



MAURITIUS

TECHNICAL ASSISTANCE REPORT—REPORT ON THE PRICE STATISTICS MISSION

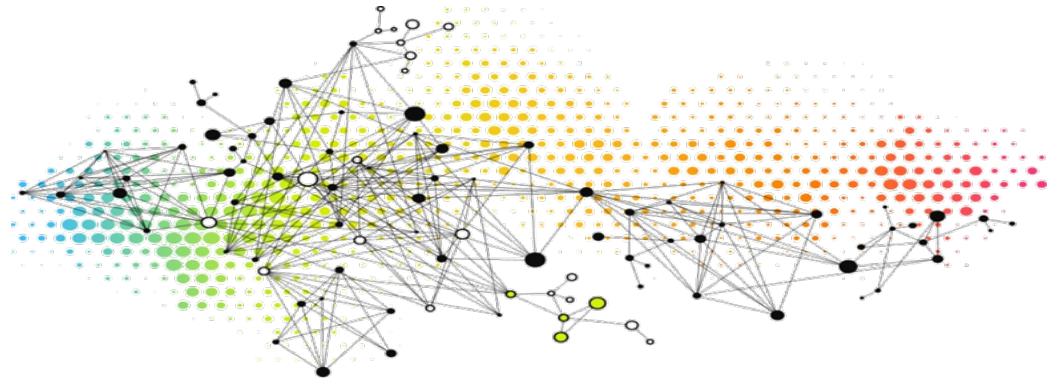
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MAURITIUS

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REPORT ON PRICE STATISTICS MISSION (MARCH 14–23, 2018)

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Glossary

AFS	IMF's Regional Technical Assistance Center for Southern Africa - AFRITAC South
CIF	Cost, Insurance and Freight
COICOP	Classification of Individual Consumption according to Purpose
CPC	Central Product Classification
CoPI	Construction Price Index
CPI	Consumer Price Index
EOE	Export Oriented Enterprises
FOB	Free on Board
GVA	Gross Value Added
ISCO	International Standard Classification of Occupations
ISIC	International Standard Industry Classification
MPI	Import Price Index
NSIC	National Standard Industry Classification
PPI-A	Producer Price Index on Agriculture
PPI-M	Producer Price Index on Manufacturing
RPPI	Residential Property Price Index
SDDS	Special Data Dissemination Standards
SITC	Standard International Trade Classification
SM	Statistics Mauritius
SPPI	Producer Price Index for Services
XPI	Export Price Index

SUMMARY OF MISSION OUTCOMES AND PRIORITY RECOMMENDATIONS

- 1. In response to a request from Statistics Mauritius, a technical assistance mission¹ took place during March 14–23, 2018 to assess the methodological soundness of all price indexes compiled.** These include the producer price index on agriculture (PPI-A), producer price index on manufacturing (PPI-M), export and import price index (XPI and MPI), and the construction price index (CoPI). In addition, discussions were held on broadening the coverage of the producer price index to include services (SPPI) for improving the deflators used in national accounts, especially for hotels, business services, education, and health. The mission also discussed the consumer price index (CPI) and the status of the project to develop a residential property price index (RPPI) since the previous price statistics mission in March 2017.
- 2. Reliable price statistics are essential for informed economic policy making by the authorities.** They also provide the private sector, foreign investors, government departments, and the public in general with important information for decision making, while informing both economic policy and IMF surveillance. A comprehensive set of price indexes also enables the compilation of robust estimates of real GDP.
- 3. The methodologies employed by Statistics Mauritius are sound and largely in line with the international guidelines and practices.** All price indexes use similar aggregation methodologies and the same index compilation system. Statistics Mauritius is dependent on a consultant to maintain the compilation system. However, the production system would be less vulnerable if proper documentation is available and Statistics Mauritius develops more system knowledge.
- 4. The PPI-A, the PPI-M, and the XPI and MPI cover all important industries (see Annex 1);** while the CoPI covers only residential properties and the CPI excludes costs of owner occupied housing except interest on home loans. Users would benefit from an extension of the coverage of both the CoPI and the CPI. There is also scope to develop the SPPI and the RPPI for Mauritius.
- 5. Statistics Mauritius is currently conducting its Census of Economic Activities 2018.** The first phase, which consists of data collection from small establishments (those having less than 10 employees), has started. The second phase, during which data will be collected from large establishments (10 or more employees), will be conducted in 2019.
- 6. Statistics Mauritius collects and disseminates statistics under the authority of the Statistics Act 2000, amended in 2011 and 2017.** The Statistics Act provides the necessary legal framework for data collection and dissemination, data sharing with other parties, confidentiality, and users consultations. Over time it would be helpful for Statistics Mauritius to explore ways of

¹ The mission was partly funded by AFRITAC South (AFS).

improving the application of the Statistics Act to acquiring business survey data and administrative data from both government departments and private corporations to improve the coverage and quality of the statistics, while reducing survey operation costs and response burden. In addition, it is recommended that Statistics Mauritius engages the Bank of Mauritius in data sharing initiatives to mutually pursue these objectives. This could be achieved through annual senior management meetings to determine priorities, quarterly management meetings to coordinate interaction, and ongoing working level interactions to ensure data exchange.

To support progress in the above work areas, the mission recommended a detailed action plan with the following priority recommendations to make headway in improving the quality and completeness of price indexes:

Table 1. Priority Recommendations

Target Date	Priority Recommendation	Responsible Institutions
June 2018	<i>Implement the roadmap for RPPi development set in March 2017.</i>	Statistics Mauritius
June 2018	<i>Identify the coverage and source data for the SPPI and prepare a roadmap for development.</i>	Statistics Mauritius
December 2019	<i>Study the possibilities to enlarge the coverages of the CPI and the CoPI.</i>	Statistics Mauritius

Further details on the priority recommendations and the related actions/milestones can be found in the action plan under *Detailed Technical Assessment and Recommendations*.

