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# SURINAME

## TECHNICAL ASSISTANCE REPORT—CARTAC REPORT ON THE PRICE STATISTICS MISSION

June 2018

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**Caribbean Regional Technical Assistance Centre**


# SURINAME

## REPORT ON THE PRICE STATISTICS MISSION

(August 21–September 1, 2017)

**Prepared by Mari Yla-Jarkko**

**March 2018**

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## GLOSSARY

| | |
|---|---|
| ANAS | Annual National Accounts Survey |
| BR | Business Register |
| CARTAC | Caribbean Region Technical Assistance Centre |
| CBS | Central Bank of Suriname |
| COICOP | Classification of Individual Consumption according to Purpose |
| CPI | Consumer Price Index |
| *CPI Manual* | *Consumer Price Index Manual 2004* |
| EA | Elementary aggregate |
| GBS | General Bureau of Statistics, Suriname |
| HBS | Household Budget Survey |
| IMF | International Monetary Fund |
| PPI | Producer Price Index |
| QESS | Quarterly Economic Statistics Survey |
| SBS | Small-Business Survey |
| STA | Statistics Department of the IMF |
| SUT | Supply and Use Table |
| XMPI | Export and Import Price Index |
| XPI | Export Price Index |

## EXECUTIVE SUMMARY

**In response to a request from Suriname's General Bureau of Statistics (GBS) and Ministry of Finance,** and in consultation with the IMF's Western Hemisphere Department, a mission of the IMF's Caribbean Regional Technical Assistance Center (CARTAC) visited Paramaribo, Suriname during August 21 to September 1, 2017 to review and provide advice on improving the price statistics of Suriname.

**The mission discussed issues concerning the consumer price index (CPI), the producer price index (PPI) and export price index (XPI).** On the CPI, the mission reviewed current practices and provided some recommendations. The main recommendations are to switch from a Dutot to a Jevons index on the elementary aggregate level and to start publishing the CPI according to the Classification of Individual Consumption according to Purpose (COICOP) on a class level provided the number of items permits. On the planned PPI and XPI, the discussion focused on available data sources and next steps for developing a PPI for Suriname.

**Reliable price statistics are essential for informed economic policy-making by the authorities.** They also provide the private sector, foreign investors, rating agencies, and the public in general with important inputs in their decision-making, while informing both domestic economic policy and IMF surveillance. A comprehensive PPI also enables robust estimates of real GDP to be compiled.

**The GBS publishes the CPI on a monthly basis.** The publication includes indexes for 11 divisions (major groups in GBS terminology) and subgroup indexes for several of the divisions. The sub classification has similar groupings as the COICOP. At the highest level, division 9 and 10 are combined.

**The CPI is a Laspeyres-type index.** On the elementary aggregate (EA) level a Dutot formula is used. The current CPI has an index reference period of April–June 2016 and is based on information received from the Household Budget Survey (HBS) conducted between November 3, 2013 and August 31, 2014. The previous CPI index reference period was April–June 2009. The biggest changes in the weights were in groups of food and housing (Table 1).

**The GBS does not currently compile a PPI or a XPI.** The GBS has recently completed the *Establishment Census 2016,* that could be used as data source for developing a PPI and a XPI for Suriname.

**Table 1. Suriname's Previous and Updated CPI Weights April–June 2009 and April–June 2016 (in percent)**

| COICOP Major Groups | | April–June 2009 | April–June 2016 | Change, %-points |
|---|---|---|---|---|
| 1 | Food and Non-Alcoholic Beverages | 40.4 | 31.3 | -9.1 |
| 2 | Alcoholic Beverages and Tobacco | 2.9 | 1.8 | -1.1 |
| 3 | Clothing and Footwear | 3.6 | 3.9 | 0.3 |
| 4 | Housing and Utilities | 14.1 | 22.9 | 8.8 |
| 5 | Housing Furnishings | 4.8 | 5.2 | 0.4 |
| 6 | Health Care | 2.6 | 4.7 | 2.1 |
| 7 | Transportation | 11.7 | 12.3 | 0.6 |
| 8 | Communication | 3.9 | 4.3 | 0.4 |
| 9&10 | Recreation, Culture and Education | 4.1 | 3.4 | -0.7 |
| 11 | Food Away from Home | 1.4 | 0.8 | -0.6 |
| 12 | Miscellaneous Goods and Services | 10.7 | 9.4 | -1.3 |

Source: The CPI press release of the GBS 01/24/2018.

