.7	Job vacancies
14	**Wages**
14.1	Hourly earnings: all activities
14.2	Hourly earnings: manufacturing
14.3	Unit labour costs: manufacturing
	Labour costs/prices
	Total labour costs

Variable No.	Variable
15	**Producer prices**
15.1	Total
15.2	Manufacturing
15.2.1	Consumer goods
15.2.2	Investment goods
15.2.3	Intermediate goods including energy
15.2.4	Intermediate goods excluding energy
15.2.5	Energy
15.3	Food
15.4	Services
16	**Consumer prices**
16.1	Total
16.2	Food
16.3	All items less food and energy
16.4	Energy
16.5	All services less rent
16.6	Rent
16.7	National core inflation
17	**Domestic finance**
17.1	Narrow money
17.2	Broad money
17.3	Domestic credit to total economy
17.4	New capital issues
17.5	Fiscal balance
17.6	Public debt
18	**Balance of payments**
18.1	Current account balance
18.1.1	Balance on goods
18.1.2	Balance on services
18.1.3	Balance on income
18.1.4	Balance on current transfers
18.2	Capital and financial account balance
18.2.1	Reserve assets
18.3	Net errors and omissions
19	**Interest rates**
19.1	3-month interest rate
19.2	Prime interest rate
19.3	Long-term interest rate
20	**Share prices**
20.1	All shares price index
21	**Foreign finance**
21.1	US dollar exchange rate: spot
21.2	Euro exchange rate: spot
21.3	Reserve assets excluding gold

ANNEX 2

DATA REQUIREMENTS UNDER THE SHORT-TERM STATISTICS REGULATION (EC) NO. 1165/98, 19 MAY 1998

Variable No.	Name	Reference period	Delay Target

Industry

110	Production	month	1 month and 15 calendar days
120	Turnover	month	2 months
121	Domestic turnover	month	2 months
122	Non-domestic turnover	month	2 months
130	New orders received	month	1 month and 20 calendar days
131	Domestic new orders	month	1 month and 20 calendar days
132	Non-domestic new orders	month	1 month and 20 calendar days
210	Number of persons employed	At least quarter	3 months
220	Hours worked	At least quarter	3 months
230	Gross wages and salaries	At least quarter	3 months
310	Output prices	month	1 month and 15 calendar days
311	Output prices of the domestic market	month	1 month and 5 calendar days
312	Output prices of the non-domestic market	month	1 month and 5 calendar days
313		month	1 month and 15 calendar days

Construction

110	Production	At least quarter	2 months
115	Production of building construction	At least quarter	2 months
116	Production of civil engineering	At least quarter	2 months
130	New orders received	At least quarter	3 months
135	New orders received for building construction	At least quarter	3 months
136	New orders received for civil engineering	At least quarter	3 months
210	Number of persons employed	At least quarter	3 months
220	Hours worked	At least quarter	3 months
230	Gross wages and salaries	At least quarter	3 months
320	Construction costs	At least quarter	3 months
321	Material costs	At least quarter	3 months
322	Labour costs	At least quarter	3 months
411	Building permits: number of dwellings	At least quarter	3 months
412	Building permits: square metres of useful floor area or alternative size measure	At least quarter	3 months

Retail trade and repair

120	Turnover	month	3 months
210	Number of persons employed	quarter	3 months
330	Deflator of sales	month	3 months

Other services

120	Turnover	quarter	3 months
210	Number of persons employed	quarter	3 months

DATA REQUIREMENTS UNDER THE REGULATION CONCERNING LABOUR COST INDEX (EC) NO. 2001/0166, 23 JULY 2001

Variable No.	Variable	Reference period	Delay target
1	Total labour costs	quarter	70 days after end of reference period
2	Labour costs excluding bonuses	quarter	70 days after end of reference period
3	Wages and salaries	quarter	70 days after end of reference period
4	Employers' social contribution plus taxes paid by the employer less subsidies received by the employer	quarter	70 days after end of reference period

ANNEX 3

EUROPEAN COMMISSION PRINCIPAL EUROPEAN ECONOMIC INDICATORS

PERIODICITY AND DELAYS IN CALENDAR DAYS

Set	Indicator	Periodicity	EU Delay Target	EU Delay Actual
Set 1: Consumer Price Indicators				
1.1	Harmonised Consumer Price Index: MUICP flash estimate	monthly	0	2
1.2	Harmonised Consumer Price Index: actual indices monthly	monthly	17	17
Set 2: National Accounts Indicators				
2.1	Quarterly National Accounts: First GDP estimate	quarterly	45	NA
2.2	Quarterly National Accounts: First GDP release with more breakdowns	quarterly	60	70/120
2.3	Quarterly National Accounts: Household and Company Accounts	quarterly	90	NA
2.4	Quarterly National Accounts: Government Finance Statistics	quarterly	90	100
Set 3: Business Indicators				
3.1	Industrial production index monthly	monthly	40	48
3.2	Industrial output price index for domestic markets monthly	monthly	35	35
3.3	Industrial new orders index monthly	monthly	40/50	Preliminary data
3.4	Industrial import price index monthly	monthly	45	NA
3.5	Production in construction	monthly/ quarterly	45	75
3.6	Turnover index for retail trade and repair	monthly	30	60
3.7	Turnover index for other services	quarterly	60	Partial data
3.8	Corporate output price index for services	quarterly	60	NA
Set 4: Labour Market Indicators				
4.1	Unemployment rate	monthly	30	30
4.2	Job vacancy rate	quarterly	45	NA
4.3	Employment	quarterly	45	70/75
4.4	Labour cost index	quarterly	70	90
Set 5: Foreign Trade Indicators				
5.1	External trade balance: intra and extra for MU and EU	monthly	45	50

NA : not available (not published yet at EU level)