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INTEGRATION OF PRICE INDICES

**UPDATE OF THE HARMONIZED INDEX OF CONSUMER PRICES
IN THE WEST AFRICAN ECONOMIC AND MONETARY UNION**

**Note by the Economic and Statistical Observatory
of Sub-Saharan Africa (AFRISTAT)**

SUMMARY

In 2007, the Economic and Statistical Observatory of Sub-Saharan Africa, funded by the Commission of the West African Economic and Monetary Union, updated the harmonized index of consumer prices, one of the main instruments for monitoring economic convergence. This update project represents an opportunity not only to make updated weighting systems available, but also to bring the index into conformity with international standards.

The experience gained over the past 10 years with the harmonized index of consumer prices shows that one of the main problems to be solved is still the establishment of an index management system. The Economic and Statistical Observatory of Sub-Saharan Africa has made this one of its main concerns and is proposing indicators for measuring the performance of index production. In addition to this mechanism, this document shows that one of the solutions to the problem of addressing quality impact lies in sharing practices and information relating to each case. The international statistical community, by establishing platforms for disseminating these data, will contribute significantly to the availability of information and methods that are essential for improving the quality of data produced, irrespective of the initial methodological choices.

I. INTRODUCTION

1. The update of the Harmonized Index of Consumer Prices (HICP) for the eight member States of the West African Economic and Monetary Union (WAEMU) undertaken in 2007 was an opportunity to conduct a detailed methodological assessment of the index established in 1996, in order to identify the aspects requiring revision, to bring it into line with current international standards, and to take account of the economic environment of the States and user needs.
2. One of the aims, however, was to preserve the knowledge and experience acquired by national statistics institutes (NSIs) and take account of their capacities. The general structure of the index, as well as the terminology, has also been maintained in most cases.
3. The main methodological changes relate to:
 - (a) A more precise specification of products, inspired by the International Comparison Programme for Africa (ICP-Africa);
 - (b) Broader sampling;
 - (c) A method for calculating indexes of elementary aggregates that respects international recommendations;
 - (d) Revised working classifications (West African Consumption Nomenclature (NCOA)) adapted to the needs of the HICP (NCOA-HICP), classification of price observation points);
 - (e) Seasonality of prices and better processed products;
 - (f) A variety of other methodological improvements.
4. The methodological assessment has brought to light the rigidity of the States' harmonized indices of consumer prices (HICPs), owing to their lack of ability to address changes in quality. The HICP update project in the member States of WAEMU is an opportunity to reflect strategically on issues of an organizational nature in anticipation of more active HICP management in each member State and at the regional level.
5. This document presents the main improvements made to HICP methodology, and addresses the problem of adjusting quality impact and monitoring the quality of the indices in a context of resource scarcity.

II. MAIN METHODOLOGICAL IMPROVEMENTS

6. Since 1996, when the Harmonized Index of Consumer Prices (HICP) was established in the WAEMU member States, international consumer price index (CPI) standards have improved considerably. Over recent years several international technical institutions have strived to

establish quality norms and resolutions. The HICP update project was an opportunity to bring the HICP into line with these norms and resolutions, while taking account of the member States' available resources. The main innovations in respect of the field and coverage of the index, the formulae for calculation of elementary aggregate indices, and the price concept used were largely based on reference documents such as the International Labour Office (ILO) Consumer Price Index Manual and the EUROSTAT compendium of HICP reference documents.

7. Other innovations derive from the experience of the International Comparison Programme for Africa (ICP-Africa) and from the weaknesses observed in price sampling.

A. More precise specification of products

8. Consumer price indices are intended to measure pure price changes. The products whose prices are collected and compared in successive time periods should ideally be perfectly matched; that is, they should have identical or highly comparable physical and economic characteristics. When the products are perfectly matched, the observed price changes are pure price changes.

9. The Resolution concerning consumer price indices adopted by the seventeenth International Conference of Labour Statisticians in 2003 states that, "Specifications should be provided detailing the variety and size of the products for which price information is to be collected. These should be precise enough to identify all the price-determining characteristics that are necessary to ensure that, as far as possible, the same goods and services are priced in successive periods in the same outlet. The specifications should include, for example, make, model, size, terms of payment, delivery conditions, type of guarantees and type of outlet. This information could be used in the procedures used for replacement and for quality adjustment."

