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Group of Experts on Consumer Price Indices**Eleventh session**

Geneva, 26 – 28 May 2014

Report**Note by the secretariat***Summary*

The present document is the report of the meeting of the Group of Experts on Consumer price Indices, 26-28 May 2014, and is provided to inform the Conference of European Statisticians of the organization and outcomes of the meeting.

The Conference of European Statisticians at its plenary session in June 2013 approved the UNECE Statistical Programme for 2013 (Report of the Conference of European Statisticians, Sixty-first plenary session, Geneva, 10-12 June 2013; document ECE/CES/85, para. 71). The Statistical Programme for 2013 includes the list of meetings planned to be organized from June 2013 onwards. The list includes a meeting of the Group of Experts on Consumer Price Indices to be organized jointly with the International Labour Organization and held in Geneva in 2014 (document ECE/CES/2013/14, Annex I, para. 30).



I. Introduction

1. The Group of Experts on Consumer Price Indices (CPI) meeting was held in Geneva on 26–28 May 2014. The meeting was organised jointly by UNECE and ILO. It was attended by Armenia, Australia, Austria, Azerbaijan, Belarus, Belgium, Canada, Chile, China, Côte d'Ivoire, Denmark, Estonia, Fiji, Finland, France, Georgia, Germany, Iceland, Ireland, Israel, Italy, Japan, Kazakhstan, Kyrgyzstan, Latvia, Luxembourg, Madagascar, Mauritania, Mexico, Moldova, Morocco, Netherlands, New Zealand, Norway, Poland, Russian Federation, Serbia, Singapore, Slovenia, South Africa, Sweden, Switzerland, Tajikistan, Thailand, Turkey, Uganda, Ukraine, United Kingdom, United States of America, Viet Nam and Uzbekistan. Representatives of the European Central Bank (ECB), the Organization for Economic Co-operation (OECD) and Eurostat attended. The following specialised agencies and intergovernmental organizations attended: the International Labour Office (ILO), the International Monetary Fund (IMF), the Food and Agricultural Organization (FAO), Eastern Africa Statistical Training Centre (EASTC), the Economic and Statistical Observatory for Sub-Saharan Africa, the Interstate Statistical Committee of the Commonwealth of Independent States (CIS-STAT) and the Secretariat of the Pacific Community. Mr. A. Cavallo, Massachusetts Institute of Technology, United States, Mr. W. E. Diewert, University of British Columbia, Canada, Ms. N. Abesadze, Tbilisi State University, Georgia, Ms. Rusudan Kinladze, Georgian Technical University, Georgia, and Mr. D. Fenwick, United Kingdom, attended the meeting as invited experts.

2. The meeting was chaired by Mr. Michael Horrigan, Bureau of Labour Statistics, United States of America.

II. Organization of the meeting

3. The following topics were discussed at the meeting on the basis of the provided papers and presentations:

- (a) Workshops on Consumer Price Indices:
 - Elementary price indices
 - Higher-level Price Indices
 - Treatment of seasonal products
 - Quality adjustment: A general framework and the role of Hedonics
 - Core inflation measurement
 - Scanner data
 - Quality management
 - The Price Index Processor Software
- (b) Update of the 2004 CPI Manual
- (c) Methodological issues I
- (d) Methodological issues II
- (e) Price collection methods
- (f) Difficult to measure products and services
- (g) Management
- (h) Future work

III. Summary of discussions and main conclusions reached at the meeting

4. During the workshops, which were organised by statistical offices from a number of countries and organisations, substantial and comprehensive discussions took place based on papers and presentations provided by the organisers and the participants. Brief summaries of the outcome of the workshops are included in the Annex to this report.
5. A proposal for a possible update of the 2004 CPI Manual prepared by the Intersecretariat Working Group on Price Statistics (IWGPS) was presented in session 2 of the meeting. The participants unanimously supported that work to update the 2004 CPI Manual should be initiated. The work should be organised under the auspice of the IWGPS by establishing a CPI Technical Expert Group (CPI-TEG) to update the manual. The IWGPS should report on progress of work to the CPI Expert Group Meeting in 2016 and solicit comments and proposals from countries and organisations for the further work. A number of proposals of topics that should be addressed in an update of the CPI manual were raised, which are listed in the Annex.
6. In sessions 3 to 7 a number of methodological and practical topics were discussed. Summaries of the outcome of the sessions are also included in the Annex.
7. Recommendations for future work discussed in session 8 are given below.
8. The proceedings of the meeting, including this report, are available from the UNECE website www.unece.org/stats/documents/2014.05.cpi.html.

