

Belize System of National Accounts

Rebasing to reference year 2014: Results

Economic Statistics, Statistical Institute of Belize

December, 2020

Table of Contents

Acknowledgment2
Introduction
Supply and Use Tables
Belize Supply and Use 20146
The Dimensions
The Supply Side7
The Use Side7
Table 1: Condensed Supply Table (SUT 2014, in Millions of Belize Dollars)
Table 2: Condensed Use Table (SUT 2014, in millions of Belize Dollars)1
Results of the Supply and Use 20140
SUT Industry Main Highlights of Change1
Rebasing and Chain-linking4
Overview
Rebasing5
Chain linking7
Results of Rebasing and Chain Linking Exercise
Driaf Undated Draduction Cast Structure
Bher Opdated Production Cost Structure
Change in the Structure of the Rebased GDP
Change in the Structure of the Rebased GDP
Change in the Structure of the Rebased GDP
Change in the Structure of the Rebased GDP
Change in the Structure of the Rebased GDP
Change in the Structure of the Rebased GDP

Acknowledgment

The rebasing of the national accounts to reference year 2014 would not have been possible without the participation of several persons and institutions. The Statistical Institute of Belize wishes to acknowledge the contribution of government ministries, departments and agencies, the business community, non-profit institutions, public corporations, and individuals, in the provision of the necessary data, to facilitate the completion of this activity. Their continued cooperation to the SIB will continue to be critical in the production of reliable socio-economic indicators.

The SIB extends its gratitude to the Statistics Canada (StatsCan), for endorsing and supporting the SIB from 2016 to present, through its Project for the Regional Advancement of Statistics in the Caribbean (PRASC). Our deepest appreciation goes to Mr. Dave Styles (Statcan), Mrs. Nathalie Thakekk (Statcan) and Claudio Perez (Statcan) and others at Statistics Canada who helped from the onset of the project.

Additionally, the SIB would like to recognize the International Monetary Fund (IMF) and the Caribbean Regional Technical Assistance Centre (CARTAC) for the technical assistance obtained through the help of Mr. Zia Abbasi (IMF-CARTAC) and Mr. Robin Youll (IMF-CARTAC) who dedicated their time and effort in order to complete this project.

These acknowledgements underscore the fact that this major exercise was truly a combination of local, regional and international effort by our partners which are among the most renowned regional and international agencies in the field of statistics.

Finally, we would want to extend our sincere thanks and commendation to the National Accounts Team lead by Mr. Jefte Ochaeta at the Economic Statistics Unit for their relentless effort and commitment in bringing this project to a scheduled completion.

Introduction

The Belize System of National Accounts(BSNA) is guided by the recommendations presented through the System of National Accounts (SNA) which is prepared by the United Nations Statistical Department in collaboration with the International Monetary Fund (IMF), World Bank Group (WB), and the Organization for Economic Co-operation and Development (OECD).

What is the System of National Accounts (SNA)?

In brief, it is a standard set of international-agreed recommendations on how to compile measures of economic activity in accordance with strict conventions based on economic principles. These recommendations are expressed in terms of a series of concepts, definitions, classifications and accounting rules that comprise the standard for measuring such items as Gross Domestic Product (GDP), the most frequently quoted indicator of economic performance. The National Accounts are an essential tool for planning and policy making, monitoring the economy, and for international comparisons.

The SNA is important for the following reasons:

- a. It provides data needed for international credit rating agencies to assess the Belize economy and provide rating scores, which then enables borrowing on the international financial market by both government and the private sector.
- b. It provides economic data that are used in the borrowing documents so that financial institutions can assess the credit worthiness of borrowers, as well as determining interest rates at which loans can be accessed.
- c. The statistics generated by the SNA are used by both government and the private sector in business planning and policy formulation and evaluation. It provides information on the size of the domestic economy, the relative contribution of the various industries to GDP, and the performance of the industries.
- d. It assists international and regional institutions, such as the Caribbean Development Bank, Inter-American Development Bank, International Monetary Fund, and the World Bank with their surveillance and formulation of advice to the Government.
- e. It enables international and regional comparisons, for example, by the CARICOM Secretariat, of Belize's GDP with other countries.
- f. It is also used by risk management agencies such Caribbean Disaster Emergency Management Agency (CDEMA) to assess the effect of disasters and thereby the level of funding if and when needed.

