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**Report on the implementation of the methodology approved by the
Commission for cost-of-living surveys at headquarters duty stations**

Note by the secretariat of the International Civil Service Commission

* ICSC/ACPAQ/39/R.1

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I. Introduction

1. The Advisory Committee on Post Adjustment Questions (ACPAQ) at its thirty-eighth session reviewed several aspects of the methodology for cost-of-living measurements in preparation for the 2016 round of surveys. The Committee made recommendations on such aspects as:

(a) the list of items and their specifications for the basket of goods and services, a revised procedure for calculating the average price of an item, the use of price data collected under the European Comparisons Program (ECP) for covered duty stations, and the discontinuation of the prior practice of distinguishing between conventional and organic brands when calculating price ratios for items in the food and non-alcoholic beverages category;

(b) the survey instruments, including the staff expenditures questionnaire, and the survey coordinator's report, which were to be administered online or in electronic format;

(c) the procedures for establishing the new set of common expenditure weights, as modified to reflect changes to the structure of the questionnaire;

(d) the procedures and guidelines for data collection at headquarters duty stations.

2. Procedures and guidelines governing various aspects of data collection for the 2016 baseline surveys, included the use of the ECP to review item specifications and as a source of price data for covered duty stations, the implications of the adoption of the ECP for the roles played by all stakeholders, with regard to such issues as the selection of outlets or the contribution of Local Survey Committees (LSC). Also covered was the use of the Internet as a source of price data, as well as operational aspects related to the inclusion of Canton Vaud in the price data collection for the survey in Geneva.

3. In its thirty-fourth to thirty-sixth sessions, the Committee also made other recommendations approved by the Commission, regarding the determination of the weight and the index of the Out-of-Area (OA) component, and the calculation of the Rent Index for group I duty stations, and confirmation of the validity of the Post Adjustment Index (PAI) structure.

4. All new recommendations of the Committee were approved by the Commission at its eighty-second session (see ICSC/82/R.7 for details). This full set of the Committee's recommendations, as approved by the Commission, brought a significant number of changes to the methodology underlying the 2016 round of surveys, the most notable of them being:

(a) the adoption of the ECP as a source of specifications for the updated basket of goods and services, except for items whose prices were to be collected by the survey coordinator, mostly

services and electronic or technological items subject the Real Time Price Comparisons (RTPC) approach, or directly by the secretariat, cars and scooter, also subject to the RTPC approach;

(b) The adoption of the ECP as a source of price data for a large share of the basket of goods and services for ECP covered duty stations (London, Madrid, Paris Rome and Vienna). On the other hand, this methodological change did not affect all headquarters duty stations, as for Geneva, Montreal, New York and Washington D.C., price data were collected directly by the ICSC secretariat, in collaboration with the LSCs, in accordance with the approved guidelines;

(c) the change in the calculation of average prices, whereas the prior two-step approach of deriving first within-store averages and secondly, determining the item average price as an across-outlets simple average was discontinued and replaced by a straightforward simple average of price quotations across all surveyed outlets in one step only;

(d) the design of a staff expenditures survey questionnaires, entailing the integration into one of the two separate questionnaires on housing and domestic services costs and household expenditures, used in prior rounds of surveys, the aggregation of questions on expenditures in the food, non-alcoholic beverages and alcoholic beverages categories, the aggregation of questions of formerly distinct basic headings and the introduction of new or more disaggregated questions in other areas of the questionnaire. This allowed for the elimination of repetition and redundancies, and considerably reduced the response burden by reducing the number of questions asked to respondents;

(e) the change in the basic heading structure, based on a further reduced number of basic headings, to 80 from the 84 used in the 2010 round, and the procedure of estimating those selected subsets of the common weights related to basic headings of the In-Area (excluding Housing) component grouped under one question only (while maintaining the earlier criteria regarding the required accuracy of the estimates, set by the Committee as coefficients of variation of at most 15 percent, for each grade at a given duty station, and 25 per cent across all grades and duty stations, and post-stratification by collapsing estimates across duty stations in case results were not acceptable for some duty stations, and resorting to the use of external data only as a last resort);

(f) the change in the specification of the OA weight, now better reflecting the reality as measured by the survey than the administrative formula used universally for group I duty stations in the 2010 round, which set the applicable OA weight as 20 percent of net remuneration of a staff member at the level of P-4 Step 6 with dependents (if the actual OA weight is indeed less than 20 percent of net remuneration) plus Non Consumption Commitments (NCC), estimated as 5 percent of the net base salary;

- (g) the new weighting pattern of the 26 countries whose consumer price indices (expressed in US dollars) are used in the calculation of the OA Index, determined on the basis of a special global staff survey conducted in 2012;
- (h) an updated set of longevity weights for the calculation of the 6-year moving average of rents, and duty-station specific patterns of dwelling type and size weights used in the calculation of the rent index for group I duty stations;
- (i) the use of an expanded set of New York average rent levels, as surveyed by the International Service for Remunerations and Pensions (ISRP), covering not only the traditional and most typical living surface areas of the target dwelling types and sizes, but also new and less typical ones, to match the dwelling types and sizes of other group I duty stations, thereby rendering unnecessary the use of dwelling size adjustment factors; and
- (j) the expansion of the staff population eligible to participate in the survey to include the D-2 grades.

5. Following the eighty-second session of the Commission, the secretariat then began preparatory activities, including the organization of pre-survey consultations with survey coordinators and LSCs at all designated duty stations, the design and development of data collection and processing tools, and other practical arrangements.

6. In June 2016, the secretariat, accompanied by a number of local observers, including a price statistics expert as independent consultant, conducted price data collection in New York, for all items except RTPC items. In September and October 2016, the secretariat, accompanied by local observers and supported by price survey consultants, conducted price surveys at duty stations not covered by the ECP: Geneva, Montreal, and Washington D.C. for all items, except those subject to RTPC, which were to be priced by the SC. At the same time, a supplementary fall price data collection took place in New York, to cover winter item clothes or other items that could not be priced earlier, as well as to collect the prices in New York of matched items subject to the RTPC approach. A subset of prices, related mainly to utilities and various services, were collected by survey coordinators, along with supplementary information concerning their duty station. The expenditure surveys administered to staff were conducted during this same period. Survey Coordinators were provided with an online tool to monitor staff participation in real time. It should be highlighted that the data collection activities were greatly facilitated by the active collaboration of all Survey Coordinators and LSCs.

7. During the months of September and October, the secretariat updated, according to disaggregated national consumer price index (CPI) series, the ECP average prices obtained from Eurostat and converted such updated average prices into US dollars using the applicable monthly operational exchange rates.

8. In the months of November and December 2016, data collected were processed using the ICSC's in-house integrated data processing system. Independent experts representing the administrations or the staff federations visited the ICSC secretariat in December 2016 to review the analysis of the price data conducted by the secretariat for their respective duty stations, as well as for New York. The experts, who were given full access to the price databases according to specific guidelines, including appropriate measures for protecting the confidentiality and privacy of statistical data, provided pertinent feedback, both of a general nature and regarding individual items, about the data processing by the secretariat and other issues related to the surveys. The secretariat greatly acknowledges the provision of experts' feedback, which was given due consideration during the secretariat's second review of price data processing before the finalizations of its analyses.

9. During its first and second data processing review the secretariat followed as much as it could the approved methodology. However, guided by consultants' feedback as well as its own review of the data collected from the surveys and the overarching principle of achieving the fairest like-to-like comparison between duty stations and New York, in some cases the secretariat adopted slightly different approaches in its data processing and took appropriate decisions with regard to a number of aspects of data processing. Issues of particular relevance that the secretariat encountered related to the non-comparability of items' specifications for a subset of items surveyed in New York compared to the same items for which price data were obtained from the ECP. There was also the need to adapt the specification of one item not discussed during the thirty-eighth session of ACPAQ, to edit numerous expenditure questionnaires, and to re-consider the use of dwelling size adjustment factors in the calculation of rent indices. Each of these issues is discussed in the appropriate sections of this document.

10. Besides the non-comparability of identified individual items, the secretariat analyzed the factors influencing the results of the baseline cost-of-living surveys and ascertained that, after appropriate methodological corrections, the transition from sourcing its price data from its own price surveys to ECP average price data was the only plausible reason for differentiated rates of decreases in price relativities between ECP and non-ECP covered duty stations. In this respect, the secretariat proposes a correction to be applied to price relativities of ECP covered duty stations so as to nullify this survey transition effect. The secretariat's proposal is submitted to the Committee for its technical review.

II. Organization of cost-of-living surveys

11. Following the Commission's call for the active cooperation of organizations and staff federations in the administration of the surveys, organizations at each of the headquarters duty stations and Washington D.C. were requested to set up a LSC with the designated survey coordinator as its head. LSCs comprised representatives of the organizations as well as of the staff federations. The secretariat visited each duty station during April and May 2016 with the goal of providing information on all aspects of the survey to LSCs. Among these were explanations about the roles of all stakeholders, the schedule of activities, data collection forms

and instructions for completing them, important changes to the methodology, guidelines for the development of the list of outlets and various administrative and logistical arrangements. Also discussed were duty station-specific issues. Such pre-survey consultations also offered the opportunity for briefings of staff at large, which helped to raise awareness of the importance and the impact of their participation in the survey as well as of the new methodology and operational rules underlying the post adjustment system. Live demonstrations of the expenditure survey questionnaire were made and issues of data protection and confidentiality were discussed directly with staff. Feedback collected from such demonstrations and discussions was incorporated, to the extent possible, into the finalization of survey instruments before the launch of the surveys.

12. The conduct of cost-of-living surveys at all designated duty stations by the secretariat followed the following sequence of activities:

(a) Collection of raw price data for the basket of goods and services approved by ACPAQ or updating of ECP average price data on the basis of appropriate inflation factors to reflect price levels during the survey months;

(a) Collection of data on housing, domestic services and household expenditures from all eligible staff of United Nations common system organizations, or other organizations not formally part of the Common System but which adopt its salary package;

(b) Processing of both price and expenditures survey data, including the calculation of the PAI.

13. While the secretariat was central in all such activities, other stakeholders were an integral part of the organizations of the surveys. Survey Coordinators were the primary link between the secretariat and the duty stations. They contributed to conduct of the surveys with several operational and administrative activities. LSCs were an essential link between Survey Coordinators and various organizations at the duty station and greatly facilitated the flow of information between the secretariat and various organizations. Besides, they supplied important inputs and facilitated the outreach to various organizations staff. Eurostat and the International Service for Remunerations and Pensions (ISRP) are partner agencies of the ICSC secretariat and, although not participating directly to the conduct of the surveys, they contributed essential inputs (price and rent data, with meta-information about them) and support. A more detailed review of these and other important stakeholders in the baseline cost-of-living surveys at headquarters duty stations is provided with section VI.

14. In order to improve staff participation in the surveys, the secretariat created a special website dedicated to the survey (<http://pp2016.commonsystem.org/>). It was designed to be a central source of information on all aspects of the survey, including the survey schedule, a section for survey coordinators, one for staff at large and various survey documents. Furthermore, important features of the website were the Frequently Asked Questions (FAQs) section, which

was sub-divided in three general sets: General Questions (Pre-Survey), Questions during the survey, Technical Questions about Post Adjustment, with a fourth area of Geneva-specific questions addressed providing guidance and clarifications on the treatment of responses from staff living in neighbouring France. Furthermore, a "Contact us" page enabled staff at large to send requests for information and clarifications directly to ICSC.

15. The development of the lists of outlets was differentiated between duty stations that were covered by the ECP and those that were not. For duty stations covered by the ECP, the list of outlets did not need to be developed for the whole basket of goods and services, but only for that part of the basket under the responsibility of the survey coordinator since the calculation of price relativities for items covered by the ECP was to be based on average prices, originally collected at the duty station by National Statistical Offices for ECP purposes, on a list of outlets unknown to the secretariat, and then provided to the secretariat by Eurostat. Therefore, only a limited number of outlets was included in the list. On the other hand, for duty stations not covered by the ECP, developing the list of outlets was done as in the past round, starting with the list of outlets approved by the Chairman of ICSC for the previous round of surveys as a reference, and updating the list to take into account changes at the duty stations or experience acquired from the previous survey. The lists of outlets proposed by the duty stations were reviewed by the secretariat with a view to fine-tuning them before they were ultimately approved by the Chairman of ICSC, with the understanding that minor amendments might be necessary during price data collection at each duty station to deal with cases of closed outlets, or changes of address or the nature of the outlets. Furthermore, additional outlets were added, when necessary to boost the number of price quotations for some items. Changes to the lists of outlets during field operations were subject to the approval of the SC. In accordance with the guidelines approved by the Commission, Internet websites of outlets at the duty stations were used for price data collection. In this regard, the secretariat could assess the availability of sufficiently detailed price data from the web sites of approved outlets even before price surveys and plan accordingly, to complement or supplement in-store price data collection, for example by covering data gaps during field operations or in case of outlet refusals to participate in the surveys. Using Internet web sites of approved outlets also supported field operations, for example by detecting in advance whether outlets still operated or if their address had changed since the previous survey. Price data collection on the Internet was generally more pronounced than in the previous round. The secretariat obtained numerous confirmations that, with a few exceptions, price data available on outlets' web sites coincided with prices quoted in physical outlets.

16. For cars and scooters, items subject to the RTPC approach, there was no need to identify specific dealers at the duty stations since the secretariat collected Manufacturer's Suggested Retail Price (MSRPs) from the national web sites of car and scooter manufacturers.