IV. Recommended future work

9. The participants recommended that a meeting of the Group of Expert on Consumer Price Indices should be organised in 2016 and included in the programme of work of the Conference of European Statisticians (CES). The following topics were suggested for possible inclusion in the agenda:
 - (a) Update of the 2004 CPI Manual
 - (b) Communication and dissemination
 - (c) Scanner data and web-scraping; theory and practices
 - (d) Difficult to measure services and products (including QA)
 - (e) Higher-level price indices (COLI/COGI, chain-drift)
 - (f) Elementary indices (weights and formulas)
 - (g) Sampling (Outlets, products, quality assurance)
 - (h) CPI for population groups, by income and geographical areas
 - (i) Commercial property price indices
10. UNECE should solicit countries volunteering to organise sessions to ensure in-depth discussions of topics. Organisation of workshops and/or poster sessions should be considered.

Annex

Reports of workshops and sessions

I. Session 1: Reports from the workshops

A. Workshop 1: Elementary Price Indices

Organiser: Erwin Diewert, University of British Columbia, Canada

1. The workshop discussed the relative advantages and disadvantages of the three main index number formulae that are used to aggregate prices at the lowest level of aggregation when quantity or expenditure information is not available: the Carli, Jevons and Dutot formulae. An econometric method, the Time Product Dummy method, reconciling with the overall target index, methods of aggregating prices at the elementary level using price information for more than two periods were also discussed.

2. The workshop included a presentation of the Consistency in Aggregation Approach by the German Central Bank. To preserve consistency in aggregation when choosing formula for elementary indices the target of the CPI should be taken into account. Possible bias, the use of weights within elementary indices and elasticity of substitution were also discussed. The practice of using a particular month, often December, for chaining may introduce some asymmetry; further work in analysing other options would be useful.

B. Workshop 2: Core inflation measurement

Organisers: Irina Goryatcheva, CIS-STAT, and Michael Silver and Brian Graf, IMF

3. This workshop provided an overview of different methods for measuring core inflation and discussed how to choose among these. Focus was on the practical issues of credibility of core measures and the relationship between the central bank and national statistical offices (NSOs) in the design, compilation and publication of the measures. There were a number of presentations by the organisers, CIS-STAT and IMF, the State Statistics Committee of Ukraine and Statistics Norway, which addressed a number of practical issues and challenges in compilation and dissemination of a core inflation measure.

4. The preferred method appears to be the “omission-approach” where a group or groups of goods or services are excluded. This method is easy to implement in practices and transparent.

5. Transparency was underlined to be crucial to ensure general trust in the core inflation measure; without trust it will be difficult to anchor inflation expectations to the measure and it will fail as a useful tool for the monetary authorities.

6. Cooperation with main stakeholders, usually the central bank, is important to ensure the general acceptance of the core inflation measure. In some instances it may be more appropriate that the central bank calculates and publishes the core inflation measure, while the NSO may provide the required input data for the calculation. Micro data collected by the NSO, nevertheless, should be kept confidential.

7. In the following discussion it was stressed that in cases where the NSO is compiling the measure, it should not be labelled “core inflation” because of the ambiguity of this term. Rather, the measure should be labelled, for example, “CPI excluding food and energy”, or in similar descriptive terms.

C. Workshop 3: Quality management

Organisers: Mari Ylä-Jarkko, Statistics Finland, Derek Bird, Office for National Statistics, UK, and Rafael Gaona Lopez, National Institute of Statistics and Geography, Mexico

8. The workshop discussed how the CPI production process can be organised and monitored to ensure the over-all quality of the published CPI. Examples of quality management frameworks (QMF) were presented by the organisers of the workshop, which demonstrated how quality frameworks can be implemented in practice and benefits in terms of streamlining and documenting the production process, quality assurance and cost/benefit optimization.

9. Implementing a QMF will include management and quality assurance of the various steps of compiling the CPI, from the planning of the sample of products, the regular price collection, data validation, calculation and publication of the figures. The possible use of tools such as the Generic Statistical Business Process Model (GSBPM) and the Generic Statistical Information Model (GSIM) were also mentioned; exchange of experiences in using these would be valuable.

10. A quality management framework is useful to, in the first instance, describe current procedures and practices, and in the second instance, a useful tool to improve these procedures. A QMF thus is also helpful to support improvements and innovations, and an indispensable tool for long-term strategic management. The issue of QMF focusing on processes and quality assessment frameworks focusing on the quality of the outcome statistics was also mentioned.

