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Data Quality Assessment Framework (DQAF) for the Consumer Price Index

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DATA QUALITY ASSESSMENT FRAMEWORK (DQAF) FOR CONSUMER PRICE INDEX

Introduction

A. Purpose of the Framework

The main purpose of the Framework is to provide a flexible structure for the qualitative assessment of the consumer price index statistics (referred to as the statistics or the index throughout the Framework).

The Framework could be used in a variety of contexts, including the following:

- reviews performed in the context of IMF country work, e.g., the data module of the Reports on the Observance of Standards and Codes (ROSCs), technical assistance, and surveillance;
- self-assessments performed by national statistical offices, central banks, and other data producing agencies; and
- assessments by other groups of data users, such as financial market participants.

B. Structure of the Framework

The DQAF comprehensively covers the various quality aspects of data collection, processing, and dissemination. The Framework is organized in a cascading structure that progresses from the abstract/general to the more concrete/specific details.

The first level covers the **prerequisites** of quality and five **dimensions** of quality; assurances of integrity, methodological soundness, accuracy and reliability, serviceability, and accessibility. For each of these prerequisites and five dimensions, there are **elements** (two-digit level) and **indicators** (three-digit level.)[1]

At the next level, **focal issues** that are specific to the compilation of the Consumer Price Index are addressed. Below each focal issue, **key points** identify quality features that may be considered in addressing the focal issues. The key points are meant to be suggestive, not exhaustive.

Box A provides a view of the cascading structure employed in the Framework.

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[1] The first three levels are common with other Data Quality Assessment Frameworks that have been developed to assess datasets. This design was implemented to ensure a common and systematic assessment across datasets. To date, frameworks have been developed for national accounts statistics, consumer price index, producer price index, government finance statistics, monetary statistics, balance of payments statistics, and income poverty statistics.

C. Content of the Framework

The elements and indicators within their respective dimensions are described below.

0. Prerequisites of quality: Although not itself a dimension of quality, this group of "pointers to quality" includes elements and indicators that have an overarching role as prerequisites, or institutional preconditions, for quality of statistics. Note that the focus is on the agency, such as a national statistical office, central bank, or a ministry/department. These prerequisites cover the following elements:

- 0.1 legal and institutional environment,
- 0.2 resources available for the statistical program,
- 0.3 relevance, and
- 0.4 other quality management.

1. Assurances of integrity: This dimension relates to the adherence to the principle of objectivity in the collection, compilation, and dissemination of statistics. The dimension encompasses institutional arrangements that ensure professionalism in statistical policies and practices, transparency, and ethical standards. The three elements for this dimension of quality are the following:

- 1.1 Institutional Integrity,
- 1.2 transparency, and
- 1.3 ethical standards.

2. Methodological soundness: This dimension covers the idea that the methodological basis for the production of statistics should be sound and that this can be attained by following internationally accepted standards, guidelines, or good practices. This dimension is necessarily dataset-specific, reflecting different methodologies for different datasets. This dimension has four elements, namely:

- 2.1 concepts and definitions,
- 2.2 scope,
- 2.3 classification/sectorization, and
- 2.4 basis for recording.

3. Accuracy and reliability: This dimension covers the idea that statistical outputs sufficiently portray the reality of the economy. This dimension is also data specific, reflecting the sources used and their processing. The five elements of this dimension cover the following:

- 3.1 source data,
- 3.2 assessment of source data,
- 3.3 statistical techniques,
- 3.4 assessment and validation of intermediate data and statistical outputs, and
- 3.5 revision studies.

4. **Serviceability**: This dimension relates to the need that statistics are disseminated with an appropriate periodicity in a timely fashion, are consistent internally and with other major datasets, and follow a regular revision policy. The three elements for this dimension are as follows:

4.1 periodicity and timeliness,
4.2 consistency, and
4.3 revision policy and practice.

5. **Accessibility**: This dimension relates to the need for data and metadata to be presented in a clear and understandable manner on an easily available and impartial basis, that metadata are up-to-date and pertinent, and that a prompt and knowledgeable support service is available. This dimension has three elements, namely:

5.1 data accessibility,
5.2 metadata accessibility, and
5.3 assistance to users.

Box A: The Cascading Structure of the Data Quality Assessment Framework, DQAF May 2012, for the Consumer Price Index: An Example

Using serviceability as the example of a dimension of quality, the box below shows how the framework identifies three elements that point toward quality. Within consistency, one of those elements, the framework next identifies three indicators. Specifically, for each indicator, focal issues are addressed through key points that may be considered in identifying quality.

Dimension	**4. Serviceability**
Elements	**4.1 Periodicity and Timeliness** **4.2 Consistency** **4.3 Revision policy and Practice**
Indicators	**4.2.1 Statistics are consistent within the dataset** **4.2.2 Statistics are consistent or reconcilable over a reasonable period of time** **4.2.3 Statistics are consistent or reconcilable with those obtained through other data sources and/or statistical frameworks**
Focal Issues	***i. The statistical series is internally consistent***
Key Points	• Estimates produced for all classification typologies are consistent in the sense that the all-items aggregate is invariant to the typology of aggregation.[1] 1/ For the CPI, the two classification typologies are geographical and item/expenditure class

0. Prerequisites of Quality

0.1 Legal and institutional environment

— The environment is supportive of statistics.

0.1.1 The responsibility for collecting, processing, and disseminating the statistics is clearly specified.

i. The primary responsibility for collecting, processing, and disseminating the statistics is clearly established.

- A law, such as a statistical law, or other formal provision (e.g., inter-agency protocol or executive decree, supranational legislation) assigns primary responsibility as well as the authority to an agency (agencies) for the collection, processing, and dissemination of the statistics.
- Working arrangements are consistent with this assignment of responsibility.
- If more than one data producing agency is involved in producing parts of the statistics, arrangements are in place to promote consistency of methods and results.
- Conflicts or potential conflicts between the legal authority to produce the statistics and other laws or provisions (e.g., access to information law or bank secrecy laws) have been successfully resolved or reconciled with no major impairment to the data production.
- Oversight of the institution(s) responsible for collecting, reporting and disseminating statistics is conducted in order to ensure that statistical work accords with the laws or other provisions governing such work.