17. Considering that the approach to developing the list of outlets did not change from the past round, outlets selected for the surveys of Geneva, Montreal, New York and Washington D.C. were largely comparable across the two rounds, although for some items, changes in the specifications between the 2010 and the 2016 rounds called for identifying different outlets (for

example, the 2016 round item “Cappuccino” required to be priced at a bar/café and the like at the table with waiter service, whereas the 2010 round item “Cappuccino” required to be priced at a bar of an hotel belonging to international chains). However, for duty stations covered by the ECP, the assessment of the comparability of the list of outlets was based on a statistical analysis based on the distribution of outlets by type (department stores; hypermarkets/supermarkets; convenience stores and the like; specialized shop chains; etc.) conducted by Eurostat on the basis of the list of outlets and the number of price quotes derived thereof, as used by the secretariat for its last survey in New York and the same information available to Eurostat for its equivalent price survey in Brussels, as reported in the document ICSC/ACPAQ/38/R.5. The statistical tests used in the analysis indicated that there was no significant statistical difference between the distributions of the outlets in the two duty stations. While the analysis conducted by Eurostat was considered valid, it became evident to the secretariat that differences in item specifications, individual deviation in the distribution of outlets used in ECP surveys versus those used in New York or other possible factors (for example, the possibility that the different market positioning of outlets within the same category, i.e. department stores of “higher” or “lower” level, may also have a significant impact as a price determinant factor) a proper like-to-like comparison for certain items in the basket could not be guaranteed. All items identified by the secretariat as not sufficiently comparable are listed under Section V Data Processing.

III. Price data collection and processing

18. Periodic updating of specifications for the basket of goods and services is necessary to keep up with changes in products, expenditure patterns and lifestyles of United Nations common system staff members as well as market trends. The new list of items and specifications was recommended by ACPAQ at its thirty-eighth session (ICSC/ACPAQ/38/R.2) and approved by the Commission at its eighty-second session. The list was in large part drawn from a subset of the list of items used by ECP that was deemed to match in the best possible way item specifications from the 2010 round. Item specifications not drawn from the ECP included those to be collected by survey coordinators or directly by the secretariat (RTPC items, cars and scooter). The list was reviewed together with organizations and staff federations, and while updating the specifications for most of the items, it also included new items in various categories of goods and services, such as:

- fresh tortellini or ravioli;
- ladies' blazer;
- cleaning, men's shirt;
- ibuprofen (generic);
- daily newspaper (largest circulation);
- two types of magazines (monthly for men; weekly gossip).

Other items were dropped, for example:

- men's raincoat;
- women's summer suit;

- women's summer dress, cotton;
- women's sport shoes;
- kitchen chairs, IKEA;
- area rug, IKEA;
- electric stove;
- portable electric heater;
- several cars brands and models (Jeep Grand Cherokee; Chevrolet Aveo; Cadillac CTS, etc.);
- bicycle;
- basic cellular phone, etc.

19. As in the past, the Committee also recommended granting the secretariat the flexibility of making minor revisions to the list of items and their specifications during price data collection, as long as such adjustments did not lead to an outlet change. In this connection, the ICSC secretariat made some modifications to some specifications on the basis of realities discovered by pricing teams during the price data collection in New York as follows:

(a) Item 066-01: Dog food, dried, WKB-H. The original specifications called for “wet” food; in different package sizes. Replaced with “dry” dog food owing to limited availability of items following original specifications in New York price survey;

(b) Item 066-02: Cat food, tray, WKB-M/L. Replaced original cat food item with another from ECP list with a different weight range (min and max quantity) to reflect item availability during New York price survey;

(c) Item 042-02: Acetylsalicylic acid, original, 375-500 mg. Created a range for strength in mg, rather than using the original 500 mg strength only, to reflect item availability during New York price survey. 500 mg is the standard European strength, 375 mg is the standard US strength;

(d) Item 035-01: Fridge-freezer, tall, bottom freezer, A+, WKB-H. Adjusted range for capacity to reflect item availability during New York price survey. European models tend to be smaller than those available in the American market;

(e) Item 035-03: Refrigerator, under-counter, with freezer, WKB-M. Adjusted range for capacity to reflect item availability during New York price survey. European models tend to be smaller than those available in the American market;

(f) Item 036-06: Steam iron, auto-off function, WKB-M. Adjusted range for wattage to reflect availability and mainstream specifications during New York price survey. US devices operate under different voltage and therefore have different wattage in their specifications;

- (g) Item 077-02: Hairdryer, WKB. Adjusted range for wattage to reflect availability and mainstream specifications during New York price survey. US devices operate under different voltage and therefore have different wattage in their specifications;
- (h) Item 048-02: Petrol, 95 octane (US:89). Adjusted the number of octanes, for the US and other similar markets, to reflect the difference in “regular” and “premium” petrol between North American and European markets;
- (i) Item 048-03: Petrol, 98 octane (US:93). Adjusted the number of octanes, for the US and other similar markets, to reflect the difference in “regular” and “premium” petrol between North American and European markets;
- (j) Item 068-01: Admission to sporting event. Changed specifications by: i) adding other popular professional sport games (originally, only basketball) and (ii) from the most to the least expensive seat, because such a specification would have rendered the item not comparable between New York (with very expensive price of the most expensive seats in professional basketball games at 3,000 US dollars and more), and all other duty stations. Since current specifications are outside the ECP list, the item was priced by the survey coordinator;
- (k) 068-02: Fitness centre, renewal of monthly subscription. Added item, in order to provide the basic heading with a proper index in case professional sports games are not available at the duty station. The new item follows ECP specifications;
- (l) 068-03: Fitness centre, renewal of annual subscription. Added item, for the same reasons as indicated for item 068-02;
- (m) 068-04: Fitness centre, gym only. Added item, for the same reasons as indicated for item 068-02;
- (n) 057-05: Post-paid package, all unlimited. Adjusted range for mobile phone internet speed to reflect the evolution of technology since the time the item was first specified in the ECP surveys (at that time the prevailing technology was 3G; but today, it is 4G/LTE) and at the same time to account for possible lower speeds in field duty stations.

20. In addition to the listed minor revisions, the secretariat realized that while the Committee recommended the introduction of a new basic heading in the PAI structure, “Hotel, motel and camping”, no discussion about the associated items took place. The Chairman of ICSC approved the use of the specifications from one item on the ECP list, as recommended by the secretariat, as follows:

(a) Item 075-01: Hotel - category 1, capital, weekend: Hotels/chains (Target): BEST WESTERN, HOLIDAY INN, MERCURE, NOVOTEL Hotel, RAMADA Hotel, TRYP , RADISSON BLU or similar; Location: central; Room: standard (Breakfast: yes); No. of persons: 2; No. of nights: 2; Arrival: Friday, price collected 1 month before arrival; Type of room rate: private (no business rates), cancellation allowed without costs up to 24h before arrival; Exclude: weekends with important fairs, member (loyalty) card prices; RAMADA Plaza; Specify: name of the chain, name of the hotel, national classification, data source.

21. The final list of items can be broken down according to the stakeholders responsible for price data collection, as shown in the following table

Table 1. Distribution of items in the basket of goods and services, by stakeholders responsible for price data collection

Pricing responsibility	No. of items
ECP or pricing agent	261
<i>of which</i>	
ECP – fully available	244
Pricing agent required	10
ECP - Prescription Drugs	7
Survey Coordinator's Report	26
<i>of which</i>	
RTPC - electronics	7
ICSC - RTPC Cars and scooter	13
TOTAL	300

22. The subgroup “ECP or pricing agent” includes 244 items that are available from the ECP and need not to be priced in group I duty stations covered by the ECP. Another 10 items marked “Pricing agent required” are included in the list particularly for group II duty stations, and while they are not expected to be priced in covered ECP duty stations, they might be priced in group I non-covered ECP duty stations. The survey coordinators have to price a total of 26 items, 7 of which are RTPC electronic items. Finally, the secretariat is responsible for pricing cars and scooters at all group I duty stations.

Organic/biological products

23. In a departure from the 2010 methodology, organic/biological food and beverage items were not treated differently from their regular counterparts. They could be selected along regular items as long as complied with the item specifications and by reference to the criteria used for sampling items to price.

Treatment of items subject to the real-time price comparisons (RTPC) approach

24. Compared to the 2010 round, when the RTPC approach was first introduced, the specifications of the RTPC electronic and technological items for the 2016 round were slightly more narrow and standardized. Also, the number of such items in the basket was slightly reduced. Once items priced at the duty stations by survey coordinators were submitted to the secretariat, they were matched with the same or very similar items in New York, and then priced during the same survey month using the web sites of approved outlets.

25. The collection of prices of cars and scooters was done concurrently in New York by the secretariat for both the duty station and New York by matching in the best possible way brands and models available in the respective national web sites of manufacturers. Subsequently, model ratios for matches judged not sufficiently good were excluded from the calculation of the basic heading ratio. Part of the matching process entailed reviewing the availability of different sets of basic options and accessories, which enabled a customized configuration of the car at the duty station and New York. Only MSRPs were used in the comparisons.

26. The list of cars included a total of 12 brands/models, with the goal of collecting as many price quotations from the list as possible. Each brand and model corresponded to a different item. Since the MSRPs were used, the same prices (and items) found in New York were used for Washington D.C., the only difference between New York and Washington D.C. being the sales tax rates. One scooter (Piaggio Vespa) allowed for several models and engine sizes to be matched. Table 2 shows the distribution of cars used for the calculation of the basic heading ratio across the various duty stations.

Table 2. Car brands and models used

Brand and model	Geneva	London	Madrid	Montreal	Paris	Rome	Vienna
Ford Focus	Y	Y	Y	Y	Y	Y	Y
Volkswagen Golf	Y	Y	Y	Y	Y	Y	Y
Mercedes E-Class	Y	*	Y	Y	Y	Y	Y
Honda Fit (Jazz)	*	*	*	Y	*	*	*
Toyota Yaris	*	*	*	Y	Y	*	*
BMW 3-Series	Y	Y	Y	Y	Y	Y	*
Volvo S60	Y	Y	Y	Y	Y	Y	Y
BMW X5	Y	Y	Y	Y	Y	Y	Y
Volvo XC90	Y	Y	Y	Y	Y	Y	Y
Volkswagen Tiguan	Y	Y	*	Y	Y	Y	Y
Toyota Rav4	Y	*	*	Y	Y	Y	Y
Honda CR-V	Y	*	*	Y	Y	*	*
Nr. of matched models	10	7	7	12	11	9	8

* Found brand, but not sufficiently similar model to be used.

Price collection from regular outlets

27. In Geneva and Montreal, price data collection was conducted by pricing teams comprising an ICSC staff member, a local price survey consultant, usually employees of national or local statistical offices or of other offices of the national or local government, and an observer representing administrations or staff federations at the duty station. The pricing teams were guided by the guidelines and procedures approved by the Commission. Only prices of items available in the outlets during the visits were collected. The overall responsibility for the collection of prices rested with the ICSC staff members. In New York and Washington D.C., pricing teams did not include local price survey consultants, because the ICSC secretariat had the requisite local knowledge and experience with these markets to be able to conduct the price surveys without the assistance of local price survey consultants.

28. Prices of items not subject to RTPC were recorded mostly on tablet PCs, but paper forms were used whenever pricing teams determined this to be more efficient, for instance, in small stores carrying only few items of interest. In some cases, especially for doctors, electricians, plumbers, and cinemas, but also for other services, prices were collected over the telephone most often with the support of the Survey Coordinator. Sometimes, telephone calls were made to request clarifications about prices collected earlier during the price survey.

Price collection from the Internet

29. As approved by the procedures and guidelines, the secretariat was authorized to collect price data from websites of outlets approved for the duty station. In this connection, price data were collected from web sites of approved outlets in all duty stations, including New York. Such price data collection was used much more widely than in the previous round. As a matter of fact, the considerable development of e-commerce since the beginning of the previous round made available on the Internet a considerable amount of price and item specifications information. A rather common development across many duty stations is the fact that managers of outlets, or the management of various chains of outlets, confirmed that, with the only exception of limited and temporary local sales, prices on e-shops of their web sites coincide to those found in the physical outlets. The secretariat maintained a preference for visiting physical outlets in the duty stations where it conducted fully-fledged price surveys, but many more price quotations would have been obtained from the Internet if a more concerted effort was made in this regard by the secretariat.

30. While the web sites of approved outlets were used, the secretariat noticed that for certain categories of items, for example prescription drugs or petrol, third-party web sites, either from the government or other institutions, or consumer crowd-sourced web sites, could provide very reliable price and specification information that would avoid the need to survey individual outlets, either physically or via their web site. In this regard, the secretariat suggests to the Committee that, if agreeable to the Survey Coordinator, as happened with the price survey in Montreal, such third-party web sites could be used for price data collection in future surveys.

Sale prices

31. As in the past, sale prices were collected only when such prices related to promotional offers during the price data collection. In this case, the regular price was also recorded, if available. Such regular prices were used for analytical purposes only. Sale prices were not collected when they were clearly related to end-of season or complete liquidation of the outlet, a close out of an entire line of merchandise, fire-damaged goods being cleared from the outlet.

Sales or value added tax

32. All government, provincial, state or county sales taxes and value added taxes were applied to prices collected as necessary in all the duty stations surveyed. These taxes were added before average prices were calculated. If sales taxes were applicable but were not included in the prices collected, as in Montreal, New York and Washington, D.C., then such taxes were applied to the prices of relevant items. Value added tax for European headquarters duty stations were already incorporated in retail prices. Sales taxes may be differentiated by items and, in New York and Washington D.C., also by geographical areas. In the latter case, average sales taxes were estimated as weighted averages throughout the areas, using the shares of the staff population residing in those areas as weights.

Treatment of education costs

33. The schools initially used for place-to-place comparisons were originally provided by Survey Coordinators. However, such schools were reviewed against the criteria used by the Commission to filter in schools for the review of the education grant according to the education grant scheme still currently in place (the criteria are referenced in ICSC/70/R.4). Furthermore, as noted by independent consultants representing the various duty stations, the tuition fee structure of several schools in New York (Browning, Collegiate, Convent of the Sacred Heart and Spence schools) provided for the inclusion of items such as food, books and materials, field trips, etc. in the tuition fees, thereby distorting comparability between New York and other duty stations, which generally reported with tuition and registration fees only.

34. In light of the foregoing, the secretariat decided to exclude such schools from the comparisons and added other New York schools that provided a higher level of disaggregation in their tuition schedule. Added schools were drawn from the list of reference schools for the review of the education grant (Horace Mann School and the Lycée Français de New York). Tuition fees and other school associated costs, both in New York and at the duty station, were examined with a careful balancing procedure in order to match as much as possible the same elements of education related costs on both sides of the comparisons.