11. There are different QMFs which, nevertheless, have much in common. Sharing experiences between countries was thought to be very valuable; both for countries which have already implemented a framework, and countries considering implementing a QMF framework could benefit much from experiences from other countries and not have to start from scratch. It was proposed that an update of the CPI should provide material on QMF to guide countries.

D. Workshop 4: Scanner data

Organiser: Muhanad Sammar, Statistics Sweden, and Martin B. Larsen, Statistics Denmark

12. The objective of the workshop was to clarify the concepts of scanner data and address a number of important issues, such as quality assurance, confidentiality, cooperation and agreements with data providers and scanner data software. The session included papers from Sweden, Iceland, Austria and Denmark and a presentation by GS1¹. The following comments and conclusions were made during the workshop:

(a) Scanner data can be used in 2 ways; for analysis and data validation, or as direct input into the regular CPI compilation. Scanner data can help in reducing costs for price data collection, increase sample sizes and reduce measurement errors.

¹ GS1 is a neutral, not-for-profit, global organisation that develops and maintains the most widely used supply chain standards in the world. GS1 has local Member Organisations in over 110 countries. The EAN-13 barcode is defined and maintained by GS1. The EAN-13 barcode (*originally European Article Number*, but renamed to *International Article Number* while the abbreviation EAN has been retained) is a 13 digit (12 data and 1 check) barcoding standard which is a superset of the original 12-digit Universal Product Code (UPC) system developed in the United States. More information at www.gs1.org

(b) Scanner data need to be mapped to COICOP in order to compile indices according to this classification. Mapping the GS1 global EAN-codes to COICOP is a challenge in countries. To this end further cooperation and exchange of experiences and good practices would be useful.

(c) It is possible to process scanner data using the Global Data synchronization Network (GDSN). This system gives important information such as the Global Trade Item Numbers (GTIN), price, quantity and date.

(d) The presentation from Denmark explained the collection and index calculation of COIOP group 1 and 2 based on scanner data. To implement scanner data in Denmark an IT system was created based on maintaining the link between EAN and COICOP and drawing and maintaining a representative basket.

(e) It is important to consider how long it is necessary to preserve scanner data in full detail and which strategy can be used to store data for future research. Iceland considered that it is sufficient to keep scanner data for 18 months for use in CPI, HICP and PPP. For research raw data should be aggregated and archived without links to store or chain information.

(f) It is necessary to build up a unified production system for scanner data processing, including data recording, processing and editing. The paper presented by Austria highlighted the necessity to keep in mind the potentially large resources needed to integrate scanner data into the CPI compilation process.

(g) While scanner data offers detailed products characteristics, the challenge is to integrate scanner data in the production of the regular CPI. A gradual, step-by-step approach was recommended.

(h) There are still issues with the quality of scanner data and how to ensure this (Comparisons with information from traditional surveys and other sources may be helpful) and problems with replacements that need further work.

E. Workshop 5: Higher-level index formulas, substitution and CPI weight updates

Organiser: Marcel van Kints, Australian Bureau of Statistics

13. The main goals of the workshop were to discuss the traditional approaches generally used in NSOs in calculating higher-level indices and uncover possible weaknesses of these approaches. The following points and conclusions were made during the workshops:

(a) When determining the purpose(s) of the CPI the methods for calculating both elementary and higher-level price indices should be considered. The question of what are the practical implications of choosing a Cost of Good Index (COGI) or a Cost of Living Index (COLI) as the principal target of the CPI was also raised

(b) How should elementary aggregates and higher-level aggregates be defined and delineated? The level of aggregation where elementary aggregates are formed and from which level further aggregation is made as simple weighted averages of the elementary indices was found to be of particular importance. The level of aggregation is likely to influence the overall CPI and has also implications for e.g. adjustment for quality changes.

(c) Because of better and more detailed data availability, the trend seems to be to have more detailed elementary aggregates, and growing use of weights within elementary indices.

(d) Laspeyres, Laspeyres-types, Young and Lowe indices and price-updating of expenditure weights were discussed. Under 'normal' conditions Lowe will be upward biased against Laspeyres, which in turn will be upward biased against a superlative index,

while Young may have some problematic axiomatic properties. When determining the target of the CPI the (geometric) Lowe and Young indices should be considered. Some clarification of terminology is needed.

(e) The main data sources for higher-level indices are household expenditure surveys (HES) and national accounts data (often both are used in a combined approach using HES at the detailed level and national accounts data at aggregated level), while other data sources may also be used.