0.1.2 Data sharing and coordination among data-producing agencies are adequate.

i. Arrangements or procedures exist to facilitate data sharing and coordination between the agency (agencies) with the primary responsibility for compiling the statistics and other data producing agencies.

- Procedures are in place to provide for the effective and timely flow of source data (e.g., administrative data as well as survey data) to the data-producing agency (agencies).
- Contacts (e.g., regular meetings and workshops) are maintained with other data producing agencies to promote a proper understanding of data requirements, to avoid duplication of effort, and to take into account reporting burden (e.g., by discussing changes to administrative processes before they take place.)

0.1.3 Individual reporters' data are kept confidential and used for statistical purposes only.

i. ***The confidentiality of individual reporters' data is guaranteed and that guarantee is widely known.***

- A law or other formal provision clearly states that individual data are to be treated as confidential, and shall not be disclosed or used for other than statistical (or research—see 0.1.3.ii.) purposes.

- In surveys and other statistical inquiries, respondents are informed of their rights and obligations with regard to the provision of information, and they are informed that the information they provide will be used for the purpose of producing statistics.

ii. ***Procedures are in place to prevent disclosure of individual reporters' data.***

- Rules and regulations to prevent disclosure include penalties against staff who disclose confidential data.

- Access to individual data is restricted to staff who require the information in the performance of their statistical duties.

- Special aggregation rules are used to prevent residual disclosure when aggregations of survey or other confidential data are disseminated.

- Staff review all data prepared for dissemination for possible indirect disclosure of individual data and design tables and outputs in a way that prevents disclosure.

- Where unit records are made available (e.g., for research purposes), the confidentiality of the individual data is protected (e.g., by making all records anonymous, or ensuring that access to data is bound by confidentiality provisions).

- Confidentiality of data is appropriately guarded during storage and during the process of the destruction of records.

- Steps are taken to secure the premises of the data producing agency and its computer systems to prevent unauthorized access to individual data.

0.1.4 Statistical reporting is ensured through legal mandate and/or measures to encourage response.

i. ***A law or other formal provision provides for the reporting of information needed to compile the statistics.***

- The data producing agency has the legal authority to collect data required to compile the statistics.

- Collection activity is consistent with the legal authority.

- If reporting is mandatory, penalties for noncompliance (including misreporting) act as effective deterrent, even if such provisions rarely need to be employed.

ii. Other mechanisms are in place to provide for adequate reporting of data for compiling the statistics.

- The data producing agency considers carefully response burden (e.g., by actively pursuing alternative avenues to obtain data, such as web-posted prices.

- The data producing agency provides assistance to respondents in completing and submitting forms, as necessary (e.g., by using electronic methods, providing a point of contact).

- The data producing agency seeks to secure cooperation by creating goodwill (e.g., by registering and dealing with respondents' complaints, indicating the purpose of the data collection, informing of measures to limit response burden, raising awareness of the importance of good quality statistics, and providing respondents with data upon request).

0.2 Resources

— *Resources are commensurate with needs of statistical programs.*

0.2.1 Staff, facilities, computing resources, and financing are commensurate with statistical programs.

i. Staff resources for compiling the statistics are adequate to perform required tasks.

- Overall, the number of staff is adequate to perform the required tasks.

- The qualifications of the staff are adequate, with their skills maintained and developed to perform the required tasks.

- A core staff with adequate training is maintained and staff turnover is manageable.

- Salary levels are adequate for the nature of the work and competitive with public administration conditions in the country.

ii. ***Computing resources for compiling the statistics are adequate to perform required tasks.***

- Overall, sufficient resources are allocated and best efforts are made to exploit the full potential of effective computing technology for compiling and disseminating the statistical series.

- Software utilized for compiling and analyzing the statistical series is effective, periodically updated, and well adapted to perform existing and emerging tasks.

- Hardware and software (e.g. hand-held devices) are adequate for the collection and downloading of price data.

- Hardware and software are distributed adequately to facilitate the efficient collection and processing of data, and management of databases, specifically when national statistics are the aggregate of regionally –collected and aggregated regional ones.

- Adequate protection is provided for computer resources, including through provision of emergency back-up systems for retrieval of statistical series and updates in the event of natural disasters, accidents, and other unusual events.

iii. ***Physical facilities are adequate.***

- Office building provides adequate working facilities (e.g., lighting, heat, and cooling).

- Office furniture and equipment (e.g., desks, chairs filing cabinets, telephones, and related equipment) are adequate to perform required tasks.

iv. Other resources are adequate to perform required tasks

- Resources are available to adequately support data collection activities (transportation, telephone, per diems, etc).

v. ***Funding for compiling the statistics is adequate to perform required tasks.***

- Funding is reasonably secure for the identified needs of the statistical program.

- Budgeting practices provide clear information to financing authorities (e.g., when reviewing priorities for improvements, cutbacks, or increase in certain elements of programs).

- The funding horizon is amenable to planning for statistical developments (e.g., over a two- to three-year period for current operations and a maximum of five years for rebasing).

0.2.2 Measures to ensure efficient use of resources are implemented.

i. Management ensures that resources are used efficiently.

- Periodic reviews of staff performance are conducted.

- Efficiencies are sought through periodic reviews of work processes, e.g., seeking cost effectiveness of survey design in relation to objectives, and encouraging consistent concepts, classification and other methodologies across datasets.

- When necessary, the data producing agency seeks outside expert assistance to evaluate statistical methodologies and compilation systems.

ii. Costing and budgeting practices are in place and provide sufficient information to management to make appropriate decisions.

- Resources used to compile the statistics are measured periodically (costing) and compared to other statistical programs.

- Budgeting procedures are used to help allocate resources.

0.3 Relevance
— Statistics cover relevant information on the subject field

0.3.1 The relevance and practical utility of existing statistics in meeting users' needs are monitored.

i. Specific actions are taken to ensure that current statistics meet needs of data users.