INTRODUCTION

7. Statistics Mauritius publishes on a regular and timely manner the following price indexes: the consumer price index (CPI), the producer price index on manufacturing (PPI-M), the producer price index for agriculture (PPI-A), the construction price index (CoPI), the export price index (XPI), and the import price index (MPI). For all published indexes metadata are available on the website of Statistics Mauritius. Statistics Mauritius is an SDDS subscriber and also reports regularly the CPI COICOP data to the IMF's Statistics Department.

8. Statistics Mauritius is currently in the process of centralizing its price index program. This transition presents an opportunity to increase program documentation and to standardize index practices as they relate to product quality adjustment and replacement in addition to outlet sample management. Moreover, it is necessary to devise a long-term systems strategy to increase capacity for newly developed surveys and to reduce the program risk associated with systems resources not being directly employed by Statistics Mauritius.

CONSUMER PRICE INDEX

Scope, Coverage and Main Users

9. The consumer price index (CPI) measures the price changes of a fixed basket of goods and services that the private consumers buy in Mauritius. The CPI covers domestic and foreign residents of both islands, Mauritius and Rodrigues. The foreign resident coverage is restricted to the long-term residents living outside the enterprise provided housing areas. The hiring enterprises provide food and lodging for short-term foreign workers and a Statistics Mauritius study showed that the expenditure of this group is negligible.

10. The CPI for Mauritius is used in the formulation of the monetary and fiscal policies. It is also used for other purposes, such as wage negotiations, indexing pensions and social security benefits, and indexing other payments, such as payments of rent.

11. The CPI excludes purchaser prices and major repairs of owner-occupied housing, gambling, and financial intermediation services indirectly measured (FISIM). Also, illegal activities, such as prostitution and narcotics, are excluded. The interests on home loans are included in the CPI, but other costs of owner-occupied housing are excluded. As 90 percent of households in Mauritius live in owner-occupied houses, the CPI should cover also costs of owner-occupiers other than the interest.

Recommended Action:

- *The CPI coverage should be expanded to cover all costs of owner-occupied housing.*

Weights and Classification

12. The CPI weights are derived from the household budget survey (HBS). The weights of some product groups with underreporting, such as alcoholic beverages and tobacco, are corrected using other data sources like tax data. The items with weights under 0.5 percent are excluded and the weight is derived to the other products in the same class.

13. The HBS covers the whole calendar year and all households in Mauritius. The current weights are from the HBS conducted in 2012, the latest HBS was conducted in 2017 and the rebased CPI will be introduced when the April 2018 index is published in May 2018. The 2012 HBS had 6,720 responding households, while the 2017 HBS responding households are expected to be 7,000.

14. The CPI uses the Classification of Individual Consumption according to Purpose (COICOP). The CPI is published on the group level. The detailed data are available upon request, but would be more useful if published in the online database.

Recommended Action:

- *The CPI with more detailed classification should be published online.*

Price Collection

15. The price collection of the CPI covers 1,017 representative varieties in 500 outlets throughout Mauritius. The varieties are chosen based on sales volumes. The outlets are selected using the point-of-purchase information collected jointly with the HBS and based on regional distribution and sales volumes.

16. The prices are collected weekly or monthly between the 12th and 19th of the month. There are 7,800 price quotations each month. The prices of perishable items are collected on a weekly basis, others monthly. The rents are collected quarterly. The mission recommends that the rents should be collected on a monthly basis. As the lease contracts are annual, so the rents could be collected every six months with a monthly panel survey. With this method the rents would be included monthly into the index.

17. The prices of vegetables, fruits, fish, and meat are collected weekly from eight markets. As these prices can be volatile it is recommendable to cover the whole month. As the price development on different markets seem to be similar within a month, this coverage can be reached by collecting prices from each market only once a month, two markets each week and each market during the same week of the month.

18. The accuracy of the prices is verified after the price collection. If the price change is big and the price collector has not justified it, the price is checked from the outlet. Also cross-checks of selected items of the producer price index (PPI) and import price index (MPI) are made.

19. The price collection is carried out with paper forms. The data from the price collectors form is transferred manually to another book and in case of weekly price collection to an excel file. Statistics Mauritius is interested in moving to the use of tablets or hand-held devices for price collection and is also studying the possibilities to use scanner data. The mission encourages the authorities to continue to study both these price collection methods. As the current work process increases risk for mistakes in the data entry process.

Recommended Actions:

- *The rents should be collected monthly with a six months rotational panel.*
- *The weekly price collection of perishable products should be changed to a monthly price collection covering the entire month by collecting prices from two markets each week of the month.*
- *Continue to study the possibilities of using hand-held devices and scanner data in the price collection process.*

Index Compilation

20. The CPI uses the Jevons formula at the elementary aggregate level and the Laspeyres formula for subsequent levels aggregation. The Jevons formula is applied as a ratio of long-term price relatives using the price of index reference period as base price. The mission recommends moving to the use of short-term price relatives in the future. The short-term relative is more effective when replacement items must be introduced as no long imputation of prices backwards are needed.

21. For some products temporarily missing prices are imputed to reflect the price changes of similar products. If an item is permanently missing, the replacement is introduced into the index using the overlap method if quality adjustment is required.

22. There is no imputation of missing prices for some products, they are excluded from the monthly calculation but not from the base years average. This method will cause index change even if there were no price change, as the averages are not from the same sample of products. The use of short term price relatives and imputing the missing prices with price change of the prices available in both time periods would provide robust elementary aggregate indexes.

23. The CPI is compiled at national level. Statistics Mauritius and the regional office on Rodrigues Island are considering the publication of island indexes. The mission provided advice on how the regional indexes could be compiled.