(f) Although calculating different types of indices (like COLI for pensioner and different income level groups) satisfies user needs, it also complicates the choice of convenient and appropriate indices to use in public monetary policy decisions.

14. The workshop concluded with the introduction of a data quality framework with seven quality dimensions: Institutional Environment; Relevance; Timeliness; Accuracy; Coherence; Interpretability; and Accessibility. It was underlined that these seven dimensions are necessary for quality assessment and reporting while their order or importance can change depending on NSOs initiative.

F. Workshop 6: Quality adjustment: A general framework and the role of Hedonics

Organiser: Michael Silver and Brian Graf, IMF

15. When items disappear it is not always possible to find a replacement of similar quality. The workshop provided an overview of methods for adjusting for quality changes when disappearing items are replaced by items of a different quality, and what data are needed to perform this adjustment. The workshop presented and discussed practices of relatively straightforward methods, including indirect methods of imputation and linking, and direct methods, including the use of Hedonic regressions. Such regressions are also used when there is a rapid turnover in transactions on models with differing characteristics, such as consumer electronics, and can be applied to separately constructed databases taken, for example, on a monthly basis from retailers' websites on the prices and characteristics of different models on the market.

16. A number of presentations were provided by the organiser, IMF, New Zealand and Switzerland. In the discussion it was mentioned that Hedonics may be a suitable method for house price indices (where, for example, it may be useful to single out the land component of the total price of the property). It may also be suitable for rent surveys and for, e.g. cars and many products typically found in supermarkets. Web scraping was mentioned as one way to collect product characteristics that should be further analysed.

G. Workshop 7: Seasonal products

Organiser: Federico Polidoro, National Institute of Statistics of Italy

17. The treatment of seasonal products continues to be one of the main challenges in CPI compilation. The workshop discussed the nature of seasonal products and different methods in which they can be included in the CPI. The workshop included presentations by the organiser, the Central Bank of Turkey and Hungary. The following issues were raised in the discussion:

(a) For which product groups (e.g. fresh food, clothing and footwear) should the variable or the fixed weights approach be applied, and what are the experiences from using these two approaches? Experiences of EU member countries applying the regulation on seasonal products for compilation of the Harmonized Consumer Price Indices (HICPs) would be useful to share.

(b) Changing seasonality, i.e. when in-season months change from year to year, appears to pose particular problems in many cases. Alternatives to the traditional fixed and variable weights approached should be considered. It may be that no single method will provide the better results in all cases for which reason methods may be selected on case-by-case basis.

(c) Large price fluctuations often associated with strong and weak seasonal products pose problems to CPI compilers and users, such as central banks, interested in the underlying price development. A changing seasonal pattern means that such price fluctuations are also often not predictable. Underlying, analytical series may be produced, although it was stressed that compilers should be careful that methods applied will not alter or unduly reduce the seasonal variation.

18. The workshop concluded that an update of the 2004 CPI Manual should provide clearer recommendations on the treatment of both weak and strong seasonal products.

H. Workshop 8: The Price Index Processor Software (PIPS)

Organiser: Paul Armknecht, Expert, and Niall O’Hanlon, Central Statistics Office of Ireland

19. The Price Index Processor Software (PIPS) offers a complete statistical system for the regular production of consumer and producer price indices by national statistical offices. PIPS consists of two applications, one for processing establishment data to produce a producer price index and one for processing outlet and rent data to produce a consumer price index.

20. The workshop provided demonstrations of each application and showed participants five components: (i) Data entry and editing; (ii) Data diagnosis and validation; (iii) Item weights creating, editing, and distribution; (iv) Index imputation; and (v) Tabulation and reporting.

21. During the workshop both the advantages and disadvantages were discussed. On the plus side were:

(a) PIPS provides software that many participants found useful for applications to their price index systems either in Access or SQL.

(b) PIPS can be used to process indexes at both the national and regional levels.

(c) PIPS provides users the ability to use Excel applications for data collection using PDAs and for data analysis.

(d) It also provides tools for data review and editing.

22. The shortcomings of PIPS are:

(a) Applications run in older Windows environment and need to be updated for Windows upgrades.

(b) For larger countries, SQL database platform is needed, but PIPS only operates with 2005 and 2008 MS SQL.

(c) Training is needed for countries interested in PIPS but international support is not available.

(d) PIPS does not have resource support to make improvements or upgrades.

23. Future activity for PIPS should be to get international financial support, upgrade the software to be compatible with current Windows and PC platforms, and update the PIPS operating guides if enhancements are made.

