

Consumer Price Index Manual: Concepts and Methods

Summary of Changes

Below provides an overview of the updates and changes reflected in the CPI Manual. After providing a summary of general updates, a chapter by chapter review follows.

General

1. More prescriptive:
 - a. Wherever possible, the Manual provides more prescriptive advice.
 - b. Second-, and in some cases, third-best options are also presented to guide compilers on what options can be used as they implement plans for improvement and strive to meet the ideal standard and best practice.
2. Reflect advances in technology that have given rise to e-commerce and the digital economy. E-commerce and the digital economy provide new opportunities for consumers, impacting expenditure patterns and resulting in the availability of new goods and services. The update addresses conceptual changes needed to better measure the growing importance of e-commerce and these new goods and services.
3. Reflect improvements made to the concepts and methods used to compile CPIs.
4. Reflect evolving data user needs.
5. Ensure broader consistence with the *2008 System of National Accounts*.
6. Eliminate repetition and ensure consistency between chapters.
7. As part of the broader objective of being more practical and prescriptive, incorporate the *Practical Guide to Compiling Consumer Price Indices* into the Manual. The CPI Guide will be replaced by the Manual and discontinued.
8. Each chapter now concludes with a summary of the key points and identifies key recommendations.
9. Standardizing terminology:
 - a. The use of the terms product, item, and variety varies from one NSO to the next and the updated manual to create more uniformity and consistency across countries:
 - i. Product: goods and services that result from a process of production.
 - ii. Item: an individual good or service selected to represent a sampled product. In the aggregation structure, the item level refers to the lowest level where an expenditure weight is available.
 - iii. Variety: the individual observation for which prices are collected during the collection period. It includes the detailed specification of the product

observed also known as the *structured product description* (SPD). Varieties are sampled to represent items.

- b. Elementary aggregate has been defined more clearly to mean the first level with expenditure weights. This change was made in response to the use of alternative sources, such as scanner data, to develop detailed weights below the elementary aggregate level. There is need to ensure consistency across countries when referring to elementary aggregates.

Chapter by Chapter Summary

Chapter 1 – Introduction, Overview, and Basic Steps for CPI Development

Chapter 1 has been redrafted to follow the various steps need to develop and maintain a CPI that meets the standards set out in the Manual. Recommendations that are made in each of the chapters have been summarized in each section. The chapter is also intended to serve as a stand-alone resource for data users by providing a broad overview of the key concepts and recommendations for compiling a CPI.

Chapter 2 – Uses, Concepts, Scope, and Classifications of Consumer Price Indices

Combines two chapters in the previous manual – *Uses of Consumer Price Indices* and *Concepts and Scope*. The chapters were combined and streamlined to eliminate the extensive repetition between the two chapters. Updated to reflect importance of e-commerce and digitalization.

Key updates include:

- Uses of CPI – more discussion on uses of CPI for deflation of national accounts; extended description of using the CPI as a macroeconomic indicator; importance of CPI as key input into monetary policy decisions; and enhanced discussion of core inflation and importance of collaboration between central banks and CPI compilers.
- Concepts – concepts more aligned with *2008 SNA*; different definitions of consumption identified and presented; updated discussions of domestic versus national concepts to account for internet purchases, monetary and non-monetary expenditure, and the different type of CPI depending upon use.
- Coverage – streamlined into four main sections (coverage of households, coverage of household expenditure on goods and services, coverage of price collection, and coverage of outlets); more clarity on household coverage and the need for broad coverage; elaboration, consolidation, and clarification on different types of expenditure; enhanced discussion on treatment of subsidized prices, own-account production, discounts, sales, etc; and expanded discussion on outlet coverage to include internet outlets and need for broader coverage.
- Classifications – new section added to provide a summary of changes adopted in the new version of the *Classification of Individual Consumption According to Purpose* (COICOP 2018).

Chapter 3 – Expenditure Weights and their Sources

Key updates:

