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Report

Summary

The present document is the report of the meeting of the Group of Experts on Consumer Price Indices 2 – 10 June 2021. This report is provided to inform the Conference of European Statisticians of the organisation and outcomes of the meeting.

I. Introduction

1. The meeting was organised by the United Nations Economic Commission for Europe (UNECE) in cooperation with the International Labour Organization (ILO). The agenda of the meeting was prepared by the UNECE Steering Group on Consumer Price Indices.
2. The five sessions of the meeting were attended by 500 participants from 110 countries and more than 20 organisations and universities. Experts from national statistical offices (NSOs) of the following countries participated: Afghanistan, Albania, Andorra, Angola, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bangladesh, Belarus, Belgium, Belize, Botswana, Brazil, Bulgaria, Burkina Faso, Cambodia, Cameroon, Canada, Chili, Colombia, Costa Rica, Croatia, Cyprus, Denmark, Dominican Republic, Egypt, Estonia, Eswatini, Ethiopia, Finland, France, Gabon, Georgia, Germany, Guinea, Hong Kong (China), Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Lithuania, Luxembourg, Madagascar, Malaysia, Maldives, Malta, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Netherlands, New Zealand, Niger, Nigeria, Norway, Pakistan, Palestine, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Saint Lucia, Samoa, Sao Tome and Principe, Senegal, Serbia, Singapore, Slovenia, Somalia, South Africa, Spain, Sweden, Switzerland, Tanzania, Tunisia, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Uzbekistan, Vanuatu, Vietnam and Zimbabwe.
3. Experts from the following organisations participated: Bank of Canada, Bank of Italy, Bank of Japan, City University of New York, European Central Bank, European Free Trade Association (EFTA), Eurostat, Eurasian Economic Commission, Fundação Getúlio Vargas, Brazil, Georgian National University, ILO, International Monetary Fund (IMF), Interstate Statistical Committee of the Commonwealth of Independent States (CIS-STAT), Organisation for Economic Co-operation and Development (OECD), Tbilisi State University, 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), University of Tokyo (Japan), University of Tuscia (Italy) and ValueBridge Advisors.
4. The meeting was chaired by Christopher Jenkins, Office for National Statistics, United Kingdom.

II. Organization of the meeting

5. The meeting was organised in the following sessions:
 - (a) Session 1. New data sources – scanner Data
 - (b) Session 2. New data sources – web scraping
 - (c) Session 3. Quality changes and quality adjustment methods
 - (d) Session 4. Meeting user needs
 - (e) Session 5. Producing CPI under lockdown
 - (f) Session 6. Information items
 - (g) Future work
6. The main outcome and conclusions of the sessions are summarised in section III.
7. The proceedings of the meeting are available on the UNECE website: <https://unece.org/info/Statistics/events/348376>

III. Summary of main outcome and conclusion of the meeting

A. Session 1. New data sources – Scanner data

8. The session was chaired by Corinne Becker Vermeulen (Statistics Switzerland). The session was based on presentations by Claude Lamboray (Eurostat), Kjersti Nyborg Hov (Statistics Norway), Gwendoline Volat (National Institute of Statistics and Economic Studies (INSEE), France), Alex Rose (Office for National Statistics, United Kingdom), Alessandro Brunetti (Italian Statistical Institute (Istat)) and Antonio G. Chessa (Statistics Netherlands). The discussion was moderated by Beiling Yan (OECD).

9. The presentations provided an overview of different approaches to utilise scanner data and discussed multilateral methods, aggregation issues, machine learning as a classification tool and experiences from countries on implementing scanner data.

10. More and more statistical offices are using scanner data directly in the production of the CPI. Scanner data is a promising data source for compiling the CPI. It facilitates easy collection of prices and weights data of high quality, better geographical coverage and better or even full coverage of the reference period. Where available, scanner data can replace field price collection and reduce response burden. By providing information on quantities and turnover, scanner data allows weighting at a detailed level.

11. However, there are challenges in relation to classification and compilation methods. Regarding classification, using machine learning to classify products from scanner data into the CPI basket can significantly reduce the time spent on classification and improve the quality of the classification.

12. Scanner data allows compiling monthly chained indices where products are priced and weighted at a detailed level. However, such chained indices are likely to be subject to chain drift bias. Multilateral methods offer solutions to avoid this type of bias but also raise challenges, including: 1) Lack of consensus of which multilateral methods should be the preferred ones; choice of formula, linking and splicing methods and length of estimation period (the time window). 2) How to combine multilateral price indices with indices derived from other data sources and with other methods, which is needed since multilateral methods cannot be used for all products in the CPI basket. 3) How to ensure the quality of multilateral price indices?

13. Further research and testing are needed to gain more experiences and developing international consensus and ranking of the most appropriate methods. It will be important to continue sharing of methods and practical experiences among countries.