35. For place-to-place comparisons tuition fees, balanced as described above, were taken as a simple average, in order to avoid the downward spiral effect, i.e., the possibility of students attending schools of lesser quality because they could not afford the better quality schools at a duty station. The weights for the education component of the PAI were based on common

expenditure weights.

Costs of professional services

36. In response to questions raised by the independent consultants representing the various duty stations, the secretariat decided to review the specifications and re-estimate the costs of two professional services: electricians (Item 027-01: Electrician, installation of 1 electrical fuse, total service) and plumber (Item 027-02: Plumber, total service). Originally, the specifications used by the secretariat made reference to a duration of each of such services of about 4.5 to 5 hours. However, evidence collected from the duty stations as well as from ECP average costs, revealed that the costs of the two mentioned services should be re-configured to 3 hours duration in the case of the electrician, and 1.5 hours for the plumber service, in order for these measurements to be realistic. Therefore, all quoted services, both in New York and at the various duty stations were estimated according to these more realistic durations of service.

37. Furthermore, after having ascertained that the costs of electricians and plumbers total services are much more subject to biases due to differences in costs of materials or travel charges than average hourly rates, the secretariat proposes that the two current items be replaced by their counterpart hourly rates for future surveys, as experience acquired from past survey rounds has shown that hourly rates are more comparable across duty stations and less susceptible to reporting errors.

Collection of the price of gasoline

38. In accordance with the approved guidelines and procedures, the price of gasoline was collected three times, at the beginning, in the middle and at the end of price survey month so as to dampen the effects of short-term fluctuations of prices within the survey month.

Survey coordinator's report

39. At each duty station, except New York, the survey coordinator was requested to complete the coordinator's report which provided supplementary data on utility costs, car and scooter insurance, airfare, international letter postages, monthly satellite subscriptions, school tuition fees, staff canteen items and such services as wireless money transfer and safe deposit box. Survey Coordinators also supported the secretariat with items such as service rates for electricians and plumbers, and professional fees for medical and dental services. In the case of New York, the prices were collected by staff members of the ICSC secretariat.

IV. Survey of staff expenditures

40. In contrast to the previous round, staff expenditures for housing, domestic service costs and household expenditures were recorded on a single online questionnaire, integrating the two separate questionnaires on housing and household expenditures used in previous rounds of surveys. The integration allowed the secretariat to streamline the questionnaire, eliminating

duplications and other redundancies and, in the process, considerably reducing the burden on staff responding to the survey. Among many enhancements, basic and biographical information was requested only once, in the first section.

41. Housing costs were used to derive duty station-specific housing weights but also the ratio of the basic heading “other housing costs”, which belongs to the Housing component of the PAI. Domestic service costs were used to derive the weight and the ratio of the basic heading “domestic services”, which belongs to the In-Area (excluding Housing) component of the PAI. All other household expenditures were used to develop the new set of common weights for all duty stations in the United Nations common system and to estimate the actual out-of-area weight for each duty station. Household expenditures were requested either on a monthly or an annual basis, with the exception of expenditure for vehicles, which were requested for the past five years.

42. Eligible staff, as per lists supplied by SCs, received an email from ICSC inviting them to participate in the survey. Upon registration, staff received an automatic email with their own password enabling them to access the questionnaire multiple times, even after completion, throughout the survey month. Upon completion of the questionnaire, respondents were presented a table showing their total expenditures versus their net remuneration and their own percentage distribution of expenditures by major group, which they could review and, if any error was detected at that macro level, make appropriate checks and corrections to the data they provided to the relevant sections of the questionnaire. Finally, respondents could also request and receive a certificate of completion of the questionnaire and also provide a written feedback to the secretariat about their experience in participating in the survey.

43. Feedback received by respondents was mixed, ranging from great appreciation to great dissatisfaction about their survey experience. In many cases, respondents included commentary about their individual cost-of-living experience, clarifications about individual entries in the questionnaire and a wide variety of comments regarding the survey or the questionnaire itself. Notably, many home owners lamented that they could not provide itemized housing expenditures as only their dwelling type and size was requested by the questionnaire. The tenor of the feedback received showed that staff, on average, did not make sufficient use of survey support micro-site that was developed by the secretariat as part of its strategy to encourage staff participation in the survey. In fact, the secretariat learned that staff sought guidance more from information in the questionnaire itself than the survey support micro-site or in the email survey invitation. The secretariat is therefore planning a number of changes to the questionnaire and its functionality in order to guide respondents to future surveys more clearly and offer a smoother survey experience.

44. Included in the planned enhancements of the questionnaire are the following:

(a) Incorporate in the main body of the questionnaire further guidance on some key questions, currently embedded in the information icons next to the questions;

- (b) Guide even more home owners by indicating better why only their dwelling structure is needed and change current instructions that ask them to indicate their mortgage and other housing costs under the other unclassified section of the questionnaire;
- (c) Reset more appropriately some default settings (frequencies, wage rates, etc.);
- (d) Adopt duty station-specific lists of currency codes;
- (e) Clarify that before entering expenses under monthly unclassified expenditures, they should browse the annual section of the questionnaire;
- (f) Strengthen guidance about In-Area and Out-of-Area concepts. Embody the country of their duty station under the headings of the relevant columns of In-Area expenditures;
- (g) Deactivate showing to respondents their net remuneration as it generates confusion through their comparison with their own, lower net pay amounts (differences introduced by variable allowances, medical plans, pension contribution, rental subsidy, etc.), replace this information with the calculated ratio of expenditure over income.

45. Staff participation rates in 2016 were very good, a result attributable to the joint efforts of the secretariat and the LSCs. In five of the nine concerned duty stations, the response targets were met or exceeded; in the remaining four duty stations, the targets were nearly achieved. Table 3 below provides figures for total populations, target and number of submissions.

Table 3. Baseline cost-of-living surveys at headquarters duty stations 2016, staff participation rates

Duty station	Number of staff	Target	Responses received	Participation rate	
				% of population	% of target
Geneva	6,147	2,315	2,773	45	120
New York	5,428	2,145	2,521	46	118
Rome	1,649	1,134	1,111	67	98
Vienna	2,191	1,118	1,253	57	112
Paris	715	567	418	58	74
Washington DC	351	309	293	83	95
Montreal	335	300	319	95	106
London	197	163	155	79	95
Madrid	41	40	40	98	100
Total	17,054	8,091	8,883	52	110

46. A comparison between staff participation in 2016 (integrated survey, household expenditures) with the 2010 round (household expenditures survey) is presented in table 4.

Table 4. Comparison of number of questionnaires received and used in the analysis in 2016 and 2010

Duty station	Number of staff	Responses received		Responses used	
		2016	2010	2016	2010
Geneva	6,147	2,773	1,743	2453	1,421
New York	5,428	2,521	1,945	2168	1,839
Rome	1,649	1,111	1,031	998	933
Vienna	2,191	1,253	1,082	1120	948
Paris	715	418	340	365	300
Washington DC	351	293	262	255	235
Montreal	335	319	281	292	245
London	197	155	161	144	148
Madrid	41	40	31	35	25
Total	17,054	8,883	6,876	7,830	6,094

47. Staff members serving in some duty stations under organizations that do not belong to the United Nations common system, were allowed to participate in the surveys because they were deemed by the LSCs of those duty stations to have the same expenditure patterns as regular professional staff members of the UN common system organizations. The participation of staff of non-UN Common System organizations was part of the effort to maximize the chances of collecting adequate amounts of expenditure data for the derivation of reliable common expenditure weights. Data on housing and domestic services collected from such staff was also used in the analysis.

48. The participation of staff of non-UN common system organizations was governed by the following conditions:

- (a) The organization is an international organization and follows the salary scales and classification of posts of the UN common system (category, grade, and step);
- (b) The staff members are based in the relevant headquarters duty station;
- (c) The survey coordinator includes all staff of the organization in the list of staff for the duty station, according to the template provided;
- (d) The survey coordinator provides other ancillary information about the organization, for example whether the organization follow the UN pension scheme, or a similar scheme, its

medical insurance plans or other key aspects to determine the comparability with UN Common System staff members.

49. Table 5 compares the number of respondents to the household expenditure questionnaire coming from UN Common System organizations to those from non-UN Common System organizations.

Table 5. Participation from non-United Nations Common System organizations

Duty station	UN Common System		Non-UN Common System ¹	
	Included	Excluded	Included	Excluded
Geneva	2,379	306	74	14
New York	2,168	353		
Rome	995	112	3	1
Vienna	1,023	113	97	20
Paris	360	51	5	2
Washington D.C.	255	38		
Montreal	292	27		
London	130	9	14	2
Madrid	35	5		
Total	7,710	1,027	120	26

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- Geneva: International Organization for Migration (IOM), International Union for the Protection of New Varieties of Plants (UPOV)
- Rome: International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM)
- Vienna: The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty (CTBTO)
- Paris: European and Mediterranean Plant Protection Organization (EPPO)
- London: International Coffee Organization (ICO), The International Oil Pollution Compensation Funds (IOPCFUNDS), the International Sugar Organization (ISOSUGAR)

V. Data processing

50. Data processing was conducted on all types of data collected by the surveys: prices, housing and domestic service costs and household expenditures, using the ICSC secretariat's Integrated Data Management System 2016 (IDMS). However, certain tasks were executed outside the IDMS, using standard software packages (Excel), for example the calculation of common expenditure weights.

Prices

51. Price data for non-covered ECP duty stations were first reviewed for editing errors made during data collection. Editing in these cases mostly consisted of fixing unit of measures, comments and similar pieces of information. In a few cases, it was necessary to determine prices after data collection (for example, the prices of cars were obtained after appropriate configurations, or appropriate sales taxes were added to price quotations in New York and Washington D.C.). In the case of price data for non-covered ECP duty stations it is possible to compare the number of price quotations collected with the number of those used for actually calculating the average price. As per approved methodology, item average prices were calculated as simple averages across all sampled outlets in one step only, thereby giving an implicit weight to each of the sampled outlets, corresponding to the number of price quotation collected from them.

52. Price data for ECP duty stations came in the form of average prices, supplemented by meta-information contained in Quaranta tables. Meta-information included the number of price quotations used for calculating the item average price as well as its coefficient of variation. Because of confidentiality restrictions, this did not include any information about the outlets from which price data were originally collected or the number of quotes originally collected. Hence, in the case of these duty stations it was not possible to compare the number of price quotations collected against the number used in the analysis. ECP price data included average price and meta-information for the primary matched item but also for secondary matches. Secondary matches are items that differed from primary matches for some parts of their specifications. For example, the primary match item in the case of appliances could indicate that the brand of the item should be well-known in the high level of the market, excluding some specific brands/models, whereas secondary matches could be based only on brands/models excluded by the primary matches. The use of available secondary matches depended on the availability of corresponding brands/models in New York.

53. The matching of products for items subject to the RTPC approach, although still laborious, absorbed much less time compared to the 2010 round, when the RTPC approach was first introduced. This result was due primarily to the reduction in the number of items subject to the RTPC, the streamlining and simplification of their specifications as well as the higher experience acquired by the secretariat from the 2010 round of surveys, in dealing with the matching of electronic and technological RTPC items. As far as cars and scooters are concerned, the approach taken by the secretariat to centralize the collection of MSRPs directly from the national web sites of manufacturers also helped, as the collection and matching work was done concurrently by the same price collectors, who divided the work among themselves by brands and models across all duty stations, thus developing a more intimate knowledge of available matching options, rather than by dividing the work by duty station. Cars priced at the duty stations and in New York were first matched in the best possible way and secondly, only item ratios based on matched cars deemed to properly ensure a good or exact like-to-like matching were retained.

54. The first step of price data processing was to create a "general" New York's price dataset, a starting point in the process of creating benchmark New York datasets to be used for comparisons with various duty stations. At this level, exclusions of price data concerned outliers, prices considered too low or too high, without a comparison to any specific duty station. Also excluded were price quotations of products found not to comply with the specifications. However, it should be noted that this being the first time that the secretariat was reviewing items surveyed in New York for compliance with the ECP specification, the initial set of exclusions was not sufficient to ensure sufficient adherence to the ECP specifications.

55. The second step in price data processing was that of balancing New York with individual duty stations data. Balancing consisted in excluding selected price quotations, item by item, either from the duty stations or from general New York's price dataset with a view to achieving a more uniform comparison between the two. In general, for example, ranges of variation of price quotations were harmonized so that similar ranges of variation were obtained for both the duty station and New York or to harmonize outlets approved for each duty station with those used in New York. Outliers were reviewed in light of the specificities of the associated duty station. This activity led to the creation of separate New York datasets each specific to one of the eight other duty stations.

56. This second balancing step, however, was much more significant for duty stations not covered by the ECP (Geneva, Montreal and Washington D.C.) than for ECP duty stations. As a matter of fact, the need for introducing balancing in the methodology was devised back in the past when all duty stations were subject to a fully-fledged price survey, which was no longer the case for ECP-covered duty stations. In the case of ECP-covered duty stations, the possibility of appropriately balancing the New York's price dataset was much more reduced than in the past, since only average price data, already screened for internal consistency within the internal data processing procedures of the ECP was available. Thus, in the case of ECP-covered duty stations, their corresponding New York price dataset should all be very similar, if not identical, for most of the items. Possible exceptions could still remain when, in the case of ECP-drawn items, secondary matching was used, or for all other items not sourced from the ECP.

57. This incongruity in the use of balancing in the context of ECP-covered duty stations was noticed particularly by the independent consultants, who indicated that New York's price datasets were balanced too differently across ECP-covered duty stations, which was considered not proper in view of the expectation that ECP average prices should already be consistent among themselves and therefore their New York's counterparts should also be consistent. The secretariat agreed with this general observation and, during its second price data review, eliminated a much larger number of price quotations from the New York price datasets in order to meet much more strictly the ECP specifications in a consistent manner uniform across duty stations.