- Data users are consulted and/or kept informed on specific aspects of current data (e.g., usefulness in terms of detail, periodicity, and timeliness) through surveys, newsletters or seminars, with their feedback actively sought (e.g., e-mail address provided).

ii. Mechanisms are in place to identify new and emerging data requirements.

- A structured and periodic process of consultation (e.g., users' advisory committee or working groups) takes place with policy departments/ministries and other principal data users, which include academia, the press, and/or other private sector representatives, to review the usefulness of existing statistics and to identify emerging data requirements.

- The data producing agency regularly participates in statistical meetings and seminars organized by international and regional organizations and by professional organizations (e.g., International Statistical Institute (ISI) and International Association for Official Statistics (IAOS)).

- The data producing agency undertakes studies to help identify new and emerging data requirements.

0.4 Other quality management
— Quality is a cornerstone of statistical work

0.4.1 Processes are in place to focus on quality.

i. There is recognition throughout the organization that quality builds trust and thus is a cornerstone of statistical work.

- Management is sensitive to all dimensions of data quality, and promotes a shared concern for quality throughout the organization (e.g., mission statement emphasizes importance of quality, managers are held accountable for achieving quality).

- Staff training programs emphasize the importance of quality and give staff an understanding as to how quality may be achieved.

- The organization provides an infrastructure for quality by recognizing trade-offs, economies of scale, and interrelations between datasets.

- The organization has implemented externally recognized processes or activities that focus on quality (e.g., Total Quality Management, ISO 9000, quality initiatives within the European Statistical System, and independent evaluations).

- Information is publicly available on the organization’s commitment to quality, including information about trade-offs affecting the statistical work program.

0.4.2 *Processes are in place to monitor quality during the planning and implementation of the statistical program.*

i. Measures are in place for a systematic monitoring and review of quality.

- Monitoring processes are in place to inform managers on the quality achieved for ongoing statistical activities (e.g., response rates, editing rates, revisions history, timeliness evaluations).

- Compiling areas have access to expert guidance on the quality of their statistics and on strategies for improving data production.

- Periodic reviews are undertaken to identify steps necessary to maintain quality requirements.

1. Assurances of Integrity

The principle of objectivity in the collection, processing, and dissemination of statistics is firmly adhered to.

1.1 Institutional Integrity

— *Statistical policies and practices are guided by professional principles.*

1.1.1 Statistics are produced on an impartial basis.

i. The terms or conditions under which the statistics are produced are in accordance with professional independence.

- A law or other formal provision supports professional independence by, for example:
  - addressing the general need for the professional independence of the data-producing agency (e.g., the importance of professional independence in carrying statistical functions is clearly stated and recognized);
  - prohibiting interference from others, including other government agencies, in the compilation and/or dissemination of statistical information; and
  - ensuring that the choice, tenure, and reporting arrangements of the agency's head are supportive of the professional independence of the statistical agency (e.g., tenure does not usually coincide with that of current government; appointment and removal of head result from transparent processes with emphasis on professional qualifications and performance).

- If there is no law or formal provision to support professional independence,
  - traditions or cultures of professionalism are clearly recognized as essential to the credibility of statistical results (e.g., others, including other government agencies, understand the importance or noninterference); and
  - the choice, tenure, and reporting arrangements of the agency's head are supportive of the professional independence of the agency.

ii. Professionalism is actively promoted and supported within the organization.

- Recruitment and promotion are based on relevant aptitude and/or expertise in statistics (e.g., sampling techniques or in the subject matter area).

- Formal (using internal and outside experts) and on-the-job training in the methodology and compilation methods is provided, including participation in seminars, courses, and workshops arranged by regional and international organizations to further knowledge of statistical practices and providing easy access to professional literature.

- Processes and activities in the workplace promote a culture of professionalism (e.g., by professional accreditation of staff, peer review of statistical work, recognition of authors of methodological papers, organization of lectures and conferences, and the institutional support of professional bodies).

- Research and analysis (including rationale for the choice of methodologies) are encouraged and published subject to internal review and other processes to maintain the agency's reputation for professionalism.

1.1.2 Choice of data sources and statistical techniques as well as decisions about dissemination are informed solely by statistical considerations.

i. The choices of data sources and statistical techniques are informed solely by statistical considerations.

- The choice of source data (e.g., among surveys, between surveys and administrative records, or between collected data and administrative records) is based on measurement objectives and data requirements.

ii. Decisions about dissemination are informed solely by statistical considerations.

- Decisions to disseminate data are based solely on statistical considerations.

- Decisions about the timing, media, and other aspects of dissemination are based solely on statistical considerations.

1.1.3 The appropriate statistical entity is entitled to comment on erroneous interpretation and misuse of statistics.

i. The data producing agency comments when its statistics are misinterpreted or misused.

- The data producing agency seeks to prevent misinterpretation or misuse of statistics by providing explanatory materials and briefings (e.g., to the media).

- There is a formal policy or well-established custom to deal with data misinterpretations or misuse of statistics.

- The data producing agency
  - monitors media coverage of its data ("clipping service"), and
  - comments publicly and in a timely manner on erroneous interpretations or misuse of the statistics in the media and in other fora.

1.2 Transparency

— Statistical policies and practices are transparent.

1.2.1 The terms and conditions under which statistics are collected, processed, and disseminated are available to the public.

i. Information is available to the public about the terms and conditions under which the statistical series are compiled and disseminated, including the obligation to compile and disseminate the statistics, the confidentiality of individual reporters' data, and other key features.

- Agency publications and/or websites reproduce material from the statistical law and other relevant documents about the terms and conditions under which official statistics are compiled and disseminated. These terms and conditions may refer to the obligation to compile and disseminate the statistics, the confidentiality of individual reporters' data, and other key features (e.g., the codes of conduct under which official statistics are compiled and disseminated, the approval process for data dissemination, the procedures to hire and remove the head of the data producing agency).