As a key objective of the SNA is to guide a comparable measure of the economy, its recommendations, methodologies and classifications all get updated from time to time. With the latest iteration of such development being the SNA 2008, which is an update to the SNA 1993. Some of the key updates to the system are:

- a. Research and development and weapon systems are now treated as capital investment rather than as intermediate input.
- b. Updated methods for calculating Financial Intermediation Services Indirectly Measured (FISIM) and its partial allocation between GDP by economic activity and GDP by expenditure.

Along with these changes it is also internationally recommended that the national accounts be restructured every five years to keep in line with the evolution of price changes in an economy.

The Belize System of National Accounts, base 2000, was prepared and compiled in accordance to the recommendations and classifications pointed out in the SNA 1993. Thus, to strengthen the economic measure for Belize, the Statistical Institute of Belize, guided by recommendations of main users, identified that the current BSNA 2000 suffered from a number of shortcomings that needed to be addressed urgently. Some factors that required urgent attention were:

- a. The transition from SNA 1993 to SNA 2008; which would entail improvement to methodology and industrial classification.
- b. Updating the structure of the economy to a more recent year, as the base year 2000 structure of the economy is not representative of the Belize Economy, more than 20 years later.
- c. Addition of 'new' industries that were not considered in the Belize economy structure based in the year 2000, but which existed prior to 2000 and continue to exist in the Belizean economy to present.
- d. Inclusion of newer industries that emerged in the Belize Economy post 2000's.

A strategic decision was made, as early as 2015, to make the upgrading of National Accounts one of the cornerstones of the SIB's institutional modernization initiative. Following this, the SIB engaged in several preparatory activities that would lead to the upgrading of the Belize System of National Accounts. Some of the key preparatory activities included:

- a. Business Establishment Survey 2016
- b. Stake holder and industry profiling
- c. Agreements with several Administrative Data providers
- d. Development of the first Supply and Use table for Belize

From 2016 onwards the SIB has been accomplishing each of the key activities needed to update the National Accounts Estimates. The updating and strengthening of the Economic measures will now align itself to reflect:

- a. An appropriate Economic Structure for the country of Belize, moving the structure from 2000 to 2014.
- b. New constant price estimates and growth rates using base year 2014 prices.
- c. Relevant conceptual changes to better align with the 2008 SNA.
- d. Conversion to the new industrial classification: International Standard Industrial Classification of all Economic Activities (ISIC Rev 4).
- e. Improved methods of estimation and the incorporation of new, revised, and more relevant source data.

f. Revised price deflators and volume indicators.

Supply and Use Tables

Supply and use tables are macroeconomic statistics depicting the structure of an economy by adding a product dimension to traditional macroeconomic aggregates such as international exports or market output. The tables show where products originate in terms of domestic production or international imports, and the ultimate destination of these goods or services as intermediate consumption by industry or by final users of the good or service.

The tables are "a powerful tool with which to compare and contrast data from various sources and improve the coherence of the economic information system. They permit an analysis of markets and industries and allow productivity to be studied at this level of disaggregation."¹

A stylized version of a supply and use table (SUT) is shown below. Product supply and use are shown across the rows, industry and final uses are shown reading down columns.

	Industry	Industry	Industry	International	Margins	Total supply at
	Α	В	С	imports		purchasers prices
Product A	10			300	50	360
Product B		100	10	200	50	360
Product C			200	200	100	500
Total						
Products	10	100	210	700	200	1220

The Supply Table

The Use Table

	Industr	Industr	Industr	Household	Gross	Internation	Total use
	у А	у В	уC	final	fixed	al exports	at
				consumptio	capital		purchaser
				n	formatio		s prices
				expenditure	n		
Product A	2	10	20	323		5	360
Product B	2	50	20	100	88	100	360
Product C	2	20	100	378			500
Total Products	6	80	140	801	88	105	1220
Value Added	4	20	70				94

¹ SNA 2008 p271

Compensation					
of employees	3	5	50		58
Gross					
operating					
surplus	1	15	20		36

Note how the total supply for a product is equal to its total use – this is one of the key identities guiding the compilation of the tables. For example, the total supply of Product A is 360, and the total use is also 360.