# DETAILED TECHNICAL ASSESSMENT AND RECOMMENDATIONS

## I. CONSUMER PRICE INDEX

### A. Coverage, Weights and Classifications

1. **The CPI weights, product groups, and outlets are based on the Household Budget Survey (HBS) conducted between November 3, 2013 and August 31, 2014 (10 months).** According to international recommendations the HBS should cover 12 consecutive months to cover the consumption of seasonal products. However, the GBS has found that a survey covering seven to eight months is sufficient for Suriname as seasonal patterns in household consumption are minimal. The mission recommends to verify the pattern from time to time.

2. **The CPI uses the Classification of Individual Consumption according to Purpose (COICOP) at the division level, combining 9 and 10.** The published data include information on the divisions and some subgroups. In view of cross-country comparability including regional data comparison, the GBS may consider adding the publication of data following COICOP for all official levels of COICOP down to 4-digit level if the number of items per class permits. This would also assist the users with analyzing the CPI. Both systems could be done in parallel. The classes with small weight can be excluded and their weights be distributed to other groups

***Recommended actions:***

- *Consider publication of the CPI at a more detailed level to allow more precise analysis of the CPI.*
- *Consider moving to (or adding) COICOP classification at the group level and class level at the next rebasing.*
- *When adopting COICOP, focus on classes that are relatively important. In all cases all expenditure should be included in the weights.*

### B. Price Collection

3. **The prices are collected from five regional Domains grouped from seven Districts.** Item selection for each Domain reflects the Domain's consumption patterns. The number of items varies from 208 for Nickerie (including Wageningen) to 258 for ParWan (i.e., Paramaribo and Wanica). The mission advised that this approach is reasonable when there are differences in consumption patterns.

4. **The prices are collected from both markets and outlets.** For some products the average price over a store type is calculated and then weighted by the relative number of observations. In case this outlet type average price is not needed for other purposes, this step is unnecessary. The number of each outlet type in price collection in each Domain

should reflect the purchase habits of residents of the Domain. In some products there are only one or two prices available and several providers. In these cases, the market shares of providers should/could be used to aggregate the prices. Normally this approach is used for products such as mobile phone services.

5. **In Suriname, for each price observation a price collector chooses a representative item to be included in the index compilation**. In addition, two alternative shadow items with price data are collected from the base period onwards. If the representative item is available, the shadow item prices are not used in the calculations. This is a resource demanding method for treating a missing items problem. A less resource demanding alternative would be to use all prices in the calculation. When the item is temporarily unavailable, the price can be imputed. If the item is permanently unavailable, the replacement should be chosen. If the price is temporarily missing for more than three months, according to international recommendations a replacement should be introduced.

6. **According to the data received from the GBS Consumer Price Index Section, the missing prices of food and non-alcoholic beverages are common in Suriname.** On the calculations 24-44 percent of the prices were missing during the price collection (see Table 2) and in a majority of the cases either shadow alternative or group imputation was used. In five percent of the cases a carry forward method was used. A carry forward method is reasonable in cases where the price is known to remain unchanged during the period of time, for example certain fees, such as hospital fees that are normally adjusted only once a year.

**Table 2. Treatment of Missing Values of Food and Non-alcoholic Beverages in the CPI (in percent)**

| | May-17 | Jun-17 | Jul-17 |
|---|---|---|---|
| Price not missing | 56.5 | 75.7 | 57.8 |
| Shadow alternative or Group imputation | 37.8 | 18.2 | 36.2 |
| Carry forward | 4.9 | 5.3 | 5.0 |
| Imputation | 0.5 | 0.6 | 0.8 |
| Substitute: comparable | 0.2 | 0.2 | 0.2 |
| Substitute: with quality adjustment | 0.1 | 0.1 | 0.1 |

Source: The GBS Consumer Price Index Section.

