TECHNICAL ASSISTANCE REPORT

CAYMAN ISLANDS

Report on National Accounts Mission Rebasing of Gross Domestic Product (August 5–9, 2024)

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CARTAC

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Summary of Mission Outcomes and Priority Recommendations

1. **In response to a request from the Economics and Statistics Office (ESO) in Cayman Islands, a technical assistance (TA) mission took place between August 5–9, 2024, to support the improvement and rebasing of Gross Domestic Product (GDP).** The ESO intends to update the base year of the National Accounts Statistics (NAS) with the development of supply and use tables (SUT). A Household Budget Survey (HBS) for 2023 will be the major new data source introduced. As a concurrent exercise, the ESO will compile tables one to six of a Tourism Satellite Account (TSA) within the SUT.

2. **The mission focused on the following aspects:** updating the industry dimension of the SUT to the International Standard Industrial Classification, Revision 5 (ISIC); providing guidance on estimating the primary tables of a TSA within SUT; expanding detail the of product dimension of SUT to improve estimates of gross fixed capital formation (GFCF), household final consumption expenditure (HFCE) and intermediate consumption (IC) of transportation products; and demonstrating fixed versus variable ratio backcasting.

3. **A draft Revision 5 version of ISIC is now available.** This updated ISIC is meant to compliment the upcoming *System of National Accounts (SNA) Manual, 2025.* The mission therefore reviewed the industry dimension of the Cayman Islands 2015 SUT against the updated ISIC. Although there are many minor changes in ISIC which the ESO should adhere to, there are more significant changes to Accommodation Services, which need to be defined in the updated SUT.

4. **The SUT product dimension should be expanded to improve estimation of transportation goods.** Although a full analysis of the SUT product dimension was limited due to a forthcoming update of the Central Product Classification (CPC), the transportation goods product detail should be expanded. This will improve the estimation of the composition of GFCF, HFCE and IC for these products. As most of these products are imported, the International Merchandise Trade Statistics (IMTS) contain sufficient detail in the Harmonized System (HS) codes to identify the level of detail required.

5. **To support a TSA, some of the tables should be compiled within the SUT.** The mission provided training and recommendations on estimating a limited benchmark TSA as part of the rebasing process. There are issues with the detailed Balance of Payments (BOP) data which the TSA requires. There are cases where exports of tourism products are greater than domestic production. This is not possible and highlights issues with these data. Additional information on travel expenditures is required. Nevertheless, the framework for a limited TSA has been demonstrated. Since the ESO are committed to producing a TSA, it is recommended to seek out additional capacity development (CD) assistance.

6. **The backcasting method could be expanded to include variable ratio backcasting and a link year**. The fixed ratio method which has been utilized by the ESO assumes that previously published growth rates at current and constant prices by industry are relatively high quality and should be maintained in the backcasted series, in all years before the link year. There are instances however where the annual indicator is relatively low quality and the previously published estimates of the level of value added (VA) in the previous benchmark is relatively higher quality. In those cases, a variable ratio method of backcasting is preferred. Regardless of whether a fixed ratio or variable ratio method is used, a link year should be introduced to allow the weights to vary in the historical time series.

7. **To support progress in the above work areas, the mission proposed the following priority recommendations needed to improve estimates of GDP.**

TABLE 1. Priority Recommendations

Target Date	Priority Recommendation	Responsible Institutions
October 2024	Update the industry dimension in the SUT to reflect ISIC, Rev.5, especially for Accommodation Services.	ESO
January 2025	Expand the product dimension of the SUT to improve estimation of GFCF, HFCE and IC of transportation products.	ESO
January 2025	Investigate product dimension of BOP statistics and collect information on the level and product composition of travel expenditures for the updated benchmark year.	ESO

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

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Acronyms

BOP	Balance of Payments
CARTAC	IMF's Caribbean Regional Technical Assistance Centre
CD	Capacity Development
CII	Change in Inventories
CPC	Central Product Classification
ESO	Economics and Statistics Office
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
HBS	Household Budget Survey
HFCE	Household Final Consumption Expenditure
HS	Harmonized System
IC	Intermediate Consumption
IMTS	International Merchandise Trade Statistics
IPD	Implicit Price Deflator
ISIC	*International Standard Industrial Classification*
ITS	International Travel Survey
NAS	National Accounts Statistics
NSO	National Statistics Office
SNA	System of National Accounts
SUT	Supply and Use Tables
TA	Technical Assistance
TSA	Tourism Satellite Account
TVA	Tourism Value Added
VA	Value Added

Section I. Introduction

10. **With support from The Caribbean Regional Technical Assistance Centre (CARTAC) the ESO compiles and releases current and constant 2015 price annual estimates of production-based GDP based on the ISIC Revision 4.** The estimates are broadly consistent with the standards set out in the *2008 System of National Accounts (2008 SNA)*.

11. **The objectives of the mission were to (i) update the industry dimension of the SUT to ISIC Revision 5; (ii) provide guidance on estimating tables one to six of the TSA within the SUT; (iii) demonstrate different backcasting techniques; and (iv) expand detail of product dimension of SUT to improve estimates of GFCF, HFCE and IC of transportation goods.** These developments are considered in the following sections of this report.

Section II. Updating SUT Industry Dimension to ISIC, Rev. 5

12. **The United Nations Statistical Commission have released an updated ISIC.** The most recent SUT for Cayman Islands is for base year 2015, and uses ISIC, Rev. 4. A new SUT will be compiled to rebase the NAS to 2023 and will make use of the recently completed HBS. The ESO should take this opportunity to review the industry classification and make modifications to be consistent with the new ISIC version. The mission therefore assisted with this review.

13. **There are activities which the ISIC, Rev. 5 do not provide sufficient detail.** ISIC is available at a four-digit level of detail. There are activities in Cayman Islands that are sufficiently large which are more granular than a four-digit ISIC. As in ISIC, Rev. 4, additional industries should be created beneath the ISIC four-digit. For example, for the industry 'Urban and Suburban Passenger Land Transport', ISIC 4921, the ESO wish to separately identify the Public School Bus, and Private Bus components. This can be achieved by disaggregating 4921 into 4921_1 and 4921_2, which are industries 'Urban and Suburban Passenger Land Transport – Public Bus', and 'Urban and Suburban Passenger Land Transport – Private Bus', respectively. There are several industries which require this type of disaggregation.

14. **Ensure sufficient detail is specified for any industries with a significant tourism component.** It is necessary to identify tourism industries in the SUT specification. A tourism industry is one which would be significantly reduced in the absence of tourism. For example, for industry 'Other Amusement and Recreation Activities', 9329, it isn't obvious whether this fits the definition of a tourism industry. However, one could decompose this industry into the three separate activities of: 'Diving, Snorkelling and Related Activities', ISIC 9329_1, 'Activities of Night Clubs', ISIC 9329_2, and 'Operations of Beaches & Recreations Parks', ISIC 9329_3. Using knowledge of the economy, ISIC 9329_1 and ISIC 9329_3 have been identified as tourism industries, where ISIC 9329_2 is not. This is one example where further disaggregation is required for TSA compilation.

14. **There are cases where combining ISIC is required.** For example, the ESO does not have separate data on non-life insurance and reinsurance, as the same companies provide these two activities, and the financial statements cannot be decomposed. The insurance industries are therefore specified as 'Life Insurance', ISIC 6511, and 'non-life insurance & Reinsurance', which is ISIC 6512 and 6520 combined.