Recommended Actions:

- *Statistics Mauritius should consider moving to the use of short-term price relatives in the elementary price index compilation.*
- *In imputation the price change used should reflect the price change of those products that are available in both periods.*

Publication and Upcoming Changes

24. The CPI is released within five working days after the end of the month. The publication dates are in the annual release calendar. The CPI is final when published. The publication includes a table of the main contributors to the monthly change, and the division indexes of current and previous months. The quarterly economics bulletin includes more detailed analysis of the data. The metadata are published on the website of Statistics Mauritius.

25. The CPI is rebased every five years. The rebased CPI for April was published in May, the year after the HBS. The rebased index was compiled backwards to January of the base year. Long time series with a single base year are compiled for the total CPI only, not for lower levels of classification. These longer time series would be useful for analytical purposes.

Recommended action:

- *Long time series for lower levels of the CPI should be compiled and published on the website.*

PRODUCER PRICE INDEXES

A. Construction Price Index

Scope, Coverage and Main Users

26. The construction price index (CoPI) provides a measure of the change in construction prices, including all materials, labor, equipment, and profits. It excludes the cost of the building permit and draughtsman's fee as per international guidelines. At present, Statistics Mauritius publishes an index that covers residential buildings only. From the building permits approximately, 90 percent are for residential buildings, but according to staff the large building projects or the governmental building projects do not require a building permit. Thus, the share of residential buildings from total construction is lower and therefore the coverage of the CoPI should be expanded.

27. This index is used as a deflator for the measurement of real growth in the entire construction sector (residential and non-residential). It is also useful for evaluating cost fluctuations in contracts regarding construction works and for renegotiating owner-tenant agreements.

Recommended Action:

- *The coverage of the CoPI should be enlarged to cover construction of non-residential buildings. In the interim, the acquisition and use of government standard schedule of rates for institutional units' construction when they have been developed can be used for that segment and as a proxy for commercial and institutional buildings until they are developed.*

Weights and Classification

28. The CoPI uses weights throughout the entire aggregation structure. The classification is unique to this index, at the lowest level it is disaggregated by input item, then combined to the work category (that is plumbing, electrical, painting, etc.) and then aggregated to a total for residential construction.

Price Collection

29. The most common model dwelling was determined from the 2000 housing census data and covers developments assumed to have taken place between 2000–2007. The drawings of the prototype model were provided by the Mauritius Housing Company Ltd. but the model should be updated on a regular basis and should cover all major types of houses built. Given the homogeneous nature of residential construction in Mauritius, the model specifications are for a single story (ground floor) detached house of 138 square meters (1,485 square feet) of floor area. Plumbing, sanitary installation, and electrical installation are included. It should also include the contractors wage and profit margin, although these might be difficult to separate, therefore it is important to communicate with contractors about how they price. The mission discussed with the staff about separating the building model into (a) a “grey” building which is just the structure and (b) the rest of the finishing’s, because it is rare in Mauritius for one contractor to complete the entire residential building.

30. The data are collected every month from a sample of 50 outlets in 8 regions and include the pricing of 109 items, which go into the compilation of the index. Replacement items are included as necessary and close monitoring of the movement of prices is carried out and any discrepancies are queried from producers in the construction industry by price collectors. Maintaining good relationships with contractors will facilitate price collection and validation.

Recommended Actions:

- *Housing models need to be updated, particularly the input materials and weights.*
- *Attempts should be made to build relationships with contractors to improve data quality given the small and diverse nature of the construction industry.*

Index Compilation

31. The CoPI uses a Carli formula on the elementary aggregate level although Statistics Mauritius intends to replace this with a Jevons at the next scheduled index rebase. The recommended formula at the elementary aggregate level is Jevons. A Laspeyres index is used at the aggregate levels. Similar input costs by region are combined for the elemental index, followed by a weighted average of price relatives across input and weight categories. The index, weight and price reference periods are all based on the second quarter of 2009.

Recommended Action:

- *The formula at the elementary aggregate level should be changed to Jevons.*

Publication and Upcoming Changes

32. The CoPI is published quarterly, eight weeks after the reference quarter. Monthly, quarterly and annual indexes are disseminated on a quarterly basis, via the Statistics Mauritius website and a printed quarterly publication beginning at the category level. Published figures are final and as such not revised.

B. Export and Import Price Indexes**Scope, Coverage and Main Users**

33. The export and import price indexes (XPI, MPI) provide an overall measure of pure price changes of goods exported to other countries or imported from other countries. They are used by national accountants, central banks, government departments, and businesses to: (1) measure changes in prices, (2) analyze the effect of trade price changes on the various sectors of the economy, (3) calculate changes in the volume of trade, (4) calculate the terms of trade (the ratio of export prices to import prices), and (5) analyze the effect of exchange rates on trade prices.

34. The concepts and definitions of the XMI and MPI largely follow the guidelines provided in the *Export and Import Price Index Manual, Theory and Practice, 2009*.

Weights and Classification

35. The XPI and MPI follow the Standard International Trade Classification Revision 2 (SITC Rev.2) which is the national version of the International Standard Industrial Classification Revision 4.

36. The XPI uses as its frame the administrative customs export data (domestic exports and re-exports) which include roughly 90 percent of the value of merchandise exported during the base year 2013. Ten percent are excluded due to the heterogeneity and inherent difficulties in constant quality pricing. Examples include precious stones, jewelry, recorded media and free publications, and all products classified within the Sections 1, 3, 7 and 9 of the SITC Rev.2. Subsequently, commodities selected for the basket constitute 70 percent of the total value of export shipments. Trade value weights are applied at the SITC Rev.2 seven-digit level and aggregated to the total SITC Rev.2 two-digit level and are consistent between exports and imports.

37. The MPI uses a similar frame and sampling strategy covering 89 percent of the value of merchandise imported in 2013. Eleven percent are excluded due to heterogeneity and pricing challenges. Examples include precious stones, jewelry, cellular telephones, recorded

media and free publications, aircraft, helicopters and marine vessels, certain machine parts, textile wastes and Section 9 “Commodities and transactions not classified elsewhere” of the SITC Rev.2. The commodity basket represents 55 percent of the value of imports.

