



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.

Export and Import Price Indexes

The outbreak of COVID-19 (Coronavirus) and measures implemented to limit its spread could impact the routine compilation and dissemination of export and import price indexes (XMPI). Issues and challenges include increased numbers of missing prices in sampled establishments, delays in receiving data from customs authorities, and impacts on the level of detail and quality of customs data. In a growing number of cases, staff in national statistical organizations (NSOs) are working remotely and plans should be developed to support XMPI continuity.

I. DATA COLLECTION

In most cases, national statistical organizations (NSOs) use customs data as the basis for compiling XMPI data. While the trade of goods continues, reduced staffing levels in customs authorities may impact both the timing and quality of the data reported. There may be delays in processing and compiling customs data declarations and the level of detail and quality of these data may be impacted as well. For those NSOs that use the hybrid approach (blending customs data with price collection from establishments), data are generally collected via email, phone, or internet portals. These XMPI data collection activities will not be impacted; however, NSOs should communicate with respondents to ensure continued cooperation and reporting of prices.

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 *Export and Import Price Index Manual: Theory and Concepts*. **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. This is important so that the XMPI continues to provide a reliable estimate of price change. A key use of XMPI data is to deflate trade data. XMPIs provide key data on the price developments of international transactions in goods and services.

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 frozen salmon are missing, the index for frozen fish can be used as the basis for making the imputation. If all frozen fish are missing, the index for fish is used as the basis for making the imputation, and so on.

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 consecutive periods. In the third period, 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 8 of *Export and Import Price Index: Theory and Practice*, which discusses the treatment of temporarily missing prices in detail (<https://www.imf.org/external/np/sta/xipim/pdf/xipim.pdf>). 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.

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

- **Collecting prices from establishments that remain open** – Many NSOs collect XMPI prices via phone, email, electronic data transfers, or internet portals. These methods should continue to be used. Very few NSOs collect prices in person for the XMPI, and staff should collect these prices by phone or email until it is safe to resume in-person price collection.
- **Temporarily closed outlets** – Some establishments will close temporarily. The prices collected in these closed establishments should be treated as temporarily missing and imputed. Because these establishments are closing temporarily, they should not be replaced. These establishments are expected to re-open when deemed safe to do so.
- **Customs data** – Reduced staffing levels in customs authorities may impact the level of detail and quality of the data used to compile XMPIs. For example, under normal circumstances, the customs authority would provide detailed data by type of frozen fish; however, data may be reported only at the more aggregate level of frozen fish. In this case, these data would not provide meaningful unit values and the indexes should be imputed. The imputation can be made using either related indexes, such as live fish, or upper-level indexes. Should customs data be delayed, data would not be available to compile the indexes or support imputations. This would be a problem especially for those countries that compile the XMPI using only customs data. One option would be to identify the primary source (country) of imports by product. If that country produces an export price index for that product, the index changes could be used as the basis to impute the import price index. This could also be done with the export price index by identifying the primary destination for exports. Using an available and appropriate import price index disseminated by that country, the export price index could be imputed in the same way. These data should be published as preliminary and subject to revision once customs data are received.

If it is not possible to use the export or import price index from a major trading partner to impute the XMPI and customs data are not available, it may be necessary to delay publication. A delay in publication should be a last resort and used only after exhausting all other means.

Below are two examples of using alternative sources to impute a missing index. In these examples, Greece exports fish fillets to the United States. Customs data used to compile the export price index for fish in Greece will be delayed due to staffing shortages. Greece decides to use the import price index for fish fillets disseminated by the US Bureau of Labor Statistics as the basis for making the imputations. Two approaches are presented below. The first simply uses the short-term relative change as the basis for making the imputation, while the second adjusts the short-term relative change to account for exchange rates.

Example A: Imputation using short-term relative change of appropriate alternative index

US Import Price Index -- Fish Fillets (HS 0304)					Greece -- Export Price Index -- Fish Fillets (HS 0304)				
		December	January	February			December	January	February
HS 0304	Fish fillets	114.5	115.5	116.3	HS 0304	Fish fillets	146.2	147.1	148.1
	STR		1.0087336	1.0069264					

In this example, the short-term relative change (STR) of the US import price index for fish fillets is used directly to impute the missing February index in the Greek index. The STR is calculated by dividing the February index by the January index – $116.3/115.5 = 1.0069264$. The short-term relative is then multiplied by the January index to impute the February export price index for Greece as follows: $147.1 \times 1.0069264 = 148.1$. The February index is flagged (bold and italic) to note that this is an imputed index.