15. **Attempt to use official ISIC codes and descriptions as much as possible**. The 2015 SUT often used industry descriptions or codes which were not consistent with ISIC. Rev 4. Although there are

cases were a more detailed or regional specific description is desired, aim to be as consistent as possible. Appendix I contains the recommended industry detail, using information from the 2015 SUT, requirements of the TSA, and regional nuances.

Recommended Actions

The ESO should:

- Disaggregate four-digit ISIC codes into more detail where appropriate data exist, and the detail is significant for the Cayman Islands economy.
- Ensure sufficient industry detail is specified to identify tourism industries.
- Combine ISIC codes when detailed data does not exist.
- Use official descriptions and codes as much as possible.
- Use the recommended industry detail in Appendix I as a guide.

Section III. Expanding SUT Product Dimension to Improve Estimation of Transportation Goods

16. The treatment of transportation goods in the SUT would benefit from additional granularity. The 2015 SUT contained two transportation goods: 'Motor Vehicles', and 'Other Transport Equipment'. Neither of these products contained any domestic production, and supply was from imports. The demand for both products were contained in HFCE and GFCF. The method for determining the composition between HFCE and GFCF was to the use HBS to estimate HFCE, and GFCF (and change in inventories (CII)) was the residual.

17. An expansion of the product detail of transportation goods could improve estimation. The HBS may have problems like other surveys and additional data sources and analysis could compliment the HBS. For example, it is unlikely there is any HFCE of 'Tanks and Other Light Armoured Vehicles', HS 8710. If there are any imports of HS 8710, it can safely be allocated to GFCF. When initializing the 2023 SUT, the imports of transportation goods which are exclusively for GFCF, should be allocated there. For products which can contain a HFCE and GFCE component, it is recommended to the use the HBS at the level of detail available. Any excess supply remaining can then be allocated to GFCF (and CII). Table 2 contains a list of transportation goods at a four-digit HS level, and whether they should be completely allocated to GFCF, or a combination of GFCE and HFCE.

Recommended Actions

The ESO should:

- Initialize values of GFCF of 'Motor Vehicles', and 'Other Transport Equipment' using international imports for the specified HS codes as illustrated in Table 2.
- For the four-digit HS codes which contain both GFCF and HFCE, use the HSB to estimate HFCE, and GFCF (and CII) will be the SUT balancing item.

TABLE 2. HFCE and GFCF Presence of Transportation Goods (HS-Four Digit)

HS Code	Description	HFCE	GFCF
8701	Tractors	No	Yes

HS Code	Description	HFCE	GFCF
8702	Vehicles; public transport passenger type	No	Yes
8703	Motor cars and other motor vehicles; principally designed for the transport of persons	Yes	Yes
8704	Vehicles; for the transport of goods	No	Yes
8705	Special purpose motor vehicles; not those for the transport of persons or goods	No	Yes
8706	Chassis; fitted with engines	No	Yes
8707	Bodies; (including cabs) for the motor vehicles	No	Yes
8709	Works trucks, self-propelled, for factories, warehouses etc.	No	Yes
8710	Tanks and other armored fighting vehicles	No	Yes
8711	Motorcycles (including mopeds) and cycles; fitted with an auxiliary motor.	Yes	Yes
8712	Bicycles and other cycles; including delivery tricycles, not motorized	Yes	No
8713	Carriages for disabled persons, whether or not motorized	Yes	Yes
8801	Balloons and dirigibles; gliders, hang gliders	Yes	Yes
8802	Aircraft, spacecraft and suborbital and spacecraft launch vehicles	No	Yes
8804	Parachutes and rotochutes	Yes	Yes
8901	Cruise ships, excursion boats, ferry-boats, cargo ships, barges	No	Yes
8902	Fishing vessels; for processing or preserving fishery products	No	Yes
8903	Yachts and other vessels; for pleasure or sports, rowing boats and canoes	Yes	Yes
8904	Tugs and pusher craft	No	Yes
8905	Other vessels: of which is subsidiary to main function; floating docks, drilling	No	Yes
8906	Vessels; other, including warships and lifeboats, other than rowing boats	No	Yes
8907	Boats, floating structures, other	Yes	Yes
8908	Vessels and other floating structures; for breaking up	No	Yes

Section IV. Estimating Tables of TSA Within SUT

18. The mission presented the fundamentals of estimation of a TSA. The ESO has been interested in developing a TSA. A previous CARTAC mission in February 2023 presented the essential

elements of a TSA. This included definitions, direct versus indirect and induced tourism activity, an explanation of tables one to ten, the main data requirements, and other country experiences. The current mission extended this through providing a presentation on estimation of tables one to six of the TSA within SUT. As CD in TSA is generally beyond the scope of CARTAC activities, the mission focussed on the direct TSA only. The mission made use of Statistics Canada's Manual on the Canadian Tourism Satellite Account [1]. Although this manual presents the Canadian experience, it focuses on direct tourism only, and is consistent with the methods outlined in the International Recommendations for Tourism Statistics Manual 2008 [2] , from the United Nations. Finally, Statistics Canada used their Manual when providing CD to Saint Lucia in the development of their TSA. Appendix II contains the presentation provided to the ESO.

19. **Define the scope of a tourist.** There are two types of tourists. The first is a person who spends one or more nights outside of their usual environment. This is defined as a 'tourist'. The second is a person who spends less than one night outside their environment and defined as an 'excursionist'. Together, these are defined as 'visitors. A TSA therefore is really a Tourism Visitor Account. In practice though, when we use the term 'tourists', we are also including 'excursionists. In Cayman Islands, it is important to include 'excursionists' in the TSA as they would comprise of cruise ship visitors. The purpose of the visit must be for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited. This is broader than the notion of "leisure travel".

20. **Define tourism industries.** A tourism industry is an industry which would operate at significantly reduced levels in the absence of direct tourism. There is no explicit notion of the term 'significant', and National Statistics Offices (NSO) have some degree of flexibility. A restriction is that the tourism activity has to be direct. For example, one may believe that 'Cargo Handling' is a tourist industry. However, it does not meet the requirement of 'direct tourism'. Most of the expenditures on 'Cargo Services' is IC in the Transportation Industries rather than direct purchases by tourists. Only when the indirect and induced impacts of tourism are compiled will 'Cargo Handling' be relevant. The mission assisted the ESO using the 2015 SUT and the compilers knowledge of the economy to determine the tourism industries for the 2023 SUT. Table 3 lists these industries, which are also consistent with ISIC. Rev. 5. It also contains a list of industries that are not part of the TSA but are often mistaken to be.

TABLE 3. Tourism Industries in the 2023 SUT

Industry Code	Description	TSA
4922_1	Taxi	Yes
4922_2	Other passenger land transport	Yes
5011	Sea and coastal passenger water transport	Yes
51	Air transport	Yes
5222	Service activities incidental to water transportation	No
5223	Service activities incidental to air transportation	No

[1] Statistics Canada, Income and Expenditure Accounts Technical Series, Canadian Tourism Satellite Account Handbook, 2007.
[2] United Nations, Department of Economic and Social Affairs, International Recommendations for Tourism Statistics, 2008.

