United Nations ECE/CES/2021/14/Add.2

Economic and Social Council

Distr.: General
26 April 2021

English only

Economic Commission for Europe

Conference of European Statisticians

Sixty-ninth plenary session
Online, 23-25 June 2021
Item 8 (a) of the provisional agenda
Programme of work of the Statistics subprogramme of the United Nations Economic Commission for Europe
Reports on the work of the Conference of European Statisticians, its Bureau and Teams of Specialists

Implementation of the United Nations Economic Commission for Europe Statistical Programme 2021

Note by the secretariat

Addendum

Report of the webinar on producing Consumer Price Indices under lockdown

Summary

The present document is the report of the webinar on producing the Consumer Price Index (CPI) under lockdown, that took place online on 21, 28 October and 4, 11 November 2020. This report is provided to inform the Conference of European Statisticians of the organisation and outcomes of the meeting.

I. Introduction

1. The webinar was organised by the United Nations Economic Commission for Europe (UNECE) in cooperation with the Ottawa Group on Price Indices. The sessions of the webinar were prepared by the UNECE Steering Group on Consumer Price Indices and the Steering Committee of the Ottawa Group on Price Indices. The webinar was hosted by the German Bundesbank.

2. The webinar attracted global interest. In total, 450 participants took part in the webinar. Experts from the following countries participated: Afghanistan, Albania, Andorra, Angola, Antigua and Barbuda, Armenia, Australia, Austria, Bangladesh, Belarus, Belgium, Bhutan, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Cambodia, Cameroon, Canada, Chili, China, Colombia, Cook Islands, Costa Rica, Croatia, Eswatini, Fiji, Finland, France, Georgia, Germany, Gabon, Ghana, Greece, Guinea, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Japan, Kazakhstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Lithuania, Luxembourg, Malaysia, Maldives, Mauritania, Mauritius, Mexico, Mongolia, Montenegro Mozambique, Myanmar, Netherlands, Nigeria, Norway, Pakistan, Palestine, Peru, Philippines, Poland, Portugal, Putrajaya, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Sao Tome and Principe, Senegal, Singapore, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Tehran, The Netherlands, Timor-Leste, Tonga, Trinidad and Tobago, Tunisia, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Vietnam and Zimbabwe.

3. Experts from the following organisations participated: European Central Bank, Eurostat, Eurasian Economic Commission, International Labour Organization, Interstate Statistical Committee of the Commonwealth of Independent States, Organisation for Economic Co-operation and Development (OECD), United Nations Economic Commission for Africa, United Nations Economic Commission for Latin America and the Caribbean, United Nations Economic and Social Commission for Western Asia, World Bank, University of British Columbia, Canada, University of New South Wales, Australia, and University of Tokyo, Japan.

II. Organization of the meeting

4. The webinar was organised in the following sessions:

(a) Session 1. Theoretical considerations

(b) Session 2. Data collection

(c) Session 3. Imputations for missing observations

(d) Session 4. Communication

5. Detailed summaries of comments and conclusion of the four sessions of the webinar are provided below in section III.

6. The proceedings of the webinar are available on the UNECE website: www.unece.org/index.php?id=52564

III. Summary of main outcome and conclusion of the webinar

7. Based on countries' experiences with producing the CPI during the covid-19 pandemic, the webinar discussed challenges and best practices in data collection, imputation of missing prices and dissemination and communication with users under lockdown conditions. The outcome of the webinar will be used for further discussion at the 2021 meeting of the UNECE Expert Group on CPI with the aim to summarize recommendations and good practices for producing the CPI under lockdown in a reference document that countries may draw on in similar situations in future.

A. Session 1. Theoretical considerations, 21 October

8. The session was chaired by Jens Mehrhoff (German Bundesbank). The session was based on a presentation by Kevin J. Fox (University of New South Wales, Australia) of the paper *Measuring Real Consumption and CPI Bias under Lockdown Conditions* by Erwin Diewert and Kevin J. Fox. Bernhard Goldhammer (European Central Bank) and Peter Nilsson (Statistics Sweden) acted as discussants. The discussion during the session was moderated by Carsten Boldsen (UNECE).

