



Special Series on Statistical Issues in Response to COVID-19

This is one of a series of notes produced by the Statistics Department to help members address the COVID-19 emergency. This note, drafted by the IMF, has been developed in conjunction with the price statistics experts from the Inter secretariat Working Group on Price Statistics (Eurostat, International Labour Office, International Monetary Fund, Organization for Economic Cooperation and Development, United Nations Statistical Commission for Europe, and the World Bank). The views expressed in this note are those of IMF staff and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

Consumer Price Index

The outbreak of COVID-19 (Coronavirus) and measures implemented to limit its spread have impacted the routine compilation and dissemination of consumer price indexes (CPI). In particular, the collection of prices has become increasingly difficult. Issues and challenges include increased numbers of missing items in sampled outlets, the temporary closure of retail outlets, and restrictions on movement. In a growing number of cases, staff in national statistical organizations (NSOs) are working remotely and data collectors are being asked to remain at home.

I. DATA COLLECTION

These restrictions implemented to contain COVID-19 present unique challenges to the continued collection of prices. CPI programs should remain dynamic and flexible in order to adapt to the ever-changing situation and ensure the continued dissemination of a reliable index, while ensuring that collection activities do not contravene emergency rules and/or recommendations issued by authorities and do not place staff at risk.

When facing increased numbers of missing prices, it is important to remind that all temporarily missing prices should be imputed using one of the methods described in *Consumer Price Index Manual: Concepts and Methods*. **As noted in the Manual, carrying forward, or repeating the last available price, should be avoided as it introduces a downward bias into the index.** The imputation techniques described in the Manual do not introduce bias into the index. Imputations are self-correcting, which means that once a price can be collected, the index returns to the correct level. This is important so that the CPI continues to provide a reliable estimate of price change. The CPI is a critical input to economic policy making, particularly during periods of economic uncertainty.

If an entire index is missing, it is recommended to use the next level up in aggregation as the basis for making the imputation. For example, if all prices for oranges are missing, the index for citrus fruits can be used as the basis for making the imputation. If all citrus fruits are missing, the index for fruits is used as the basis for making the imputation. If all fruits are missing, the index for fruits and vegetables is used. If fruits and vegetables are missing, the index for food is used. If the index for food is missing, the index for food and non-alcoholic beverages is used. Finally, if all food and non-alcoholic beverages is missing, the All Items index is used as the basis to impute.

Many countries have a limit on the number of periods a variety can be considered temporarily missing before asking a data collector to select a replacement variety. For example, a number of NSOs allow a variety to be missing for three months. In the third month, a replacement variety is identified, and price collection begins for that new variety. It may be necessary to consider relaxing these rules given the current circumstances.

For more information on the different imputation methods, please see Chapter 6 of *Consumer Price Index Manual: Concepts and Methods*, which discusses the treatment of temporarily missing prices in detail (<https://www.imf.org/en/Data/Statistics/cpi-manual>). Imputation of missing prices should be standard practice and routine each month. In the context of the current circumstances, care must be taken that the index compiles correctly in the event of widespread missing prices.

Prices missing due to seasonal factors should be treated as they normally are. All prices missing due to seasonal factors should be imputed using one of the imputation methods described in Chapter 6 of the Manual. Seasonal prices are imputed in each of the months they are missing.

Below are suggestions to deal with the current challenges for collecting prices:

- **Partial collection for March** – For many countries, prices were collected during the first two, or even three, weeks of March. The missing prices should be imputed using one of the methods described above.
- **Collecting prices from outlets selling food and other essential items that remain open** – Outlets selling essential items such as food, medicine, medical supplies, and petrol remain open. In lieu of in-store collection, data collectors can instead collect prices from home. If the outlet has an online presence, prices could be collected via the internet. Data collectors can collect and report those prices that are available online. The prices collected online should be compared directly to those collected in person in the previous month. If the outlet does not have an online presence or if the sampled varieties are not available online, prices could be collected by email or phone. While generally not ideal for collecting prices because of increased respondent burden, these methods can be employed temporarily. The preferred mode and timing for reporting can be agreed with the respondent. In some cases, data collectors collect available prices when doing their personal shopping or ask friends and relatives to report the prices of sampled varieties (according to their precise variety description) when they shop.
- **Temporarily closed outlets** – Many retail outlets are temporarily closing their physical locations. For those outlets that have an online presence, it is possible to continue collecting prices online. If the outlet does not have an online presence, the prices collected in the closed outlets should be treated as temporarily missing and imputed. Because these outlets are closing temporarily, they should not be replaced. Similar outlets are also closed at this time and the outlets are expected to re-open when deemed safe to do so.
- **Restaurants and cafes** – In many areas, restaurants and cafes are closing their sit-down dining services and offering only delivery or take-away services. In some cases, the menus for these delivery and take-away items are available online and can be collected via the website. In other cases, prices can be collected via phone or email. Again, while these are not ideal methods because of the increased burden on the respondent, data collectors or CPI staff can agree on an appropriate time to contact the respondent and collect prices.
- **Airlines and hotels** – Many airlines and hotels have temporarily ceased operations, but in many cases, prices are available to be collected. Many countries use travel agents to collect the prices of airline tickets, package holidays, and hotel bookings. With the closure of travel agents, prices can be collected online using the defined specifications. For example, London to Male, Maldives, two-week advanced purchase, economy class, 1 passenger. It is possible to enter these details into the British Airways website and collect a price for