7. **In total there are 6,940 target prices included in the CPI calculations each month.** 276 of the 316 items (i.e., joint set of the five regions or domains) have at least one shadow product price. As there are 208-258 products in the index for the five regions, for each region there are, on average six to seven prices per product (=6,940/227/5). If the products are homogeneous and the prices do not vary too much, the number of price observations can be lower, but for the heterogenous and volatile products

more price observations should be included to better reflect the actual changes of prices. A cost neutral choice is to include the shadow products prices into the calculations.

***Recommended actions:***

- *Continue to have regional consumption baskets reflect the consumption expenditures of each Domain.*
- *Use the imputation method for temporarily missing prices in the majority of cases.*
- *Continue the use of a carry forward method for goods and services when prices are known to remain unchanged during a period of time.*
- *Increase the number of price observations per Domain and reflect the volatility of prices. A cost neutral choice is to include all collected prices into the calculations.*
- *Continue to collect prices from different outlet types in Domains. The number of different outlet types should reflect the consumption habits of residents. For some products, if applicable, market/expenditure shares should/could be used in aggregation.*

## C. Index Compilation

8. **In Suriname, the CPI on the elementary aggregate (EA) level, a product index for a Domain, is calculated using a ratio of arithmetic mean prices (Dutot index)**. According to international recommendations, a Dutot index should be used for homogeneous products. For EA indexes a Jevons index produces better results as it passes proportionality, unit measurement, time reversal, and transitivity tests (see Appendix 1). A change from Dutot to Jevons will require some explanation to the public and a technical note could be made available along with some intuitive explanations. For example, Jevons better reflects the typical consumer behavior or moving from more expensive to less expensive products.[1]

9. **From the EAs upward the GBS aggregates 32 subgroups for each Domain and then from Domain indexes to a Suriname national level.** In aggregation, the expenditure weights of each Domain for each product is used. This Laspeyres-type index compilation from the EA level up is in line with the international recommendations. In compilation, monetary units should be used as weights, so that the index remains consistent in aggregation (i.e., the index remains unchanged whether calculated from national level up or from Domain level, see Appendix 2 for example).

10. **When replacing an item with a new representative, the GBS either imputes or uses judgment to determine whether the substitute is comparable or whether quantity adjustments are required.** For quantity adjustment, the GBS sums the individual prices and derives the sum of individual quantities (in lbs.) and then converts

[1] See Consumer Price Index Manual, 2004, paragraphs 11.43-11.50.

to the desired unit. Taking into account the quantity changes is appropriate, but the chosen approach sometimes shows price change when the unit price remains unchanged. The quantity standardization should be done at the product offer level. (see Table 3). However, as the amount of quantity adjustments is only 0.1 percent for all products (see Table 2), the effect to the index is minor.

**Table 3. Example on the Effect of the Quantity Adjustment Method**

| | Month 1 | | | Month 2 | | |
|---|---|---|---|---|---|---|
| | Price | Quantity | Price/lbs. | Price | Quantity | Price/lbs. |
| Item 1 | 200 | 0.5 | 400 | 400 | 1 | 400 |
| Item 2 | 200 | 0.5 | 400 | 200 | 0.5 | 400 |
| Item 3 | 300 | 1 | 300 | 300 | 1 | 300 |
| Item 4 | 400 | 1 | 400 | 400 | 1 | 400 |
| Item 5 | 600 | 2 | 300 | 600 | 2 | 300 |
| *Sum* | *1700* | *5* | | *1900* | *5.5* | |
| Average price | | | | | | |
| Current way | 1700/5= | 340 | | 1900/5.5= | 345.4545 | |
| At item level | | | 360 | | | 360 |
| Index | | | | | | |
| Current way | | 345.45/340*100= | | | 101.60 | |
| At item level | | 360/360*100= | | | | 100 |

***Recommended actions:***

- *Use the Jevons (geometric average) at the elementary aggregate level for all products.*
- *Continue to use a Laspeyres-type formula from the elementary aggregate level up using monetary units as weights so that the index is consistent in aggregation.*
- *Continue to use imputation or direct comparison, where applicable, as quality adjustment method.*
- *The quantity adjustments should be done at the item level.*

## D. Index Publication

11. **The GBS publishes the CPI around the 22nd of the month following the reference month.** The first published results are preliminary and this is stated at the press release. The final CPI is published one month later together with the next month's publication. The press release also explains that the results are first published to a certain group of authorities and to the public. The publication process is transparent.