9. The outbreak of the covid-19 pandemic and the following lockdown in many countries lead to dramatic shifts in consumption patterns. In most countries the official CPI is based on fixed expenditure weights that refer to a past weight reference period, usually a year or an average of several years. Fixed expenditure weights do not capture the effects of changing consumption patterns and many households, therefore, may have experienced different changes in their cost of living than indicated by the headline CPI.

10. The study by Diewert and Fox takes an economic approach to price indices and derives a cost-of-living index (COLI) based on the assumption of utility maximizing consumers. The paper argues for using so-called reservation prices (prices that would result in zero demand) to estimate prices of products that are no longer available on the market because of the lockdown. The difference from the last observed, pre-lockdown period to the estimated reservation price is taken as a measure of the change in utility of the consumers. Assuming the estimated reservation prices are higher than imputed prices, the paper argues that the use of imputed prices will lead to an underestimation of the increase in cost-of-living and an overestimation of real consumption growth.

11. Because of the need for a headline CPI serving a variety of purposes and limited availability of data sources the paper concludes that in the short run, missing prices should be imputed in line with the guidance of the Intersecretariat Working Group on Price Statistics (IWGPS). Instead, the paper suggests national statistical offices (NSOs) should implement programs to obtain current expenditure weights for the consumption basket. Once the new consumer expenditure information becomes available, NSOs should produce an analytical and revisable CPI that could supplement the existing headline CPI. It is recognised that this would require additional resources.

12. The following comments were made in the discussion:

(a) Regarding the theoretical foundations for a COLI several questions were raised. Reservation prices are theoretical constructions, which only under a number of assumptions can be interpreted to measure changes in utility. A COLI is based on fixed preferences while consumer preferences have changed dramatically during the lockdown. Reservation prices will need to be estimated based on pre-lockdown data and pre-lockdown preferences and may not be suitable to estimate missing prices in the lockdown period. It is not straightforward how a pandemic such as the covid-19 should be reflected in a conditional COLI in which external factors (environment, general security or health etc.) are assumed to be constant.

(b) Given the widespread uses of the CPI for both indexation purposes and as a measure of inflation it is problematic to base the choice of imputation methods only on the economic approach and the use of reservation prices. Also, in most countries there is a strong preference for basing imputations of missing prices on observed transaction prices. It may be difficult to argue for the use of estimated reservation prices. It was also noted that while in theory reservation prices may work for a COLI, they will be difficult to estimate in practice and may be associated with significant uncertainty.

(c) The use of current monthly expenditure weights would require use of alternative data sources (e.g., credit card transactions, scanner data, eventually combined with data from continuous consumer expenditure surveys). However, such data sources may not be readily available in all countries, and where they are available their use may introduce additional uncertainty into the CPI. Nevertheless, to derive current weights in principle all available sources should be used. This could also involve using data from other countries if these could help estimating the weights.

(d) Use of variable weights for the lockdown period (if available) would create breaks in the CPI time series both at the beginning and the end of the period. It was also not clear what would be the suitable index formula to apply spanning over the lockdown period. In case of a relative short lockdown period, revising the weights for a few months may create additional disturbance and harm the credibility of the CPI. At the same time, it was underlined that there is a strong user need for a non-revisable CPI.

(e) The observed changes in consumption patterns are, by and large, a direct consequence of the lockdown, rather than the results of consumer substitution due to changes in underlying preferences, and therefore of temporary nature. Hence, whether an index based on weights from the lockdown period would be useful for monetary policy analysis, i.e. able to identify inflationary trends, is doubtful.

13. The following main conclusions were made:

(a) Given the widespread uses of the CPI for different purposes, the headline CPI should be based on annual expenditure weights that are kept constant between regular intervals of updating the weights. Missing prices should be imputed in line with the recommendations of the 2020 CPI Manual and the IWGPS continuity guidance for producing the CPI under lockdown.

(b) It is crucial to maintain public trust in the CPI. Introducing changes in methods, coverage or weights of the CPI that have not been announced in advance and are not in line with the regular schedule of CPI updates may be questioned and may harm the general trust in the CPI.

(c) Input from researchers on theoretical issues is useful for developing and improving CPIs compiled by countries by suggesting methods and directions for the compilation of the CPI. Researchers should be involved also in future work in developing methods and best practices.