Price Collection

38. An establishment survey is conducted to collect prices from importing and exporting establishments. Data from the Mauritius Sugar Syndicate and Air Mauritius are used for sugar exports and aircraft imports respectively, although efforts should be made to expand the usage of data from the exporters and the importers. Response rates are excellent averaging 95 percent of the 55 export establishments and 150 import establishments in sample, providing between one to five products per respondent.

39. The selected exporters, which are concentrated heavily in certain commodities like sugar, seafood, and textiles are phoned monthly and visited quarterly for prices. The collected prices are reported on a free on board (FOB) basis and are mostly contract based.

40. Importers are less concentrated and transact in heterogeneous commodity groups compared to exporters. They are visited quarterly for collection, more aligned with their transaction frequency. The collected prices are reported on a cost, insurance, and freight (CIF) basis and are mostly contract based.

41. All prices are reported in the currency of transaction and then converted to Mauritian Rupee using the rate closest to the transaction date. In some cases, unit quantities are not held constant and this should be rectified to ensure constant quantity and quality price movement. This could be done by programming the system to automatically identify situations where changes in products occur based on changes in certain cells on the questionnaires. At first the treatments can be done manually, but should be automated in the long run.

Table 2. Most Common Export and Import Trade Regions

Most common export trade regions	Most common import trade regions
South Africa Europe United States	India China

42. Item replacement is done as required in cases where the current item has been phased out or become obsolete. The exporter or importer is contacted to select a new item, while traders who completely cease operations are replaced using the administrative customs records. Missing prices are imputed based on price changes of similar items within the elementary aggregate from the same time period.

Recommended Actions:

- *Quantities and units should be kept constant during repricing.*

- *Perform custom data unit value analysis to confront and replace survey data.*
- *Expand the use of alternate data sources beyond only sugar exports and aircraft imports.*

Index Compilation

43. The XMI and MPI use the Jevons formula at the elementary aggregate level and the Laspeyres formula on aggregation. The elementary aggregate (SITC Rev.2 seven-digit) indexes are calculated as a geometric average of the price relatives for each establishment. As the response rates are good, it might be helpful to amend the questionnaire to include the product weights for each establishment.

44. Statistics Mauritius does not use customs based unit value prices in its trade indexes. It would be useful to analyze this unit value data to understand their price movements, where they are stable and how they compare to the survey based prices.

Recommended Action:

- *The pricing questionnaire should be expanded to include product weights below the company (outlet) level.*

Publication and Upcoming Changes

45. Indexes are released on the website within a quarter of the reference period. The export and import price indexes are quarterly indexes, despite monthly collection on the export side. Both the indexes have 2013 as reference period for index, weight, and price. Published figures are provisional when first published and are revised and final in the next quarter. The indexes are rebased every five years based on customs data with the next one scheduled for 2019 (base year 2018).

C. Producer Price Index for Agriculture

Scope, Coverage, and Main Users

46. The producer price index for agriculture (PPI-A) provides a measure of the average change in the prices which producers receive for their agricultural products. It serves a variety of purposes including: (1) compilation of national accounts at constant prices for the agricultural industry; (2) economic analysis, including the monitoring of price trends and their sensitivity to domestic and international price changes, and developments in agricultural production; (3) monitoring the implementation of agricultural price policy decisions such as the introduction or modification of subsidy/support prices; and (4) forecasting price movements in connection with market studies or business cycle research.

47. Most agricultural products are included in the index, representing about 79 percent of total production. Forestry, fishing, and agricultural services are excluded. However, it should be noted that the national accounts department collects their own fishing prices. Also,

agriculture input prices are collected and provided to the national accounts to deflate the intermediate inputs of the agricultural industry. Input price indexes are not published externally, although if there is a user demand the mission recommends publishing also an input PPI-A.

Recommended Action:

- *Formalizing and publishing an agriculture input price index should be considered.*

Weights and Classification

48. The PPI-A covers agricultural products that are classified according to the latest Central Product Classification (CPC) Ver.2.1 and includes two main divisions (see Table 3).

Table 3. Classification of the Producer Price Index for Agriculture

Division 01	Crop Products
Group 012	Fresh vegetables
Group 013	Fruit and nuts
Group 014	Oilseeds and oleaginous fruits
Group 015	Edible roots and tubers
Group 016	Stimulant and spice
Group 018	Sugar cane
Group 019	Flowers, ornamental plants
Division 02	Animals & Animal Products

49. Statistics Mauritius employs a two-stage base period weighting scheme. Base period weights are first derived by multiplying the average of production across three consecutive years with the middle year as the reference period, currently 2013. It then selects 12 monthly baskets of commodity groups with different weights over the course of the year to account for the seasonality in the agricultural industry. A weight is assigned to each commodity group based on total production (as a proxy for sales) pertaining to the particular group.

Price Collection

50. In Mauritius, survey respondents and data sources vary depending on the agricultural product being priced. Respondents can include; (1) producers (farmers); (2) purchasers; and (3) markets (auctions and marketing agencies) according to the following commodities:

- Sugar cane and tea leaf, marketing agency data is used,
- Vegetables, price data are obtained by price collectors visiting weekly auction markets in two towns,
- Fruits, prices are collected producers or purchasers such as planters and wholesale purchasers, and

- d. Animals and animal products, price data are collected from a combination of marketing agencies and producers.

51. The auction prices are collected from two markets on auction day. Statistics Mauritius has plans to include a third major auction site in Flacq for pricing and the mission supports this plan.

52. The share of sales via marketing agencies has decreased. Collecting more data directly from the producers to maintain the data quality for those products where the sales volumes have shifted from marketing agencies to other channels of sales is preferred.