II. Session 2: Update of the 2004 CPI Manual

Session Chair: Peter van der Ven (OECD)

24. An issues paper on a possible update of the *2004 CPI Manual* prepared by the Intersecretariat Working Group on Price Statistics (IWGPS) was presented to the meeting. The following comments were made, in order of interventions:

(a) **Sweden:** Supports update. The manual perhaps should be updated more often than every 10 years. More should be included on scanner data, including how to ensure/control the quality of scanner data. In September 2013 Eurostat conducted a survey on CPI methodology, the results of which would be useful to take into account.

(b) **United Kingdom:** supports update. Some basic descriptions could be updated. Eurostat will update the HICP manual – there may be differences. Need to be careful when drafting because the manual is read carefully by users and taken on face value. Scanner data, big data and how to handle big data sets are emerging issues to be addressed. Supports establishing a CPI-TEG.

(c) **Netherlands:** Supports update. Things are evolving that should be incorporated. We move from sampling surveys to more or less complete data, while calculations methods are based on traditional sampling surveys approach. What to do when you have complete data on quantities and prices? If all information is available, maybe it is not necessary with a two-step procedure (elementary indices – higher-level indices) in future.

(d) **France:** Supports update. An update should address scanner data and parts of manual could be improved, e.g. on sampling and seasonal products. First and foremost an updated manual should provide methods to be applied. Being prescriptive is secondary.

(e) **South Africa:** Supports update. One weakness of 2004 version is that it outlines different methods, an update should provide different methods/solutions but indicate preferred/best practices. The on-going discussions about updating COICOP perhaps should also be taken into account.

(f) **Morocco:** Supports update. There is too much theory in the 2004 manual, a better balance between theory and practices should be ensured. An update should provide information in the order in which it is used by the users – the CPI compilers. Some text could be placed in annexes, e.g. chapters 16 and 18. More details for data collections in particular for developing economies would be useful together with more recommendations on calculation of EA indices. Integration with ICP should also be considered.

(g) **Thailand:** Supports update. An update should give better guidance on e.g. treatment of taxes and subsidies and other types of “non-market” prices.

(h) **Australia:** Supports update. Separate theory and practice. It would be useful to include “international standards” in an updated manual, as for the SNA manual.

(i) **German Bundesbank:** Supports update. Be more descriptive while maintaining theory that is necessary. Provide justification for acquisition approach and Laspeyres type indices for higher-level indices. More material on the different uses of the CPI (inflation measure, deflation of NA series, cost of living), and more guidance on aggregation in one-step (scanner data may provide the opportunity) and more on chain linking. Supports a CPI-TEG. Should an updated manual be a living document?

(j) **Viet Nam:** Supports update. Provide more practical guidelines, for example on imputation methods. More guidance is needed on CPIs for poor households since this is required for poverty measurement.

(k) **Italy:** Supports update. Many changes over the last decade should be reflected in an update. Big data should be dealt with, including web scraping. In favour of a CPI-TEG.

(l) **Canada:** Supports update. Where there are more methods/approaches advantages and disadvantages should be explained and preferred methods and practices be recommended. Supports a CPI-TEG.

(m) **ECB:** Supports update. More guidance should be provided on OOH (which should be dealt with in one chapter instead as in the current manual where it is dealt with in chapters 10 and 22). More guidance should be made on breaking down overall CPI in, for example, goods and services, how to do this in a consistent way and explain this to the users.

(n) **Russian Federation:** Supports update. An update should include the theories/methods that form the basis of the recommended practices. Recommendations should be provided in a clear way, which will also help to facilitate evaluations of the quality of a CPI.

(o) **CIS-STAT:** Supports update. It is important that links are made to the ICP. This will help countries and be a useful tool to increase international comparability of CPIs. Perhaps a separate chapter on international comparability of CPIs should be included?

(p) **Denmark:** Supports update. Recommendations, for example on quality adjustment methods, should also take costs into account. This is important since many NSOs face resource constraints and need to select the most cost efficient method.

25. The Chair of the meeting (**USA**) added that BLS has experiences with a module/layered approach for the documentation of the US CPI, which is user friendly, easy to review and update, and which can be produced as a searchable pdf document.

26. In the summary of the session it was concluded that:

(a) There was unanimous support to initiate and update of the manual;

(b) While the manual should present different methods/practices where this is relevant, the manual should be more prescriptive by being clearer on what are the preferred/recommended options;

(c) Scanner data and big data and related issues will grow in importance. It will be useful if an update can provide more guidance to countries in this area;

(d) Practicality and cost efficient methods should be targeted;

(e) International comparability is important – an update should help to improve this;

(f) The IWGPS should consider the balance between theory and practice and the ordering of the chapters;

(g) The IWGPS should consider different ways to structure an updated manual (e.g. a layered approach) and issues in relation to maintaining a living document.