12. **The press release includes indexes and the change rates compared to different price periods.**[2] Long time series are not available, but the publication includes link factors for major groups and total index for the previous CPI 2009: Apr-Jun=100.

13. **The GBS webpages include materials from the press conference held when publishing the current CPI.** However, metadata do not appear to be publicly available. Public metadata would be useful for the users.

***Recommended actions:***

- *Consider the publication of metadata on the website.*
- *Continue to have the press conference when first publishing a rebased CPI.*

## II. PRODUCER PRICE INDEX AND EXPORT AND IMPORT PRICE INDEXES

### A. Scope, Coverage, Source for Weights, Next Steps

14. **Suriname is currently in the process of developing a new PPI. The primary users of the PPI (and XPI) will be the GBS' national accounts division.** Other users will be Central Bank of Suriname and Ministry of Finance, trade and business representatives, and other users including researchers.

15. **A primary reason for developing a PPI is to improve and develop quarterly measures of economic growth**. A PPI supports volume changes in GDP for measures of GDP at constant prices. Improvements to detailed nominal gross value-added estimates in Suriname will arise from the development of Supply and Use Tables (SUTs), rebasing of GDP to 2015, and the recent completion of a Business Register (BR) for 2015 make it opportune to develop a PPI as a deflator for the improved estimates.

16. **An enhanced PPI survey for the establishments would provide information for representative goods for the export and domestic market, as relevant.** Mining and mining-related exports accounted for 80.63 percent in 2016 and the remaining 20 percent of the export value is relatively concentrated in Rice, Fish and Shrimp, and Wood Pulp. As the exports are concentrated, it is recommendable to collect data both for the PPI and the export price index (XPI) in the same survey.

17. **The coverage and the scope of the PPI, including the XPI, should be developed in close cooperation with national accounts, as they use the PPI as**

[2]GBS, *Consumer Price Index and Inflation over December 2017*,January 2018 as "New Release," available at: http://www.statistics-suriname.org/index.php/statistieken/downloads/category/24-new-release or subsequently: http://www.statistics-suriname.org/index.php/statistieken/downloads as "History CPI Release."

**deflator. The GBS has three main surveys of establishments**:[3] the Quarterly Economic Statistics Survey (QESS), Annual National Accounts Survey (ANAS) both covering "large" establishments with 10 or more employees, and the (annual) Small-Business Survey (SBS) covering "small" establishments. The surveys suffer from relatively high non-response rates, estimated at 40, 65, and 40 to 50 percent respectively.

18. **The GBS has recently completed the *Establishment Census 2016*.** This provides a listing of the 12,475 business establishments—based on an 89 percent response rate—operating in Suriname as at December 2015: a Business Register (BR). The BR would well serve as a sampling frame for a PPI. Each establishment has "employment" as a measure of size, data on gross output being patchy and too limited for use.

19. The next steps in development work are to define the following issues (in bracket the recommendations):

a) the type of PPI (output PPI);
b) purpose (deflator and measure of inflation);
c) geographical coverage (to exclude the interior);
d) valuation (basic prices);
e) coverage of goods and services ("manufacturing and mining" to start with, along with key activities such as "rice" production);
f) periodicity (quarterly);
g) integration with current enterprise surveys;
h) sample design;
i) confidentiality;
j) methods of improving non-response (follow-up and incentives);
k) price collection;
l) respondent burden;
m) strengthening of the Statistics Act;
n) dissemination; and
o) likely budget and resulting opportunities/constraints.