Recommended Actions:

- *An auction from the third region (Flacq) should be added to the collection sample.*
- *The surveying of producers should be increased to maintain data quality wherever volumes of sales through marketing agencies are decreasing.*

Index Compilation

53. Given the variety of data sources, collected prices are heavily scrutinized and regularly reviewed for accuracy, incompleteness or outliers and adjusted when necessary. Missing prices must be accounted for, as each product has a weight in the monthly basket. As such, the last observed price is carried forward temporarily. Using another imputation method is preferred to the carry forward method which could introduce a downward bias to the index when prices are generally rising.

54. The PPI-A is aggregated using a Laspeyres formula. Quarterly and annual indexes are compiled using a weighting pattern based on the production value for the base period.

Recommended Actions:

- *For missing prices, the carry forward method should be replaced by the imputation method.*

Publication and Upcoming Changes

55. The PPI-A is published on a quarterly basis, eight weeks after the reference quarter and is essentially final. The only revisions that occur are for sugar cane and tea which are updated with final crop year data. The weights of the PPI-A basket are updated infrequently as the Census of Agriculture is conducted only every 10 years in line with the Census of Population. The next Census of Agriculture should collect the same information that is collected on the Census of Economic Activity (CEA). These results should be used to improve industry composition analysis and optimize the sampling stratification between small and large establishments.

Recommended Actions:

- *The Census of Agriculture should include turnover information since the industry falls outside the scope of the CEA.*

- *The results from the Census of Agriculture should be used to improve the sampling stratification between small and large establishments.*

D. Producer Price Index for Manufacturing

Scope, Coverage and Main users

56. The producer price index for manufacturing (PPI-M) provides a measure of the changes in the effective prices received by producers in the manufacturing industry for their output sold on the domestic market. It does not include the output of export oriented enterprises (EOE) which are identified in the Ministry of Industry registry. These should be included as soon as possible and a separate export manufacturing aggregate beneath the total PPI-M should be calculated. In addition, any high growth industries not currently in scope should be added if their weight in the latest CEA warrants inclusion. The PPI-M is used: (1) as a leading indicator of the future status of consumer inflation; (2) in the economic analysis of inflation through various stages of the value-added production process; (3) as price deflators for the computation of national accounts at constant prices for manufacturing industries; (4) as an escalation clause to protect buyers and sellers in private contracts; and (5) in econometric models for forecasting and inventory accounting.

Recommended Actions:

- *The frame should be expanded to include the EOE's and include them in the sample.*
- *An export manufacturing index should be produced as a separate aggregate but within the structure of the overall manufacturing producer price index.*
- *The index coverage should be expanded by adding the high growth industries to the sample (pharmaceuticals, computers, electronics, etc.).*

Weights and Classification

57. Large and small manufacturing establishments falling within divisions 10 to 32 of the NSIC Rev.2 are included in the scope of the index. Establishments are classified under 71 groups, 137 classes and 240 sub-classes. Data are published mainly by division and class, yet some items are published by subclass. Exclusions, in addition to exporting enterprises, are those that fall under divisions 12, 19, 21 and 26. Division 12, Manufacture of tobacco products is excluded as there is no longer manufacturing in Mauritius. Division 19 Manufacture of coke and refined petroleum products is excluded as the weight in the overall index is not significant. Divisions 21 Manufacture of basic pharmaceutical products and pharmaceutical preparations, 26 Manufacture of computers, electronic and optical products, and 33 Repair and installation of machinery and equipment are excluded as their weights in the overall index are not significant and the product changes are frequent. Weights are introduced at the company level as they are combined to the five-digit industry level.

Price Collection

58. Roughly 400 products are selected for pricing from a sample of 126 establishments from the 2013 Census of Economic Activity, which constitutes a coverage of roughly 60 percent of manufacturing output. Representative products are selected based on their importance to their contribution to the gross output or turnover of the selected establishments. Product replacement occurs when necessary with establishments being asked to select a similar product to continue pricing. Temporarily missing prices are imputed using the average price in the five-digit sub-class or next highest level. Factory gate prices are collected on a monthly and quarterly basis and do not include value added taxes or excise duties.

59. Internal editing procedures are used to validate the accuracy and reliability of the data, including respondent follow up. Data confrontation also occurs between the CPI and export and import price indexes.

Index Compilation

60. The PPI-M is aggregated using a Jevons formula at the elementary aggregate level and a Laspeyres formula in aggregation. The PPI-M is an industry based index with weights revised every five years following the results of the CEA. According to best practices, the PPIs should be produced also by commodities.

Recommended Action:

- *Statistics Mauritius should consider producing a commodity based PPI-M in the future.*

Publication and Upcoming Changes

61. Preliminary monthly indexes are published and subsequently revised at the time of the quarterly index release. The PPI-M is released within one month after the reference period and the quarterly indicators are released within one quarter after the reference period.

PRODUCER PRICE INDEX FOR SERVICES

62. The mission reviewed deflators used for service industries in national accounts. A variety of implicit and explicit service price deflators are used as well as the overall CPI (see Annex 2).

63. The share of service sector has been increasing and is approximately 75 percent of the Gross Value Added (see Annex 1). The mission recommended the development of PPIs for financial services, transportation services, accommodation services, and possibly wholesale and retail services when the analysis of the frame and the CEA results are complete. For other service, the overall CPI price index could be replaced with either a more detailed CPI series or by using an industry specific wage rate index if labor costs are the largest input to professional services.

Please see annex 2 for a detailed breakdown of current and proposed deflators for the services industries.

Recommended Actions:

- *Statistics Mauritius should expand the coverage of the PPI to include financial services, transportation services, and accommodation services.*
- *If the overall CPI is used as deflator, it should be replaced either with a lower level CPI series or with an industrial wage rate index.*

A. Deflation of Foreign Trade in Services

64. Statistics Mauritius receives its gross output in foreign trade in services from the Bank of Mauritius and uses a variety of proxy price deflators. A knowledge sharing exercise between the statistical office and the central bank to better understand the data sources and compilation methodology of these estimates is strongly encouraged. Statistics Mauritius can refine their use of deflators as indicated in Annex 2 for specific foreign trade service categories. In many cases, this supports the development of other service price index development and they can be used for multiple purposes thus increasing efficiency.