Industry Code	Description	TSA
5224	Cargo handling	No
5229	Other support activities for transportation	No
5510	Hotels and similar accommodation activities	Yes
5520	Other short term accommodation activities	Yes
5590	Other accommodation n.e.c.	No
5610	Restaurants and mobile food service activities	Yes
5621	Event catering activities	No
5629	Other food service activities	No
5630	Beverage serving activities	Yes
7710	Rental and leasing of motor vehicles	Yes
791	Travel agency and tour operator activities	Yes
9121	Museum and collection activities	Yes
9329_1	Diving, Snorkeling and Related Activities	Yes
9329_3	Operations of Beaches & Recreations Parks	Yes
9690_3	Wedding & Social Event Planners	Yes

21. **Ensure the product dimension is sufficiently detailed.** The ESO will wait for the updated CPC before finalizing the 2023 SUT product dimension. The dimension should identify tourism products as much as possible. For example, Air Transport produces both Air Passenger and Air Freight Transport Services. One needs to isolate and estimate Air Passenger Transport Services as much as possible. Table 4 contains the primary products associated with each tourism industry and indicates whether it is a tourism product.

TABLE 4. Tourism Industries, Primary Products, and TSA Products 2023 SUT

Product Description	Industry Description
	Taxi
Taxi Services – TSA	
	Other passenger land transport
Charters and Excursions – TSA	
Limo Services – TSA	
	Sea and coastal passenger water transport

Product Description	Industry Description
Water Passenger Transport – TSA	
	Air transport
Air Passenger Transport – TSA	
Air Freight Transport - Not TSA	
	Hotels and similar accommodation activities
Accommodation services – TSA	
	Other short term accommodation activities
Accommodation services – TSA	
	Restaurants and mobile food service activities
Direct Food and Beverages Services – TSA	
Catering of Food and Beverages - Not TSA	
	Beverage serving activities
Direct Food and Beverages Services – TSA	
	Rental and leasing of motor vehicles
Rental of vehicles – TSA	
	Travel agency and tour operator activities
Travel agencies and tour operators – TSA	
	Museum and collection activities
Museums – TSA	
	Diving, Snorkeling and Related Activities
Diving, Snorkeling and Related Activities – TSA	
	Operations of Beaches & Recreations Parks
Operations of Beaches & Recreations Parks – TSA	
	Wedding & Social Event Planners
Wedding & Social Event Planning – TSA	

22. Estimating domestic tourism supply. For each of the tourism industries, output, IC, and VA must be compiled within the SUT. The sources and methods used are really not different than those currently being utilized in the annual GDP compilation. A potential issue could be the composition of output for tourism industries which have a tourist and non-tourist component. In Table 4, these are Air

Transport, and Restaurants and Mobile Food Service Activities. It is unlikely the ESO will be able to estimate this without additional data sources. Rather, these will be estimated through the product balancing reconciliation.

23. Estimating tourism demand. There are three types of tourism demand, with each corresponding to a specific table in the TSA. Table 1 is inbound tourism demand. These expenditures should be incorporated in the BOP statistics and be recorded as an export in the SUT. An International Travel Survey (ITS) should be conducted which provides the total expenditure and the details which correspond to the TSA products in Table 4. In practice, obtaining total expenditures and a breakdown between Air Transportation Services, Other Transportation Services, Accommodation Services, Food and Beverage Services, Travel and Tour Operators, and Recreational Services is more common. It is the intention of the ESO to conduct this survey to support the TSA and BOP. Whatever the level of detail is in the survey, it will need to be allocated over the TSA products in Table 4 and recorded as an export. Table 2 of the TSA is domestic tourism demand. For simplicity, the ESO will assume this is insignificant, and initialize it at zero. This is the same method being used in the TSA of Saint Lucia. Table 3 is outbound tourism demand. This information is to be contained in the HBS and should be recorded as an import.

24. **Balancing tourism products in 2023 SUT.** The balancing of the tourism products follows the best practices of product balancing in general. Data which are considered relatively high quality are not adjusted in the process. The ESO will need to assess that quality. An added complexity of tourism products is that they have both a tourism and non-tourism component. Consider the product 'Taxi Services' produced by the 'Taxi' industry. Although the ESO has determined that the Taxi industry meets the requirements to be defined as a tourism industry, less than 100 percent of expenditures on Taxi Services are tourism related. It is necessary to determine this composition when producing Tourism Value Added (TSA) by industry. Table 5 illustrates to compilation borrowing from the 2015 SUT.

TABLE 5. Taxi Services from 2015 SUT

SUT Category	(CI$'000)
Domestic Production - Taxi Industry	10025
Imports	742
Taxes less Subsidies	0
Total Supply at Purchaser Prices	10767
Intermediate Consumption	0
Exports	8933
HFCE	1834
Total Demand and at Purchaser Prices	10767
Tourism Expenditure	8933
Commodity Ratio	0.89

25. **Tourism expenditure will rely on export estimates.** The production of taxi services used in the National Accounts Survey, HFCE was determined through the HBS, while international trade made use of BOP. In the balancing process the international trade estimates are generally considered relatively high quality, and any product imbalance could be address with adjustments to output and HFCE (within reason). This highlights the importance of improving BOP with a detailed ITS. From the balanced product we see 89 percent of domestic production is used by tourism activity. Although to be precise, a further decomposition of the exports is required since a small portion of exports are not tourism related (airplane crew, etc.). This commodity ratio can then be used to estimate tourism value added (TVA) for the Taxi Industry as illustrated in Table 6, borrowing from the 2015 SUT.

TABLE 6. Taxi Industry Tourism Value Added from 2015 SUT

	(CI$'000)
Production	10767
Intermediate Consumption	3391
Value Added	6634
Commodity Ratio	0.89
Tourism Value Added	5911

26. **TVA by industry requires commodity ratios.** As illustrated in Table 6, one needs to calculate commodity ratios for each of the tourism products. For tourism industries with production of non-tourism commodities (Air Transportation, Food and Beverage Services), the commodity ratio is only calculated for the tourism component. To compile TVA for these industries, only the proportion of VA associated with the tourism product is used. One can assume (in the absence of other information) that VA to output ratios are the same for tourism and non-tourism products. Table 7 illustrates this compilation for Air Transportation using fictitious data, and a commodity ratio of Passenger Air Transportation of 0.90.

TABLE 7. Air Transportation, Tourism Value Added

	(CI$'000)
Production	15000
Passenger Transportation	10000
Freight Transportation	5000
Intermediate Consumption	10000
Value Added (1)	5000
Proportion of Value Added - Passenger Transportation (2)	0.67
Commodity Ratio - Passenger Transportation (3)	0.90
Tourism Value Added (1 * 2 * 3)	3000

27. **Compiling Tourism GDP.** TVA needs to be compiled for each of the tourism industries using the methods illustrated in Tables 5, 6 and 7. To compile tourism GDP, taxes less subsidies on products for the tourism products needs to be introduced. For each of the tourism products, one needs to compile the taxes less subsidies that are allocated to tourism. In this case, the commodity ratio for each tourism product can be used.

28. **Likely errors were discovered for tourism products in the 2015 SUT.** When demonstrating the compilation of commodity ratios, the mission discovered instances where the exports were greater than the domestic production. This is unlikely in the case of trade in services, as re-exports are not common. Under these cases, the commodity ratio is greater than 1. When balancing the tourism commodities (and service commodities in general), one should investigate the ratio of exports relative to domestic production. Table 8 illustrates this for Water Passenger Transport.