- In public speeches and other gatherings, the agency makes an active and ongoing effort to inform about the terms and conditions under which it operates.

- Statistical publications identify where more information about the data producing agency and its products can be found, usually, on its website.

1.2.2 Internal governmental access to statistics prior to their release is publicly identified.

i. The public is made aware of internal government access to statistics prior to their release to the public.

- Internal government access to statistics prior to release is made public in terms of who has access, the level of detail of the access, and how long before the dissemination access is given.

1.2.3 Products of statistical agencies/units are clearly identified as such.

i. Statistical products are clearly identified so that the public is aware of what the data producing agency takes responsibility for.

- Data released to the public are clearly identified as the data producing agency's product (e.g., by name, logo, and insignia).

- In the case of joint publications, the part attributable to the data producing agency is identified (e.g., statistics are clearly distinguished from policy interpretation).

- The data producing agency requests attribution when its statistics are used for reproduced.

- Data released via its website are the data producing agency's product unless clearly identified as otherwise.

1.2.4 Advance notice is given of major changes in methodology, source data, and statistical techniques.

i. Users of statistics are made aware in advance of major changes in methodology, source data, and statistical techniques.

- Advance notice is given to the public (e.g., articles in bulletins, briefings, or news releases) when major changes are introduced in methodology, sources, and statistical techniques.

1.3 Ethical standards
— Policies and practices are guided by ethical standards.

1.3.1 Guidelines for staff behavior are in place and are well known to the staff.

i. A clear set of ethical standards has been prepared.

- There are clear guidelines outlining correct behavior when the agency or its staff is confronted with potential conflict of interest situations. The guidelines should be published on the data producing agency's website.

- There are clear guidelines that make the connection between ethics and staff work (e.g., with respect to guarding against misuse and misrepresentation of statistics (see also 1.1.3)).

- A strong culture for maintaining ethical standards discourages political interference.

ii. Staff are made aware of the ethical standards.

- Management acknowledges its status as a role model and is vigilant in following the standards.

- New staff are made aware of the standards when they join the organization.

- Staff are reminded periodically of the standards (e.g., in staff training, announcements to staff, or by requiring staff to periodically reaffirm ethical practices or adhere to conflict of interest policy).

2. Methodological Soundness

The methodological basis for the statistics follows internationally accepted standards, guidelines, or good practices.

The methodological soundness dimension is assessed against the guidelines outlined in the *System of National Accounts 2008* (*2008 SNA*) or the *European System of Accounts 1995* (*1995 ESA*), and the *Consumer Price Index Manual (CPI Manual).* The concepts and definitions from the *2008 SNA* are used as guidelines with regard to coverage and valuation, and the methods and procedures from the *CPI Manual* are used as guidelines for compiling the CPI. The *2008 SNA* and *1995 ESA* are viewed as interchangeable whenever reference is made in this document to the *2008 SNA*. *1993 SNA* concepts and definitions hold for countries still using these standards.

2.1 Concepts and definitions

— *Concepts and definitions used are in accord with internationally accepted statistical frameworks.*

2.1.1 The overall structure in terms of concepts and definitions follows internationally accepted standards, guidelines, or good practices.

i. CPI concepts and definitions are based on international standards and recommendations, and good practices

- Concepts and definitions for household consumption expenditures from *2008 SNA/1995 ESA*[2] or ILO guidelines are followed regarding determination of the index weights for the CPI.[3]

- Concepts and definitions such as those given in the *CPI Manual* are followed regarding the definition or specification of the individual goods and services on which periodic price measurements are to be taken.[4]

ii. Expenditure estimates are compiled at a sufficient level of commodity and service detail

- Level of detail for commodities and services is sufficient for detailed analysis of price movement:
  - at the level of the main tabulation categories of the classification used (e.g., one- and/or two-digit COICOP[5]);

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[2] References to *2008 SNA* imply both *2008 SNA/1995 ESA*.

[3] The weighting concept for the CPI is consumer purchases of goods and services (goods and services purchased for use by the household for household consumption).

[4] Including the consideration of product and transaction characteristics that have a significant effect on price.

[5] Classification of Individual Consumption by Purpose.

   - at the level of groups, classes, and sub-classes of the classification (e.g., two- and/or three-digit COICOP, or two-, three-, four-digit CPC[6] level) or more-detailed items as country circumstances require.

- Level of detail for household residential capital formation expenditures (if appropriate to index coverage) is sufficient for detailed analysis of price movement:
   - at the level of the main tabulation categories of the classification used (e.g., one-digit COICOP or country system);
   - at the level of all groups, classes, or items of the classification (e.g., two-, three-, four-, five-digit CPC) or several of them.

- Deviations from the above concepts and definitions are noted in the detailed metadata and kept under review (see also 5.2.1).

2.2 Scope
— *The scope is in accord with internationally accepted standards, guidelines, or good practices.*

2.2.1 The scope is broadly consistent with internationally accepted standards, guidelines, or good practices.

i. The institutional unit and transaction scope of the CPI comprises a selection of aggregates fitting within household final consumption and capital formation expenditure as defined in the 2008 SNA.

- The consumption expenditure of all resident households are included in the CPI; in particular, the following:
   - urban and rural households;[7]
   - households of all sizes (regardless of the number of persons) and income levels;
   - households whose major activity involves an unincorporated business activity that can separate records on business and consumption purchases;
   - households whose primary activity is farming or fishing.

- The transactions undertaken by the household sector that are included in the CPI comprise selected components from the following 2008 SNA aggregates:[8]

[6] Central Product Classification.

[7] If only urban households are included the CPI, the CPI should be designated as "Urban CPI" and the metadata should define the cities covered by the index.

[8] Two broad classes of CPIs may be distinguished regarding scope: Inflation-CPIs and consumption-CPIs. The inflation-CPI comprises households' monetary expenditures only, while the consumption-CPI comprises selected components of household consumption expenditures. Both types encompass households' monetary

(continued)

- Final consumption expenditure;
- Fixed capital formation, in the form of residential structures, as applicable.

ii. Differences in the scope of coverage between the CPI and the consumption and capital formation final expenditure of the household sector as defined in the 2008 SNA are clearly determined.