B. Wage Rate Index

65. Statistics Mauritius publishes a quarterly wage rate index by industry. Initially, the weight for the Industry groups is derived from the 'Survey of Employment and Earnings in Large (employing 10 or more persons) Establishments. Within each sub class weighted NSIC, occupations are classified to an occupational grouping according to the International Standard Classification of Occupations (ISCO). The NSIC aligns closely with the national account gross value-added industry groupings. They are also aggregated by institutional sector. Data are collected from government sources and from a sample of around 250 establishments and the response rate is excellent at 90 percent. Weights are based on both the number of employees and earnings. The index is calculated for regular earned wages (based on the ILO recommendations) although it was suggested that Statistics Mauritius should develop a total earnings index, including overtime and irregular payments to assist the national account estimates of total compensation of employees.

Recommended Action:

- *Start producing a total earnings index.*

RESIDENTIAL PROPERTY PRICE INDEX

66. Statistics Mauritius has been developing a residential property price index (RPPI) since 2013. The IMF has had two missions, in August 2014 and March 2017, to give technical assistance to Statistics Mauritius. Because of the limited information on property characteristics,

property-mix adjustment is likely to follow the stratification approach. There are only 800 sales during a year and the data consists of only the sale, floor area, and address.

67. The preliminary results for the RPPI were ready for houses and apartments for the period between the first quarter of 2015 to the fourth quarter of 2016. The price per square meter data is volatile. The mission recommended to continue analysis of how validation should be performed. However, ongoing volatility can be expected as the level of stratification is relatively basic and there is likely to be considerable heterogeneity within strata.

68. Statistics Mauritius should target to publish the RPPI when the data validation is final for 2015–2017. The publication should include good metadata and also explain volatility if necessary.

69. The weights used for the RPPI are the sales of houses and apartments. As the national accounts also would need information on the stock value, the stock weights also could be used to produce a separate index. The next housing census is planned to be conducted in 2020 and could serve as a source of weights or alternatively to assess the 2011 results and determine if census improvements are required for 2020.

Recommended Actions:

- *More validation of the data should be done before the first publication of the RPPI.*
- *Statistics Mauritius should target to publish the first results of the RPPI in near future. The overall RPPI can be published quarterly, the regional indexes on an annual basis.*

DETAILED TECHNICAL ASSESSMENT AND RECOMMENDATIONS

Priority	Action/ Milestone	Risk Assumptions/ Verifiable Indicators	Target Completion Date	Actual Completion Date	Implementation Status
Outcome: The CPI is in line with the international recommendations and best practices					
L	The CPI coverage is expanded to cover all costs of owner-occupied housing.	The best timing is when rebasing the index and depending on the recommendations of the new CPI manual	04/2023		
M	The CPI with more detailed classification are published online.		05/2018		
H	The rents are collected monthly		06/2018		

Priority	Action/ Milestone	Risk Assumptions/ Verifiable Indicators	Target Completion Date	Actual Completion Date	Implementation Status
	with six months rotational panel.				
H	The weekly price collection is replaced by monthly covering the total month.		08/2018		
H	All missing prices are imputed by the price change of observed prices.		08/2018		
L	Study of using hand-held devices.		12/2018		
L	Study the use of scanner data from supermarkets.		12/2018		
L	Moving to use short-term relative in the elementary price index compilation.	Dependent on IT resources and system flexibility	06/2019		
M	The regional indexes for both main islands are compiled.	If the weights are found to be reliable	06/2019		
M	Long time series for lower levels of the CPI are compiled and published on the website.		12/2018		
Outcome: The PPI is in line with the international recommendations and best practices					
H	The coverage of the CoPI is enlarged to cover construction of non-residential buildings.	Depending on data sources	When next rebasing		
M	CoPI housing models are updated, particularly the input materials and weights.		When next rebasing		

Priority	Action/ Milestone	Risk Assumptions/ Verifiable Indicators	Target Completion Date	Actual Completion Date	Implementation Status
L	Relationships with contractors are built to improve data quality of the CoPI.		12/2018		
M	The MPI and XPI pricing questionnaires are expanded to include product weights below the company (outlet) level.		12/2018		
H	MPI and XPI quantities and units are kept constant during repricing.		06/2018		
M	Custom data unit value analysis on MPI and XPI are performed to confront and replace survey data.		12/2018		
L	Administrative sources beyond sugar exports and aircraft imports are received.	Depended on availability of the data.	Ongoing		
L	An agriculture input price index is formalized and published.		1/2021		
L	Additional auctions from other regions (Flacq) are added to the collection sample and increase the surveying of producers to maintain data quality.		08/2018		