TABLE 8. Water Passenger Transport 2015 SUT

SUT Category	(CI$'000)
Domestic Production	15449
Imports	1238
Taxes less Subsidies	0
Total Supply at Purchaser Prices	16688
Intermediate Consumption	0
Exports	15775
HFCE	912
Total Demand and at Purchaser Prices	16688
Tourism Expenditure	15775
Commodity Ratio	1.02

29. **Further Capacity Development is recommended.** The ESO are motivated to produce a TSA as part of GDP rebasing, including estimates of the indirect and induced effects. It is recommended to seek additional CD, beyond the fundamentals of estimation delivered in this mission.

Recommended Actions

The ESO should:

- Ensure excursionists are included in the TSA and part of the data collection process.
- When identifying tourist industries, use the list in Table 3 as a guide.
- Isolate tourism commodities as much as possible when developing SUT product classification.
- Seek additional data sources such as an ITS to estimate tourism demand.
- Compile commodity ratios as a method to determine Tourism Value Added by Industry.
- Investigate services commodities in the 2015 SUT which contain an export to domestic supply ratio which is greater than one.

Section V. Backcasting Methods

30. Introduce a link year. When the ESO rebase to 2023 the updated estimates will be backcasted to at least the previous base year. In the previous rebasing a fixed ratio backcasting method was used. The 2015 SUT resulted in a level revision to VA by industry, relative to the previously published level. To backcast the series, the previously published growth rates at current and constant prices were maintained. An issue with this approach is that the same weights are imposed on the entire historical series. An introduction of a link year addresses this problem. A link year could be chosen as the mid-year between the previous and updated base year. In this case, the link year could be 2019. From 2020 to 2022 (or the most recent annual publication year) the series is recompiled with updated source data, SUT, methodology, etc. Commencing between 2019 and 2020 the backcasting occurs.

31. Consider introducing variable ratio backcasting for certain industries. Using fixed ratio backcasting is a common practice for the period before the link year. There are instances though when it can be improved. Consider the industry of personal services. The 2015 SUT estimates made use of the HBS at that time to reconcile output estimates of personal services. The resulting output and VA are therefore considered high quality. Between 2015 and 2023 an annual indicator extrapolated VA. This indicator is often population growth. 2023 will feature a new HBS in the SUT, and a level revision to the VA of personal services may occur. The level of VA in both the 2015 and 2023 SUT are most likely a more accurate measure of VA than the one derived using the growth in population. As in fixed ratio backcasting, the 2020 to 2022 will need to be recompiled. However, commencing in 2019, the revised level of VA at current prices is wedged back to 2015 in a manner which emulates the previously published series as much as possible, while producing no revision in 2015. At constant prices, one can use the previously published implicit price deflators (IPD) re-referenced to 2023 to convert from current to constant prices. Appendix III contains the presentation on these methods including the formula for variable ratio backcasting. Table 9 illustrates the methods for a single series.

Recommended Actions

The ESO should:

- Introduce a Link year in the backcasting exercise.
- Consider using variable ratio backcasting for certain industries.

TABLE 9. Demonstration of Backcasting Methods

Industry	2015	2016	2017	2018	2019	2020	2021	2022	2023
					Link Year				
Value Added - Current Prices - Base Year 2015	15449	15681	15994	16474	16804	16804	17224	17741	18628
Value Added - Constant Prices - Base Year 2015	15449	15635	15791	16107	16429	16478	16643	16976	17485
Implicit Price Deflator (2015)	100	100	101	102	102	102	103	105	107
							Recompiled		SUT 2023

Industry	2015	2016	2017	2018	2019	2020	2021	2022	2023
Value Added - Current Prices - Base Year 2023						17594	18137	18578	19559
Value Added - Constant Prices - Base Year 2023						18358	18643	18964	19559
Method 1) Fixed Ratio									
Value Added - Current Prices - Base Year 2023	16176	16418	16747	17249	17594				
Value Added - Constant Prices - Base Year 2023	17212	17418	17592	17944	18303				
% Revision - Current Prices	4.70	4.70	4.70	4.70	4.70	4.70	5.30	4.72	5.00
% Revision - Constant Prices	11.41	11.41	11.41	11.41	11.41	11.41	12.01	11.71	11.86
Method 2) Variable Ratio									
Value Added - Current Prices - Base Year 2023	15449	15826	16291	16935	17433				
Implicit Price Deflator, Re-Referenced to 2023	93.9	94.1	95.1	96.0	96.0				
Value Added - Constant Prices - Base Year 2023	16459	16810	17135	17639	18158				
% Revision - Current Prices	0.00	0.92	1.86	2.80	3.75	4.70	5.30	4.72	5.00
% Revision - Constant Prices	6.53	7.52	8.51	9.51	10.53	11.41	12.01	11.71	11.86

Section VI. Detailed Technical Assessment and Recommendations

TABLE 10: Detailed Technical Assessment

Priority	Action/Milestone	Target Completion Date	Actual completion date
Objective: Strengthen compilation and dissemination of National Production, Income and Expenditure Accounts.			
Outcome: New benchmarks have been developed aligned to international statistical standards and using the latest most comprehensive source data available			

Priority	Action/Milestone	Target Completion Date	Actual completion date
M	Developed and release a new Vintage of Supply and Use Tables	4/30/2026	On-going
M	Update- GDP backcasted results and publish	4/30/2026	On-going
M	Finalize 2023 SUT	10/31/2025	On-going

TABLE 11: Summary of Recommendations

Priority	Recommendation	Target Completion Date
H	Update the industry dimension in the SUT to reflect ISIC, Rev.5, especially for Accommodation Services.	October 2024
H	Expand the product dimension of the SUT to improve estimation of GFCF, HFCE and IC of transportation products.	January 2025
H	Investigate product dimension of BOP statistics and collect information on the level and product composition of travel expenditures for the updated benchmark year.	January 2025
M	Disaggregate four-digit ISIC codes into more detail where appropriate data exist, and the detail is significant for the Cayman Islands economy.	October 2024
H	Ensure sufficient industry detail is specified to identify tourism industries.	October 2024
M	Combine ISIC codes when detailed data does not exist.	October 2024
M	Use official descriptions and codes as much as possible.	October 2024
H	Use the recommended industry detail in Appendix I as a guide.	October 2024
H	Initialize values of GFCF of 'Motor Vehicles', and 'Other Transport Equipment' using international imports for the specified HS codes as illustrated in Table 2.	January 2025
H	For the four-digit HS codes which contain both GFCF and HFCE, use the HSB to estimate HFCE, and GFCF (and CII) will be the SUT balancing item.	January 2025
H	Ensure excursionists are included in the TSA and part of the data collection process.	January 2025
H	When identifying tourist industries, use the list in Table 3 as a guide.	January 2025
H	Isolate tourism commodities as much as possible when developing SUT product classification.	January 2025
H	Seek additional data sources such as an ITS to estimate tourism demand.	October 2024
H	Compile commodity ratios as a method to determine Tourism Value Added by Industry.	July 2025
H	Investigate services commodities in the 2015 SUT which contain an export to domestic supply ratio which is greater than one.	July 2025