- Concepts – Summary of main conceptual issues and how these concepts are applied in practice for the development of weights. These include: domestic versus national concepts; own-account production and in-kind remuneration; treatment of owner-occupied housing; business expenditure; social transfers in kind; taxes and subsidies; and institutional households.
- Elementary aggregates – Defines elementary aggregate as lowest level with expenditure weight; stresses need for a detailed weighting structure; and uses of alternative sources of data to develop weights. The actual elementary aggregate level will differ from country to country, depending upon the source data available.
- Regional weights – Expanded section to describe different strategies for developing regional weights. Emphasis on preferred approach of developing estimates of expenditure on a regional level using available expenditure data. Regional weights are then aggregated to form the national weights. More detail on need for urban and rural weights, as needed. Finally, more stress on avoiding the use of population to develop CPI weights.
- Data sources – More detail and emphasis on need for collaboration between CPI, national accounts, and household expenditure survey staff when designing the household expenditure survey; elaborates more on the need for household expenditure data to develop detailed weighting structure. Expanded discussion of how to use national accounts data to develop upper level index weights with more discussion of advantage and disadvantages of using national accounts data. Finally, a new section discussion other potential data sources to develop more detailed weights including, scanner data, retail sales data, point of purchase surveys, and cross-border shopping surveys.
- Deriving weights in practice – This section now incorporates more practical advice on developing index weights taken from the *Practical Guide*. To account for over- and under-reporting of expenditure data, more detailed provided on using the commodity flow approach.
- Weight reference period – Stronger recommendation that weight reference period should be a minimum of 12, consecutive months.
- Frequency – Greater emphasis on need to reduce the lag between the weight and price reference period. The recommendation still stands that weights should be updated at least every five years. There is more emphasis on the advantages of updating weights more frequently, including introduction of new products, outlets, and methodologies.
- Special issues – Discussion of developing weights for owner-occupied housing included.

Chapter 4 – Sampling

Chapter 4 has been rewritten to better reflect the multistage sampling process that is required to select CPI samples of geographic areas, items, outlets, and varieties.

Key updates:

- Sample design – Probability sampling is the preferred approach; however, given the lack of data to support probability sampling methods, there is more discussion on how to maximize sample representativity in practice using non-probability methods.
- Optimal sample allocation – updated to include more details on practical approaches to sample allocation, including linking allocation of prices collected to the weight of each elementary aggregate (more prices collected for those elementary aggregates with higher weight); and more emphasis on allocating samples based on price variation and how these can be applied with the different sampling methods used. Introduces a minimum threshold of the number of prices collected for each elementary aggregate (8-10 prices) to avoid the estimation bias when samples are too small.
- Greater emphasis on practical methods used by countries to select and maintain samples.

Chapter 5 – Price Collection and Validation

The chapter has been significantly updated to reflect growing importance of e-commerce and digitalization and the evolution of price collection methods.

Key updates:

- More focus on the operational and practical issues of price collection. Significant portions of the *Practical Guide* have been incorporated into the update of this chapter.
- Section added focusing on the internet shopping and the collection of prices on-line.
- An appendix on web scraping has been added that draws on actual country experiences using web scraping to collect prices on line. The new appendix provides details on how web scraping can be used in the context of monthly CPI production and how it fits in terms of current compilation methods.
- Section added on using handheld tablets/devices for the collection of prices.
- Expanded discussion of fieldwork operations, including more details on management and organization.
- Expanded discussion of defining a transaction price to include discussions on the unit values associated with scanner data, bargained prices, discounts, and sales.
- Sections added on quality management issues and the importance of developing documentation.
- Sections added on the different methods and tools used for the validation of prices.

Chapter 6 – Temporarily and Permanently Missing Prices and Quality Adjustment

The chapter has been updated to emphasize the steps compilers should follow when price quotes are missing and that quality adjustments arise out of missing prices. The title has been changed to reflect this shift. While the methods have not changed, the organization of the chapter has been updated to better represent the practical issues compilers face in the compilation process. The chapter has been reorganized to begin with the discussion and treatment of temporarily missing prices. This is followed

by a discussion of permanently missing prices and the different methods (implicit and explicit) used to adjust for changes in quality.

Key updates:

- The matched models method (MMM) facilitates the measurement of a constant quality price index. The chapter has been updated to better describe that the treatment of temporarily and permanently missing prices and quality adjustments are related to the failure of the matching, when prices go missing.
- More emphasis throughout the chapter on the role and importance of data collectors and CPI staff in the treatment of missing prices and quality adjustments.
- Greater detail describing implicit and explicit methods of quality adjustment with illustrative examples.
- Expanded discussion of permanently missing items due to high model turnover with outline of alternative methods for treatment and advantages/disadvantages of each method.
- New section on importance of developing metadata describing imputation and quality adjustment methods.
- New discussion on quality assurance to ensure consistent and appropriate treatment of missing prices and quality adjustment methods.

Chapter 7 – *Maintaining the Sample*

Chapter reorganized and streamlined to avoid duplication. Significant parts of the chapter were cut to reduce excessive duplication and repetition.

Key updates:

- Standardize terminology – “New goods” includes new goods and services
- Expanded discussion of revolutionary and evolutionary new goods and outlets.
- Enhanced discussion on strategies for maintaining the sample, especially in the context of infrequent updates/revisions.