(d) For the development of a COLI CPI based on monthly weights and applying reservation prices, it would be useful with additional discussion of theoretical issues and the availability and use of data sources, suitable index calculation formulas and operational guidance on estimation of reservation prices. Sharing of empirical studies would be useful.

B. Session 2. Data collection, 28 October

14. The session was chaired by Christopher Jenkins (Office for National Statistics (ONS), United Kingdom). The session was based on presentations by Rob Cage and Ursula Oliver (Bureau of Labor Statistics, United States), Chris Payne (ONS, United Kingdom) and Patrick Kelly (Statistics South Africa). Rui Evangelista (Eurostat), Heidi Ertl (statistics Canada) and Federico Polidoro, (Istat, Italy) acted as discussants. The discussion during the session was moderated by Jens Mehrhoff (German Bundesbank).

15. The webinar focused on challenges in price collection under lockdown conditions where outlets may be closed and/or the price collectors are not available or restricted to enter outlets, the collection of prices from alternative sources, and issues of weighting and quality changes when comparing prices collected from different sources.

16. The following comments were made in the discussion:

(a) The lockdown called for quick solutions of logistical and practical problems related to price collection and ensuring as many prices as possible could be collected. NSOs also had to make quick decisions about imputation methods under time pressure. The lockdown thus underlined the value of having contingency plans ready in such situations.

(b) Many NSOs experienced drops in response rates during the first months of lockdown. After, many succeeded to revert the drop and increase response rate through contacts to outlets and through use of alternative methods, e.g., contact through e-mail or telephone or collecting the prices from the web.

(c) Using web prices, price collectors become ‘internet detectives’ to trace and identify products to be priced. When using alternative data sources, it may be necessary to confirm the products are actually available for sale.

(d) In many developing countries only a limited number of prices may be available from the web. Hence, available alternatives to field collection has been telephone contact and e-mail but with limited success in many cases. In-person price collection, where staff from the NSO or their family members or acquaintances collect prices, have been used in several countries.

(e) The use of multiple sources is helpful to increase the number of collected prices. But it also raised questions regarding the weighting of price observations collected from different data sources and the treatment of possible quality differences.

(f) Collecting prices from new data sources requires an assessment of whether the quality of the product is comparable to the product that is being replaced. When replacing a product previously collected in an outlet with a product collected from the web, quality differences should be accounted for. It was mentioned that services provided in physical outlets (for instance in terms of guidance or instructions) may not be provided when the same product is purchased from the internet.

(g) One type of replacements is when a service previously provided ‘face-to-face’ is replaced by a service provided online. One example is education and training courses in classrooms that may be replaced by online courses offered during the lockdown. It may be very difficult to judge about the value of possible quality differences between classroom training and on-line training courses. In practice, the only possible options will often be to assume zero quality change (and include the full price change in the CPI) or to link the new online service into the CPI calculation assuming the price difference is equal to a difference in quality (and hence not included in the CPI).

(h) Another type of replacement is when an additional payment is charged for the product. For instance, sit-down meals in restaurants may be replaced by take-away or delivery of a similar meal, where a transport charge may be added to the price. When delivery charges are directly connected to the purchase of the priced product and not separately invoiced, the 2020 CPI Manual recommends they should be included in the price for the CPI (paragraphs 5.18 and 11.59). However, when comparing the price for a sit-down meal in a restaurant with the price of a similar meal delivered after the lockdown it can be argued that the delivery charge should be disregarded since this covers an additional service that was not included in the price of the sit-down meal before the lockdown. When the lockdown is lifted, and prices of sit-down meals again can be collected, the last observed price for the delivery meal (excluding delivery charges) should be compared with the observed price for the reappeared sit-down meal.

(i) Transport services, including busses, trains and flights, is another area that have been heavily impacted by the pandemic. In many countries public transport and flights have been severely restricted or closed completely. This has made it difficult to find suitable prices that could be used for imputations. In general, the focus should be on pricing a service of similar quality.

(j) Price increases due to security measures (personal protection equipment charges or ‘covid-fees’) should normally be included as price changes in the CPI when the consumer receives the same product. Such charges, as seen for instance in personal services (e.g. dentists or hairdressers) can be regarded as increased production costs which are transferred to the consumers.