- The inclusion or exclusion of the following items in the CPI expenditure aggregate is clearly determined:[9]
  - purchases of market goods for consumption,
  - purchases of market services for consumption,
  - sales of illegal market goods and services to willing buyers,
  - own-account production of market goods for own final consumption,[10] and
  - production of selected services for own final consumption.[11]

2.3 Classification/sectorization

— Classification and sectorization systems are in accord with internationally accepted standards, guidelines, or good practices.

2.3.1 Classification and sectorization systems used are broadly consistent with internationally accepted standards, guidelines, or good practices.

i. The classification and sectorization used in the compilation of the CPI is in broad conformity with internationally accepted systems.

- The *2008 SNA* is followed to classify:

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consumption expenditures, including monetary expenditures on rent. The principal difference between the two is in the treatment of owner-occupied dwellings. The inflation-CPI includes households' *acquisitions less disposals of dwellings*, a component of fixed capital formation, while the consumption-CPI excludes all capital formation but includes instead the *imputed rentals of owner-occupied dwellings*. Besides the imputed rent of owner-occupants, the consumption-CPI also may include a selection of other components of nonmonetary consumption as in-scope, depending on their importance and on user requirements, and generally acceptable practice varies in this regard. (See 2.2.1.*ii*.) For example, some countries include certain components of households' consumption from own production other than imputed rent, such as home-grown food. On the other hand, as a general practice, consumption from compensation paid by employers in-kind is not considered in-scope for the CPI even though it is included in household consumption expenditure. See *2008 SNA*, Chapter XI for the range of items included in household consumption expenditure.

[9] See notes to 2.1.1.*i* regarding the definition of household consumption expenditures. An item may be in-scope for measurement irrespective of the coverage that is actually achieved.

[10] Comprising, for example, agricultural products for consumption by the owners, employees, and their families of an unincorporated household farming enterprise.

[11] Principally comprising the value of rental services produced by household owner-occupants of residential housing for own final consumption.

  - institutional units;
  - transactions.

- COICOP, ILO[12] guidelines, or a compatible (derived or related) national expenditure classification are used to classify consumption activities.

- CPC, CPA,[13] or a compatible (e.g., derived or related) national product classification is used to classify products.

- Deviations from the above classifications are kept under review (see also 5.2.1)

2.4 Basis for recording

— Flows and stocks are valued and recorded according to internationally accepted standards, guidelines, or good practices.

2.4.1 Market prices are used to value flows and stocks.

i. The valuation rules used for recording flows and stocks are in accordance with the 2008 SNA.

- Regarding weights in the CPI,
  - consumption expenditure is valued at purchasers' prices, which include trade and transportation margins and applicable taxes less subsidies on products;
  - if household residential capital formation is included in the CPI, transfer and equipment setup costs are included in the value of residential capital acquisitions.

- Product specifications include price-determining characteristics of the item, the terms of the transactions, and services provided by the outlet.

- Discriminatory discounts, which are not "generally available," but only to a restricted group of households are usually excluded. But practice as to the definition of "generally-available" must take account of country-specific situation and be recorded in metadata.

- Deviations from the above valuations are kept under review (see also 5.2.1).

2.4.2 Recording is done on an accrual basis.

[12] International Labour Organization.

[13] Classification of Products by Activity.

i. ***The timing rules used for recording flows are in accordance with the 2008 SNA.***

- Prices of goods and services are recorded in the period they are purchased or posted.
- Perishable items may require a higher frequency of collection and the specified time for collection is included in the detailed item specification.
- Deviations from the above recording are clearly identified (see also 5.2.1).

2.4.3 Grossing/netting procedures are broadly consistent with internationally accepted standards, guidelines, or good practices.

i. ***The grossing/netting procedures are in accordance with the 2008 SNA.***

- In particular, the weights applied to purchases of existing goods such as used cars or other durable consumption goods with a secondary market are defined as acquisitions less disposals of such goods.
- Deviations from the above procedures are explained and kept under review (see also 5.2.1).

3. Accuracy and Reliability

Source data and statistical techniques are sound and statistical outputs sufficiently portray reality.

3.1 Source data

— *Source data available provide an adequate basis to compile statistics*.

3.1.1 Source data are obtained from comprehensive data collection programs that take into account country-specific conditions.

i. ***The data collection programs employed to compile the consumer price statistics are adequate.***

- The data sources are kept under continuous review to ensure that the data collection program is comprehensive.
- The data sources of the data collection program are broadly sufficient to compile the consumer price statistics.
- Information from other available sources supplements core compilation.

ii. Household expenditure statistics are collected through a regular household budget survey program for compiling CPI expenditure weights.

- Compilation of consumption expenditures is at a frequency appropriate to the speed of change in consumer purchasing and behavior (at least every five years and more often if consumption expenditure patterns change rapidly).

- Household surveys are based on an up-to-date register, or an area sample frame that is current and comprehensive for the scope of the index.

- Scientific sampling techniques are used, and the probability of selection of household/persons is known.

- Where used, multi-stage samples, stratification, and for repeated surveys, planned rotation of sample units are appropriately undertaken.

- The household survey takes account of seasonal variations in household expenditure patterns.

- Resident unit coverage is comprehensive. All residents are covered, or if not, exclusions are based on criteria (e.g., the survey is restricted to the civilian noninstitutionalized population) that do not lessen the representativeness and usefulness of survey outcomes.

- Geographic coverage is comprehensive. The entire country is covered, or if not, exclusions are clearly identified and do not lessen the representativeness and usefulness of survey outcomes.

- Survey questionnaires are constructed according to sound design principles (e.g., questionnaires are subject to field/pilot testing; observation studies are conducted during the design of survey questionnaires). They are reviewed periodically to take account of changed circumstances, and proposed changes are pre-tested to ensure effectiveness.

iii. A regular representative price survey is conducted to collect consumer prices.