Priority	Recommendation	Target Completion Date
H	Introduce a Link year in the backcasting exercise.	January 2026
H	Consider using variable ratio backcasting for certain industries.	January 2026

Section VII. List of Officials Met During the Mission

Name	Institution
Mr. Christian Selburn	Economics and Statistics Office
Mr. Adolphus Ladlow	Economics and Statistics Office
Mr. Henry Rolston	Economics and Statistics Office

Appendix 1 Recommended Industry Detail for 2023 SUT

ISIC Code	Title
0113	Growing of vegetables and melons, roots, and tubers
0119	Growing of other non-perennial crops
014	Animal production
031	Fishing
B	Mining and quarrying
1010	Processing and preserving of meat
1071	Manufacture of bakery products
1103	Manufacture of beer
1105	Manufacture of soft drinks; production of mineral waters and other bottled waters
1400	Manufacture of wearing apparel
22	Manufacture of rubber and plastic products
2395	Manufacture of articles of concrete, cement, and plaster
2399	Manufacture of other non-metallic mineral products n.e.c.
310	Manufacture of furniture
32	Other manufacturing
33	Repair, maintenance and installation of machinery and equipment
35	Electricity, gas, steam, and air conditioning supply
3600	Water collection, treatment, and supply
3700 & 3800	Sewerage, Waste collection, treatment and disposal, and recovery activities
4100	Construction of residential and non-residential buildings
421	Construction of roads and railways
4220 & 4290	Construction of utility projects and Construction of other civil engineering projects
43	Specialized construction activities
G	Wholesale and retail trade
4921_1	Urban and suburban passenger land transport - Public Bus Services

ISIC Code	Title
4921_2	Urban and suburban passenger land transport - School Bus Services
4922_1	Taxi
4922_2	Other passenger land transport
4923	Freight transport by road
5011	Sea and coastal passenger water transport
5012	Sea and coastal freight water transport
51	Air transport
5222	Service activities incidental to water transportation
5223	Service activities incidental to air transportation
5224	Cargo handling
5229	Other support activities for transportation
5310	Postal activities
532	Courier activities
5510	Hotels and similar accommodation activities
5520	Other short term accommodation activities
5590	Other accommodation n.e.c.
5610	Restaurants and mobile food service activities
5621	Event catering activities
5629	Other food service activities
5630	Beverage serving activities
581	Publishing of books, newspapers, periodicals, and other publishing activities
59	Motion picture, video, and television programme production
60	Programming, broadcasting, news agency and other content distribution activities
61	Telecommunications
62	Computer programming, consultancy, and related activities
6411	Central banking
6419_1	Commercial Retail/Non-Retail Banks

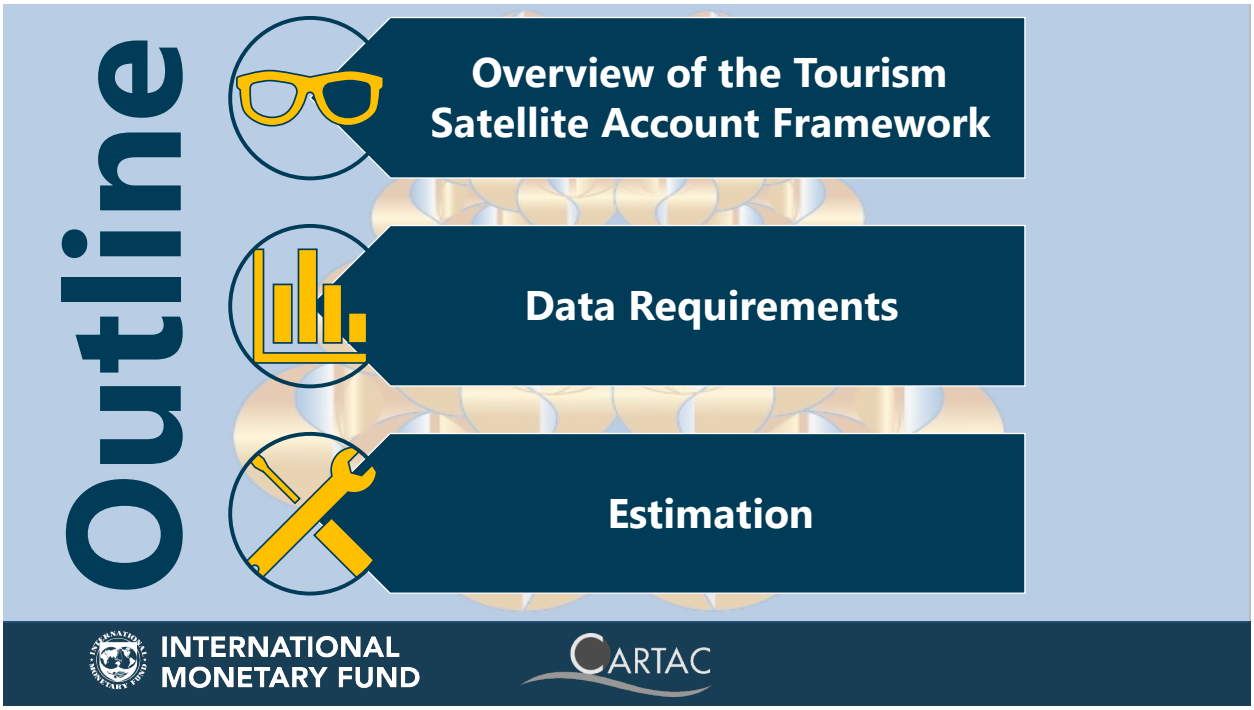
ISIC Code	Title
6419_2	Class B banks with physical presence
6419_3	Class B banks without physical presence
6419_4	Building Societies
6419_5	Credit Unions
6419_6	Remittance services
643	Activities of trusts, funds, and similar financial entities
6495_1	Other credit granting activities - Development Bank
6495_2	Other credit granting activities – Institutions
6511	Life insurance
6512 & 6520	Non-life insurance & Reinsurance
6530	Pension funding
6611	Administration of financial markets
6612	Security and commodity contracts brokerage
6619	Other activities auxiliary to financial service activities, except insurance and pension funding
6622	Activities of insurance agents and brokers
6629	Other activities auxiliary to insurance and pension funding
6630	Fund management activities
6810_1	Renting of dwellings
6810_2	Owner- occupied dwellings
6810_3	Renting of commercial property
6829	Other real estate activities on a fee or contract basis
6910	Legal activities
6920	Accounting, bookkeeping, and auditing activities; tax consultancy
7020	Business and other management consultancy activities
7110	Architectural and engineering, and related technical consultancy activities
7310	Advertising activities

ISIC Code	Title
7410	Specialized design activities
7420	Photographic activities
7500	Veterinary activities
7710	Rental and leasing of motor vehicles
772	Rental and leasing of personal and household goods
7730	Rental and leasing of other machinery, equipment, and tangible goods
7810	Activities of employment placement agencies
791	Travel agency and tour operator activities
80	Investigation and security activities
812	Cleaning activities
8130	Landscape service activities
8210	Office administrative and support activities
8411	General public administration activities
8412	Regulation of the activities of providing health care, education, and other social services
8421	Foreign affairs
8422	Defense activities
8423_1	Public order and safety activities – Police
8423_2	Public order and safety activities – Fire
8510	Pre-primary education
8520_1	Primary education – Public
8520_2	Primary education – Private
8531_1	Public secondary schools
8531_2	Private secondary schools
8531_3	Public special education
8532	Vocational secondary education
8540_1	Tertiary education – Public
8540_2	Tertiary education – Private