(k) In all circumstances, country specific conditions and the availability of data sources and resources in the NSO needs to be considered. In practise, there will often be a limit on which quality adjustments can be made because of a lack of specialized knowledge and resources more generally. Based on the main purposes of the CPI, it is up to the CPI compilers to allocate available resources to the various production steps (sampling, data processing, quality adjustments, communication) with the aim to maximize the quality of the overall CPI.

(l) Various personal protection equipment (PPE) products such as face masks and hand sanitizers/gel have become available in large quantities compared to the pre-lockdown period. Questions were raised if and how such products should be included in the sample for the CPI, if even for a limited period. It was mentioned that the prices of such products could be sampled and included in existing elementary indices containing similar types of products.

(m) Products made available by governments at nominal prices as well as products where price-ceilings have been introduced should be included in the CPI with the price actually paid by households.

(n) Tracking outlet closures and re-openings has also proved to be an issue associated with lockdown. It is crucial the NSO can identify when outlets close or re-open in order to pause or resume field collection. To this end, NSOs need to draw on available sources of information. More concrete guidance may need to be applied to define when a product is considered available or unavailable. This could be if there are no transactions at all or if there are only very few transactions that are not considered representative.

(o) Also, the collection of expenditure data through household budget surveys (HBS) may be affected by the pandemic, e.g. through restriction of interviewers. The weights that eventually will be derived based on expenditure data covering the lockdown period will show rather large changes because of changes in consumption patterns.

(p) International cooperation has been helpful during the covid-19 pandemic. This has included exchange of experiences between national statistical offices, the organisation of international webinars and the establishment of designated websites with guidance and examples of good practices, such as provided by Eurostat, ILO, IMF, OECD and UNECE (see, for instance, https://statswiki.unece.org/x/roKSE).

17. The following main conclusions were made:

(a) The lockdown has been a major challenge for the compilation of the CPI and other official statistics but has also been an opportunity to review work processes and methods.

(b) The lockdown demonstrated the use of having procedures in place that can be drawn on under such conditions. To ensure the production of a reliable CPI during lockdown (or other events that prevents price collection) a contingency plan should be in place which ideally would set out rules and procedures for price collection, imputations and communication.

(c) Utilization of new and alternative data sources and data collection methods has been crucial for ensuring as many prices as possible be collected to compile the CPI. Data sources include field data, administrative data, scanner data, web prices and other data providers (market research institutes etc.). Methods include traditional field collection by price collectors, e-mail, telephone, on-line reporting websites set-up by the NSO and collecting data from the web manually or by web scraping.

(d) The use of new data source and new collection methods raises important measurement issues regarding weighting and quality differences and how these should be adjusted for.

(e) The general recommendation is to collect as many transaction prices as possible using existing and new data sources and techniques. NSOs need to be flexible and adapt to the changing environment to ensure efficient and continued production of a reliable CPI.

(f) Moving towards a multi-source and multi-methods environment for producing the CPI will be a key future challenge for statistical offices. Such a system will help to build a more resilient production process. It will require use of multiple sources and techniques and integration of these into a coherent production system for the CPI.

C. Session 3. Imputations for missing observations, 4 November

18. The session was chaired by Patrick Kelly (Statistics South Africa). The session was based on presentations by Carsten Boldsen (UNECE), Mike Hardie (ONS, United Kingdom) and Rob Cage and Mark Bowman (Bureau of Labor Statistics, United States). Corrine Becker-Vermeulen (Statistics Switzerland), Jens Mehrhoff (German Bundesbank) and Claude Lamboray (Eurostat) acted as discussants. The discussion during the session was moderated by Christopher Jenkins (ONS, United Kingdom).

19. The webinar discussed imputation methods, under what conditions different methods are suitable, their advantages and disadvantages and potential impact on the overall CPI; issues related to the change in consumption pattern and expenditure weights and the possibility and advantages of having established contingency plans that can be used by NSOs in future cases of lockdown.

20. The following comments were made in the discussion:

(a) Because of the lockdown NSOs had to make quick decisions about imputation methods for a large number of missing prices. This underlined the value of having contingency plans ready in such situations.