58. As anticipated in the introduction and section II of this document, during the second price data review the secretariat re-considered the effective comparability and adherence to specifications for certain items of the basket. The items which the secretariat determined were

not sufficiently comparable include the following:

- (a) 014-01 Water, still, large bottle, BL
- (b) 016-04 Red wine, regional wine, European, Cabernet Sauvignon, in a bottle, WKB
- (c) 016-06 Red wine, non-European, Merlot, WKB
- (d) 016-07 White wine, ACO (Appellation d'Origine Contrôlée), European, Sauvignon Blanc, WKB
- (e) 016-08 White wine, non-European, Chardonnay, WKB
- (f) 016-09 Red wine, non-European, Cabernet Sauvignon, WKB
- (g) 018-02 Cigarettes, with filter, not domestic brand, WKB
- (h) 019-10 Men's shirt, short sleeves, WKB-L
- (i) 020-18 Ladies' straight trousers, woolmix, WKB-M
- (j) 020-19 Ladies' straight skirt, woolmix, WKB-M
- (k) 021-04 Girls' top, WKB-L

59. Non comparability for item 014-01 “Water, still, large bottle, BL (Brand-Less)” was detected upon a closer review of average prices of this item in ECP-covered duty stations, which were much lower than the prices collected in non-ECP-covered duty stations. Also, the observations raised about this item by the independent consultants pointed to the fact that, while for ECP-covered duty stations it was not possible to understand the market boundaries of the brand-less group, in New York some very popular, local brands were used to calculate the average price along with store brand price quotes. While the secretariat initially speculated that such popular, local brands would be very similar in their market positioning to the unknown brand-less items used in the context of the ECP or store brands quoted in New York, the marked differences in prices between New York and ECP-covered duty stations, as well as the difficulty in easily applying the concept of brand-less water bottles to non-ECP-covered duty stations on the basis of actually selected items, led the secretariat to conclude that sufficient like-to-like comparisons could not be ensured between New York and ECP-covered duty stations for such items. For non-ECP-covered duty stations, the secretariat decided on a case-by-case manner on whether or not like-to-like comparability was assured, using careful balancing for the items.

60. Non comparability for five different types of wines (016-04, 016-06, 016-07, 016-08 and 016-09) was also triggered by a closer review of average prices of these items in ECP-covered duty stations, even though the difficulty of ensuring proper like-to-like comparisons was not new.

Before the adoption of the ECP specifications, wines in cost-of-living surveys used to be selected by reference to internationally marketed known brands. While global alcohol brands may not be fully representative of staff consumption, they seem to provide price ratios more in line with what one would expect particularly for the ECP duty stations. In addition, concentrating on specifications including a certain geographic origin or domestic/imported categorization may not provide proper comparison basis between New York and the duty stations due to differences in how markets operate (for example, Cabernet Sauvignon prices for ‘non-European’ wines in the ECP dataset are on average 60% higher than those of ‘European’ ones, whereas in the New York’s dataset the difference is practically non-existent.).

61. Apart from the Moët&Chandon Champagne, the rest of the wine comparisons are subject to potentially large specification differences. While physical specifications can be matched – size, prominent grape, broad appellation, etc. – the description leaves wide latitude for selection within the specification. It is hard to ensure true comparability that also accounts for differences in issues like wine outlet selection (wines are not sold in supermarkets in New York whereas they are in Europe), relative sales volume, market segment, etc. In particular, compared to the ECP prices the NY wine price data seem to include much broader and higher price (and implicitly specification) range and generally excluding the lower price end of the market. Again, the borderline between Well Known Brand (WKB) and specialty is somewhat hard to establish across markets without using the price itself as a proxy for quality characteristics associated with WKB. For the future, narrower or revised item specifications should be considered. For this round, unless more comparable prices can be obtained, all non-specific brand items should be excluded from the alcohol price ratios unless a careful balancing enables the use of these items.

62. Non comparability for item 018-02 “Cigarettes, with filter, not domestic brand, WKB” stems from the simple fact that imported cigarettes, are effectively non-existent in the New York market, the secretariat needed to target specific outlets looking for a very limited amount of price quotes, which upon a second review and further research on the Internet, turned out to include quotes from cigarettes produced locally under license. Therefore, the secretariat proposes that this item should be excluded from the comparison and removed from the basket.

63. Non comparability for the identified clothing items (019-10, 020-18, 020-19 and 021-04) was detected on the basis of mixed considerations that included severe differences in price levels between New York and covered ECP-duty stations or insufficient price quotations collected in New York. Upon a further research conducted on the clothing industry that led to a more uniform and proper reallocation of all brands sampled in New York as belonging to the WKB-High, WKB-Medium and WKB-Low segments of the market, the secretariat consequently recognized that other, lower segments of the clothing market should have been better covered in New York. For the future, the secretariat will need more feedback and orientation from its Eurostat and ISRP partners with regard to the proper selection of brands and outlet types that led to the determination of prices averages in covered ECP duty stations. In the meantime, the more thorough research it conducted on the clothing industry helped the secretariat in identifying potential brands and outlet candidates to fill these gaps in New York.

64. Given the secretariat's assessment of the lack of comparability for the items discussed above, the Committee is invited to discuss the issue with the goal of finding a solution to this problem of an obvious gap of information in the basket of goods and services. A possible short-term solution might include conducting a mini-survey in New York with the objective of filling the gap of appropriate price information for the identified items. Such a mini-survey should be conducted seeking the active support of ICSC partner agencies, Eurostat and ISRP, but also, if available, the Bureau of Labor Statistics (BLS) of the United States, which by participating in the Eurostat/OECD Purchasing Parity Program, might substantially help in identifying appropriate brands and outlets for the exercise. The mini-survey could and should be conducted timely to report its results to the 85th session of the Commission, scheduled to be held 10-21 July 2017 so that proper average prices, calculated out of the new information gathered by the secretariat appropriately CPI-back corrected, could be used in time for the next group of group I duty stations surveys, scheduled to begin on September 2017 and the rest of group II duty stations. In the absence of this supplementary price information, the secretariat proposes not to consider the use of affected item ratios in the calculation of the new PAIs, except for the few duty stations where a careful balancing might be possible to ensure like-to-like comparisons.

65. All decisions about the exclusion of price quotations, either from the duty station or from New York, were documented in the IDMS. Given the exact or very close matching of individual products falling under items subject to the RTPC approach, balancing for these items was a much more limited exercise.

Housing and domestic service costs

66. The data processing of housing, domestic service costs and household expenditures consisted first in editing those individual responses to correct clearly faulty data recorded by the respondents. Compared to the prior round, the volume of editing was generally much larger. In particular, within the housing and domestic service costs data, the secretariat detected that reported domestic services costs required a thorough review of a large number of responses, across all surveyed duty stations, which produced implausibly high expenditures. The reason for this outcome lies in the design of the relevant questionnaire section, whose structure had changed since the 2010 round, which was evidently not sufficiently clear to minimize reporting errors.

67. The section of the questionnaire dedicated to expenditures on domestic services, was designed to avoid the self-selection of full- and part-time domestic services by the respondent. Respondents, had to indicate for most common domestic services the number of days worked per month, the number of hours worked per day, the wage rate (monthly, weekly and hourly rates), the amount and the currency used, plus other supplementary compensation (social security, transport, etc.). The default wage rate was hourly and the default currency the local currency at the duty station. When reporting information about their expenditures for full-time services, quite a large number of respondents indicated a number of days in the range of 20 to 30 working days per month, often with up to 8 hours per day. However, they also did not change the defaulted value of the wage rate from hourly to monthly, with the result that in all such cases, monthly

expenditure amounts were calculated by the system up to 240 times their true value, producing unrealistically high estimates. The secretariat spent a considerable amount of time in identifying and editing the questionnaires following this pattern. Another problem encountered in the processing of data from this section was the inclusion by many respondents of expenditures for services not related to domestic services, as intended in our methodology, under the unclassified domestic services for which a description of the type of service was needed. Services such as children extra-school tutoring, children summer camps, municipality garbage collection taxes, piano lessons, condominium charges, etc. crept in along with acceptable services like gardeners, drivers or combined services (for example, housekeeper and nanny at the same time). Cleaning this type of entries also required a considerable investment of time.

68. While for the future round it is the intention of the secretariat to review the collection of domestic service costs in order to simplify it, for the current 2016 round the secretariat proposes to implement a number of changes to the questionnaire addressed to staff. Proposed changes related to the collection of information on domestic services costs are as follows:

- (a) Improve significantly the guidance to respondents in the heading of the section dedicated to domestic service costs;
- (b) Add a pop-up window alerting the respondent upon saving or moving to the next section to verify the indicated days and hours of work, wage rate and related amounts;
- (c) Do not set any default wage rate, leaving that field blank. Restrict the possibility of indicating any cost amount only after the selection of a wage rate from the drop-down menu.

69. Furthermore, newcomers (defined as respondents who joined the duty station less than three months before the survey) were generally excluded. An exception to this rule was for the few staff members who, although joined the duty station (assumed duties) less than three months before the survey month, were living at their dwelling for more than three months, for instance staff members joining the organizations while already living at the duty stations.

70. Also excluded were questionnaires of staff members sharing rent with others. Outliers for high or low levels of rent, apportioned costs, maintenance, utilities, domestic services and other housing expenditures were also excluded.

71. A special case of exclusions regarded respondents of the survey in Geneva who live in neighbouring France. Quite a number of those respondents (details are provided in document ICSC/ACPAQ/39/R.4) did not follow the instructions provided with the questionnaire, or the special FAQ section of the support micro-site, which indicated that their housing expenditures, from rental, utilities, maintenance, etc. were not to be reported in an itemized manner in the housing section of the questionnaire, which was to measure such housing expenditures when incurred within the country of the duty station, but rather by adding them up and reporting them

as Out-of-Area housing expenditures in the next section of the questionnaire, in conformity with the definition of In-Area and Out-of-Area expenditures approved by the Commission upon the recommendation of the Committee. Nevertheless, all such cases were completely excluded and none contributed to the determination of any of the weights of the PAI housing component (rental for housing; maintenance and repair of the dwelling; water supply and miscellaneous service; electricity, gas and other fuels; and other housing costs).

Household expenditures

72. For the household expenditure data, the first required step in the processing was again editing those individual responses to correct clearly faulty data recorded by the respondents. The most typical issue detected by the secretariat, across several duty stations, was the duplication of responses provided in the fields In-Area (local currency) and In-Area (other currencies), with the latter requiring the respondent to indicate which other currency was used for the incurred expenditures. Respondents who duplicated the information in some cases reported exactly the same amounts in both fields, in other cases offered their own conversion in US dollars. Other problematic issues detected by the secretariat, again common across various duty stations, included the reporting of the number of purchased vehicles for which expenditures were incurred in the field designed to record the expenditure In-Area (local currency) while reporting the expenditures themselves in the field In-Area (other currencies). It should be noted that in prior rounds, the field to report In-Area (other currency) expenditures was not available for group I duty stations. In other cases, recalling that monthly and annual household expenditures were to be reported in two separate pages of the questionnaire, respondents, not finding in the first, monthly page an annual itemized expenditure they wanted to report, rather than checking in the second page of the questionnaire, reported it under unclassified expenditures, which offered a free text field for recording them. Sometimes, such annual expenditures reported as monthly ones, were repeated again under the annual section. Considering the typicality of all such errors, special tools were designed to identify them off the data processing system, determine the right values to impute and manually correct them back in the system, operations that proved rather time-consuming, as in the case of those related to the housing section.

73. While the secretariat had embodied a number of explanations and general guidance in the questionnaire, coupled with the explanations provided in the support micro-site, evidently these were not enough to prevent respondents from generating such a large volume of misreporting. The secretariat, thanks to the experience acquired with headquarter duty stations, has planned appropriate modifications to the questionnaire in all those areas where confusion emerged the most. In addition to further extending textual explanations throughout the body of the questionnaire, other actions, such as dynamically embodying the name of the country of the duty station within the heading of the In-Area (local currency) and In-Area (other currency) fields, to better clarify the dichotomy between In-Area and Out-of-Area expenditures, blanking out the default currency code of the In-Area (other currency) field, and also removing the national currency code from the currency drop-down list of that field, using a duty-station specific list of currency codes to eliminate the choice of the national currency from the list of currencies

available in the Out-of-Area field.

74. Following the editing of questionnaires described above, the next steps in the processing were to exclude incomplete or otherwise unusable questionnaires. Furthermore, newcomers (defined as respondents who joined the duty station less than six months before the survey) were generally excluded, with the exception of staff members who were employed at the duty station less than six months before the survey but had been living at the duty station for more than six months before the survey. Questionnaires showing a ratio expenditures/income lower than 20 per cent or higher than 200 per cent were also statutorily excluded, with the exception of few cases with ratios higher than 200 per cent when the respondent stated that there was another member of household working full time. Of all other cases, underlying pattern of expenditures considered too atypical were also excluded. In a few cases, the secretariat was able to impute values to individual items of expenditure where annual values of expenditure were used for fields requesting expenditures on a monthly basis. Outliers for high or low levels of individual lines of expenditures were also excluded.

75. Respondents also had the opportunity to indicate other unclassified expenditures which they could not easily attribute to any of the existing codified lines. The secretariat allocated such expenditure information to the proper basic headings to the extent possible.

VI. Collaboration with key stakeholders

76. The ICSC secretariat worked closely with the organizations of all surveyed duty stations, through the LSCs and the survey coordinators, throughout the survey process, from the preparatory phase, to price data collection, to the analysis phase. There were frequent consultations between the ICSC secretariat and the LSCs before the surveys were launched, during the administration of the surveys, and during data processing after the surveys were closed. These consultations included pre-survey consultations to review the status of preparations for the survey, the inputs expected from each of the key players, and other logistical matters pertinent to the administration of the surveys. Before the surveys took place, SCs also coordinated the review of previous lists of outlets together with the secretariat for the final approval by the Chairman of the Commission. When the duty station was covered by the ECP, they conducted such review of the previous lists of outlets limited to the items not covered by the ECP. During full price data collection activities, SCs facilitated the work of pricing teams in many ways, especially by setting up pre-approvals for outlet visits, gathering supplementary information on price data, organizing the work of price observers but also helping the secretariat in the collection of prices or costs by telephone calls, for those items such as costs of visits at various doctors, or for the services of electricians and plumbers, whereby neither personal visits nor browsing outlet web sites was deemed an efficient way of collecting price data.