- Coverage is comprehensive: all consumer purchases, see 2.2.1.ii...

- Sample design and estimation procedures are soundly designed to represent the survey universe. Scientific random sampling techniques and/or cutoff sampling are used to select geographic areas, items, outlets, and product varieties. Where sampling frames are not adequate to support statistical sampling, judgmental sampling is used as a second-best procedure with well-defined, and published, criteria for selection.

iv. The survey is of matched model pricing

- Price data collected are sufficiently detailed by product and use sufficiently detailed product specifications to ensure that period to period price comparisons within the selected outlet refer to the same variety (as determined by price-determining characteristics).

- When outlets are replaced, the price data collected are sufficiently detailed to ensure that the replacement outlet is of the same type of outlet as that being replaced to prevent unintended shifts in the composition of the outlet sample. This is especially important when using judgmental sampling techniques.

v. The compilation framework supports supplementary collection.

- *Ad hoc* surveys are conducted, when necessary, to allow the irregular collection of information to support the main compilation (e.g., to identify new products and provide their source data for weights and prices to augment the sample between rebasing). The two-stage (modified) Laspeyres facilitates the month-on-month linking of new items and is recommended.

- Some items/outlets (e.g. rent, centrally-priced/central office collection, web prices, administered prices, hedonic-adjusted prices) have separate data collection/compilation routines specifically designed for efficient and accurate price collection.

vi. The data collection programs are sufficiently open and allow for versatility to new developments in sources.

- The press and research papers are monitored for new information on prices for either external validation or direct incorporation as a data source into the index (e.g. point-of–purchase scanner data has been used for both.)

- Periodic meetings are held with consumer groups and the business community to identify new product/market developments that the CPI compilation system needs to take into account.

- International standards are monitored for changes that need to be taken into account in the consumer price index compilation system.

3.1.2 Source data reasonably approximate the definitions, scope, sectorization, classifications, valuation, and time of recording required.

i. Source data approximate the definitions, scope, classifications, valuation, and time of recording required in the CPI.

- The frequency of the price collection survey is adequate to support the publication frequency of the index.

- Source data are consistent with the definitions, scope and classifications of CPI estimates.

- Source data are consistent with the time of recording and valuation of CPI estimates.

3.1.3 Source data are timely.

i. Source data and detailed data from other statistical systems are obtained on timely basis.

- The periodicity and timeliness of the price collection survey are adequate for disseminating the consumer price statistics.

- Where other source data are used: (i) Respondents are made aware of the deadlines set for reporting; (ii) The compilers have follow-up procedures to ensure the timely receipt of source data.

3.2 Assessment of source data
— Source data are regularly assessed.

3.2.1 Source data—including censuses, sample surveys, and administrative records—are routinely assessed, e.g., for coverage, sample error, response error, and nonsampling error; the results of the assessments are monitored and made available to guide statistical processes.

i. Accuracy of the data from surveys is routinely assessed.

- For the expenditure surveys, estimates are provided (published on the website) of the extent of sampling errors, nonsampling errors, biases, over/under-coverage, misclassification, and nonresponse.

- Surveys/censuses are audited to verify the accuracy of the individual survey data (e.g., supervised field collection; random post-enumeration checks; independent reviews).

- The price survey includes procedures to identify outliers and extreme values are confirmed, or otherwise, with respondents, and records maintained on the confirmation. Automatic deletion of outliers is not used.

- Routine validation procedures exist for price collectors involving checking back a sample of data at its source.

- Data on the number/rate of types of missing values (temporarily, permanent, seasonal) by major product group and their treatment are regularly monitored and drilled down when excessive.

ii. Accuracy of administrative data and other secondary sources is routinely assessed.

- Accuracy of administrative data received from government agencies, trade associations, regulatory authorities, etc., is routinely assessed.

3.3 Statistical techniques
— Statistical techniques employed conform to sound statistical procedures.

3.3.1 Data compilation employs sound statistical techniques to deal with data sources.

i. Data compilation procedures are sound.

- Compilation procedures minimize processing errors such as coding, editing, and tabulation errors.

- Adjustments to unit records are made only when clearly warranted (e.g., unusual values are not replaced or modified unless clearly required) and can be identified in datasets.

- Procedures for imputation and adjustment for nonresponse are soundly based.

- Appropriate use is made of ancillary, and benchmark information in compiling population estimates.

ii. Appropriate statistical methods are used to handle missing prices and the introduction of new products that are within the scope of the CPI.

- Prices for temporarily missing products are appropriately handled (e.g., impute the price based on the month-on-month price changes of a higher group, or a more targeted sub-group when judged (and prior data show) it is more suitable, sample sizes permitting). The imputed price is posted in the database. A limit as to how long (say three months) prices are “temporarily” missing is established and adhered to. The two-stage (modified) Laspeyres facilitates the month-on-month imputation and is advised.

- Prices are imputed for seasonal products using the higher group price change or a more targeted sub-group when judged (and prior data show) it is more suitable, sample sizes permitting. Fixed weight formulas are generally advised. Imputed prices are recorded in the data base and, where there is no quality change, directly compared with the new season's price to facilitate the self-correcting nature of the procedure.

- Products that become permanently unavailable are replaced in the sample. Adjustments for quality differences are made. These may be explicit (e.g. hedonic, cost-margin, option cost, quantity size) or implicit (e.g. linking with overlap, linking with imputed overlap).

- New products are introduced into the sample as they gain market share.

- Metadata should be drafted on the number/ratio of missing values of all types by product group (see 3.2.1.i.) with notes on the method of quality adjustment used where applicable.

3.3.2 Other statistical procedures (e.g., data adjustments and transformations, and statistical analysis) employ sound statistical techniques.

i. Appropriate techniques are used to address specific issues of measurement for CPI weights.

- Household consumption expenditure, as defined in the *2008 SNA*, is the conceptual underpinning for weights, and can be aggregated across products or across regions and products.

- If parallel markets exist, expenditure weights should include estimates of purchases in all markets for affected goods and services.