(b) Prices may be missing because of different reasons. When deciding on what imputation methods should be applied it is useful to make a distinction between available and unavailable products. Available products are still being sold and purchased and it is possible to collect prices, although fewer than usually and they may have to be collected through different data sources. For instance, outlets may still be open, but price collectors are not available or are not allowed to enter outlets to collect prices. Unavailable products are no longer being sold and there are no transactions that can be priced, which can be the case when markets are closed. Examples of areas that have been closed include flights, hotels, restaurants and cafés, package tours, personal services (hairdressers etc.), cultural and sporting events, schools and day care services.

(c) For available products, the first issues to decide upon is to set a threshold for how many prices should be collected before implementing lockdown imputation rules. For instance, a threshold could be that minimum 80% of prices should be collected. If minimum 80% of prices are collected, the index can be calculated as usual. In many cases this implies that the missing 20% of the prices are imputed with the average price change of the collected prices.

(d) Elementary indices for which less than, say, 80% of the prices are collected should be reviewed and their reliability assessed. If the collected prices are still found to provide a reliable estimate of the elementary index the missing prices may be imputed by the price development of the observed prices or suitable prices collected for other elementary indices. However, if only few prices are collected and/or the collected price do not provide reliable information about the average price development of the elementary index to which they belong, they may be left out of the index calculation and the elementary index imputed by the development of a comparable elementary index or the nearest available higher-level price index (the parent index).

(e) It is up to the statistical office to set suitable thresholds, based on available information. The threshold should be high enough to ensure that the resulting indices have the necessary quality. A common threshold for all elementary indices is easy to implement and monitor but requires careful assessment of the resulting list of products or elementary aggregates that do not meet the minimum requirement. In addition to the proportion of prices that are collected, also the divergence in expected price changes and the weight of the elementary index should be considered. It may be easier to accept a larger share of missing observations for elementary indices that consists of products with expected similar price movements and for elementary indices with relative low weights. In other words, the ‘effective’ weight of the observed prices in the overall CPI should be considered. In all cases it is helpful to consider the potential impact of imputed prices on the CPI.

(f) The general recommendations of the IWGPS is to impute missing prices by the price change of comparable products or the parent index, the nearest available higher-

level price index. Carry forward in general is not recommended as it tends to bias the index towards zero price change. Under justified circumstances, the last observed prices can be carried forward for a limited period. This is acceptable where prices are known to be stable, expected to return to previous level after the crisis and for regulated prices.

(g) There is a need to distinguish between prices missing because of the lockdown or other reasons, e.g., bi-monthly or seasonal product prices. In the latter case, usual procedures should be applied.

(h) Calculation methods must be 'self-correcting', meaning that the index must return to the correct level after the lockdown irrespective of how missing prices are estimated. Changes between the last observed price and first imputed price, and between the last imputed price and first re-observed price must be properly captured so that the index shows the correct change from the last period where prices were observed to the period where prices again can be collected and included in the index calculation. This principle should also apply for the overall CPI; across the lockdown period it should be ensured that it returns to the correct level.

(i) In the case of unavailable products when markets are closed there will be product groups/elementary aggregates for which no prices are observed. In this case, the general recommendation of the IWGPS is to impute with a comparable elementary index, the nearest available higher-level price index or the overall CPI. If there are no transactions of a product, this is no longer part of the actual consumption basket. Imputing the price of the missing product with the overall CPI corresponds to leaving the product out of the CPI calculation. Imputing the prices of unavailable products with the overall CPI involves a rescaling of the weights of the available products to sum to unity. Carry forward in general is not recommend but may be used if duly justified for products with stable prices.

(j) Seasonal products should be treated according to normal procedures to the extent possible. Prices of out-of-season products should be imputed in line with methods in the CPI Manual chapter 11. Because of lockdown restrictions some services, e.g. package holidays, may show a different seasonal pattern, which may influence the overall CPI.

(k) Some NSOs found it helpful to develop and publish a decision tree that showed the process followed in arriving at the most appropriate method of imputation during the lockdown period. The decision tree allowed for a consistent approach to be applied by the NSO and ensured transparency for users to understand why certain imputations were used.

(l) Most CPIs are based on annual weights. A CPI based on annual weights shows the monthly change in the price of buying the same annual fixed basket. This is conceptually clear but requires use of estimated/imputed prices for products that are not available throughout the year. A CPI based on variable monthly weights avoids the use of estimated prices but is difficult to interpret since changes may be caused by changes both in prices and in the weights.