ISIC Code	Title
855	Other education
8610_1	Hospital activities – Public
8610_2	Hospital activities – Private
8620	Medical and dental practice activities
8710	Residential nursing care activities
8720	Residential care activities for persons living with a mental illness or substance abuse
879	Other residential care activities
88	Social work activities without accommodation
90	Arts creation and performing arts activities
911	Library and archive activities
9121	Museum and collection activities
9122	Historical site and monument activities
9141	Botanical and zoological garden activities
9142	Nature reserve activities
9200	Gambling and betting activities
9311	Operation of sports facilities
9312	Activities of sports clubs
9329_1	Diving, Snorkeling and Related Activities
9329_2	Activities of Night Clubs
9329_3	Operations of Beaches & Recreations Parks
9411	Activities of business and employers' membership organizations
9412	Activities of professional membership organizations
9491	Activities of religious organizations
9499	Activities of other membership organizations n.e.c.
95	Repair and maintenance of computers, personal and household goods, and motor vehicles
9610	Washing and cleaning of textile and fur products
962	Hairdressing, beauty treatment, day spa and similar activities

ISIC Code	Title
9630	Funeral and related activities
9690_1	Spas, Massage & Tattoo Parlours, etc.
9690_2	Pet Care Service Activities
9690_3	Wedding & Social Event Planners
9690_4	Other Service Activities
U	Activities of households as employers

Appendix II: Presentation to ESO on TSA



Tourism Satellite Account Framework

- The Tourism Satellite Account (TSA) is a statistical framework used to measure the economic significance of tourism and its contribution to a country's economy
- Developed by the UN World Tourism Organization (UNWTO) and the Organisation for Economic Co-operation and Development (OECD) to provide a standardized method for measuring the size and structure of the tourism industry
- The TSA uses the principles of the System of National Accounts (SNA) and is based on a set of definitions, classifications, and accounting rules agreed upon by international organizations

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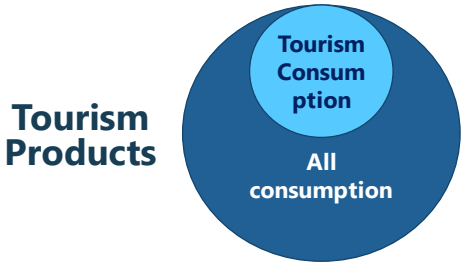
The Challenge of Measuring Tourism

- Most economic activities are easily identifiable in national accounts
- However, tourism is not explicitly defined and is spread across many sectors
- The TSA uses the national accounts framework to attempt to measure economic activity (travel and tourism) according to these subsets:



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Types of Tourism in the TSA

Domestic	Inbound	Outbound
• Residents tourist activities within country of reference	• Non-resident tourist activities within the country of reference	• Residents tourist activities outside country of reference

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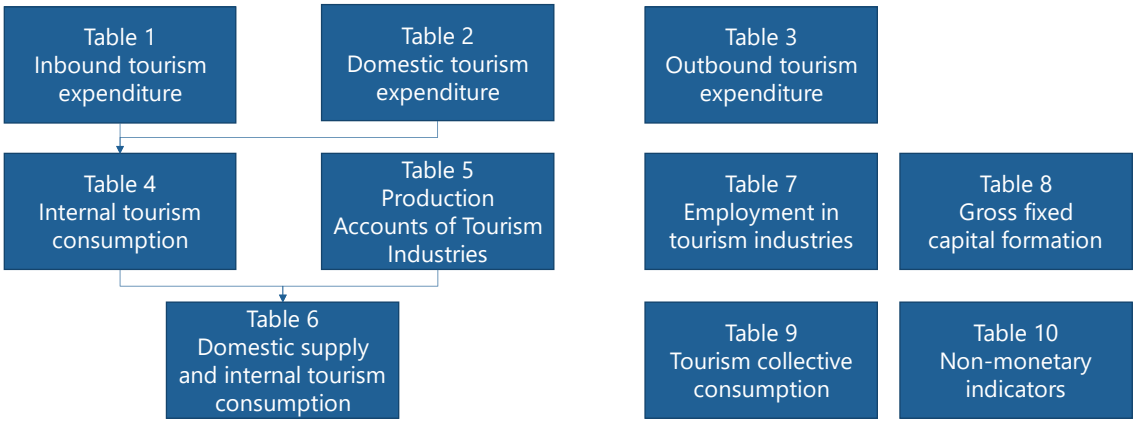
Tourism Satellite Account Main Tables



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Coverage of Tables

No	Title	Description
1	Inbound tourism expenditure	Categories of tourism expenditure observable from visitors. Tourism expenditure is a basic variable of tourism statistics that derives from procedures outlined in International Recommendations for Tourism Statistics 2008
2	Domestic tourism expenditure	
3	Outbound tourism expenditure	
4	Internal tourism consumption	Sums domestic and inbound tourism expenditure (T1&2) plus additional components are not easily attributable to the different forms of tourism (vacation accommodation on own account, tourism social transfers in kind and other imputed consumption). Key aggregate is internal tourism consumption (use).
5	Production accounts of tourism industries	The supply table focusing on tourism characteristic products and tourism industries. Similar to production accounts in the national accounts, although classifications and reservation service providers recorded differently.

INTERNATIONAL MONETARY FUND CARTAC

Coverage of Tables

No	Title	Description
6	Domestic supply and internal tourism consumption	The overall reconciliation of internal tourism consumption with domestic supply. This table is the core of the TSA: without its compilation, even with partial data, the term TSA applied to the compilation of some of the tables would be misleading. Key aggregates: Tourism direct gross value added (TDGVA) and tourism direct gross domestic product (TDGDP)
7	Employment in tourism industries	Employment in the tourism industries. Useful due to the strategic importance of tourism in the development of an employment policy.
8	Tourism Gross fixed capital formation	Focusses on GFCF by tourism industries. *Considered lower priority*
9	Tourism collective consumption	Identify tourism expenditure on collective consumption *Considered lower priority*
10	Non-monetary indicators	Used to support the analysis of the other tables

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Non-Monetary Indicators

The indicators include

- number of trips by forms of tourism
- classes of visitors
- duration of the stay
- physical indicators regarding types of accommodation
- modes of transport used by non-resident visitors travelling to the economic territory of the country of reference
- number and size of the establishments belonging to tourism industries