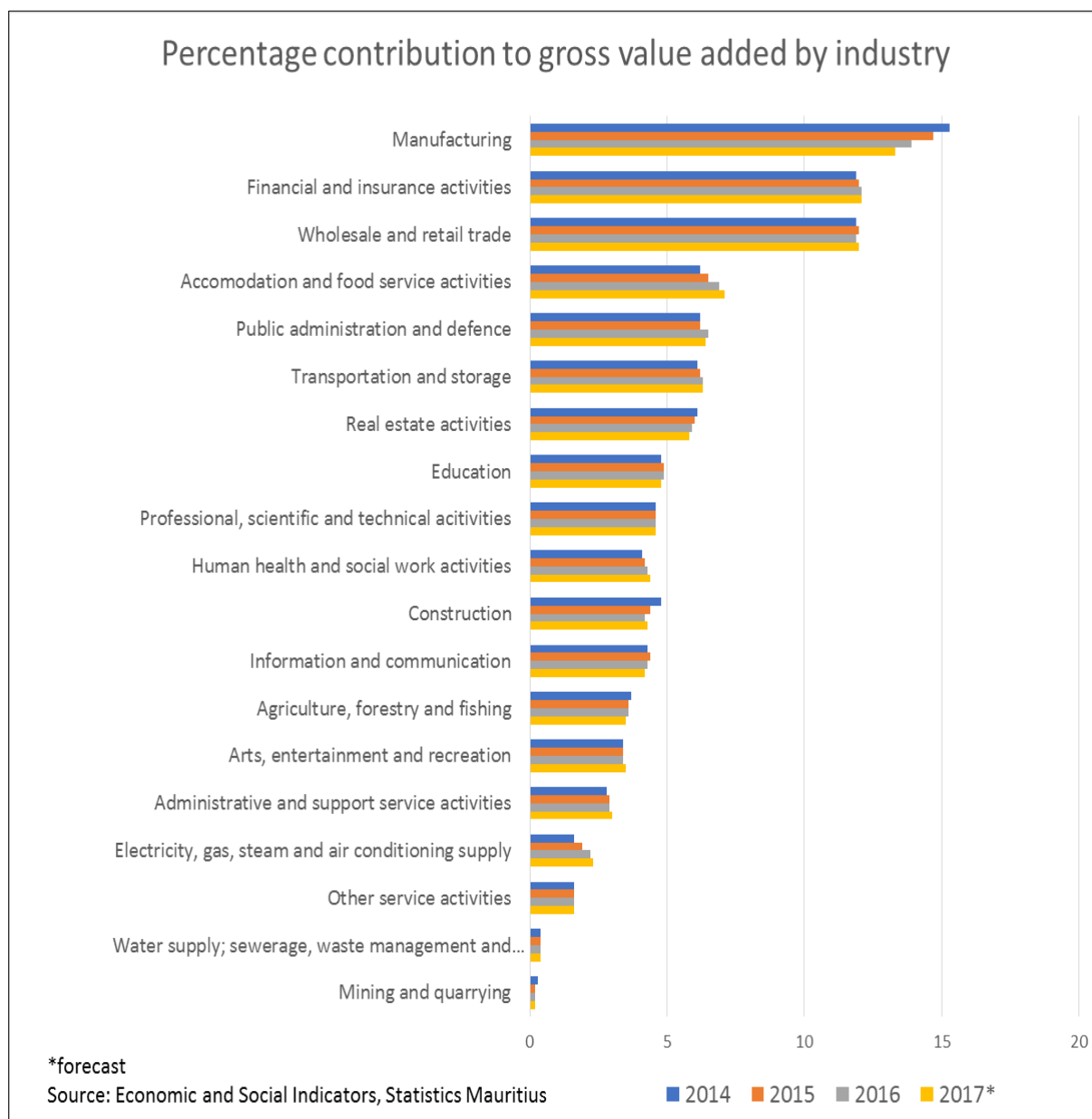
Priority	Action/ Milestone	Risk Assumptions/ Verifiable Indicators	Target Completion Date	Actual Completion Date	Implementation Status
M	Carry forward method is replaced with imputation with the average of the elementary aggregate.		05/2018		
H	Improve the census of agriculture and include turnover data		2021		
M	The census of agriculture results is used to improve sampling stratification between small and large establishments		2022		
H	The PPI-M frame is expanded to include the EOE's and include them in the sample.	In next rebasing	05/2019		
H	An export manufacturing index is produced as a separate aggregate but within the structure of the overall manufacturing producer price index.	In next rebasing	05/2019		
L	The PPI-M index coverage is expanded by adding the high growth industries to the sample (pharmaceuticals, computers, electronics, etc.).	In next rebasing	05/2019		
L	A commodity based PPI-M is produced.	In next rebasing	05/2019		

Priority	Action/ Milestone	Risk Assumptions/ Verifiable Indicators	Target Completion Date	Actual Completion Date	Implementation Status
Outcome: The SPPI's are developed for the most important service sectors					
H	SPPIs for financial services, transportation services and accommodation services are developed and published.		02/2021		
H	Overall CPI deflators are replaced with more specific series or industry wage rate indexes.		06/2019		
L	Start producing a total earnings wage rate index.				
Outcome: The RPPI is progressing well but is still in the development phase					
H	The data is validated properly and outliers are excluded from the data.		05/2018		
M	The first results of the RPPI are published with metadata: The overall RPPI on a quarterly basis, the regional indexes on an annual basis.		07/2018		

A. Officials Met During the Mission

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Annex I. Contribution to Gross Value Added by Industry



Annex II. Services Producer Price Indexes Current and Proposed Deflators

Service Industry	Component	Current Deflator	Proposed Improvements
Financial Services and Insurance	Monetary intermediation	CPI financial services component	Measure price changes in explicit fees and commissions over time using a sample of business to business transactions. This requires improved survey questionnaires or the acquisition of transaction microdata from the central bank or financial institutions.
	Financial Leasing and other credit granting	FISIM (loan rate-reference rate, where reference rate equals the midpoint of loan and reference rate)	Update reference rate to be weighted average of overnight lending rate and various bond yield rates.
	Insurance, reinsurance and pension funding	Implicit deflator derived from volume index of the number of insurance policies	Develop an explicit price index by sampling insurance companies and select representative constant quality policies and reprice them over time. Stratify by insurance line (auto, property, etc.,).
	Other: detailed below		
	Credit unions	N/A	Contact Ministry of Industry to gauge cooperative growth and include if the size is significant. Use FISIM pricing if possible, otherwise use the sum of costs approach.
	Central bank	Central bank aggregate wage rate index	Appropriate measure.
	Stock brokering	brokerage fees	Measure over time constant quality commission fees.
	Financial services commission, stock exchange, currency exchanges and financial administration	CPI financial services component	Use wage rate indexes for detailed financial industries.