10. The approach used for HICP 2008 consisted of improving the specification of products in comparison with that of HICP 96, by adopting more precise and structured product descriptions. The characteristics to be selected for product descriptions should not, however, be too restrictive, in order to avoid a deterioration in the quality indicators of the indices produced. The interim solution that has been chosen is to start with the structured product descriptions (SPDs) of the International Comparison Programme for Africa (ICP-Africa). This solution enables ICP- and HICP-related operations to be strengthened, the advantages of which no longer have to be proven for African countries. The approach used by AFRISTAT is summarized in the box below.

11. The specifications of ICP products, however, by giving the same importance to all characteristics, are such that the products monitored can be considered homogeneous. In the HICP architecture it is essential to classify varieties as homogeneous or heterogeneous. There is a rationale for calculating the average price of a homogeneous variety. Goods and services covered by the definition of the heterogeneous variety differ substantially or are highly disparate. This classification influences the methods of monitoring and calculating elementary indices.

**APPROACH USED TO INTEGRATE HICP-ICP ACTIVITIES
IN THE CONTEXT OF THE HICP UPDATE PROJECT IN
THE WAEMU ZONE**

A. Harmonization of methodological tools

The first stage of integration consists of establishing methodological tools to facilitate the transition from one system to another. In this regard, establishing bridge tables between terminology and nomenclatures is an essential first step.

In the context of the project, classifications of consumption and price observation points have been adopted, which are compatible with those of ICP-Africa.

B. Process for selecting goods and services

The first step is to list representative products in the WAEMU zone, which are structured according to 12 functions. This list is drawn up from current HICP baskets based on the 10 consumption functions of eight countries, supplemented by new products or those introduced into the field of the index.

Structured specifications of the corresponding ICP products are attached to each of the products. Specifications have been identified for non-ICP products. Local adaptations of characteristics have been conducted to take account of the varieties most commonly consumed by households. As well as cementing the two operations, this meant adopting a more precise specification of elementary products for the HICP than that established in 1996, by building on the ICP basket.

On the basis of national baskets defined by identical structured product descriptions (SPDs), it will be possible to apply the method of linking international comparisons. Given the geographical proximities and the comparable levels of development, high degrees of overlap may be found between the following pairs of countries: Togo-Benin, Benin-Burkina Faso, Niger-Burkina Faso, Burkina Faso-Mali, Mali-Senegal, Senegal-Côte d'Ivoire. Even in the case of a new ICP cycle, it may be easy to identify products that are common to the two systems.

In general terms, the proposed stages for this second phase are:

1. Adopting the structured product description (SPD) approach.
2. Initializing a regional basket based on the list of ICP products and current HICP baskets.
3. Examination and refinement of this initial regional basket by national statistics institutes in order to have a basket that is representative of consumption in the country:
 - (a) Suppressing non-existent or non-representative products;
 - (b) Adding specific products, old or new, into the country's economic space.

**APPROACH USED TO INTEGRATE HICP-ICP ACTIVITIES
IN THE CONTEXT OF THE HICP UPDATE PROJECT IN
THE WAEMU ZONE (*continued*)**

4. Describing the products added according to the ICP structured product description.
5. Redistributing SPDs according to the groups of characteristics.
6. Reconstituting a regional basket that is representative of the region.
7. Establishing country pairs that present high degrees of overlap.
8. Calculating bilateral purchasing power parities (PPPs).
9. Establishing a chain of bilateral PPPs.

Planned HICP update activities are limited to points 1 to 5.

C. Data processing and management software

In order to avoid duplicate data entries, the HICP production software will enable data management and extraction according to a format that meets ICP needs. In particular, the series of unformatted, regularized data will be expected to be exportable and automatically loadable by the ICP production application.

12. The characteristics of the ICP should enable a variety to be defined and a series to be followed accurately. We have identified:

- (a) The obligatory basic characteristics of a variety (CO);
- (b) The variable characteristics of a variety, separated into:
 - (i) Characteristics influencing prices, for which ranges are permitted for the initial choice of representative series (but the same product is always monitored afterwards) (CV1);
 - (ii) Supplementary characteristics that do not influence prices, but enable the monitored series to be found more easily (colour of trousers, reference of a piece of domestic electrical equipment, etc.) (CV2);
- (c) Possible exclusions (E).