77. Furthermore, when ICSC secretariat staff was present for fully fledged price surveys, survey coordinators and LSCs organized town hall meetings at which ICSC secretariat staff briefed staff at large about all aspects the design and administration of the survey, the critical role

of the LSC and staff at large in the process, and the consequences of low levels of staff participation, such town hall meetings could also include discussions about duty station-specific issues. In the case of Geneva and Montreal, the SCs facilitated the agreements and administrative arrangements between the secretariat and local authorities for obtaining the assistance of price survey consultants during full price surveys. For the survey in Geneva, the secretariat was supported by staff of the *Service du commerce, Département de la sécurité et de l'économie, République et canton de Genève* and also by agents of the *Police de la Région de Nyon*. For the survey in Montreal the secretariat was supported by price collectors of *Statistics Canada*. Price survey consultants were not utilized in the price survey conducted in New York and Washington D.C. on the ground of traditional good knowledge of those markets by the secretariat.

78. The secretariat also reviewed the contents of a special micro-site dedicated to the survey, including a demonstration of the survey questionnaires. The list of outlets was developed through constructive interactions between the ICSC secretariat and the LSCs, culminating in the approval of the list by the Chairman of ICSC. These consultations continued during and after the data analysis phase in the form of requests for clarifications regarding data provided by the survey coordinator or for supplementary information regarding the addition of outlets.

79. Price survey observers and independent consultants participated in the process. Price survey observers were present where fully fledged price surveys were conducted. The number varied across duty stations. Being part of the pricing teams, their role consisted in verifying that prices were collected from the approved lists of outlets and for the items specified in the basket of goods and services. Price survey observers could provide their opinion and feedback about individual items being surveyed, or about outlets, but also convey their annotations to the survey coordinator who would in turn be informed about the conformity of the pricing activity to the established guidelines. The presence of price survey observers during field operations helped particularly when quick action for replacing outlets was warranted.

80. Independent consultants visited the ICSC secretariat from 12 to 21 December 2016, during the final stages of the first review of price data and, after agreeing to be bound by appropriate confidentiality agreements, proceeded to perform their role as specified in their terms of reference, in particular, verifying that the processing of survey data conducted by the secretariat was consistent with the established guidelines and procedures. They were provided access to all available price data but also to housing and household expenditure information, via slightly modified data processing templates that enabled them full view of the duty stations' data while at the same time safeguarding the integrity of the data processing system. It was made clear to the experts that the secretariat would take into account any proposals that they might make as long as such proposals were in compliance with the approved guidelines and procedures. Once they were briefed on their terms of reference and the work programme of their visits, the consultants immediately and at the end of their visits pointed out that the allotted time of two working days per duty station was barely sufficient to screen price data processing. However, although unable to conduct a full review of housing and household expenditure data, the secretariat briefed consultants about key aspects of housing and household expenditure data,

whenever necessary. Consultants could interact with secretariat staff and discuss any issues of interest. However, because of their compressed schedules, such interactions focused primarily on the review of price data analysis.

81. While Eurostat and ISRP did not participate in the collection and processing of survey data, as indicated in section II of this document, they partnered with ICSC on number of other key activities, like the provision of price and rent data for the calculation of rent indices used in PAI calculations. Furthermore, in the months prior to the beginning of the survey round, part of the preparations included the exchange of information and discussions aimed at a higher harmonization of our respective expenditure questionnaires in view of the possibility of pooling together anonymized micro datasets in case of insufficient response rates to their respective surveys, or to support the possibility of future fully harmonized staff surveys. ISRP also supported the secretariat by facilitating its participation as observer to a coordination meeting of representatives of National Statistical Offices of those countries participating in the Organization for Economic Co-operation and Development (OECD)'s-Eurostat Purchasing Power Parity programme with the objective of securing access to average price data from countries beyond those covered by Eurostat.

VII. Derivation of common expenditure weights

82. The Committee may recall that in its thirty-eighth session it recommended an overall strategy, inclusive of contingency plans in the event of low response rates, for the administration of household expenditure surveys, which was very similar to that recommended for the 2010 round. However, it recommended expanding the pool of eligible staff to include also staff at D-2 grade. In particular, in addition to recommending that surveys be administered to all eligible staff, the Committee confirmed its earlier recommended criteria for validating the accuracy of the new set of common weights estimates, based on their coefficients of variation, with thresholds for usability set at coefficients of variation of at most 15 per cent, for each grade at a given duty station, and 25 per cent across all grades at the duty station, and that in case results were not acceptable for some duty stations, post-stratification by collapsing duty stations be carried out, before resorting to the use of external data.

83. Another new recommendation of the Committee dealt with the estimation of common weights mapped to newly aggregated shares of expenditures recorded with one question only in the household expenditure section of the questionnaire. This is the case for common weights related to the shares of expenditure on food (12 common weights), non-alcoholic beverages (2 common weights) and alcoholic beverages (3 common weights). In such cases, the estimation of coefficients of variation was done at the share of expenditure level. Upon a satisfactory accuracy for each of the three shares of expenditure, individual common weights were estimated by apportioning the aggregated shares of expenditures by using three different sets of proportions derived from the 2010 common weights.

84. The high response rates achieved at each of the designated duty stations, and overall,

ensured a precision far in excess of the requirements specified by the Committee for obtaining reliable estimates of the common expenditure weights. Annex I presents the estimated common expenditure weights for each basic heading proposed for use with the 2016 round of surveys. The coefficient of variation for each recorded share of expenditure, after collapsing by duty station and grade, or in other words through all the strata by which the population was stratified, is also given. The annex shows that the coefficients of variation of the shares of expenditure fell into a range from 0.54 per cent (Food purchased in supermarkets, stores, markets) to 6.98 per cent (Motorcycles and bicycles). The high response rates and the corresponding high sampling fractions produced very low estimated standard deviations for the estimators of the common expenditure weights. Methodological details of the calculations are provided in annex III.

85. Common weights apply only to the basic headings of the In-Area (excluding Housing) component of the PAI. Estimates of the weights of the 7 basic headings of the Housing are duty station-specific and they are derived directly from the cost-of-living survey, without using the concept of common weights. Therefore, out of the currently approved 80 basic headings in the PAI structure, the number of estimated common weights is 73. In the 2010 round, out of the approved 84 basic headings in the PAI structure, the number of estimated common weights was 77.

86. Pursuant to the contingency plans in the event of insufficient staff participation in the surveys, the secretariat compared the previous (2010) and current (2016) sets of common expenditure weights, by first re-aggregating the set of 77 common expenditure weights used in 2010 into the current set of 73 common expenditure weights. Two approaches were considered in making this comparison. One was to update them for inflation between 2010 and 2016. To update for inflation, each of the re-aggregated 73 basic headings time-to-time movements, reflective of the weighted average movement of detailed national CPI subseries from 2010 to 2016, is multiplied to re-aggregated common weights and, at the end of the process, the sum of the resulting estimates is normalized to 1000 so as to compare them with the new set of common expenditure weights. The sets of “aggregated 2010” and “aggregated 2010-updated” weights are given in annex II, which reports the 2016 common weights and compare them to the 2010 common weights, without CPI updating (column (B)) and with CPI updating (column (C)), appropriately aggregated for comparisons.

87. However, in order to assess which shifts in expenditures will be the most impactful on the new round’s PAIs, the comparison to make is between the 2010 common weights without CPI-updating, hence those effectively used in the course of the past 2010 round, and the new 2016 common expenditure weights, as reported in annex II. While many of the common expenditure weights did not change too much from 2010 to 2016, the secretariat would like to highlight those major changes (the largest five positive and five negative changes, with weights expressed in 1000s), which are expected to have the biggest impact on the evolution of the PAI. It should be noted that changes from 2010 to 2016 are somewhat affected by the introduction of a new basic heading for expenditures on “Hotels, motels, camping”, whose 2016 estimated weight is about 2.51 percent of all In-Area (excluding Housing) expenditures, that was not measured in the 2010

round. Without this new basic heading, positive and negative changes would be slightly more pronounced. Table 6 below shows significant increases in the importance of domestic services; staff restaurants and cafes; car insurance; disposable household goods and sporting events and related activities. On the other hand major decreases are recorded for cosmetics and other goods for personal care; books, newspapers and periodicals; games, toys and hobbies; major household appliances, including repair and information processing equipment, including repairs.

Table 6. Major changes in the relative importance of individual items in average expenditure pattern

BH	BH description	CW-2016	CW-2010	Diff.
40	Domestic services	60.216	40.347	19.870
73	Staff restaurants and cafes	44.994	36.313	8.681
49	Car insurance	18.622	13.894	4.728
39	Disposable household goods	21.749	17.366	4.383
68	Sporting events and related activities	16.241	11.923	4.318
78	Cosmetics and other goods for personal care	14.590	22.808	-8.217
70	Books, newspapers and periodicals	10.427	17.508	-7.081
64	Games, toys and hobbies	4.196	11.104	-6.909
35	Major household appliances, including repair	2.715	9.382	-6.667
61	Information processing equipment, incl. repairs	6.339	12.954	-6.614

VIII. Derivation of weights for the major components of the PAI

In-area (excluding Housing) weights

88. Expenditure weights for New York were constructed according to the existing methodology on the basis of common weights and duty station-specific weights for housing, pension contribution, medical insurance and out-of-area weights. More details about the derivation of the common weights are provided in section VII above. The common weights to be used for PAI calculations in the 2016 round are provided in annex I.

Housing weights

89. Housing weights were derived from expenditures for the following basic headings, as reported by staff in the housing questionnaire:

- (a) Rental for housing;
- (b) Maintenance and repair of the dwelling;
- (c) Water supply;

- (d) Electricity;
- (e) Gas;
- (f) Heating, including hot water;
- (g) Other housing costs.

The overall housing weight is obtained by adding up the weights of the above sub-components.

90. Average gross rents for renters were used to impute for rental costs for homeowners with the same dwelling types and sizes. Average net rents for renters were used to calculate the weight for rent. The overall rental weight was calculated as a weighted average of rental costs for renters and imputed rental costs for home owners, using the numbers of renters and homeowners as weights. The net costs incurred by renters for other components of housing costs were also imputed for home owners and both renters and home owners contributed to determining the weight of such other housing components.

91. The average wage for a maid, cook, babysitter/childminder and other domestic employees paid per month for a full-time employee, and per hour for a part-time employee, were also derived from data reported by staff in the housing and domestic services sections of questionnaire. The other housing costs, cited above, covered such items as key money, taxes specific to the duty station, radio & TV license, garage costs, refuse collection and other unclassified housing costs (to be specified by respondents).

Pension contribution weight

92. The amount paid by a staff member at grade P-4, step VI into the United Nations Joint Staff Pension Fund at the time of the survey was used to establish the pension contribution weight. This amount, common to all surveyed duty stations throughout their respective survey months, was \$1,058.01.

Medical insurance weight

93. The medical insurance weight was derived from the average net premium (that is, less medical insurance subsidy) weighted by the number of staff enrolled in the different insurance plans available in the surveyed duty stations during their respective survey months.

Out-of-area weight

94. The actual out-of-area weight was derived from the household expenditures questionnaires as an average across all staff at the duty station of their out-of-area share of total expenditure. As indicated in paragraph 71, in conformity with the definition of In-Area and Out-of-Area expenditures approved by the Commission upon the recommendation of the Committee,

rent and other housing expenditures recorded as In-Area by a number of respondents residing in Geneva's neighbouring France were not used to determine the In-Area housing weight, but their housing costs were added to those of other renters and home-owners who had reported their housing costs in the actual out-of-area weight. The actual out-of-area weight was then used to determine the applied out-of-area weight through the application of the harmonized specification of the out-of-area weight, by assigning a reference weight to values of the actual out-of-area weight falling within the specified brackets. While all duty stations remained below the ceiling of the first bracket (15 percent), resulting in an applied out-of-area weight of 10 percent, Geneva was the only duty station that exceeded that ceiling, with its actual out-of-area weight falling in the 15 to 25 percent bracket, associated with the reference applied weight of 20 percent.

Table 7. Out-of-area weights

Duty station	Out-of-area (OA) weight (%)	
	Actual	Applied
Geneva	17.01/a	20.00
London	11.01	10.00
Madrid	11.93	10.00
Montreal	10.77	10.00
New York	9.78	10.00
Paris	9.38	10.00
Rome	10.58	10.00
Vienna	12.87	10.00
Washington, D.C.	11.66	10.00

/a Inclusive of an estimated 0.79% due to renters in neighbouring France who reported their rent as In-Area

IX. The Housing component

External rental data

95. External rental data, collected from real estate agencies in New York by the ISRP, were used for comparisons with similar data collected in the other headquarters duty stations and Washington, D.C. In each duty station the survey is usually conducted the second quarter of the year (between end of March and end of June). Certain neighbourhoods considered to be comparable across duty stations are specifically targeted. These are areas described as "good quality" residential areas favoured by expatriates and professional people such as civil servants, university staff, doctors, managers, etc. The quality should be good to very good, but not luxurious. The surveyors visit a certain number of experienced real-estate agents in order to obtain a good estimate of current rental values for pre-defined types of accommodation. At least ten agencies are visited in the larger cities, while in the smaller cities it is possible to cover the

market adequately with a smaller number of real-estate agents, but the number of agencies visited at any duty station is at least six. Agents are asked for current rents for dwellings in the middle-to-upper range of quality (i.e. good quality but not luxurious) and they are asked to give rents for properties currently or very recently on offer.

96. The rent values collected from real estate agencies are the actual rent currently payable for the various types of dwelling. The figure excludes deposits, key money and similar one-off payments. Furthermore, surveyors are instructed to ask for real rents (including any "under the counter" part). Excluded are the luxury end of the market and accommodations rented by employers. Charges made for general services (concierge, common cleaning, lighting of common part, central heating, lifts, etc.) as well as utilities (gas, electricity, water, etc.) are excluded. After a review of the raw data, outliers are excluded by ISRP before averaging across real estate agencies and an average rent level by dwelling type is obtained for the duty station. Therefore, rents provided by the ISRP are pure rents in order to facilitate a like-to-like comparison.