	Non-Banking and global business investment holdings	CPI financial services component	Improve MOU with FSC to acquire more detailed data on financial transactions and develop price deflators based on results.
Professional Services	Legal services, head offices	Overall CPI	Best option: Survey companies and collect charge out rates, if not feasible use industry specific wage rate indexes.
	Management & consulting services	Overall CPI	Best option: Survey companies and collect charge out rates, if not feasible use industry specific wage rate indexes.
	Engineering services	Overall CPI	Best option: Survey companies and collect model prices or constant quality charge out rates, if not feasible use industry specific wage rate indexes.
	Architectural services	Overall CPI	Best option: Survey companies and collect model prices or constant quality charge out rates, if not feasible use industry specific wage rate indexes
	Accounting services	Overall CPI	Best option: Survey companies and follow representative contracts, if not feasible use industry specific wage rate indexes.
	Administrative & support services	Overall CPI	Use an industry specific wage rate.
Accommodation Services	Local tourists	CPI accommodation services	Appropriate measure.
	Foreign tourists - hotels (consumer and business)	Implicit deflator derived from volume of tourist arrivals from passport and immigration office. Tourism receipts are measured by foreign currency cash deposits to financial institutions	Develop an explicit price index from a sample of hotels and for a sample of rooms. Collect price data online, two weeks in advance, always for a Wednesday night stay (business price) and a Saturday night stay (consumer) at the time of CPI collection. Use tourism passport data to determine business traveler regions, routines and practices.

	Foreign tourists - resorts	Implicit deflator derived from volume of tourist arrivals from passport and immigration office. Tourism receipts are measured by foreign currency cash deposits to financial institutions	Meet with some resorts and explain what needs to be measured and the difficulty in bundling. Ask about their pricing structures and develop a questionnaire to produce an explicit price index. Ask them: How do they determine their cost structures? What percentage is for accommodations versus food, drinks, activities, etc.? What do you include when you report your earnings? Then develop a pricing model accordingly.
Food Services	Local restaurants	CPI for local restaurants	Appropriate measure.
	Caterers	CPI for local restaurants	Use a weighted average of the PPI-M price for food and the catering industry wage rate index if labor costs are a significant percentage.
Utilities	Energy	Implicit deflator derived from the difference between gross output and GVA	Develop an explicit price index based on Central Electricity Board data on the unit price per gigawatt by consumer type, domestic, commercial, institutional and compare to the current deflator and incorporate as necessary.
	Water	Implicit deflator derived from the difference between gross output and GVA	Develop an explicit price index based on Central Water Authority data on the unit price per cubic meter by consumer type, domestic, commercial, institutional and irrigation and compare to the current deflator and incorporate as necessary.

Wholesaling and Retailing Services		Imported goods are deflated using the MPI and local goods are deflated using the CPI. This is applied to the gross margin value that is derived from total output at a fixed ratio by industry.	Develop and explicit price deflator, however given the poor response rates to surveys, use the results from the latest CEA to analyze the industry composition. Questions to answer could include: How many wholesalers are classified to the BR? What are their sizes? What commodities are typically wholesaled compared to those bought directly from retailers? Use this information to determine the size split between wholesaling and retailing industries and improve proxy pricing or develop surveys based on average purchase and average selling prices.
Transportation	Air transport	CPI for air transportation services to deflate business and consumer output	Develop explicit price indexes for business output by collecting a business price for air travel by frequent business travel destinations.
	Road transport	CPI for road transportation services to deflate business and consumer output	Develop explicit price indexes for business output by collecting a business price for for-hire trucking based on a sample of truckers and a sample of common routes and cargo shipments. Reprice these over time.
Information and Communication	Telecommunications (65 percent)	CPI telephone call price series	Build a long-term relationship with the Information & Communication Technology Agency (ICTA) and ask them to provide both turnover data and volume measures for the providers and to split each by consumers and businesses so they can be used to deflate separately. Then there are two options to price, either derive constant quantity unit prices per service (mobile, land line, internet, etc.,) aggregated by service value or calculate an index using direct prices of

			service options (phone access, internet subscription, phone data package, etc.,).
	Software, database, website and broadcasting industries (35 percent)	Overall CPI	Use a wage rate index for specific industries.
Real Estate Activities	Real estate commissions	Overall CPI	Surveying agents is not feasible, therefore recommend deriving deflator implicitly by dividing gross commissions by the number of transactions, separated by home sales and land sales, otherwise track commission rates but they are very stable over time and generate large real output.
Education Services	Private and Public	CPI series on education services	Appropriate measure.
Health Services	Private and Public	CPI series on health services	Consider using more detailed CPI health service series that would not include health goods like pharmaceutical products.
Arts and Entertainment		Overall CPI	Consider using arts and culture CPI series.
Other Service Activities	Repairs of goods, non-government organizations, cleaning services	Overall CPI	Create total services CPI and use that to deflate or use a more detailed CPI series.
Public Administration	Levels of government	Government industry wage rate index	Appropriate measure.
Trade in Services	Imports of travel	CPI from visiting countries adjusted for the exchange rate	Use accommodation services consumer and producer price indexes from visiting countries.
	Exports of travel	CPI accommodation and food service series	Appropriate measure for consumers but use a producer price index for accommodation services for business visitors.
	Imports of transportation	IMF overall world GDP deflator	Use a weighted average of national GDP deflators (preferably service GDP

	services (air and marine)	adjusted for the exchange rate	deflators) from main import countries adjusted for the exchange rate.
	Exports of transportation services	Domestic aggregate GDP deflator	Use transportation services producer price index once developed.
	Imports of business services	Overall MPI deflator	Weighted average of national PPI service deflators from main import countries adjusted for the exchange rate.
	Exports of business services	National account deflators for communications, insurance and financial services	Use specific business service producer price indexes once they are developed or those derived from industry specific wage rates.