B. Session 2. New data sources – Web scraping

14. The session was chaired by Christopher Jenkins (Office for National Statistics, United Kingdom). The session was based on presentations by Pavel Belchev (Eurostat), Leigh Merrington (Australian Bureau of Statistics), Liam Greenhough (Office for National Statistics, United Kingdom), Alice Xu and Zachary Weselake-George (Statistics Canada), Črt Grahonja and Matevž Postrašija (Statistical Office of Slovenia), and Roobina Keshishbanoosy and Lance Taylor (Statistics Canada). The discussion was moderated by Antonio G. Chessa (Statistics Netherlands).

15. The session discussed methodological challenges with web scraping, classification of web scraped data and practical experiences from countries using web scraping.

16. The automated collection of online prices (web scraping) presents a real time and rich source of data for use in the compilation of the CPI. Progress is being made by NSOs across the world in both the research and use of web scraping for the CPI. There remain challenges to overcome, which can be considered from three perspectives - the practical issues with web scraping, methodological issues, and implementation issues.

17. Practical issues. More NSOs are experimenting with web scraping and are building capability in developing both the code (robots) and infrastructure to scrape prices on a regular basis. Other NSOs are working with third party establishments who scrape on their behalf. The wider CPI community would benefit from the sharing of code to assist with the initial implementation of web scraping. Many prices can be collected through web scraping, all of which need classification before they can be used in CPI. Machine learning techniques can help with this classification and progress is being made with research in this area.

18. Methodological issues. Web scraped prices can be used to replace prices that would otherwise be collected through traditional modes (field price collection or collection through questionnaires) and used for the compilation of bilateral price indices. Multilateral methods are being researched and may offer more scope to achieve the full potential of web scraped prices although there is no consensus on the most suitable method. Unlike with scanner data, there are no quantities or expenditure data that accompany web scraped data and therefore further research is required to investigate suitable proxy data that can be used for weighting.

19. Implementation issues. Web scraping, alongside scanner data, presents NSOs with an opportunity to dramatically increase the amount of price data available for use in CPI. However, this will require the introduction of new methodologies and users will need to understand the impact of such new indexes on CPI. The research presented to date will go some way to explain what impact web scraping may have in comparison to traditional price index methods, but more is needed. Sharing of experiences and good practices among NSOs will be helpful to move work forward.

C. Session 3. Quality changes and quality adjustment methods

20. The session was chaired by Christopher Jenkins (Office for National Statistics, United Kingdom). The session was based on presentations by Brian Barnier (Value bridge Advisors and City University of New York), Alexandra Schindlar (Statistics Austria), Brendan K. Williams (Bureau of Labor Statistics, United States), Kristiina Nieminen (Statistics Finland) and W. Erwin Diewert (University of British Columbia, Canada). The discussion was moderated by Rui Evangelista (Eurostat).

21. The session included papers and presentations covering a new perspective on quality adjustment from the viewpoint of product managers, quality adjustment of telecommunication services, the development of quality adjustment practices over the previous decades and quality adjustment and hedonics.

22. The attributes or price determining characteristics, which NSOs tend to focus on may differ from those which are considered by retailers and households and may not necessarily be the best to capture quality changes. There is potential for price indices to miss out on the reality of how products are priced and sold. For quality adjustment, NSOs should consider product management strategies to understand how retailers operate and what customers look for when buying.

23. The onset of real time data sources, such as scanner and web scraped data, offer NSOs opportunities to adjust for quality changes in dynamic and fast paced areas of the CPI basket, such as telecommunications. However, there is still further research required to identify the most appropriate model to use with such data, although a hedonic time dummy approach is displaying promising results.

24. Quality adjustment remains one of the most important and challenging aspects of price index compilation, and not getting this correct can lead to biases in the CPI. From the theoretical perspective, the many approaches to quality adjustment are well researched and evolving. The use of hedonics for quality adjustment continues to present challenges for NSOs although research is providing confidence in the suitability of these methods in CPI.

25. From a practical perspective, NSOs continue to adapt their approach to quality adjustment and the use of new data sources may help. However, it is acknowledged that with new data sources comes new methodologies and potential issues that will need further research in respect of capturing quality change in CPI. Given the importance of quality adjustment and the potential impact on CPI, the development and research in this area of index compilation is one that needs to continue.

D. Session 4. Meeting user needs

26. The session was chaired by Paul Konijn (Eurostat). The session was based on presentations by Christopher Payne (Office for National Statistics, United Kingdom), Thomas Chikadaya (Zimbabwe National Statistical Agency), Vladimir Miranda (Brazilian Institute of Geography and Statistics), Juan Daniel Oviedo (National Administrative Department of Statistics (DANE), Colombia), Rob Cage (Bureau of Labour Statistics, United States) and Paul Armknecht (expert). Valentina Stoevska (ILO) acted as moderator.

27. The session discussed a variety of subjects related to different user needs. One subject was the compilation of consumer price indices for households in different income groups. Household budget survey information can be used to estimate expenditure breakdowns by household type, while the price information tends to be the same for each household type. To come closer to inflation as experienced by households, further steps can be taken such as using democratic weighting instead of plutocratic weighting, or to move from the domestic concept of expenditure to the national concept. In the discussion, it was noted that a multitude of different indices could also confuse users.