27. Additional written comments by Paul Armknecht supporting an update were received during the meeting and forwarded to the IWGPS.

III. Session 3: Methodological issues I

Discussant: Claude Lamboray, Statistics Luxembourg

28. The session included papers from Turkey, Canada and Germany dealing with seasonal products and seasonality.

29. There are different approaches dealing with strongly seasonal products. The paper *Treatment of seasonal products and CPI volatility* by Oguz Atuk, Mustafa Utku Ozmen, and Orhun Sevinc, Central Bank of Republic of Turkey, aims at identifying those methods that reduce most the volatility of the resulting indices in order to improve their predictability. In particular, in Turkey, the strong fluctuations of prices for fresh fruits and vegetables have a significant impact on the overall annual inflation rate. The conclusion from this analysis is that a fixed weights approach combined with averaging prices over several months produces the best results. Although the use of a moving average reduces volatility, during the discussion some participants questioned if such an approach is appropriate in order to capture monthly price changes in line with usual CPI targets. It was clarified that the goal of this approach is not to perform seasonal adjustment, but only to reduce the unpredictable seasonality of the data.

30. In the second presentation, *An Empirical Illustration of Index Construction using Israeli Data on Vegetables*, by Erwin Diewert, University of British Columbia, Canada, it was shown how common index number formulas perform using a weakly seasonal data set from Israel covering vegetables. Different approaches were tried out, such as year over year indices, annual indices or month to month indices. In particular, the potential for using a rolling Mudgett Stone index as a seasonally adjusted price index was illustrated, although such an index can only be produced with a time lag of 6 months. The presentation also demonstrated that on this particular data set a monthly chained Fisher price index has a substantial downward chain drift. Finally, the RY-GEKS price index turned out to be almost identical to the monthly fixed base Fisher price index, a result which is less likely to happen with strongly seasonal data.

31. Chain-linking can be problematic if the new price index has a different seasonal pattern from the old one. In such a situation there can be a permanent jump in index levels and year on year rates can be biased during the first year after the change in seasonality occurred. The presentation *Will the real inflation rate please stand up – overlooked pitfalls of a favoured chain-linking technique* by Jens Mehrhoff, Deutsche Bundesbank, illustrated this issue with an example of accommodation services and package holidays in the German CPI. When chain-linking price indices with pronounced seasonal patterns, instead of the one-month overlap method, it may be preferable to use the annual overlap method which produces by definition a correct average annual year on year rate. The discussion highlighted the need for more detailed recommendations on chain-linking.

IV. Session 4: Methodological issues II

Discussant: Patrick Sillard, National Institute of Statistics and Economic Studies, France

32. In this session, three papers from New Zealand and Japan were presented. In addition, a Room document by the State Statistical Committee of Azerbaijan on the national practice of computing the CPI was available.

33. The paper by Frances Krsinich, Statistics New Zealand, *The FEWS index: Fixed-effect with a Window Splice - Non-revisable quality-adjusted price indexes with no characteristics information*, deals with scanner data and tries to investigate the issue of (systematic) quality adjustment. It shows in particular that product fixed-effect estimates are good alternatives to characteristics-adjusted hedonic models with time-dummies (the index is given by the time coefficients in the regression). It also points out the usefulness of window splicing in computing hedonic indexes. This raises the issue of index revision. The

paper proposes a correction that should be applied on the index in order to avoid the “splice bias” that occurs when dealing with non-revisable indexes. And finally, it points out that the method behaves quite well in the case of scanner data except in case of seasonal fashion-driven products where all the products change at the same time with prices loosely connected to the characteristics of the products.

34. The paper *Private Label Brands vs. National Brands: some Implications for the Construction of the CPI* by Satoshi Imai, Statistics Bureau of Japan and Tsutomu Watanabe, University of Tokyo, explores the issue of possible substitutions between national brands and private brands of products and shows that the effect of substitutions is of the same magnitude as the price decrease observed on products themselves in 2008.

35. The paper *Estimating daily inflation using scanner data: A progress report* by Tsutomu Watanabe, University of Tokyo and Kota Watanabe, Chuo University and University of Tokyo, Japan, shows that with scanner data, it is possible to measure, on a daily basis, the year-to-year inflation and this might have been useful to detect earlier the deflation in Japan. But at this daily frequency, chain drift becomes an important issue. Interestingly, the paper comes out with a discussion of the fact that a chain drift is likely to exist even at a monthly frequency, which is not completely in line with the work of Ivancic et al (2011).