13. Once the structured product descriptions of the ICP were retrieved for the corresponding products, they were distributed according to these characteristics, to permit definition of the varieties monitored. This regrouping of characteristics enables a variety to be defined and classified as homogeneous or heterogeneous. A variety is therefore accurately identified on the basis of its obligatory characteristics. Homogeneous varieties do not have variable characteristics

that influence their prices and can only be described by CO, CV2, and possibly E. Heterogeneous varieties, on the other hand, exhibit CV1 characteristics, and will be fully described by CO, CV1, CV2 and E. The series of a heterogeneous variety differ from one another in respect of CV1 and possibly CV2.

B. Broadened sampling of readings

14. The price observation points have been broadened to new types of commercial establishments, including general stores and supermarkets, which have shown considerable growth in the towns of the countries concerned. The broadened coverage of observation points has affected homogeneous and heterogeneous varieties alike. Similarly, the number of varieties and series has been increased considerably, the aim being to improve the quality of the indices produced (the number of varieties has increased from 300 to over 500).

15. Furthermore, the experience acquired over the life of the HICP means that it is possible to identify the series for which the number of records needs to be optimized owing to the very high (or very low) volatility of their prices.

16. Since varieties, as well as the volatility (or non-volatility) of their prices are specific to each country, survey frequency has not been adopted as a comparability criterion. Such frequency is related to each variety, in contrast to the 1996 HICP. At the same time, minimum price survey frequencies have been set for the different types of variety.

17. Follow-up methods have completely changed for some products. This is the case for rent, the survey frequency for which has increased more than fivefold.

C. Seasonality of prices and better processed products

18. The fact that seasonality was not taken into account in the 1996 HICP is a compelling reason for it to be updated. The seasonal structure of consumption is not well known, since it was not observed correctly in 1996. The household expenditure survey conducted in each of the WAEMU member States' main cities in 1996 did not cover the whole year. It should have been completed by an additional survey conducted over a period of 12 consecutive months, the aim of which would have been to check the results of the main survey, and to determine the seasonal spending structure. This second survey was never carried out.

19. Seasonality has two aspects: seasonal products, and seasonally priced products.

20. With a view to solving the problems caused by seasonality of prices and products, which is a relatively significant phenomenon in Sahelian countries, a nine-month survey, complementary to the first three-month survey on household spending, will be organized in the context of the project. It will aim to:

(a) Determine seasonal timelines for products, and take better account of seasonal household expenditure in the index;

(b) Observe the development of household expenditure over 12 months and, if necessary, correct the weighting from the first survey.

21. The output will consist of monthly weightings of seasonal varieties.
22. The index of a seasonal item could be calculated in three stages:

Stage 1: Calculation of the average price of a variety of item for a given month, arithmetical average of the prices of the series comprising the variety.

Stage 2: Calculation of the index of a seasonal item for a given month, geometric average of elementary indices of the varieties of the item.

$$I_{v0}^p = \frac{\prod (p_i^t)^{\alpha_i^t}}{\prod (p_i^0)^{\alpha_i^0}} = \prod \left(\frac{p_i^t}{p_i^0} \right)^{w_i^0}$$

where I_{v0}^p = Index of a seasonal item in month t

p_i^t = average price of variety i during month t of the current period

p_i^0 = average price of variety i during base year 0

w_i^{r0} = Share of expenditure on variety i in item-specific expenditure for month t in the initial period.

Stage 3: Calculation of the index of a seasonal subgroup for a given month, geometric average of elementary indices of the items in the subgroup.

23. The index of a seasonally priced item is to be calculated in two stages:

Stage 1: Calculation of the average price of the variety for a given month, arithmetical average of the prices of the series comprising the variety.

Stage 2: Calculation of the index of a seasonal item for a given month, geometric average of elementary indices of the varieties of the item.

$$I_{v0}^p = \frac{\prod (p_i^t)^{\alpha_i^0}}{\prod (p_i^0)^{\alpha_i^0}} = \prod \left(\frac{p_i^t}{p_i^0} \right)^{w_i^0}$$

where I_{v0}^p = Index of a seasonal item in month t

p_i^t = average price of variety i during month t

p_i^0 = average price of variety i during base year 0

w_i^0 = Share of expenditure on variety i in item-specific expenditure during the base year.