- For owner-occupied dwellings, consumption is valued as the (i) estimated rentals that tenants would pay for similar accommodation, or (ii) capital formation as acquisitions less disposals of housing units by owner occupants plus the cost of major improvements to owner occupied units.

- Goods and services produced for own final consumption, if included, are valued at market prices at the time produced.

ii. Calculation of the elementary (item) level indices

- The arithmetic mean of price relatives (Carli) is not used, due to its bias, to calculate the elementary (item) level indices and, moreover, a chained Carli can have substantial upwards drift.

- The ratio of arithmetic mean prices (Dutot) should only be used for homogeneous items.

- The geometric mean of price relatives (equivalent to the ratio of geometric means) is the preferred measure.

- A short-term update (modified) estimator of price change from the previous period is preferred.

iii. Aggregation of the higher level indices

- The weight reference period generally precedes the price reference period.
- If a fixed-quantity basket index is desired, the weights are adjusted for price change to align with the price reference period when they were introduced (Lowe Index).
- Otherwise, the expenditure shares are held constant from the weight reference period (Young Index).
- Consideration should be given to the geometric Young Index.

iv. Weight reference period

- The weight reference period has been updated within the past five years with a minimal lag for implementation and linking into the published series.
- When new weights are introduced (rebasing) the new index is linked to the old index using an internationally accepted technique.
- Rebasing also provides an opportunity for product updates, new formulas, and classification systems. Opportunity is taken to include such changes and these are fully documented.

3.4 Assessment and validation of intermediate data and statistical outputs.
— Intermediate results and statistical outputs are regularly assessed and validated.

3.4.1 Intermediate results are validated against other information where applicable.

i. Data compiled from the main data sources are validated against other independent data sources.

- The CPI is compared at a detailed level with comparable estimates from other major price indices such as the PPI, export price indices, and import price indices.

3.4.2 Statistical discrepancies in intermediate data are assessed and investigated.

i. Unusual index movements arising from potential problems in price data are investigated.

- Unusual movements in the index arising from large movements in particular sectors or from particular reporters are investigated.

3.4.3 Statistical discrepancies and other potential indicators of problems in statistical outputs are investigated.

i. Statistical discrepancies, if any, between CPI for geographical areas and the CPI for products are investigated and measures taken to remove or explain them.

- Discrepancies arising from inconsistent imputation for missing data, and other possible sources of aggregation inconsistency are assessed.
- Appropriate adjustments are made to remove discrepancies.

3.5 Revision studies

— Revisions, as a gauge of reliability, are tracked and mined for the information they may provide.

3.5.1 Studies and analyses of revisions and/or updates are carried out and used internally to inform statistical processes (see also 4.3.3).

i. Revision and/or update studies are undertaken on a regular basis.

- Periodic weight revisions and updates are analyzed to determine the effects of substitution bias on the CPI.
- Studies of long-term trends in the revision pattern are conducted periodically to identify systematic bias in revisions.
- Studies to investigate other sources of errors/bias in the CPI are undertaken.

ii. Measures are undertaken to incorporate the findings from revision and/or update studies in data compilation.

- Findings from revision studies are used to define the optimal revision cycle that is largely driven by the availability of major data sources.
- Findings from revision studies are used to refine preliminary data and data collection programs for the subsequent periods.
- Findings from studies of other sources of error/bias are used to implement change in CPI methods.
- Adequate documentation on revisions is well maintained and includes description of causes of revisions, methods used to incorporate new data sources, and the way data are adjusted.

4. Serviceability

Statistics, with adequate periodicity and timeliness, are consistent and follow a predictable revisions policy.

4.1 Periodicity and timeliness
—*Periodicity and timeliness follow internationally accepted dissemination standards.*

4.1.1 Periodicity follows dissemination standards.

i. The periodicity of the statistics follows the IMF data dissemination standards (SDDS or GDDS).

- The CPI is compiled monthly (SDDS and GDDS).

4.1.2 Timeliness follows dissemination standards.

i. The timeliness of the statistical series follows the IMF data dissemination standards (SDDS or GDDS).

- The monthly estimates are disseminated within one month after the end of reference month (SDDS).

- The monthly estimates are disseminated within two months after the end of reference month (GDDS).

4.2 Consistency
— *Statistics are consistent within the dataset, over time, and with major datasets.*

4.2.1 Statistics are consistent within the dataset.

i. The statistical series is internally consistent

- Estimates produced for all classification typologies are consistent in the sense that the all-items aggregate is invariant to the typology of aggregation.[14]

4.2.2 Statistics are consistent or reconcilable over a reasonable period of time.

i. The statistical series is consistent over time.

- Consistent time series data are available for an adequate period of time with a balance struck between the need for a consistent time series, particularly on rebasing for consistent 12-month comparisons, and any need to not revise past estimates.

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[14] The exception is for the adoption of chained/superlative indexes whose advantages outweigh some loss of additivity.

- Detailed methodological notes identify and explain the main breaks and discontinuities in time series, their causes, as well as adjustments made to maintain consistency over time.

- Unusual changes in economic trends are explained in the analytical text included in the publication and in the database accessible to users.

4.2.3 Statistics are consistent or reconcilable with those obtained through other data sources and/or statistical frameworks.

i. The statistics are consistent or reconcilable with other statistical frameworks.

- The consumer price statistics are largely consistent with other price statistics, national accounts, and other statistical frameworks, as relevant.

4.3 Revision policy and practice
— *Data revisions follow a regular and publicized procedure.*

4.3.1 Revisions and/or updates follow a regular and transparent schedule.

i. The practice of revisions and/or updates (e.g., from provisional estimates, for weight updates, for changes in methodology) follows a predictable pattern of which users of statistics are informed.

- Consumer price indexes are generally not revised, but where revisable CPIs are produced, revision or update cycle is predetermined and reasonably stable from year to year. Similar considerations apply to "revisions" as a result of rebasing.

- The revision or update cycle is made known to the public.