V. Session 5: Price collection methods

Discussant: Merav Yiftach, Central Bureau of Statistics, Israel

36. The session on price collection methods included papers from United Kingdom, Netherlands and Sweden. The papers focused on new sources for price collection based on new technologies, such as scanner data and web scraping, the opportunities and challenges of using these sources, and how they align with the traditional production set-up for CPI.

37. The paper *Collecting clothing data from the internet* by Leon Willenborg, Robert Griffioen, Jan de Haan and Karlijn Bakker, Statistics Netherlands, provides an example using prices collected from the Internet by web scraping for calculation of a price index for clothing. Price collection by web scraping or Internet robots offers a new possibility to NSOs. Advantages would include: Cost efficiency - low collection costs while collecting prices by visiting the outlets is expensive; extending the sample size, circumvent small sample problems and e.g. improve coverage of online purchases; higher frequency of price observations; relative good data quality; and some characteristics can be easily observed. Disadvantages may be lack of weighting information; insufficient information on characteristics; problems because of changes of websites. The choice of web scraping strategy affects data observed (an additional challenge is that some servers/websites today identifies users and at times hike the price based on demand).

38. NSOs would need to consider costs and benefits. Different strategies may be applied, and data collected by web scraping may be used on their own or in combination with data collected from surveys or other sources. There may be issues with regular items and sales items, and a classification system needs be in place for automatic coding. The use of web scraping offers a potential vast amount of data, reduction of price collection cost and response burden and is likely to grow in future. How can NSO extent the use of web scraping? There were some cautions raised: changes in websites may cause problems for the compilation of the regular CPI. More work and experiences are called for, also on how a CPI based on Big Data relates to a traditional CPI.

39. The presentation *Exploiting new technologies and new data sources – the opportunities and challenges associated with scanner data* by David Fenwick provided an overview of issues that should be addressed when considering using scanner data.

Perceived advantages of using scanner data includes complete or almost complete coverage and elimination of estimation error; reduced cost on data collection; reduced response burden; increased scope for harmonisation and international solutions to index methodology; use for multiple purposes such as CPI, PPI and average prices as well as expenditure weights. Some disadvantages may be that it does not fully comply with all the current methodological conventions for price indices; it is not subjected to independent audit and the logistic and quality control challenges involved in handling such large amounts of data.

40. In applying scanner data NSOs should consider to what extent this would include departing from the target measure of the CPI. In addition, the system that needs to be established, including data processing and validation procedures and logistics, can dramatically increase the costs.

41. Establishing an agreement with the owner/provider of the scanner data is crucial and complex and not an easy task. Questions remain on whether to obtain scanner data from market research companies or directly from the outlets or the head offices of super market chains, etc. The different approaches will have their advantages and disadvantages; in all cases the NSO will be depending on the provider of the data (e.g. a private company could go bankrupt, break the agreement or raise the price dramatically).

42. Sharing of experiences and good practices and tools will be useful. Joint efforts e.g. in quality issues and in making comprehensive agreement with worldwide companies should be pursued. An update of the 2004 CPI should include recommendations on scanner data.

43. Clothing continues to possess problems for CPI compilation due to the frequent occurrences of model changes, often associated with quality changes and large price reductions in periods of sale. In their paper *Sampling selection bias in Consumer Price Indices*, Kristina Strandberg and Anders Norberg, Statistics Sweden, explain why this type of bias may be expected for clothing in particular, and what measures can be taken to reduce such bias.

44. Price collectors may typically have a preference for selecting product varieties that are expected to remain in the sample for a relative long period of time, since finding replacements is difficult and time consuming. Price collectors may therefore try to avoid including items on sale when they select items. This means that in a given reference month, December, say, the proportion of sales prices will be too low so that the average December price will be too high. In the subsequent periods when current months are compared to the reference month the price index will be downward biased since price collectors will have to include sales prices when they occur. The downward bias may be significant and have an impact on the overall CPI.

45. The problem may exist in other areas (e.g. fruits and vegetables, footwear or IT products) although probably not to the same degree as for clothing. Ways in which to reduce this type of bias would include careful instruction of price collectors or change of reference month to a month that is known not to have many sales prices (e.g. instead of using December as reference month, September could be preferred).