(m) IWGPS recommends keeping expenditure weights fixed adhering to the regular schedule for updating weights. Changing weights within a year are not consistent with the fixed basked approach and will create breaks in time series. Ad hoc changes of the weights may also be questioned and may harm the credibility of the CPI. While it is recommended to keep expenditure weights constant it was noticed that imputing missing elementary indices with the all-items CPI corresponds to leaving these out of the CPI compilation, i.e., setting their weights equal to zero and rescaling the weights of the remaining elementary indices to sum to unity.

(n) In many countries the consumption pattern in 2020 will be significantly influenced by the lockdown. In addition to closed or restricted markets, weights of some goods may also be influenced by households accumulating large stockpiles of essential storable goods.

(o) Eventually, consumption expenditure data for 2020 will be used for deriving the weights of future CPIs. Because of the lockdown the weights may be unusual, which can justify a special treatment. The 2020 CPI Manual recognises problems with unusual weight reference periods (paragraphs 3.72-3.75). It is preferable to choose a "normal" consumption period as the basis for weights and avoid periods in which there are special factors of a

temporary nature at work. To arrive at "normal" weights, the manual suggests adjusting the data to overcome irregularities by e.g. smoothing erratic data or taking averages of more than one year. If the 2020 weights will be used to compile the CPI for, say, 2022-2025 it can also be argued that the weights should be as representative as possible for the average consumption expenditure pattern of this period. It may be necessary to examine carefully the weights of goods and services that have been particularly affected by the pandemic, for example for such markets that have been closed. In these cases, additional adjustments of the weights may be justified.

(p) In 2021, the European Harmonised Index of Consumer Prices (HICP) will use weights representative for 2020, as the HICP is an annually chain-linked index with weights representing year t-1. Guidance on the compilation of HICP weights and how to treat the underlying expenditure is expected to be published soon.

21. The following conclusions were made:

(a) The proportion of prices that had to be imputed differ between countries and product groups. Countries were affected differently by the pandemic and implemented different restrictions. Within countries the timing of price collection, local restrictions and the availability of alternative price collection methods (telephone, e-mail, web prices, scanner data, big data) will affect the imputation rates. The availability of alternative data sources and capacity to utilize these are important to reduce the imputation rates.

(b) International guidance of the IWGPS on imputation methods in general have been useful. More detailed guidance and practical examples would be useful, including on the use of monthly vs annual rate of changes to impute missing observations and on the potential impacts of different imputation methods on the overall CPI. Additional guidance covering the period when the lockdown is lifted would also be helpful.

(c) When deciding on imputation methods the main uses of the CPI should be considered. Different imputation methods have different effects on the monthly and annual rate of changes of the CPI. Also, national circumstances must be considered, for instance it may be decided to impute missing prices by use of observed price changes/indices in the same area or region rather than by a country wide price change. It would be useful to test the sensitivity of the CPI to different approaches and share experiences in this area.

(d) Transparency regarding methods and procedures applied should be insured. Methods, definitions etc. must be documented to support the production of the CPI and for information of users. A decision three specifying the conditions for applying different imputation methods may be helpful to guide work and ensure consistent treatment.

(e) Experiences from countries indicated a need for having contingency plans ready that could be use in future situations of lockdown. To this end, a reference document of recommendations and best practices should be developed that NSOs may use for establishing national contingency plans for the CPI.

D. Session 4. Communication, 11 November

22. The session was chaired by Vagner Ardeo (Fundação Getulio Vargas, Brazil). The session was based on presentations by Leigh Merrington (Australian Bureau of Statistics), Marie Leclair (INSEE, France), Rakesh Kumar (National Statistical Office, India) and Helen Sands (ONS, United Kingdom). Christopher Jenkins (ONS, United Kingdom) acted as moderator.

23. The webinar discussed communication of the quality and reliability of the CPI, how this may be affected by the lockdown, different ways to measure and explain potential impacts to users and publication of supplementary analysis and experimental/analytical CPI series.