97. The rent data, which covered the period of 2011 to 2016, were used to calculate six-year moving averages using average longevity weights, based on staff responses, updated with the 2016 round results, which was a departure from the previous set of longevity weights based on the 2003 IOS/Eurostat weight distribution for the purpose of producing more reliable average rents for the period under consideration. For this purpose, average rents for 2011 through 2015 were updated to 2016.

98. There are a total of 6 broad types of surveyed dwellings:

- (a) Detached house;
- (b) Non-detached house (i.e. terraced or semi-detached);
- (c) 3-bedroom flat;
- (d) 2-bedroom flat;
- (e) 1-bedroom flat;
- (f) Studio flat.

99. Since there are different average sizes for total living space in different duty stations, the newly approved methodology contemplated a new approach to the calculation of rent parities for the various dwelling types and sizes. In previous rounds a size adjustment factor was used to equalize average rent levels per unit area by type of dwelling later in the analysis, whereas with the 2016 round the secretariat planned to follow strictly the newly approved methodology that provided for expanding the collection of rent data in New York to average sizes for total living spaces beyond the mainstream sizes of living space traditionally surveyed for New York. The expanded size ranges for New York were surveyed in order to match exactly the average sizes for total living space in the other duty stations, without the need to resort to the use of size adjustment factors. However, while attempting this approach the secretariat noted that the sampled data points (real estate agencies that provided range values) in less traditional average

sizes for total living space in New York, were less than the sampled data points for traditional total living space sizes. Furthermore, since the inception of the expansion of the total living space sizes, ISRP reports warned about the use of these total living space sizes outside mainstream market sizes, stressing that “*care should be taken if the additional data is used, due to the small sample size available for certain types*”. ISRP indicated in its reports that real estate agents were somehow reluctant to provide estimates for total living space sizes outside mainstream market sizes, as there were much less rental apartments available in those reduced sizes, which explains why the number of data points is lower. Table 8 below provides the distribution of available sampled data points for external rents over time and across different dwelling classes and types for New York, the mainstream sizes being the largest shown in the greyed columns.

Table 8. Number of sampled data points for external rent data, New York

	3-BR flat			2-BR flat		1-BR flat		Non-detached house			Detached house		
	80-100 sqm	110-130 sqm	140-160 sqm	60-80 sqm	80-100 sqm	40-60 sqm	60-80 sqm	80-100 sqm	100-130 sqm	140-160 sqm	110-140 sqm	150-180 sqm	190-220 sqm
2011	7	10	14	12	14	10	14	3	4	5	2	3	5
2012	7	9	13	12	14	11	14	2	4	5	5	4	5
2013	10	12	15	14	15	13	15	2	4	5	1	4	5
2014	8	11	15	14	15	13	15	2	4	5	1	4	5
2015	11	12	14	13	14	13	14	2	4	5	2	4	5
2016	6	11	13	10	13	10	13	1	4	5	1	4	5

100. Under these circumstances, the secretariat believes that a more accurate like-to-like comparison of rents could be facilitated by the continued use of size adjustment factors. It therefore incorporated the old approach based on size adjustment factors in the calculation of the rent indices for the 2016 baseline headquarter surveys, even though this represents a slight deviation from the spirit of the approved methodology. In recognition that the use and matching of the same total living space sizes would be the preferential option if supported by more solid sample sizes, the secretariat proposes to keep monitoring the market in New York with the view of adopting the matching of the same total living space sizes once such sizes would become sufficiently mainstream in the New York rental market.

Calculation of the rent index

101. In accordance with ACPAQ’s recommendation at its thirty-fourth session, stipulating that the specification of the dwelling class weights and the length-of-occupancy weights for group I duty stations be based on the data provided by staff in the housing surveys, with effect from the 2016 round of surveys, which was approved by the Commission at its seventy-ninth session, the 2003 ISRP/Eurostat weight distribution for occupancy length, previously used to obtain a six-year average of the rents provided by ISRP, were replaced by new equivalent weights estimated on the basis of staff responses in the 2016 baseline headquarter duty stations surveys; moreover, the 1995 ISRP/Eurostat weight distribution for dwelling class and size, used to aggregate rent parities with New York as a base, were also replaced by new equivalent, duty station-specific

weights estimated on the basis of staff responses. However, in the case of Madrid, whose survey results were based on less than 100 staff, duty station-specific dwelling class and size weights could not be used, the use of pooled weights, averaging the dwelling class and size across all other European headquarter duty stations was used instead. Tables 9 and 10 provide the new weight distributions by length of occupancy and the weight distribution by dwelling type and size by duty station respectively.

Table 9. Weight distribution by length of occupancy

Year	Percentage weight	Length of occupancy
2011	11.2%	Lease of at least 6 years
2012	12.8%	Lease between 4 to 5 years
2013	14.5%	Lease between 3 to 4 years
2014	14.7%	Lease between 2 to 3 years
2015	21.4%	Lease between 1 to 2 years
2016	25.4%	Lease less than one year

Table 10. Weight distribution by dwelling type and size

Duty Station	Apartment				House	
	3-BR	2-BR	1-BR	Studio	Non-detached	Detached
Geneva	21.0	27.8	18.7	4.5	14.0	14.0
London	4.0	25.0	5.9	1.3	44.7	19.1
Madrid	20.8	32.4	18.7	3.4	13.0	11.7
Montreal	9.6	20.4	12.7	2.2	22.9	32.2
New York	8.2	30.2	31.3	5.7	7.6	17.1
Paris	17.9	34.2	28.7	4.7	5.7	8.8
Rome	23.3	41.0	15.0	2.6	11.3	6.7
Vienna	20.8	35.4	20.5	1.6	10.7	11.0
Washington, D.C.	2.4	10.8	8.4	0.0	21.7	56.6

102. Four further steps were needed before obtaining the rent index. The first step was to update previous years' rent levels (up to 5 years before the current year). Thus duty stations rent levels from 2011 to 2015 were updated by appropriate CPI subseries. Second, the moving average rent across the current and the past 5 years was calculated by using the percentage weights as per Table 9. The resulting values were adjusted by the size adjustment factors cited in paragraphs 99 and 100. The third step consisted in calculating two indices, a Laspeyres and a Paasche index, averaging rent ratios across dwelling types. Ratios by dwelling type were calculated by comparing rent levels at the duty station with their adjusted counterparts in New

York. Weights used for the calculation of the two indices are those from Table 10. The fourth and final step was to calculate the geometric average of the Laspeyres and the Paasche indices, to obtain the Fischer index, which is the rent index.

Calculation of the Housing Weight and Index.

103. As described in paragraph 89, the overall housing weight results from the sum of weights of its individual basic headings. Weights for individual basic headings are derived from averages of raw data collected from the housing section of the survey questionnaire. Corresponding housing-related indices are calculated by using information from different sources as follows:

Table 11. Sources for calculation of indices of the Housing component

BH	Housing component	Source of information for index
28	Rental for housing	ISRP/OECD rent survey
29	Maintenance and repair of the dwelling	Housing section from staff survey
30	Water supply	survey coordinator
31	Electricity	survey coordinator
32	Gas	survey coordinator
33	Heating, including hot water	survey coordinator
34	Other housing costs	Housing section from staff survey

104. The overall housing index results from the weighted arithmetic average of its component indices.

X. Formula used in calculating cost-of-living indices

105. The structure of post adjustment index to be used in the 2016 round of surveys is derived from that used in the 2010 round. However, compared with the previous round, the number of basic headings was reduced from 84 to 80. The report of the Committee at its thirty-eighth session, document ICSC/ACPAQ/38/R.8, provides a description of the changes occurred to the basic heading structure of PAI. This structure is consistent with the international classification of individual consumption by purpose (COICOP).

106. Two main reasons motivated the Committee to recommend the current PAI structure based on a set of 80 basic headings: (a) the simplification of the structure required a shorter and less burdensome household expenditure questionnaire and (b) higher comparability between the PAI structure and that of indices used by other organizations, particularly those based on COICOP, like that of the correction coefficients of Eurostat.

107. Basic headings are present only in the In-Area (excluding Housing) and the Housing major components of the PAI. They are the lowest level elements of the PAI structure associated with a weight. At higher levels, they are further aggregated into 32 subgroups, which in turn are

aggregated into 12 major groups, one of which corresponds to the Housing major component.

108. In accordance with previous ACPAQ recommendations and corresponding Commission decisions, a RTPC-adjusted modified Walsh formula was used in the calculation of the cost-of-living indices for all headquarters duty stations and Washington, D.C. In determining the cost-of-living index, the following components were calculated:

- (a) A weighted geometric mean for the in-area (excluding housing) component;
- (b) A weighted arithmetic mean for the housing component as discussed in paragraph 103;
- (c) An index for pension contribution;
- (d) An index for medical insurance; and
- (e) An out-of-area index.

These components were aggregated arithmetically.

109. No changes to the aggregation of PAI consequent to the use of the RTPC approach were made since the 2010 round. In this document, it is briefly recalled that the aggregation within the In-Area (excluding Housing) component of the PAI is no longer made by hierarchical geometric averages of basic heading indices, but it is made out of an aggregation of basic heading PAI components, which now incorporate their respective rebasing factors. Basic heading-specific rebasing factors coincide with the usual, global rebasing factor if their underlying items are not subject to the RTPC approach. On the other hand, the basic heading-specific rebasing factor for an item subject to the RTPC approach is obtained from the multiplication of the global rebasing factor by the movement of the New York's CPI subseries associated with the concerned basic heading. Therefore, the multiplication by the rebasing factor is no longer needed at the end of the aggregation of the major PAI components and the RTPC-adjusted modified Walsh formula provides the resulting PAI directly.

XI. Estimating and adjusting for the survey transition effect in the baseline cost-of-living surveys at headquarters duty stations

110. The 2016 survey results show significant differences in price level relatives to New York when compared to the previous survey in 2010. Considering the large number of methodological changes that have occurred between the two rounds, the secretariat investigated the factors most influencing the results of this component of the the baseline cost-of-living surveys. The index for the In-Area (excluding Housing) or IA-H, component resulting from the 2016 price surveys was compared to the same aggregate index for the same month resulting from the regular updating of 2010 survey results. As the regular updating incorporates changes in the evolution of exchange

rates and of the local inflation at the duty station but not of the inflation in New York, a certain amount of change in price level relativities could be attributed to the inflation in New York. On the other hand, since the exchange rates used to convert local prices at the time of the surveys were the same as applied to the regular updating of the 2010 survey results, the evolution of exchange rates between 2010 and 2016 does not have an impact on these comparisons.

111. Therefore, in order to compare the 2010-updated price ratio estimates with the 2016 survey ratios, the denominator (New York prices in June 2010) were adjusted with the appropriate New York inflation occurred from the 2010 to the 2016 survey month at the most detailed level of aggregation: the set of basic headings common in both surveys. This made the 2010 and 2016 values of the IA-H indices comparable. The remaining difference at aggregate level between the 2016 survey and updated 2010 may be accounted on the basis of:

- Real differences between the New York and duty stations price evolutions that are not correctly captured by national level inflation estimates used for updating;
- Methodological differences between the two surveys, particularly the change in price data sources (survey transition effect), and the expenditure weight differences;
- Random estimation error and differences in index compilation and validation process.

112. Table 12 below shows an estimation of the rate of change between the 2010 and 2016 overall price relativities, as aggregated in the In-Area (excluding Housing) (IA-H) component of the PAI using the 2010 set of common weights, so as to avoid the influence of changing the set of weights used in the aggregation of the IA-H indices.

Table 12. In-Area (excluding Housing) (IA-H), comparison between 2010 and 2016 surveys, at their respective time of the survey

	Vienna	Montreal	Paris	Rome	Madrid	Geneva	London	WDC
(1) 2016 survey	78.49	85.42	76.60	73.71	63.61	110.90	75.36	92.72
(2) 2010-updated, without adj. for NY inflation	102.49	98.92	103.12	100.55	87.47	132.44	106.56	105.29
(3) 2010-updated, with adj. for NY inflation	95.64	92.31	96.22	93.83	81.62	123.58	99.44	98.25
(4) 2016 survey results as percentage of 2010 adjusted results (1)/(3)	82.1%	92.5%	79.6%	78.6%	77.9%	89.7%	75.8%	94.4%

113. Montreal, Geneva and Washington D.C. (WDC in the table) are duty stations that were not subject to the switch of source of price data and their 2016 results are on average 92.0% of the 2010 results (adjusted for New York inflation), whereas the same ratio for the other duty stations subject to the switch is 78.8%, which is significantly lower. As a matter of fact, the survey results of non-ECP duty stations are about 16.8% higher ($92\%/78.8\%-1=16.8\%$) than those of ECP duty stations.

114. The lack of access to the outlets used for ECP price data collection limits the secretariat's ability to employ the traditional approaches to possibly mitigating the negative effects of any lack of comparability in the price data, including a careful balancing of outlets or adjusting for outlet selection bias on both sides of the comparison. This means that there is no direct procedure to assess the impact of introducing the ECP as a source of price average data, and so the secretariat had to resort to indirect methods, and, in this connection, proposes the use of a survey transition factor (STF) for the purpose of correcting for the survey transition effect.

115. Ideally, to estimate the survey transition factor a fully-fledged price survey should be conducted at another duty station covered by the ECP according to the traditional ICSC price survey approach and its results compared to equivalent ECP average price data. The secretariat identified Brussels as the best candidate, knowing that it might receive the best level of support from Eurostat, since Brussels is the base of their Correction Coefficients system. ICSC/ECP Brussels price relativities would be aggregated as if it were an IA-H index calculation and the result will be the survey transition factor that can then be applied to the basic headings ratios based on price data for all ECP-covered duty stations. The secretariat might conduct such a survey as early as in May 2017.

116. Subsequently, ACPAQ members might review a technical report on the results of this survey, which would be later submitted for the Commission's consideration in its summer 2017 session. If approved, the estimated survey transition factor could be used in the analysis of all non HQ group I duty stations beginning in the autumn of 2017.

117. As an interim measure, if the results of the baseline cost-of-living surveys at HQ duty stations are to be implemented on 1 April 2017, as expected, the secretariat proposes the use of the factor 1.1677, reflecting the amount of how much survey results in non-ECP duty stations are higher than their ECP counterparts compared to the 2010 adjusted results. This would effectively erase, on average, any difference brought by the survey transition effect between ECP and non-ECP duty stations, as shown with the following table.