***Recommended actions:***

- *Begin the PPI development with an output index for the industries identified to be important for the main users.*
- *Develop an XPI using price surveys and unit values as part of the development of a PPI.*
- *Derive the weights, sample design, and samples of the PPI using the recently developed Business Register. Consider options to achieve high response rates.*

[3] The Central Bank of Suriname (CBS) also undertakes a survey of enterprises. The GBS and CBS should discuss the consolidation of these surveys. Too many surveys may be unduly burdensome to respondents.

## APPENDIX 1. UNIT MEASUREMENT, TIME REVERSAL, AND TRANSITIVITY TESTS FOR ELEMENTARY AGGREGATE INDEXES AND REFLECTION TO EXTREME PRICE CHANGES

The original situation

| | P0 | P1 | Price ratio |
|---|---|---|---|
| Item 1 | 10.00 | 15.00 | 1.5000 |
| Item 2 | 15.00 | 15.00 | 1.0000 |
| Item 3 | 20.00 | 25.00 | 1.2500 |
| Item 4 | 40.00 | 45.00 | 1.1250 |
| Average | 21.2500 | 25.0000 | |
| GeoMean | 18.6121 | 22.4302 | |
| | | | |
| Dutot | 117.6471 | | |
| Carli | 121.8750 | | |
| Jevons | 120.5143 | | 120.5143 |

Unit measurement test

| | P0 | P1 | Price ratio |
|---|---|---|---|
| Item 1 | 10.00 | 15.00 | 1.5000 |
| Item 2 | 425.25 | 425.25 | 1.0000 |
| Item 3 | 20.00 | 25.00 | 1.2500 |
| Item 4 | 40.00 | 45.00 | 1.1250 |
| Average | 123.8125 | 127.5625 | |
| GeoMean | 42.9471 | 51.7573 | |
| | | | |
| Dutot | | 103.0288 | |
| Carli | | 121.8750 | |
| Jevons | | 120.5143 | 120.5143 |

Time reversal test

| | P0 | P1 | Price ratio | Inverse ratio |
|---|---|---|---|---|
| Item 1 | 10.00 | 15.00 | 1.5000 | 0.6667 |
| Item 2 | 15.00 | 15.00 | 1.0000 | 1.0000 |
| Item 3 | 20.00 | 25.00 | 1.2500 | 0.8000 |
| Item 4 | 40.00 | 45.00 | 1.1250 | 0.8889 |
| Average | 21.2500 | 25.0000 | | |
| GeoMean | 18.6121 | 22.4302 | | |
| | | | 1/inverse index | |
| Dutot | | 117.6471 | 117.6471 | |
| Carli | | 121.8750 | 119.2053 | |
| Jevons | | 120.5143 | 120.5143 | |

Transitivity test

| | P0 | P1 | P2 | | P1/P0 | P2/P0 | P2/P1 |
|---|---|---|---|---|---|---|---|
| Item 1 | 10.00 | 15.00 | 20.00 | | | | |
| Item 2 | 15.00 | 15.00 | 20.00 | | 1.5000 | 2.0000 | 1.3333 |
| Item 3 | 20.00 | 25.00 | 25.00 | | 1.0000 | 1.3333 | 1.3333 |
| Item 4 | 40.00 | 45.00 | 50.00 | | 1.2500 | 1.2500 | 1.0000 |
| Average | 21.2500 | 25.0000 | 28.7500 | | 1.1250 | 1.2500 | 1.1111 |
| GeoMean | 18.6121 | 22.4302 | 26.5915 | | | | |

| | P1/P0 | P2/P0 | P1/P0*P2/P1 |
|---|---|---|---|
| Dutot | 117.6471 | 135.2941 | 135.2941 |
| Carli | 121.8750 | 145.8333 | 145.5729 |
| Jevons | 120.5143 | 142.8720 | 142.8720 |