24. Work is under way to test these formulae and to plan, if necessary, the adoption of other, more appropriate formulae. In particular, the scale analysis of the structural differences between the base year and the current year will be further investigated.

D. A new production and dissemination nomenclature

25. The 1996 base index was already based on the main functions of the international “Classification of Individual Consumption by Purpose” (COICOP) nomenclature, which has had 12 functions since 2005. This has been considerably revised in a provisional version, pending the results of the household expenditure survey.

26. The 2008 base HICP will integrate fully the new 12 function COICOP nomenclature, adapted to HICP needs (NCOA-HICP). The global index will be established taking account of the COICOP breakdown for the top three positions, with some adjustments to the margin for inadequately weighted groupings. The nomenclature currently comprises:

- (a) 12 functions;
- (b) 43 groups;
- (c) 96 subgroups.

A total of 143 consumption items have also been created.

The level of dissemination of the index will be the level of the subgroup, the composition of which must be common to all the countries.

E. Secondary nomenclatures that are more detailed and better adapted to user needs

27. The harmonized index will be accompanied by secondary nomenclature indices, and partial indices other than those established for the 1996 HICP:

- (a) According to type of activity;
- (b) According to types of retail outlet;
- (c) According to exchangeability or lack thereof;
- (d) According to production sector (formal or informal).

28. These indices respond to the needs of a variety of users of consumer price indices in a context where the HICP remains the only available price statistic in most countries. Furthermore, a price index for poor households in the capital could be produced for use in monitoring and evaluating poverty reduction policies. It will differ from the index for all households by the effect of the weightings, which represents the consumption of the households concerned. Other products could be taken into account according to the specificity of the consumption of the households concerned.

F. Other miscellaneous methodological improvements

29. Several other methodological improvements have been made to the calculation of the HICP. They include:

- (a) Collecting all varieties, including tariffs, on a monthly basis;
- (b) Improving follow-up and calculation of indices of certain specific products, such as rent, domestic services, insurance, games of chance;
- (c) Improving collection questionnaires, so that surveyors can better monitor product characteristics and report any problems that they might have encountered;
- (d) Introducing other index monitoring and quality indicators.

III. PROBLEMS ASSOCIATED WITH MANAGING HARMONIZED INDICES

30. During the work on methodology, the rigidity of HICPs was noted, despite the instructions and the IT tool for updating weighting coefficients within items, removing or adding varieties, and addressing quality impact during replacements.

31. Apart from inadequate technical capacities, the problem of managing the quality of consumer price indices highlights a weakness in the methods of index monitoring, as well as a lack of human resources available in the States concerned. In 1998 a unit comprising a working group and a follow-up committee was established, but owing to a lack of financial resources it did not function properly. Furthermore, the services responsible for producing the HICP have an average of 10 staff members (including surveyors and office staff).

32. In this overall context of lack of resources, States are not all producing index quality monitoring indicators. The tables for monitoring consistency and exhaustiveness of data collection, which have been designed and established in the member States of WAEMU, are not regularly produced and analysed in order to improve the index production process. There is no qualitative marker against which existing practices can be evaluated in order to undertake a continuous quality improvement process.

33. Thus, in addition to the initial options adopted with regard to sampling, calculation formulae and other methodological issues, other index management aspects (updating the basket of products monitored, updating of series sampling, use of appropriate methods for replacement and estimating missing data, etc.) are determining factors for the quality of information produced. In this context, the question of quality control is raised in terms of an appropriate mechanism to be established at the regional level to ensure the quality of consumer price index production.

A. Establishment of quality control indicators for the index

34. One aspect that concerns AFRISTAT in the context of the project to update the HICP is the improvement of the institutional framework for producing HICPs. This framework should be based on the general data quality assessment framework for consumer price indices, published

by the International Monetary Fund (IMF). This is essential for maintaining the full value and significance of the exercise of monitoring economies and convergence, while ensuring temporal and spatial comparability between the indicators monitored.

35. Apart from this aspect, which will be concerned with the production process, AFRISTAT plans to improve the comparative performance analysis of the HICP production process in States by establishing quality indicators for the data produced.