Table 13. In-Area (excluding Housing) (IA-H), correction of the indices with interim measure¹

	Vienna	Montreal	Paris	Rome	Madrid	Geneva	London	WDC
(1) 2016 survey	78.49	85.42	76.60	73.71	63.61	110.90	75.36	92.72
(2) 2010-updated, without adj. for NY inflation	102.49	98.92	103.12	100.55	87.47	132.44	106.56	105.29
(3) 2010-updated, with adj. for NY inflation	95.64	92.31	96.22	93.83	81.62	123.58	99.44	98.25
(4) 2016 survey results adjusted with interim survey transition factor (1) x 1.1677	91.65	85.42	89.44	86.07	74.28	110.90	88.00	92.72

(5) 2016 survey results adjusted as percentage of 2010 adjusted results (4)/(3)	95.8%	92.5%	93.0%	91.7%	91.0%	89.7%	88.5%	94.4%
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1. Adjusting with the survey transition factor applies only to ECP-covered duty stations. Therefore, the values of the IA-H indices of Geneva, Montreal and Washington D.C. do not change from line (1) to line (4) of the table.

118. The interim survey transition factor would be applied to ECP-covered duty stations only, that is why there is no change between line (4) of Table 12 and line (5) of Table 13 for Montreal, Geneva and Washington D.C. When such corrections are reflected in the PAI, the differences between un-adjusted and adjusted 2016 survey results and their corresponding 2010-updated PAI at the survey date are shown in the following Table 14.

Table 14. Factoring the survey transition factor in the PAI¹

	Vienna	Montreal	Paris	Rome	Madrid	Geneva	London	WDC
(1) 2010-updated PAI	136.39	134.32	141.83	133.22	128.33	172.42	159.95	142.26
(2) 2016-survey PAI, without survey transition factor	123.93	134.63	129.40	116.76	110.31	165.47	149.37	142.38
(3) 2016-survey PAI, with survey transition factor	134.62	134.63	138.98	126.76	119.16	165.47	158.63	142.38
(4) 2016/201 difference unadjusted (2)/(1)-1	-9.1%	0.2%	-8.8%	-12.4%	-14.0%	-4.0%	-6.6%	0.1%
(5) 2016/201 difference adjusted (3)/(1)-1	-1.3%	0.2%	-2.0%	-4.9%	-7.1%	-4.0%	-0.8%	0.1%
(6) Impact of adjusting for survey transition effect ((3)/(2)-1)	8.6%	-	7.4%	8.6%	8.0%	-	6.2%	-

1. Adjusting with the survey transition factor applies only to ECP-covered duty stations. Therefore, the values of the PAI of Geneva, Montreal and Washington D.C. do not change from line (1) to line (3) of the table and consequently the impact of adjusting for the survey transition effect is zero.

XII. Lessons learned

119. In this section, the secretariat outlines some lessons learned and proposes a number of changes geared towards improving the efficiency of data collection and processing, in light of the experience acquired during the conduct of the baseline surveys at headquarters duty stations.

120. As far as the conduct of price surveys is concerned, the secretariat made a much wider use of Internet web sites of approved outlets in all non-ECP covered duty stations. There are numerous confirmations from field operations, contact with managers of concerned outlets, and survey coordinators, that prices on the Internet are the same as those charged in physical outlets,

expect for local, temporary sales. However, such sales may also be present on web sites too. To some extent, the use of the Internet calls into question the need to survey prices at the exact locations of outlets patronized by the staff, since the geographical differentiation is blurred when prices are collected from the Internet. The secretariat expects that future baseline fully fledged price surveys should allow the Internet to be used as the preferred mode of data collection, including using third-party web sites, when feasible. Pricing some items such as medical services or the services of electricians and plumbers is best done on the telephone and local knowledge and language are essential to be able to collect good quality price quotations.

121. Price data collection in Washington D.C. and Geneva might be affected by adopting Internet web sites of approved outlets as the preferred source of price data. As a matter of fact, whenever outlet chains were the same between Washington D.C. and New York, there would not be any need to reprice the same items in Washington D.C., rather prices of items collected in New York would be subjected to possibly different sales taxes, as applicable for Washington D.C. In the case of Geneva, a more systematic pricing from Internet web sites of major outlets common between Canton Geneva and Canton Vaud, as well as the equivalence of prices in physical outlets of major chains across the two cantons, as evidenced by several confirmations from the management of those chains, would reduce the usefulness of a fully-fledged price data collection in Canton Vaud targeting physical outlets, which, to be conducted fully, would require almost doubling the efforts devoted to the price survey for Geneva only.

122. The data collection of RTPC cars and scooter prices, centralized by the secretariat, proved to be successful because the collection was organized by brands/models rather than duty station, as this enabled price data collectors to develop a very good knowledge about their respective assigned brands and models. The secretariat intends to continue with this price data collection approach in the future. The comments obtained from independent consultants representing the various duty stations regarding engine size comparability across European and North American markets for some specific brands and models will be taken into account as a guide for future item ratio inclusions or exclusions.

123. In light of the importance of expenditures on education, as evidenced by the results of the baseline surveys, a proper like-to-like comparison in the calculation of the education ratio must be ensured and, in this respect, the secretariat suggests to instruct survey coordinators and LSCs that the selection of schools used for collection of data on tuition and other education related costs in future surveys, should be limited to schools that provide a sufficiently disaggregated tuition schedule within the broader group of schools at the duty stations considered representative schools for the review of the education grant, as identified by the Commission, even if the schools at the duty station are not included in that limited list.

124. The use of ECP average prices proved to be feasible if accompanied by an appropriate survey correction factor to account for differences in secretariat and ECP pricing approaches. As outlined in paragraphs 58 to 64, for certain specific items, further action, entailing the conduct of a mini-survey in New York, presumably in the spring of 2017, would enable the secretariat to fill

price data gaps at the base of the system. Such a mini-survey would benefit from the assistance of our partner agencies ISRP and Eurostat, or also the Bureau of Labor Statistics if available, whose relevant experience in coordinating, or conducting, price data collection programmes for purchasing power parity calculations would greatly help with regard to the identification of proper models, brands and outlets to sample in order to reach the level of like-to-like comparability for these items that the secretariat alone could not achieve.

125. Another important exercise for adjusting survey results of ECP covered duty stations entails estimating a survey transition factor as outlined in section XI of this document. Moreover, the secretariat aims to become more involved in the key processes where technical discussions within the ECP and the OECD Purchasing Parity Program take place, especially those regarding the selection of items and outlets. The secretariat will discuss with its partners the feasibility and the best modalities for achieving this goal.

126. Balancing price datasets between duty stations and New York, a feature of the current methodology, was introduced in the methodology as an approach relying on two parallel datasets of raw price data, one for the duty station and the other for New York. However, as pointed out by comments from independent consultants, when applied to ECP covered duty stations, balancing made much less sense than in the case of non-ECP covered duty stations. The secretariat should review this and a number of other guidelines for price data collection, for example guidelines regarding the procedures for the identification of target brands, the selection of outlets, its traditional approach to cover a range of items also beyond the indicated specifications, or the allotted time for duty stations experts to better review all aspects of the survey, so that its guidelines are adjusted and brought more in line with the new methodological background of the post adjustment system.

127. In light of the issues reported under section V on data processing, the secretariat identified a number of improvements to the questionnaire that should reduce the amount of misreporting. However, it is inevitable that some questionnaires in future surveys will still be affected by some level of misreporting. In this regard, the secretariat will make use of a number of checking procedures developed outside its data processing system and integrate them into its mainstream data validation protocols. While the switch to electronic questionnaires was already in place in all group I duty stations since the 2010 round, with the new 2016 round, electronic questionnaires will be administered to surveys for group II duty stations as well. With the switch to electronic questionnaires for all duty stations, part of the time that was traditionally spent on data entry of questionnaires, a step when a number of misreported figures were spotted and corrected upon data entry, will now be necessarily used to conduct data validation and editing. Obviously a proper fine-tuning of certain pre-validation features and guidance offered through the questionnaire, without altering its contents, will help to reduce the time devoted to data validation and editing. The secretariat is planning to bring these improvements and changes to its online questionnaire before the round is opened up to the non-headquarters group I and group II duty stations.

128. Additionally, the feedback received from many of staff survey respondents, which included many home-owners lamenting the seeming impossibility to report their actual housing expenditures, points to the inter-related needs of (i) reviewing the whole housing methodology, with a view of further simplifying it, (ii) reviewing alternatives to the current methodological approach of rent imputation for home owners, (iii) collecting more information from home owners beyond the current approach as needed by a possibly revised methodology. The secretariat proposes that a comprehensive review of the housing methodology be part of the methodological agenda of the Committee in the preparation for the next round of surveys in 2021.

XIII. Recommendations

129. The Committee is requested to recommend that the Commission approves:

(a) The minor modifications made to item specifications, including the change from total service to hourly rate for electrician and plumber services, on the basis of experience acquired during data collection;

(b) The new common weights for the 2016 round of surveys based on results of the household expenditure surveys;

(c) That the collection and processing of the data from the 2016 baseline cost-of-living surveys were carried out in accordance with the approved methodology whenever it proved to be technically sound;

(d) That corrections to and adjustments of the approved methodology followed by the secretariat with regard to data collection and processing are justifiable in light of the reported circumstances and that:

i. until supplementary price information is obtained, ratios for items whose comparability between duty stations and New York was judged not sufficient should be excluded for ECP covered duty stations;

ii. supplementary price information for items judged not sufficiently comparable should be collected with a dedicated mini-survey in New York at the earliest opportunity, in consultation with partner organizations;

iii. a survey transition factor be estimated on the basis of a fully-fledged price survey in Brussels and, as interim measure, the value of 1.1677 be used to correct In-Area (excluding Housing) indices of headquarter surveys for ECP covered duty stations;

iv. the use of size adjustment factors in the calculation of the rent index should continue until the reliability of New York averages rents for alternative dwelling living space sizes is considered sufficient;

(e) That the secretariat be granted the flexibility to introduce minor modifications to the staff expenditure survey questionnaire to be used in the 2016 round of surveys, in light of experience acquired during the 2016 baseline cost-of-living surveys at headquarters duty stations.

Annex I**Common expenditure weights for 2016**

BH	BH description	Common Weight 2016	Coefficient of Variation
1	Rice and cereals	9.661	Total CV 0.54%
2	Bread and rolls, biscuits and other bakery product	12.774	
3	Macaroni and similar products	5.755	
4	Meat	24.537	
5	Poultry	12.331	
6	Other meat products	8.145	
7	Fish and other seafood products	17.266	
8	Dairy products and oil/fats	13.932	
9	Fruits	19.031	
10	Vegetables	18.556	
11	Sugar, jam, honey, etc.	8.588	
12	Food products. n.e.c.	6.772	
13	Coffee, tea and cocoa	11.017	
14	Mineral water and soft drinks	11.489	Total CV 1.24%
15	Spirits and liquors	3.813	
16	Wine	12.557	
17	Beer	4.531	3.63%
18	Tobacco, cigarettes, etc.	3.034	1.26%
19	Men's clothing	13.625	1.17%
20	Women's clothing	22.000	1.43%
21	Boys and girls clothing	7.288	1.83%
22	Clothing accessories and clothing materials	3.399	0.92%
23	Repair and cleaning of clothing	18.046	1.75%
24	Men's, women's and children's footwear	9.214	2.35%
25	Repair of footwear	2.979	1.88%
33	Furniture and furnishings, carpets and other floor coverings	19.494	2.66%
34	Households textiles, including repair	3.367	3.97%
35	Major household appliances, including repair	2.715	1.24%
36	Small electric appliances	4.592	1.43%
37	Glassware, tableware and household utensils	3.113	1.84%
38	Tools, equipment and other non-durable household goods	2.700	1.52%
39	Disposable household goods	21.749	

BH	BH description	Common Weight 2016	Coefficient of Variation
40	Domestic services	60.216	1.34%
41	Prescription drugs	12.989	2.05%
42	Non-prescription drugs and vitamins	8.891	1.41%
43	Therapeutic appliances and equipment, other medical supplies	3.150	3.36%
44	Medical, dental and paramedical services (out-patient and in-hospital)	13.460	1.92%
45	Motor cars	36.707	1.57%
46	Motor cycles and bicycles	1.239	6.98%
47	Spare parts and accessories for personal transport	3.196	1.94%
48	Fuels and lubricants for personal transport	21.160	1.59%
49	Car insurance	18.622	1.33%
50	Maintenance and repair of personal transport	6.854	1.73%
51	Other services in respect of personal and public transport	3.350	3.39%
52	Taxis	12.132	1.52%
53	Local transport	21.685	1.28%
54	Long distance transport	6.116	2.71%
55	Airlines	49.895	1.00%
56	Postal services	2.286	1.80%
57	Telecommunication services	32.725	0.80%
58	Telecommunication equipment	6.975	1.46%
59	Audio-visual equipment, incl. repairs	4.003	2.23%
60	Photographic equipment and optical instruments, incl. repairs	2.588	3.37%
61	Information processing equipment, incl. repairs	6.339	1.81%
62	Recording media: CDs, cassettes, films	0.999	5.29%
63	Equipment for sport, camping and open air recreation	5.351	2.27%
64	Games, toys and hobbies	4.196	1.70%
65	Gardens, plants and flowers	3.866	2.36%
66	Pets and related products and services	4.755	4.66%
67	Cinemas, theaters, concerts and other related activities	20.613	1.06%
68	Sporting events and related activities	16.241	1.74%
69	Film developing and print processing	0.826	5.50%
70	Books, newspapers and periodicals	10.427	1.26%
71	Stationery and drawing materials	3.265	1.76%

BH	BH description	Common Weight 2016	Coefficient of Variation
72	Tuition fee	71.827	1.36%
73	Staff restaurants and cafes	44.994	1.19%
74	Public restaurants and cafes	64.100	0.95%
75	Hotels, motels, camping	25.102	1.27%
76	Hairdressing salons and personal grooming establishments	19.468	1.09%
77	Electric appliances for personal care	1.542	1.24%
78	Cosmetics and other goods for personal care	14.590	2.19%
79	Other personal effects	10.460	1.50%
80	Financial and Other services	4.731	4.24%
		1000.000	