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Data Requirements

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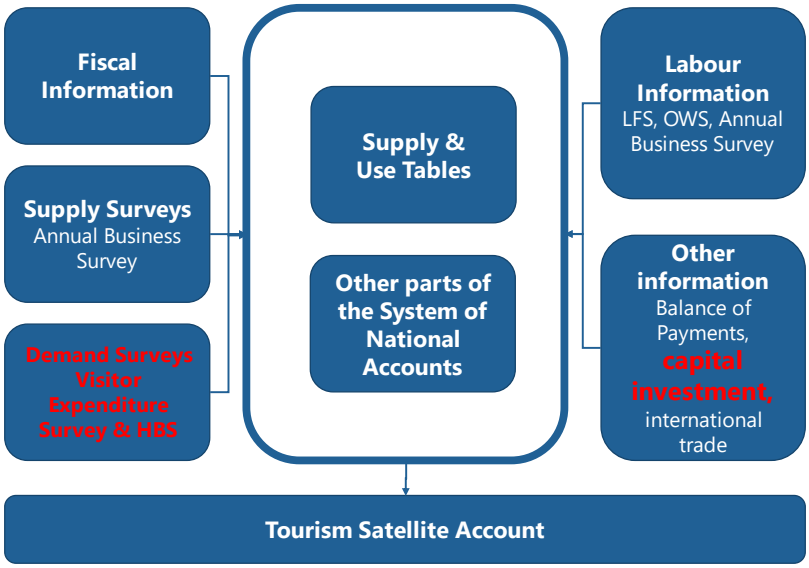
Summary of Data Sources



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Supply and Use Tables

- These tables show the **direct** impact of tourism on the economy by tracking the flow of goods and services between different industries and final demand (consumption and investment)
  - In theory, if SUT is sufficiently specified, Tables 1, 2, 3, 4, 5, 6, 8 and 9 can be compiled
  - Table 7 and 10 are normally outside of SUT scope
  - In practice, they are often 'partially' estimated, then, further 'refined' out of SUT compilation.

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Balance of Payments Tables

- These tables provide information on the contribution of tourism to the balance of payments, including exports and imports of tourism goods and services, such as:
  - accommodation services
  - food and beverage services
  - transportation services

INTERNATIONAL MONETARY FUND CARTAC

Tourism Demand Tables

- These tables provide information on:
  - the number of tourists
  - **the amount of money spent by tourists**
    - **Product composition**
  - purpose of their visit
  - Tables 1, 2 and 4.

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Challenges in identifying Tourism

- If you identify ONLY the output of industries that are typically associated with tourism activities (ex: hotels, air/water/rail transport)
- Leads to UNDERESTATEMENT
  - Buying groceries at a supermarket
- If you capture ALL the expenditures on "Eating and Drinking Places" "SHOPPING" for tourism economic activities
- Leads to OVERSTATEMENT

INTERNATIONAL MONETARY FUND CARTAC

Definitions

- **Tourism:** the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited.
- Broader than the notion of “leisure travel". It includes travel for business, leisure and other personal reasons, such as visiting friends and relatives, religious purposes, or medical treatment.
- **Usual environment** relates to the place where the individual lives and works or studies and includes any other places frequented.
- This notion is not precisely defined in the international standard, thereby allowing a country to apply the tourism concept to its own specifications.
- Canada has defined the concept of “outside the usual environment” as greater than 80 kilometers one way from home.
- Cayman Islands?

INTERNATIONAL MONETARY FUND CARTAC

Definitions

- **Tourist:** persons travelling outside their usual environment, who spend one or more nights in the place visited.
- **Same-day visitors (excursionists)** on the other hand are described as those who do
- not spend any nights at the place visited.
- Visitors = Tourists + Excursionists
- **Tourism Commodity** : Is a good or service for which a significant part of its total demand comes from visitors (What constitutes “a significant part” is not precisely defined, however, this is more or less in the range of 15%).
  - air passenger transportation = tourism commodity
  - groceries in a supermarket = not a tourism commodity (in most countries), but amount purchased by visitors IS part of TSA.
- **International Definitions**
- **Tourism characteristic products** are those which “in the
- absence of visitors, in most countries would probably cease to exist in meaningful quantity
- **Tourism-connected products**, which are products that may be important in given
- countries but are not specified among the commodities listed for international comparison.
- **Non-Tourism products** are those which “in the absence of visitors, would still exist at nearly full amounts, but some purchases by tourist”.

INTERNATIONAL MONETARY FUND CARTAC

Tourism Demand

- **Tourism demand** is defined as total spending by visitors (tourists and excursionists) on domestically produced commodities, REGARDLESS (theory) of whether or not the commodity is a designated 'tourist' commodity – Tables 1, 2 and 4. Focus on large commodities (transportation, accommodation, recreation).
- Has to be directly consumed by the tourist. If an ocean liner stops at a port to purchase fuel, this spending would not be included (Be careful of Balance of Payments).
- Can be split into several components including domestic demand, international demand.
- **Tourism domestic demand** includes the expenditures associated with tourism activity in
- country by its residents – Table 2
- **International demand** consists of the expenditures by non-residents – Table 1.

Tourism Industries

- An **industry** is defined as a group of establishments that engages in the same or a similar kind of economic activity.
- However, tourism is not an industry in this sense. Rather, tourism cuts across industries.
- In the TSA, a **tourism industry** is an industry which as a direct result of the absence of tourism would cease or continue to exist only at 'significantly reduced levels of activity'. Some industries may be affected by the absence of tourism but not directly.
- Compiling a list of tourism industries is straightforward.

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Tourism Domestic Supply

- Tourism domestic supply is the total production (or gross output) of tourism commodities.
- It excludes production of secondary output on tourism industries.
- Several of the outputs (retailing margins, royalties and license fees, non -residential rent, and rental, other
- machinery and equipment) are considered non-tourism commodities because tourism is not a significant source of their demand. These are put aside as well in order that only tourism commodities remain in the calculation of tourism domestic supply. **More generally, only the tourism commodities produced by the tourism industries are retained in calculations relating to tourism domestic supply.**

INTERNATIONAL MONETARY FUND CARTAC

Tourism Demand

- Three types of demand.
- **1) International Demand – Table 1.**
- Ideally, would have 'International Travel Survey', which is usually collected at airport departures.
- Detailed expenditure questions are asked;
- Hotels, Taxi, vehicle rental, charters and excursions, accommodations, restaurants, travel agencies, Creative arts & entertainment, Museum Activities, Preservation of Historical Sites, Monuments, Botanical and Zoological Gardens, Nature Reserves Activities, Diving, Snorkeling and Related Activities, Operations of Beaches & Recreations Parks, Gambling and betting activities
- Unlikely to obtain this information, so, in practice, will settle for expenditures on Hotels, Transportation, charters and excursions, restaurants, travel agencies, Recreation and Entertainment.

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Tourism Demand

- Cayman Islands
- Visitor exit survey
- Most likely excludes air travel
- Do we have more detail?