24. The following main points and conclusions were made during the session:

(a) It is crucial to inform users of the quality and reliability of the CPI and how this may be affected by the lockdown. This could include information about changes in the

sample and imputation methods. For instance, it may be useful to inform users about the importance (the weight) of goods or services for which markets have been closed temporarily, and what potential impact this may have on the overall CPI. This could also include information about how missing goods or services are treated in the CPI, where these have a significant weight or have been attracting media interest, for instance childcare institutions, air travels or hotels/restaurants.

(b) When the CPI is based on existing annual weights and imputation of missing prices it can be helpful to explain this to users and what implications this have, i.e. that (temporary) changes in the consumption pattern during the lockdown is not reflected in the CPI and that the CPI may differ from households' perceived inflation.

(c) Information about imputation rates by product groups/sub-indices affected by the lockdown will be useful for users and can serve as a measure of the impact of the lockdown on the CPI. In general, it is recommended to publish and flag data of sub-indices that are imputed or where a significant share of the prices have been imputed. For instance, Eurostat suggest flagging sub-indices if more than 50% of the prices have been imputed. Estimates of the impact of imputations and analysis of effects of changes (reductions) in the sample may also be helpful to inform users.

(d) Since the situation may change from month to month, it may be useful to accompany the CPI release with a monthly methodological note that explains the main features of the current month.

(e) While the general recommendation is to continue compiling the regular headline CPI based on existing annual weights and imputed missing prices it may be useful to compile supplementary experimental or analytical CPI series. If weights during the lockdown period are available or can be estimated, it may be possible to compile an analytical or experimental CPI reflecting the price development of the lockdown basket. While this may not meet the quality standards of the regular headline CPI, it may still help to picture the development and meet user needs. If an experimental CPI is compiled based on monthly weights possible drifting should be avoided by ensuring proper chaining of the month-on-month indices.

(f) Lockdown weights may be derived from relevant available data sources, including short term business statistics, scanner data and big data. These weights may be more volatile and less reliable than weights derived from the regular HBS but may still serve as estimates. Timely short-term (monthly or quarterly) expenditure weights estimates may also provide insight into consumer behaviour which information may also be published or shared with interested users.

(g) It may also be possible to compile an experimental CPI based on the price development of only those products that are still available. Such an index would include imputations for products that are still available but would leave out products in closed markets and would be relatively easy to compile by leaving the unavailable products out of the calculation.

(h) Supplementary analysis or experimental CPI series may also be helpful in situations where other institutions (private banks, market research companies etc.) may release estimates of consumer price inflation during the lockdown. In all cases, however, considerations should be made not to undermine the official CPI or creating confusion among users with the publication of supplementary analysis or experimental CPI series.

(i) Where NSOs have been collecting additional, high frequency price data to help during lockdown restrictions, such as daily or weekly web scraping or scanner data, the NSO may wish to compile and disseminate supplementary 'high-frequency' indices (weekly price indices for food items, for instance). These indices will provide the NSO with an opportunity to utilise alternative data sources and methods, but care must be taken to ensure users fully understand any limitations and don't confuse the experimental indices with the headline CPI.

(j) Experiences showed that it is useful to be proactive in communication with users. When possible, it is useful to reach out to inform key users such as e.g., central banks and ministries of finance in advance and inform about expected changes. This could also include economists, researchers and users that use the CPI for indexation purposes, including

governments and labour organisations. In cases where the CPI is used for indexation this may create additional interest in the possible effect on the CPI of the lockdown since this may have significant economic consequences.

(k) In general, statistical offices received positive feedback from users and stakeholders. Two-way communication with user groups may help to establish work relationships. Contact to key users may also be used for consultation and soliciting inputs and views that may be helpful to the NSO when deciding on methods and communication. Consultations may take place bilaterally or the NSO may organise (online) briefings for selected users. Important changes in data sources or methods should be communicated to the public well in advance and would also in many countries involve consultation with user groups and advisory boards on CPI.

(l) Transparency is crucial to maintain the trust in the CPI. Data sources and methods should be documented and made available to users of the statistics. Hence, the lockdown is also an opportunity for the NSO to meet user needs and enhance the reputation of the CPI.

(m) It is useful to share experiences and good practices in communication with users among NSOs. The IWGPS guidance note was in general found useful. It is helpful for countries that they can refer to internationally agreed recommendations when explaining their practices to users.

25. Examples of communication and supplementary analysis and experimental CPIs are available in the presentations on the website of the webinar.