that ticket. It is very likely that the travel will not occur in two weeks; however, a price is available for collection that can be used in the CPI. This method would not capture the fees, if any, passengers currently pay to exchange tickets for travel today for travel at a future date.

Alternatively, some countries collect data on revenue per passenger by class of service for pre-defined routes. This approach takes into account all of the different fares paid for a single route, as well as all fees paid. This method would include fares paid for travel in the first part of March when airlines were operating on more routes. This method would also reflect the fees paid to change travel dates from the current period to some future period. The use of this method depends entirely upon whether the airline provides these data. In some cases, airlines have suspended all services and it is not possible to collect prices online or to collect the data needed to calculate the revenue per passenger from the airline. In these cases, the prices would be treated as temporarily missing and imputed using one of the methods described in the Manual.

As with airlines, hotel prices are generally collected either online or from travel agents. Prices can be collected online for hotels using the detailed specification as a guide (room type, length of stay, 14-day advance purchase, etc.). In some cases, the hotel will not provide pricing because all operations have temporarily ceased. If it is not possible to collect a price online, it should be treated as temporarily missing and imputed.

In general, data collectors can be used at home to collect prices via the web, phone, or email. It is important to work closely with respondents to identify the preferred method for reporting and the timing, especially if collecting via phone. NSO's should make greater effort to communicate with retailers and service providers to stress the importance of the continued dissemination of a reliable index.

Metadata on the number of missing and imputed prices is considered a best practice. These data are especially important given the current circumstances as they will enhance transparency and build user confidence. It would also be important to identify the number of closed versus open outlets. These metadata should be made available to users on demand and posted on the NSO website.

When disseminating the index, it is important to flag those indexes with significant imputations. The release should also include the metadata on the total number of collected versus missing and imputed prices. It would be useful if the NSO would identify the number of collected versus imputed prices for each major group. Also, the release should include details on the number of outlets available for pricing versus those temporarily closed. The metadata should describe what methods have been implemented to collect all available prices.

Users will continue to need data at the most detailed level. All indexes should continue to be published, even if they are imputed. As noted previously, all imputed indexes should be flagged and clearly noted for users. It is important for transparency that users are able to access the full set of data that are normally disseminated.

II. ISSUES TO CONSIDER – PREPARING TO WORK REMOTELY

A number of NSOs have begun to work remotely as part of broader efforts to limit the spread of COVID-19. Individual country circumstances will dictate remote work arrangements in practice. NSOs should develop plans to support working remotely to ensure continued dissemination of the CPI. Country-specific circumstances with regard to staff and budgetary resources will drive decisions regarding plans to work remotely.

Some issues to consider include:

- Laptops – staff will require access to laptops to allow them to work from home

- Software – laptops should be equipped with any necessary software to support CPI compilation
- Data security – protocols developed to ensure CPI data remain secure and confidentiality (prices and respondents) not at risk.
- Designation of key staff (limited) needed to access headquarters to process and release the index.
- Some countries compile the CPI using Excel or some other spreadsheet. Protocols should be developed to ensure final worksheets are shared with more than one staff to limit any problems resulting from equipment failure or illness if only one staff has access.
- Data release – develop protocols for the remote approval and dissemination of data releases.
- Establish channels for communication – organize a WhatsApp group for CPI staff to communicate.

For those NSOs that do not have the capacity to connect to IT systems remotely from home, CPI compilation would be affected and, in these cases, Excel or similar spreadsheets can be used as a temporary solution. Staff can develop spreadsheets that will compile the CPI from home. Once staff return to the office, the data can be entered into the IT system and normal compilation procedures would continue.

In those cases where index compilation is not possible, it will be important to continue collecting all available prices as described above. These prices can be used to compile the index once staff return to the office and have access to the IT systems. This will ensure index continuity and minimize any disruptions to the CPI dissemination schedule.

If you wish to discuss these issues in greater detail, you can contact one or all of the following:

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