Example B: Imputation with adjustment for exchange rate

US Import Price Index -- Fish Fillets (HS 0304)					Greece -- Export Price Index -- Fish Fillets (HS 0304)				
		December	January	February			December	January	February
HS 0304	Fish fillets	114.5	115.5	116.3	HS 0304	Fish fillets	146.2	147.1	150.8
	Adjusted indexes	103.1317	104.05065	106.64833					
	STR		1.0087336	1.0069264					
	Average exchange rate	0.9007135	0.9008714	0.9170105					
	STR adjusted for exchange rate			1.02497					

In this example, the indexes will be adjusted for changes in the exchange rate. Using the average exchange rate for January ($\$1 = 0.9008714$ Euro) and February ($\$1 = 0.9170105$), the indexes for January and February are adjusted. Each index is multiplied by the average exchange rate (the adjusted indexes). The STR is calculated based on the indexes adjusted for the exchange rate. The STR adjusted for the exchange rate is $106.64833/104.05065 = 1.02497$. This adjusted STR is then multiplied by the January index to impute the February export price index for Greece: $147.1 \times 1.02497 = 150.8$.

These alternative methods are not perfect and may work better for some countries than others. One of the biggest possible challenges would be that one country does not dominate trade. In the above examples, we assume the US is the primary market for Greek fish; however, while the US may be the largest share, it does not dominate the market because Greece exports fish to dozens of countries. At the same time, the US imports fish from dozens of different countries. This method would allow for the imputation of an index in the absence of customs data. Once customs data become available, the index would be revised using normal compilation procedures.

Using alternative sources for making imputations are not the normal methods used; however, these alternative sources will provide information that can be used to ensure index dissemination. It is important when using these alternative methods to verify, using historic data, that the changes are reasonable and can be easily explained to users.

For any prices normally collected in person, 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 respondents, especially the customs authority, 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, if prices are collected from export and import establishments, 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.

Many countries have a revision policy for the XMPI. Under these revision policies, XMPI data are subject to revision for two or three months before being released as final. This revision policy allows greater flexibility to deal with the current challenges.

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 XMPI.

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 XMPI compilation
- Data security – protocols developed to ensure XMPI 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 XMPI using Excel. 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 XMPI staff to communicate.

Some NSOs do not have the capacity to connect to IT systems remotely from home, which would affect the compilation of the XMPI. In these cases, Excel can be used as a temporary solution. Staff can develop Excel worksheets that will compile the XMPI 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 XMPI dissemination schedule.

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

Andrew Baer – abaer@imf.org

Brian Graf – bgraf@imf.org

Vanda Guerreiro – vguerreiro@imf.org

Niall O’Hanlon – nohanlon@imf.org

III. USEFUL LINKS TO ALTERNATIVE DATA

The following table includes links to some useful ‘Big Data’ and ‘open data sets’ and national datasets that can be used as indicators when regular data sources are no longer available or where their quality has deteriorated:

Data Source	Organization	Description	Location
United States Producer Price Indexes	US BLS	<ul style="list-style-type: none"> • US PPI data by activity and product 	www.bls.gov/ppi
Import and export prices	US BLS	<ul style="list-style-type: none"> • Monthly import and export price indexes 	https://www.bls.gov/mxp/
Eurostat Producer Price Indexes	Eurostat	<ul style="list-style-type: none"> • Mining, manufacturing, and utilities • Domestic market sales only, no exports • Separate indexes published for other activities on Eurostat website 	https://ec.europa.eu/eurostat/web/short-term-business-statistics/publications/news-releases
Eurostat Unit value of exports and imports	Eurostat	<ul style="list-style-type: none"> • Released on or around the 15th of each month • Two-month lag (e.g. January data disseminated in March) 	https://ec.europa.eu/eurostat/web/international-trade-in-goods/data/database

Canadian PPI Data	Statistics Canada	<ul style="list-style-type: none"> • Producer price indexes for Canada • Published monthly 	https://www.statcan.gc.ca/eng/subjects-start/prices_and_price_indexes/producer_price_indexes
Canadian Import and Export indexes	Statistics Canada	<ul style="list-style-type: none"> • Portal for detailed import and export data • Disseminated monthly 	https://www150.statcan.gc.ca/n1/en/subjects/international_trade
Australian PPI data	Australian Bureau of Statistics	<ul style="list-style-type: none"> • Portal for detailed PPI data • Disseminated monthly 	https://www.abs.gov.au/ausstats/abs@.nsf/0/6F15F0CA1F2C2EFECA25765800181C2B?Opendocument
Australian Export and import price indexes	Australian Bureau of Statistics	<ul style="list-style-type: none"> • Portal for detailed data • Disseminated monthly 	https://www.abs.gov.au/ausstats/abs@.nsf/0/AD48224A384AA1C3CA25765700161B6C?Opendocument
Japanese PPI data	Bank of Japan	<ul style="list-style-type: none"> • Disseminated monthly 	https://www.boj.or.jp/en/statistics/pi/index.htm/
Japanese Export and import data	Japanese Ministry of Finance	<ul style="list-style-type: none"> • Portal for detailed data • Disseminated monthly 	https://www.customs.go.jp/toukei/info/index_e.htm
World Commodity Prices	World Bank	<ul style="list-style-type: none"> • Pink sheets are released on the second business day of the month. Next release: April 2, 2020. • The next Commodity Markets Outlook will be 	https://www.worldbank.org/en/research/commodity-markets

		published in April 2020.	
--	--	-----------------------------	--