36. Several aspects are taken into account:

(a) Data collection performance: indicators for the comprehensiveness of collection and coherence of data:

(i) Percentage of absent records;

(ii) Percentage of absent records by cause (time-related absences, definitive absences, survey problems);

(iii) Percentage of inconsistent records;

(b) Quality of practices for processing missing data: indicators on frequency of use of methods for estimating missing data:

(i) Processing percentages by decrease, increase, balance and by method;

(c) Time-related performance of replacement processing:

(i) Number of varieties or series not replaced after a certain period (three months, six months, one year);

(d) Quality of definition and monitoring of varieties:

(i) Percentage of varieties with a zero coefficient of variation;

(ii) Percentage of varieties outside the range of the coefficients of variation.

B. Establishment of a sharing mechanism for quality impact processing practices

37. Africa has a glaring need to share experiences and create a platform for permanent exchange and discussions between price statisticians. Owing to a lack of material and human resources, a certain number of consumer price index (CPI) processing operations cannot be conducted effectively by NSI price teams. Even where they can, the necessary resources would be disproportionate to the expected results. For WAEMU States, this problem is accentuated by the integration of a certain number of new and second-hand Information and Communications Technologies (ICTs) into the monitoring basket. As regards the processing of replacements for products imported from Europe, for example, certain technical and financial information cannot be obtained on the market or at retail outlets in African countries. Even when the products

concerned by replacements are produced in the WAEMU zone, the processing method adopted in one country can easily be applied in others, given the inclusion of what are after all very small markets in the zone.

38. To remedy these shortcomings, AFRISTAT has established a discussion forum on its Internet site (www.afristat.org) in order to enable experiences to be shared and question and answer sessions to be held between members of the community of price statisticians from the member States. A web page on the HICP update has also been created on this site, in collaboration with the WAEMU Commission. This page will enable outline solutions adopted by the community to be summarized and made available to cybernauts.

39. In addition to these technical provisions, however, AFRISTAT needs to establish a mechanism involving its member States and interested subregional integration organizations (WAEMU Commission, CEMAC Commission, etc.). AFRISTAT will therefore stand at the centre of a mechanism for:

Continuous capacity-building for member States

40. This will mean organizing annual seminars on practical problems encountered, and on the latest methodological advances. AFRISTAT will also be able, in this context, to manage activities for gauging the usefulness or pertinence of products for users, and analysing the profitability and optimization of resources deployed.

Sharing experiences

41. The expertise developed at AFRISTAT in the field of consumer price indices could potentially be redistributed among NSIs in several forms, including in particular real time responses to a given problem, and concentration and redistribution of information using the established network.

42. This strategy could only be effective, however, if a similar mechanism is established at the international level, or if AFRISTAT develops a partnership with national statistics institutes in the countries of the North.

43. AFRISTAT's position should enable it to be a mouthpiece for NSIs from sub-Saharan African States in their dealings with the statistics institutes of international organizations or developed countries, or more generally in relation to all other sources of information that can be mobilized. This approach provides the advantage of minimizing information channels. It ensures greater reactivity in exchanges, contributes to harmonizing methods, avoids dispersal of information and builds confidence in relations with interlocutors.

44. The establishment of an exchange platform (in whatever form) responding to this need would be an activity that could involve the International Labour Office and other international groups that work to promote best practices in respect of price statistics. Furthermore, this initiative would contribute to strengthening transparency in quality impact processing practices and could only benefit the community of price statisticians as a whole.

IV. CONCLUSION

45. The methodology adopted by WAEMU member States in the context of the HICP update aims to improve quality while fully respecting international standards. It also aims to take account of the resource constraints that States face, and constraints on comparability of indices between countries and CPI-ICP activity integration objectives. The development of an IT application common to all countries represents a pledge to maintain this comparability over time.

46. The need for States to respect this temporal and spatial comparability constitutes a considerable constraint. AFRISTAT plays a central role in this approach: AFRISTAT has established a mechanism for monitoring, supervision and communication in order to provide necessary technical assistance and disseminate information among technicians. A permanent dialogue has been established in order to ensure the timely solution of problems that States might encounter in implementing this methodology. This initiative can only be truly effective if an exchange structure with national statistics institutes in the countries of the North, international groups and organizations on CPIs allows practices and necessary data on the processing of replacements to be disseminated to the countries of sub-Saharan Africa.