VI. Session 6: Difficult to measure products and services

Discussant: Corinne Becker Vermeulen, Statistics Switzerland

46. The session included papers from Mexico, Belarus and Japan.

47. The paper *Mobile Phone Service Computing Methodology* by Rafael Gaona Lopez, INEGI, Mexico, explains the development of the price index for generic mobile phone

services by use of consumer profiles, and how this method is integrated in the CPI compilation. The price measurement for telecommunication services is a particular difficult area to statistical offices because of the multitude of offers to consumers, widespread use of tariff pricing linked to various types of conditions, and markets that are not always transparent. This paper describes the development in the Mexican market characterized by a proliferation of new services, market liberalization and a great number of providers. The method of using consumer profiles seems to provide good results also under such difficult conditions.

48. In the paper *Methodological approaches to recording certain types of services in the consumer price index in Belarus*, Ekaterina Grikhanova, National Statistical Committee of the Republic of Belarus provides an overview of a number of difficult issues concerning the treatment of utility services, such as central heating, water supply, sewerage and electricity. These services, which form a substantial part of households' expenditures, are complex in terms of specific features of the price formation and the way they are paid by households. The price typically consists of several components and the measurement of these components in the CPI has been an issue of discussion with main stakeholders. Transparency in selection data sources and methods has proved to be the best way to increase to credibility and the trust in the CPI.

49. The paper *Alternative Approaches to Commercial Property Price Indexes for Tokyo* by Erwin Diewert, University of British Columbia, Canada, and Chihiro Shimizu, Reitaku University, Japan, outlines problems associated with the construction of price indexes for commercial properties. Property price indexes are required for the stock of commercial properties in the balance sheets of the national accounts, and the related price indices for the land and structure components of commercial properties are required in the income accounts if the multifactor productivity of the commercial property industry is calculated as part of the national accounts. The paper uses a variant of the builder's model that has been used to construct residential property price indices.

50. Measuring the price movement of commercial properties is very difficult because of the heterogeneity of the market. Moving away from traditional methods and laying foundations for an alternative one is obviously complex; the research of Diewert and Shimizu is an important contribution to a better understanding of the current economic period. Property indices (commercial and residential) are essentials tools for the understanding of the real estate market and are carefully analysed by monetary institutions because of fear of "house bubbles". Decomposition of the overall index in structure/capital prices and land prices appears to be a major challenge.

VII. Session 7: Management

Discussant: Levan Karsaulidze, National Statistics Office of Georgia

51. The session included presentations by Canada, South Africa and United Kingdom.

52. In his presentation *Statistics Canada's Consumer Price Index Enhancement Initiative (CPI EI)*, Haig McCarrell gave an overview of the 5 years initiative launched in 2010 to address priority needs in the Canadian CPI: the main achievements, lessons learned and next steps. The Initiative had three main goals: updating the basket more frequently, expanding and making the monthly sample of prices more representative and introducing better quality adjustment techniques. Significant improvements to the IT infrastructure would be needed to enable the changes. The initiative has included important organizational issues. Project management and planning-related considerations were instrumental in the project's success thus far.

53. The paper *Quality management* by Patrick Kelly describes, and critically assesses, the measures put in place at Statistics South Africa to ensure the quality of the national CPI. A Total Quality Management approach is applied using a Plan-Do-Check-Act cycle. Specific indicators facilitate management's focus on the key elements of the statistical value chain on a month by month basis. These performance measures cascade through to employee performance contracting and evaluation. Periodic reviews highlight important methodological issues which have longer lead times for implementation. Careful measurement of operational processes and statistical outcomes enables improvements to be initiated before large or systematic errors in data develop.

54. Total quality management, should include the following five main dimensions: quality control; quality assurance; people management; international benchmarking; and measurement. Quality measures should be set for each stage of the production process. These measures should be as quantitative as possible and be evaluated against pre-determined targets on an ongoing basis. Performance indicators are essential for total quality management. They are useful to identify problem areas and act as positive measures for improvement evaluation.

55. In his paper *High quality official statistics – benchmarking as an integral part of a quality management system*, David Fenwick gives an overview of what international benchmarking and what benefits it may have. The paper provides more detail from an example of the joint initiative of the UK Office for National Statistics and the Australian Bureau of Statistics. Benchmarking against other national statistical offices provides a tool for the identification of potential issues relating to the compilation of official statistics and is one example of the processes that a statistics office can deploy to fulfil its commitment to ensure a cost-effective compilation of high quality statistics. Such benchmarking should operate within agreed operational guidelines and objectives and should focus on a pre-determined and mutually agreed set of performance indicators. The paper draws attention to a number of necessary conditions for a successful benchmarking exercise and makes a number of observations on how benchmarking can be an integral part of a quality management system.