28. Another topic addressed was the use of weights in the CPI. For an accurate measure of current inflation, weights are needed that reflect current expenditures. However, these are not available in real time. The pros and cons of price-updating previous period weights to the price reference period when the weights are introduced in the index were discussed, including the relation to the elasticity of substitution. It is also possible to compile superlative indices retrospectively, or to forecast the real-time weights. In the discussion, it was pointed out that the elasticity of substitution is different across different goods and services, thereby calling for different approaches to price-updating for different products. It was also questioned whether forecasting weights should be a task for an NSO.

29. Further subjects discussed were the challenges of CPI compilation in markets in which different payment systems operate in parallel and the measurement of ride sharing services based on data scraped from the internet. The discussion concentrated on whether the payment channel should be part of the product descriptions, and on the need for fall back solutions in case data scraping fails.

30. The chair concluded that the session had been very rich in the number of subjects addressed demonstrating the wide and important uses of CPIs, as well as the efforts of NSOs to address user needs. The session included presentations from four different continents which reflects the global nature of the issues discussed.

E. Session 5. Producing CPI under lockdown

31. The session was chaired by Patrick Kelly (Statistics South Africa). The session was based on presentations by Catherine Smyth (Australian Bureau of Statistics), Christopher Jenkins (Office for National Statistics, United Kingdom), Ioannis Xirouchakis (Eurostat), Rafael Gaona Lopez (National Institute of Statistics, Geography and Informatics, Mexico) and Anya Stockburger (Bureau of Labour Statistics, United States). Brian Graf (IMF) acted as moderator.

32. New data sources, such as scanner data, give a more responsive indication of short-term inflation related to panic buying and lockdown. The quantity and price information contained in scanner data reveals the specific product categories affected, and the pricing response of retailers to changes in demand.

33. The draft *Guide on producing CPI under lockdown* was presented. Based on the experiences with producing the CPI during the pandemic, the Guide provides recommendations and good practices for data collection, imputation methods and communication that countries may refer to in periods of lockdown or similar exceptional circumstances. Meeting participants were encouraged to review the Guide and send comments before end of June 2021. The Guide is prepared by a task team under the UNECE Steering Group on CPI, consisting of experts from Georgia, Italy, United Kingdom, United States, Eurostat and UNECE. It will be finalised in autumn 2021 and made available online for countries to refer to.

34. The lockdown measures during the pandemic had significant impact on households' consumption pattern in many countries. The unusual consumption expenditure shares in 2020 and 2021 pose two important challenge to NSOs when updating the weights of the CPI.

35. Firstly, the usual data sources (e.g. the household budget survey) may have been impacted by the lockdown and may therefore not be fully representative of households' consumption. Hence, there is a need to assess the quality of the data sources. Alternative data sources, such as national accounts data, short-term statistics, energy, transport and tourism statistics, can be used for this purpose and to estimate expenditure weights.

1. Secondly, when deriving weights based on data for 2020 and 2021, NSOs will need to carefully examine the weights and consider whether adjustments should be made to reduce the temporary impact of the lockdown on the weights. Adjustments to arrive at "normal" weights includes, e.g., smoothing erratic data or taking averages of more than one year. More frequent (e.g. annual) updating of the weights provides more scope for using more recent data and thereby capturing the shifts in consumption patterns during and after the pandemic. Timely data sources can be used to estimate expenditure weights.

2. The use of alternative data sources on household expenditure and the calculation of weights in times of disruption were identified as topics for future discussion.

F. Session 6. Information items

Report from the UN Task Team on scanner data

3. Tanya Flower (Office for National Statistics, United Kingdom) gave a report of the work of the UN Task Team on scanner data. The work of the Task Team is divided in three work streams: 1) developing guidance for using alternative data sources; 2) developing classifications tools; 3) developing training material. The Team aims to publish an e-handbook on the use of alternative data sources in September 2021. A joint workshop with Eurostat is planned to take place towards the end of 2021. More information is available from the Task Team [homepage](#).

Presentation of the 2020 CPI Manual

4. Brian Graf (IMF) presented the 2020 *CPI Manual*. After global consultation with countries and reviews by the IWGPS, the Manual was adopted as an international statistical standard by the United Nations Statistical Commission in March 2020. The Manual was published in December 2020 by IMF. It will be translated into several languages. Draft chapters of the publication *Consumer Price Index Theory* that will complement the CPI Manual are currently under review.

Information about the meeting of the Ottawa Group on June 2022

5. Federico Polidoro (Istat) informed that the next meeting of the Ottawa Group on Price Indices is scheduled to take place in Rome, Italy, on 7-10 June 2022. The meeting will be jointly hosted by Istat and Bank of Italy.

F. Future work

6. The following topics were proposed to be discussed at the 2023 meeting of the Group of Experts on Consumer Price Indices:

- a) New data sources – scanner data
 - b) New data sources – online prices and web scraping
 - c) Quality adjustment methods
 - d) Expenditure weights
 - e) COICOP 2018 – implementation in the CPI
 - f) CPI and the measurement of wellbeing, digitalisation and the sharing economy
 - g) Modernising CPI production
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