Visitor Expenditure 2016-2019				
	2016	**2017**	**2018**	**2019**
Stay over visitors				
Average length of stay (nights)	6.27	6.30	6.20	6.09
Average group size	2.39	2.38	2.35	2.39
Expenditure per person per night (CI$)	178.14	188.79	197.40	201.70
Estimated Total Spending (CI$M)	**430.5**	**497.6**	**566.7**	**617.6**
Cruise ship visitors*				
Daily expenditure (CI$)	97.33	98.78	96.30	94.90
Actual Arrivals (000's)	1,712	1,728	1,921	1,831
Estimated Number of landed visitors (000's)	1,541	1,556	1,729	1,648
Estimated total spending (CI$M)	**149.9**	**154.0**	**166.5**	**156.4**
All visitors (CI$M)	**580.4**	**651.6**	**733.2**	**774.0**
Source: Cayman Islands Department of Tourism, Visitor Exit Survey				
Expenditure estimates for 2020-2022 are not yet available				

INTERNATIONAL MONETARY FUND CARTAC

Tourism Demand

- Balance of Payments.
- Travel comprises earnings from visitors for both business and personal purposes

	2,018	2,019	2020R	2021P
Transport	84,375	92,396	46,864	47,668
Sea transport	28,567	28,495	16,979	12,669
Freight	-	-	-	-
Other2	28,567	28,495	16,979	12,669
Air transport	50,133	58,160	24,428	26,848
Passenger	25,771	29,697	2,769	5,480
Freight	307	611	248	386
Other	24,055	27,852	21,410	20,981
Postal and courier services	5,674	5,741	5,457	8,151
	2,018	2,019	2020R	2021P
Travel	726,149	765,697	208,997	32,568
Total (Travel plus Air)	751,919	795,394	211,767	38,048

- Any other data?
- A one-time, benchmark, Detailed (accommodation, transportation, meals, recreation) International Travel Survey is suggested, otherwise……..
- Mirror statistics

INTERNATIONAL MONETARY FUND CARTAC

Tourism Demand

- Three types of demand.
- **1) Domestic Demand – Table 2.**
- Ideally, would have a 'Cayman Island Travel Survey', which could be part of HBS.
- No indication from 2015 HBS of that information.
- Is it assumed this is statistically insignificant?
- Assuming insignificance significantly simplifies the process BUT will underestimate total GDP for tourism.

- Three types of demand.
- **1) External Demand – Table 3.**
- From previous HBS:
- 'Estimation of residents' travel expenses as input for the current account of the Balance of Payments (BOP).'

How to distribute over tourism commodities?
In absence of a one -time benchmark survey…..

	2,018	2,019	2020R	2021P
Transport	142,704	154,247	103,570	139,933
Sea transport	54,270	59,804	55,982	87,862
Freight	54,270	59,804	55,982	87,862
Other2	-	-	-	-
Air transport	82,223	88,182	41,317	45,184
Passenger	58,298	59,593	11,655	11,739
Freight	8,602	8,706	19,471	25,330
Other	15,323	19,884	10,191	8,116
Postal and courier services	2,410	2,391	2,353	2,785
	2,018	2,019	2020R	2021P
Travel	178,430	189,462	122,637	117,646
Total (Travel plus Air)	236,728	249,054	134,292	129,384

Appendix III: Presentation on Backcasting

Backcasting Methods

- Fixed ratio splicing;
  - "Proportional approach" in which conversion coefficients are compiled at the most detailed possible level of aggregates using the common year data of these variables.
  - These coefficients are then applied on the old series (both at current and constant prices) to form a time series that is consistent with the new series.
  - This method is equivalent to applying the growth rate of the old time series to the revised levels of the new series, for each variable being backcast.

1

Backcasting Methods

- Steps.
- 1) Identify the detailed levels of activities, products and aggregates that would be covered in the fixed ratio splicing exercise.
- 2) Prepare concordance tables based on conversion coefficients for each detailed level identified for backcasting.
  - The conversion coefficient is calculated as new series value in the base year (which is also the common year between the two series) divided by the old series value.
  - The current and constant price values are same for the base year. Therefore, same data are used for compiling coefficients separately for backcasting current and constant price values in the old series.
  - For improving the quality of the conversion coefficients it is recommended to extend the period of double coding, for instance by another year, in order to give the new classification time to settle down, and to have the coefficients calculated on the basis of data which has already undergone some corrections.

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Backcasting Methods

- When to apply fixed ratio splicing.
  - 1) It has been determined that recompilation is not possible or not defendable.
  - 2) It is believed that the difference in aggregates computed in the SUT apply **in equal magnitude** to all years in past and previously published growth rates remain correct.
    - EX; 2013 base year estimates used a SUT and a survey of **large** wholesale/retailer businesses to estimate value added for distributive trade.
    - VA was subsequently extrapolated using GST/VAT.
    - 2017 base year estimates used a SUT and an economic census. SUT gave a VA estimate of 10% higher than previously published.
    - 2013 series most likely underestimated VA in **all** years at roughly the same magnitude due to poorer coverage.
    - Fixed ratio splicing is appropriate.
    - VAT/GST was still a reliable indicator of growth.

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Backcasting Methods

- Variable ratio splicing (wedging);
  - Use when recompilation is not possible AND, no conceptual reason to believe old base year level was incorrect.
  - The new level in the new base year is tapered/wedged back through time so that at some point (usually the previous year) the values are identical.
  - Technically more advanced than fixed ratio splicing.
  - An infinite number of methods to taper/wedge (will present the most common method).
  - Yet, a defendable backcasting exercise will almost always contain some series with variable ratio splicing (you need to know how to implement it).

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Variable ratio splicing

- instead of a fixed factor (as in historical series indicator), factor starts at one and move towards the factor at splice point

	2006	2007	2008	2009	2010	2011	2012
Output of economic activity 1 - New (2010 -12)					110	123	138
Output of economic activity 1 - Old	60	75	85	94	105	117	134
GR of Output of economic activity 1 - Old		25.0	13.3	10.6	11.7	11.4	14.5
Factor	1	1.0119	1.0238	1.0357	1.0476		
Output of economic activity 1 - New (2006 -12)	60	75.9	87.0	97.4	110	123	138
GR of Output of economic activity 1 - New (2006 -12)		26.5	14.7	11.9	13.0	11.8	12.2

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Backcasting Methods

- Variable ratio splicing - technicalities;
- Most common method;
- Wedge the new base year level back to the old base year so that the values are identical.

	2013	2014	2015	2016	2017
Old Base	12000	13000	13500	13300	14000
New Base from SUT	12000	X	Y	Z	15000

Need to derive values for X, Y and Z.

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Backcasting Methods

- Standard Formula;
- Step 1) Derive Annual Adjustment (AA) - Fixed.
  - AA = (New Base value/Old Base Value) ^ (1/(Number of years -1))
- Step 2) Derive Adjustment Factor (AF)– Variable for each year.
  - AF = (AA) ^ (Number of years since old base year)
- Step 3) Derive Adjustment Factor (AF)– Variable for each year.
  - New Value = Old Value * AF

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Backcasting Methods

	2013	2014	2015	2016	2017
Old Base	12000	13000	13500	13300	14000
New Base from SUT	12000	X	Y	Z	15000

- AA = (New Base value/Old Base Value) ^ (1/(Number of years -1))
- = (15,000/14,000) ^ (1/4) = 1.0174
- AF = (AA) ^ (Number of years since old base year)
- AF(2013)=1.0174^0=1, AF(2014)=1.0174^1=1.0174
- AF(2015)=1.0174^2=1.0351, AF(2016)=1.0174^3=1.0531
- AF(2017)=1.0174^4=1.0714
- New Value (NV)= Old Value * AF
- NV2013=12000*1=12000, NV2014=13000*1.0174=13226
- NV2015=13500*1.0351=13974, NV2016=13300*1.0531=14006
- NV2017=14000*1.0714=15000

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Backcasting Methods

	2013	2014	2015	2016	2017
Old Base	12000	13000	13500	13300	14000
Growth		8.3	3.8	-1.5	5.3
New Base	12000	13226	13974	14006	15000
Growth		10.2	5.7	0.2	7.1

- Major implication of this method;
  - Most revision tend to be positive.
  - Therefore, this method normally produces higher backcasted growth rates.

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