Annex II**Comparison of expenditure weights**

BH	BH description	(A) Common Weight 2016	(B) Aggregated 2010 CWs (A)-(B)	(C) Aggregated and updated 2010 CWs (A)-(C)
1	Rice and cereals	9.66	8.90 (+0.76)	8.91 (+0.75)
2	Bread and rolls, biscuits and other bakery product	12.77	11.62 (+1.16)	11.78 (+0.99)
3	Macaroni and similar products	5.75	5.29 (+0.46)	5.31 (+0.45)
4	Meat	24.54	21.05 (+3.49)	22.63 (+1.90)
5	Poultry	12.33	10.91 (+1.42)	11.37 (+0.96)
6	Other meat products	8.14	7.01 (+1.14)	7.51 (+0.63)
7	Fish and other seafood products	17.27	15.11 (+2.16)	15.93 (+1.34)
8	Dairy products and oil/fats	13.93	12.46 (+1.48)	12.85 (+1.08)
9	Fruits	19.03	16.76 (+2.27)	17.55 (+1.48)
10	Vegetables	18.56	17.19 (+1.36)	17.12 (+1.44)
11	Sugar, jam, honey, etc.	8.59	7.84 (+0.75)	7.92 (+0.67)
12	Food products. n.e.c.	6.77	6.37 (+0.40)	6.25 (+0.53)
13	Coffee, tea and cocoa	11.02	7.87 (+3.14)	8.33 (+2.68)
14	Mineral water and soft drinks	11.49	9.04 (+2.45)	8.69 (+2.80)
15	Spirits and liquors	3.81	3.95 (-0.14)	3.94 (-0.12)
16	Wine	12.56	13.00 (-0.44)	12.97 (-0.41)
17	Beer	4.53	4.60 (-0.07)	4.68 (-0.15)
18	Tobacco, cigarettes, etc.	3.03	3.36 (-0.32)	3.88 (-0.85)
19	Men's clothing	13.62	16.75 (-3.13)	16.72 (-3.09)

BH	BH description	(A) Common Weight 2016	(B) Aggregated 2010 CWs (A)-(B)	(C) Aggregated and updated 2010 CWs (A)-(C)
20	Women's clothing	22.00	26.52 (-4.52)	26.67 (-4.67)
21	Boys and girls clothing	7.29	6.63 (+0.66)	6.70 (+0.59)
22	Clothing accessories and clothing materials	3.40	3.75 (-0.35)	3.59 (-0.19)
23	Repair and cleaning of clothing	18.05	18.83 (-0.79)	20.08 (-2.03)
24	Men's, women's and children's footwear	9.21	9.63 (-0.41)	10.25 (-1.04)
25	Repair of footwear	2.98	4.56 (-1.59)	4.86 (-1.88)
33	Furniture and furnishings, carpets and other floor coverings	19.49	24.17 (-4.68)	22.30 (-2.81)
34	Households textiles, including repair	3.37	4.12 (-0.75)	3.75 (-0.38)
35	Major household appliances, including repair	2.71	9.38 (-6.67)	7.85 (-5.13)
36	Small electric appliances	4.59	4.68 (-0.09)	3.99 (+0.60)
37	Glassware, tableware and household utensils	3.11	3.35 (-0.24)	3.09 (+0.02)
38	Tools, equipment and other non-durable household goods	2.70	2.86 (-0.16)	2.75 (-0.05)
39	Disposable household goods	21.75	17.37 (+4.38)	16.51 (+5.24)
40	Domestic services	60.22	40.35 (+19.87)	42.20 (+18.02)
41	Prescription drugs	12.99	13.98 (-0.99)	13.71 (-0.72)
42	Non-prescription drugs and vitamins	8.89	9.41 (-0.52)	9.27 (-0.38)
43	Therapeutic appliances and equipment, other medical supplies	3.15	5.52 (-2.37)	5.54 (-2.39)
44	Medical, dental and paramedical services (out-patient and in-hospital)	13.46	17.83 (-4.37)	19.21 (-5.75)
45	Motor cars	36.71	37.51 (-0.80)	33.84 (+2.86)
46	Motor cycles and bicycles	1.24	4.65 (-3.41)	4.43 (-3.19)
47	Spare parts and accessories for personal transport	3.20	3.14 (+0.05)	2.93 (+0.26)

BH	BH description	(A) Common Weight 2016	(B) Aggregated 2010 CWs (A)-(B)	(C) Aggregated and updated 2010 CWs (A)-(C)
48	Fuels and lubricants for personal transport	21.16	24.89 (-3.73)	22.03 (-0.87)
49	Car insurance	18.62	13.89 (+4.73)	15.52 (+3.11)
50	Maintenance and repair of personal transport	6.85	9.20 (-2.35)	9.94 (-3.09)
51	Other services in respect of personal and public transport	3.35	2.95 (+0.40)	3.11 (+0.24)
52	Taxis	12.13	14.56 (-2.43)	15.44 (-3.31)
53	Local transport	21.68	20.78 (+0.90)	22.08 (-0.39)
54	Long distance transport	6.12	6.51 (-0.40)	6.61 (-0.49)
55	Airlines	49.89	48.57 (+1.33)	42.96 (+6.93)
56	Postal services	2.29	3.12 (-0.84)	3.45 (-1.17)
57	Telecommunication services	32.72	29.74 (+2.98)	27.60 (+5.12)
58	Telecommunication equipment	6.97	4.56 (+2.41)	2.47 (+4.50)
59	Audio-visual equipment, incl. repairs	4.00	7.19 (-3.18)	5.46 (-1.45)
60	Photographic equipment and optical instruments, incl. repairs	2.59	4.79 (-2.20)	3.11 (-0.52)
61	Information processing equipment, incl. repairs	6.34	12.95 (-6.61)	8.61 (-2.27)
62	Recording media: CDs, cassettes, films	1.00	6.83 (-5.83)	5.77 (-4.77)
63	Equipment for sport, camping and open air recreation	5.35	11.74 (-6.39)	10.72 (-5.37)
64	Games, toys and hobbies	4.20	11.10 (-6.91)	9.40 (-5.20)
65	Gardens, plants and flowers	3.87	8.56 (-4.69)	8.52 (-4.65)
66	Pets and related products and services	4.75	4.88 (-0.13)	4.93 (-0.17)
67	Cinemas, theatres, concerts and other related activities	20.61	22.13 (-1.52)	23.36 (-2.75)
68	Sporting events and related activities	16.24	11.92 (+4.32)	12.72 (+3.52)

BH	BH description	(A) Common Weight 2016	(B) Aggregated 2010 CWs (A)-(B)	(C) Aggregated and updated 2010 CWs (A)-(C)
69	Film developing and print processing	0.83	1.91 (-1.09)	2.00 (-1.18)
70	Books, newspapers and periodicals	10.43	17.51 (-7.08)	18.34 (-7.91)
71	Stationery and drawing materials	3.27	3.88 (-0.61)	3.60 (-0.34)
72	Tuition fee	71.83	69.64 (+2.19)	78.15 (-6.33)
73	Staff restaurants and cafes	44.99	36.31 (+8.68)	39.71 (+5.29)
74	Public restaurants and cafes	64.10	65.46 (-1.36)	70.25 (-6.15)
75	Hotels, motels, camping	25.10	-	-
76	Hairdressing salons and personal grooming establishments	19.47	20.15 (-0.68)	21.12 (-1.65)
77	Electric appliances for personal care	1.54	1.41 (+0.13)	1.27 (+0.27)
78	Cosmetics and other goods for personal care	14.59	22.81 (-8.22)	20.68 (-6.09)
79	Other personal effects	10.46	7.39 (+3.07)	7.28 (+3.18)
80	Financial and Other services	4.73	5.32 (-0.59)	5.91 (-1.18)

Annex III**Methodological details pertaining to the calculation of common expenditure weights and the assessment of the precision of their estimates**

130. The objective of this annex is to provide details pertaining to the estimates of common expenditure weights (CWs or common weights) and their corresponding coefficients of variation (CVs), the statistical measure recommended by ACPAQ as the preferential tool for assessing the precision of the estimates of common weights.

131. In accordance with the recommended strategy for the calculation of the common weights, the total staff population was stratified by duty station and grade. Since the populations at P1 and D2 grades are low at each duty station, they were combined with the P-2 and D-1 grades respectively for purposes of the estimation of the common weights and their CVs. Calculations were done also for the “all grades” stratum, which included all sampled staff across all grades.

132. Tables 15 and 14 provide the population and samples sizes by stratum:

Table 15. Eligible staff population by duty station and grade, 2016 round, baseline expenditure surveys

	<i>P-1/P-2</i>	<i>P-3</i>	<i>P-4</i>	<i>P-5</i>	<i>D-1/D-2</i>	<i>Total</i>
Geneva	762	1,790	1,920	1,190	485	6,147
New York	678	1,578	1,801	952	419	5,428
Rome	222	454	492	329	152	1,649
Vienna	247	599	773	469	103	2,191
Paris	175	236	173	92	39	715
Washington D.C.	73	87	125	40	26	351
Montreal	58	91	106	56	24	335
London	42	48	38	43	26	197
Madrid	8	7	10	11	5	41
Grand Total	2,265	4,890	5,438	3,182	1,279	17,054

Table 16. Sample size by duty station and grade, 2016 round, baseline expenditure surveys

	<i>P-1/P-2</i>	<i>P-3</i>	<i>P-4</i>	<i>P-5</i>	<i>D-1/D-2</i>	<i>Total</i>
Geneva	334	720	733	476	173	2,436
New York	264	646	752	370	136	2,168
Rome	123	269	313	201	90	996
Vienna	131	311	384	243	51	1,120
Paris	87	123	95	44	16	365
Washington D.C.	49	57	95	35	19	255
Montreal	48	77	95	53	19	292
London	32	32	33	30	17	144
Madrid	5	6	10	9	5	35
Grand Total	1,073	2,241	2,510	1,461	526	7,811

133. Before the analysis, a number of exclusions, and in a few cases also imputations, were made as described in paragraphs 72 and 75. The numbers of questionnaires used in the determination of the CWs were those shown in Table 4. All expenditure values in local currencies were converted in US dollars using the prevailing exchange rates at the time of the survey. However, this step had no implications whatsoever in the determination of the common weights since these are based on individual expenditure shares at basic heading level, which, being proportions, are the same regardless of the exchange rate used for converting local currencies in US dollars.

134. Individual expenditure shares by basic heading were calculated for each of the analyzed questionnaires by expressing the individual expenditure share as a percentage of the questionnaire's In-Area (excluding Housing) total expenditure. For each duty station and each grade, a simple arithmetic average of each individual expenditure share across all questionnaires was taken. Expenditure shares by duty station and grade were obtained. The CVs of these average expenditure shares for each duty station and each grade were then calculated and reviewed.

135. For each grade, and overall for all grades, a weighted arithmetic average for each individual expenditure share across all duty stations was taken. Weights used were the total number of staff by grade across all duty stations. In the case of the "all grades" stratum, weights coincided with duty stations' population totals. The weighted arithmetic average made across "all grades" produced the new set of expenditure shares from which to derive the common expenditure weights. In almost all cases expenditure shares coincided with common weights with the exception of three groups: "Food", "Non-alcoholic beverages" and "Alcoholic beverages", in these cases, expenditure shares were split into their underlying individual basic headings'

common weights by using the proportions derived from the set of 2010 common weights.

136. To understand the process that led to the calculation of coefficients of variation, it is useful to review some of the terminology used in survey sampling. Any subset of the population that is of analytical interest is referred to as a "domain". For instance, for purposes of calculating CWs and their respective CVs we have 45 domains, defined by 9 categories of "duty station" (namely, Geneva, London, Madrid, Montreal, New York, Paris, Rome, Vienna and Washington D.C.) and by 5 categories of grade (P-1/P-2, P-3, P-4, P-5 and D-1/D-2). Additionally, there are two overall domains: "All duty stations" and "All grades".

137. For any parameter p in domain h , the coefficient of variation is defined by:

$$(1) \quad CV(p)_h = \frac{SD(p)_h}{\text{Average}(p)_h},$$

where $SD(p)_h$ is the standard deviation of the parameter and $\text{Average}(p)_h$ is its average, in domain h . In every domain, $\text{Average}(p)_h$ is obtained with the calculation steps described in paragraph 134. Moreover, within each domain, $SD(p)_h$ is calculated in accordance with the formula for simple random sampling, which is:

$$(2) \quad SD(p)_h = \sqrt{\frac{(1-f)s_h^2}{n_h}},$$

where $f = n_h/N_h$ is the sampling fraction of the domain (n_h and N_h are its sample and population sizes respectively) and s_h is the standard deviation of the domain.

It therefore follows that, the larger the sample size within a domain, the lower $SD(p)_h$ is. In fact, when n_h becomes large and approaches N_h , then $(1-f)$ becomes smaller and this decreases the numerator of equation (2). At the same time a large value of n_h increases the denominator in equation (2) and both effects contribute towards a small $SD(p)_h$.

138. When it comes to calculating the coefficient of variation across domains (i.e. across grades, duty stations or both), while formula (1) still holds, the calculation of the reference standard deviation of the parameter changes. Since the estimated parameter p is a weighted arithmetic average of the estimated parameters across the considered domains, as with the following formula:

$$(3) \quad \text{Average}(p) = \sum_h W_h \text{Average}(p)_h ,$$

where W_h represents the weight of the domain ($W_h = N_h/N$) and $\text{Average}(p)_h$ is the average of the parameter p within each domain, it follows that the variance of the estimator is:

$$(4) \quad \text{Variance}(p) = \sum_h W_h^2 \text{Variance}(p)_h ,$$

where $\text{Variance}(p)_h$ is the variance within each domain, or the square of $\text{SD}(p)_h$ as calculated with formula (2). Thus the $\text{SD}(p)$ is the square root of the above variance as in the formula:

$$(5) \quad \text{SD}(p) = \sqrt{\text{Variance}(p)} .$$

139. Coefficients of variation shown in annex I were calculated according to formula (5).