## APPENDIX 2. ILLUSTRATION OF CONSISTENCY IN AGGREGATION, USING MONETARY UNITS (MU) FOR WEIGHING

| | | | | | *Weights, in MU* | | | |
|---|---|---|---|---|---|---|---|---|
| COICOP | | | | CPI Items and Aggregates | Reg1 | Reg2 | Reg3 | Country |
| 01 | 1 | 1 | | BREAD AND CEREALS | 49,295.20 | 110,914.20 | 86,266.60 | 246,476.00 |
| 01 | 1 | 1 | 1 | Cereals (wheat) | 543.49 | 1,212.75 | 943.25 | 2,699.49 |
| 01 | 1 | 1 | 2 | Rice | 5,716.20 | 12,755.25 | 9,920.75 | 28,392.20 |
| 01 | 1 | 1 | 4 | Flour, highest quality | 746.16 | 1,665.00 | 1,295.00 | 3,706.16 |
| 01 | 1 | 1 | 5 | Flour, first quality | 6,699.31 | 14,949.00 | 11,627.00 | 33,275.31 |
| 01 | 1 | 1 | 6 | Semoline manna | 957.51 | 2,136.60 | 1,661.80 | 4,755.91 |
| 01 | 1 | 1 | 7 | Buckwheat | | 915.75 | 712.25 | 1,628.00 |
| 01 | 1 | 1 | 8 | Wheat bread, first quality | 20,749.11 | 46,300.05 | 36,011.15 | 103,060.31 |
| 01 | 1 | 1 | 9 | Macaroni | 6,187.89 | 13,807.80 | 10,739.40 | 30,735.09 |
| 01 | 1 | 1 | 10 | Vermicelli | 4,870.21 | 10,867.50 | 8,452.50 | 24,190.21 |
| 01 | 1 | 1 | 11 | Other bakery products | 2,825.33 | 6,304.50 | 4,903.50 | 14,033.33 |

| | | | | | *Indexes* | | | | |
|---|---|---|---|---|---|---|---|---|---|
| COICOP | | | | CPI Items and Aggregates | Reg1 | Reg2 | Reg3 | Country - upper levels from country index, products from regional indexes | Country - all from regional indexes |
| 01 | 1 | 1 | | BREAD AND CEREALS | *110.95* | *93.69* | *109.28* | *102.60* | *102.60* |
| 01 | 1 | 1 | 1 | Cereals (wheat) | 110.23 | 93.05 | 107.33 | 101.50 | 101.50 |
| 01 | 1 | 1 | 2 | Rice | 110.25 | 92.67 | 108.65 | 101.79 | 101.79 |
| 01 | 1 | 1 | 4 | Flour, highest quality | 110.25 | 92.63 | 108.85 | 101.84 | 101.84 |
| 01 | 1 | 1 | 5 | Flour, first quality | 110.73 | 93.23 | 109.19 | 102.33 | 102.33 |
| 01 | 1 | 1 | 6 | Semoline manna | 110.90 | 93.32 | 110.00 | 102.69 | 102.69 |
| 01 | 1 | 1 | 7 | Buckwheat | | 93.55 | 109.42 | 100.49 | 100.49 |
| 01 | 1 | 1 | 8 | Wheat bread, first quality | 110.66 | 93.78 | 109.22 | 102.57 | 102.57 |
| 01 | 1 | 1 | 9 | Macaroni | 110.90 | 93.80 | 109.64 | 102.78 | 102.78 |
| 01 | 1 | 1 | 10 | Vermicelli | 112.20 | 94.52 | 109.46 | 103.30 | 103.30 |
| 01 | 1 | 1 | 11 | Other bakery products | 113.32 | 95.10 | 110.29 | 104.08 | 104.08 |

Para 9.45-9.46 of the *Consumer Price Index Manual 2004* discusses the issue of consistency in aggregation. The Manual notes that both "… Dutot and the Jevons indices are also not consistent in aggregation with a higher-level Laspeyres" but "... the CPIs actually calculated by statistical offices are usually not true Laspeyres indices anyway, even though they may be based on fixed baskets of goods and services. As also noted earlier, if the higher-level index were to be defined as a geometric Laspeyres, consistency in aggregation could be achieved by using the Jevons index for the elementary indices at the lower level, provided that the individual items are sampled with probabilities proportional to expenditures." Since in most instances it is neither practical nor advisable to sample items with probabilities proportional to expenditures, the resulting inconsistency in aggregation is accepted on pragmatic grounds.