Chapter 8 – *Calculating Consumer Price Indices in Practice*

Many sections of the chapter have been rewritten to be more prescriptive in terms of recommendations.

Key updates:

- Recommendation to avoid using the Carli index. The section on elementary indices provides more detailed explanations and examples to demonstrate why the Jevons and Dutot indices are preferred over Carli.

- Section added on the Jevons and Dutot to explain the strengths and weaknesses of each method, including a clearer definition of what is meant by homogeneity.
- Section on missing prices enhanced to more clearly illustrate and describe the preferred imputation methods that should be used. Discussion on how to deal with “zero” prices has been added.
- Section added to describe how to compile regional indices.
- Section on higher level index indices includes detailed discussion on the Modified Laspeyres versus the long-term relative formula. The advantages of the Modified Laspeyres are now presented in detail.

Chapter 9 – Updating CPI Weights and Linking New to Previous CPI Series

This is a new chapter written to provide guidance on the procedures for deriving new weights and for introducing these new weights. Price-updating weights has been a well-used and, in many cases, standard procedure to ensure the CPI measures price changes in a constant quantity basket of goods and services. Another approach is to directly use the new weights assuming the expenditure shares have remained the same. This chapter gives guidance on which approach is most applicable and elaborates on the pros and cons of price updating the weights. Detailed methods for updating the weights are described. The chapter concludes with discussing and demonstrating the methods of linking the new CPI to existing the existing CPI to create a continuous time series of data for users.

Chapter 10 – Scanner Data

This is a new chapter that discusses the opportunities and challenges presented when using scanner data to compile the CPI and provides guidance to NSOs. It outlines several practical considerations regarding the acquisition of scanner data sets, the assessment and preparation of the data, and implementation issues. New methods that have been developed to construct price indices from scanner data, so-called multilateral methods, are presented. This chapter concludes with a discussion of the assessment of the new methods and the empirical results, communication with users and stakeholders, and publication and dissemination of the ‘new’ price indices.

Chapter 11 – Selected Special Cases

The chapter has been updated to reflect the growing importance of e-commerce and digitalization, as well as changes in the methods used to treat select products which have proven challenging for CPI compilers. Significant material from the *Practical Guide* has been incorporated in this chapter.

Key updates:

- Seasonal products – This section has been updated to remove the discussion of variable weights as an option for the treatment of seasonal product. The preferred approaches for the treatment of seasonal products are presented. More practical advice provided on the treatment of seasonal clothing.
- Housing – This section has been updated to include a discussion of rent surveys as well as owner-occupied housing. All possible approaches to owner-occupied housing are outlined and explained. Still no consensus on a preferred approach to the treatment of owner-occupied housing.

- Own-account production – Focus on the practical measurement issues. The section provides a distinction between the treatment of goods produced for own consumption and owner-occupied housing services. More practical guidance provided on preferred approaches to the treatment of own-account production.
- Tariffs – Updated to include more extensive discussion of challenges faced by compiler, including: complex pricing schedules; bundled packages; long-term contractual agreements; substitution between different providers of the same type of service and between different tariffs offered by the same service provider; and quality differences in the service provided. Illustrative examples are provided to describe the matched sample, unit value, and customer profiles approaches.
- Second-hand goods – Updated to align more with the *2008 SNA*. More practical guidance on developing net weights.

Chapter 12 – *Errors and Bias in the CPI*

This chapter has been updated only to ensure consistency with other chapters and reflect more current references.

Chapter 13 – *Data Quality Management and Reporting*

Chapter has been renamed and updated to provide more focus on quality management processes in the context of CPI production and dissemination. Incorporates international best practice and examples from the *Practical Guide*.

Key updates:

- Provides more detailed and practical advice on data quality management and reporting.
- Includes more illustrative examples on the editing of prices.
- Expands discussion on the need for detailed meta-data and data quality reporting.
- Presents the IMF's Data Quality Assessment Framework (DQAF) as a structure for assessing existing practices against best practices. A more detailed summary of the DQAF and its use in the data quality management context provided.

Chapter 14 – *Publication, Dissemination, and User Relations*

Chapter updated to reflect evolving dissemination methods and data user needs. Overall, minimal updating needed for this chapter.

Key Updates:

- Includes discussion of the growing trend to disseminate data electronically.
- Recommends the dissemination of detailed indices on NSO website. Data should be disseminated down to the elementary aggregate level.

- Recommends dissemination of detailed weight data on the NSO website (down to elementary aggregate level).
- Recommends dissemination of detailed regional data in addition to national data (down to elementary aggregate level).