- The reasons underlying the cycle (e.g., the availability of source data, the timing of revisions with related datasets, the timing for preparing important economic policy documents) are explained.

- Adequate documentation of revisions is included in the publication of the statistical series and in the database accessible to users.

- When revisions or updates outside the regular cycle are called for (e.g., by the discovery of new source data, errors), they are made known to the public.

ii. The agency has adopted a clear and consistent revision policy.

- Revision policy clearly defines when data will be subject to revision should an error or new data source be discovered.

- Revision policy clearly defines how far back data are subject to revision.
- Revision policy is included in metadata and is available to all users.

4.3.2 Preliminary and/or revised/updated data are clearly identified.

i. Data series subject to revision are clearly identified (e.g. flash estimates, experimental indices such as the CCPI-U in the United States, etc)

- Publications and metadata clearly identify those data series that may be subject to revision.
- Revision policy and practice are clearly detailed and made available to users.

ii. Users are informed about the preliminary nature of the data.

- At the time of data dissemination, users are informed whenever data are preliminary.

iii. Users are informed about the revised and/or updated nature of the data.

- At the time of data dissemination, users are informed whenever data are revised or updated.
- Users are informed about the nature of the revisions and/or updates.

4.3.3 Studies and analyses of revisions and/or updates are made public (see also 3.5.1).

i. Users are informed of results and studies of the revisions and/or updates to the statistics.

- Revisions and updates are measured, assessed, and explained in the statistical publication and in the database accessible by users.
- Analysis of differences between the revised and preliminary data is published for major aggregates to allow an assessment of the reliability of the preliminary data.

5. Accessibility

Data and metadata are easily available and assistance to users is adequate.

5.1 Data accessibility

— *Statistics are presented in a clear and understandable manner, forms of dissemination are adequate, and statistics are made available on an impartial basis.*

5.1.1 Statistics are presented in a way that facilitates proper interpretation and meaningful comparisons (layout and clarity of text, tables, and charts).

i. The presentation of the statistics data is commensurate with users' needs.

- Data are published in a clear manner; charts and tables are disseminated with the data to facilitate the analysis.
- Datasets are published with various levels of detail (disaggregation).
- Analysis of current-period developments is included with dissemination.
- Estimates are disseminated at a detailed level and with time-series.
- Relevant series are disseminated in a seasonally adjusted form.

5.1.2 Dissemination media and format are adequate.

i. Statistics are disseminated in formats to suit users' needs.

- Statistics are disseminated in ways that facilitate redissemination in the media (e.g., information release).
- More comprehensive and/or detailed statistics are also disseminated in paper and/or electronic formats.
- Detailed current statistics and longer time series can be easily accessed in electronic form on the authority's website, or through an electronic database maintained by, or on behalf of, the data producing agency.

5.1.3 Statistics are released on a preannounced schedule.

i. Statistics are released on the preannounced schedule.

- A schedule announces in advance the dates the statistics are to be released.
- The statistics are released punctually, that is according to the preannounced schedule.

5.1.4 Statistics are made available to all users at the same time.

i. The statistics are made available to all users at the same time.

- The public is informed of the statistics being released, and of the procedures to access them (e.g., Internet, publications).
- The statistics are made available to all interested users simultaneously.

- If the press is briefed in advance, embargos are imposed to prevent early public disclosure.

5.1.5 Statistics not routinely disseminated are made available upon request.

i. Statistics not routinely disseminated are made available to users upon request.

- For general use purposes, statistics are made available upon request, in addition to the statistics routinely disseminated.

- For specific purposes, customized tabulations can be provided (perhaps for a fee).

- The availability of additional statistics and of the procedures for obtaining them are made known.

5.2 Metadata accessibility
— Up-to-date and pertinent metadata are made available.

5.2.1 Documentation on concepts, scope, classifications, basis of recording, data sources, and statistical techniques is available, and differences from internationally accepted standards, guidelines, or good practices are annotated.

i. The metadata give adequate information about the meaning of the data and about the-methodology used to collect and process them.

- A comprehensive sources and methods document is published in a readily accessible form, that should generally include the website, and updated regularly, and it includes the following:
  - information on concepts, definitions, classifications, data sources, compilation methods, statistical techniques and other relevant methodological aspects and procedures;
  - departures from internationally accepted standards, guidelines, or good practices;
  - information on survey sources, such as survey characteristics (response rates, survey monitoring and studies of non sampling errors) and other survey features (method, sample frame, sample design and selection, estimation and imputation techniques, etc.), and on the nature of administrative data sources; and main linkages with related major data systems.

- The SDDS/GDDS metadata, SDDS summary methodologies, and other related descriptions are reviewed and updated regularly.

- The metadata are readily accessible (e.g., websites, statistical publications) and their availability is cross-referenced in data releases, and otherwise well publicized (e.g., in catalogs).

5.2.2 Levels of detail are adapted to the needs of the intended audience.

i. Different levels of metadata detail are made available to meet users' requirements.

- General use information (e.g., a brochure, FAQ) about the CPI and other price statistics (e.g., how to locate the data) is available and made public.

- Good practice would include such information being readily available on the data-producing authority's website.

- More specialized use information (e.g., background papers, working documents) is available and made public.

5.3 Assistance to users
— *Prompt and knowledgeable support service is available*.

5.3.1 Contact points are publicized.

i. Adequate assistance is given to users of statistics.

- Prompt and knowledgeable service and support are available to users of statistics.

- All statistical releases identify contact points for enquiries by mail, telephone, facsimile, or by e-mail.

- Material to raise awareness on the use of statistics is available (e.g., for schools and research).

- Access points for clients to obtain statistical information are well advertised.

- Assistance to users is monitored and reviewed periodically (e.g., time of response to e-mail requests).

5.3.2 Publications, documents, and other services, including information on any charges, are widely available.

i. Publications and other services are available to users of statistics.

- Catalogs of publications, documents, and other services to users are available and updated regularly (e.g., each year if needed).

- Publications are readily available on the agency website.

- The prices of the statistical products and services are clearly disclosed and assistance is provided in placing orders.