Totals across products (i.e. the sum of the columns) for *industries* represent outputs (reading the supply table) and intermediate consumption (reading the use table). These concepts are of critical importance in understanding the methodologies involved in constructing the industry estimates. The difference between total outputs and total intermediate consumption is industry value added, or gross domestic product at basic prices.

Supply and use tables dramatically expand the type of analysis researchers can undertake. For example, we now have estimates for the ratio of Product A to total output, or the fact that Industry C has multiple products, or what is the ratio of exports to total supply for Product B, or what are the primary goods and services used to produce the output in Industry B or what is the ratio of labour inputs to outputs in Industry A, and so on. In short, a wealth of critical macroeconomic relationships can now be seen by researchers and policy makers alike.

Of equal importance is the rigor that these relationships enforce on the global macroeconomic estimates. By comparing all this information, a national accountant can be assured of the quality and accuracy of the macroeconomic aggregate. In other words, the coherence and accuracy of the statistical system is improved through the compilation of the SUT.

Belize Supply and Use 2014

The Dimensions

The Belize 2014 SUT comprises of 78 industrial activities, which were identified as key economic activities in the domestic production of the country, following the ISIC rev 4. Utilizing the ISIC Rev 4 classification allowed us to aggregate these industrial activities of the SUT into the main industry grouping as indicated in the ISIC. As it relates to the product classification, the SUT follows the Central Product Classification (CPC), which enabled the identification of a possible 204 different products and services, either produced or consumed in the Belizean economy. Thus, the SUT comprises of two matrices of dimension 78 by 204, which are the Supply and Use, respectively. Additionally, extra columns are added to each specific matrices for valuation and balancing purposes. For instance, in the Supply table we need to include not only the domestic supply but also the international supply of goods and services (imports) and the margins associated with the production of the supply of the goods and

services (that is, trade margins, transport margins, taxes and subsidies). On the use side, apart from the intermediate consumption by industries, the inclusion of final demand of the total supply is required. That is for instance if the good or service is consumed by Government, Households or Non-Profits as Final demand, or if it's part of Investment and inventories, or if it's destined for Exports.

The Supply Side

An aggregated Supply table was prepared from the SUT (supply) for 2014, as shown in Table 1. This table illustrates the total value of domestically produced goods and services which totalled \$6,888 million dollars. The column total represents the value of output produced by the respective industries. One feature of the supply table is that the diagonal entries of the domestic supply quadrant always shows a higher value in relation to the off-diagonal. This represents the principal products produced by the establishments classified in the particular industry. The off-diagonal entries therefore reflect secondary goods and/or services being produced in the industry.

The Primary Industries in Belize accounted for 15 percent of domestic production, Secondary Industries accounted for 24 percent and Tertiary industries accounting for 61 percent. Within the Primary Industries, Agricultural Crop production accounted for 44 percent of the total output of the primary industries, or a total of \$441 million. Mining and Quarrying accounted for 24 percent followed by Animal Farming (20 percent) and Fishing (11 percent). Manufacturing activities accounted for 55 percent of the total domestic production of the Secondary Industries, followed by a 24 percent contribution made by Construction Activities. Within the Tertiary Industries, Wholesale and retail trade and repair of motor vehicles services accounted for 20 percent of the services output while Government Services and Financial Services accounted for 13 percent each of the total services output.

Of the supply of goods and services offered for consumption in 2014, 23 percent (\$2,207 million) was imported.

The Use Side

The use table shows how the supply of goods and services are consumed domestically or exported. In essence, it displays a product (good or service) by end use. The use table reflects whether goods and services were used as intermediate consumption by industry, final consumption, gross capital formation or exports. The row totals represent the total uses by product, while the column totals show the total input by Industry, total final consumption, total gross capital formation and total exports. Also shown in the use table are the components of value added GDP by income by industry, namely compensation of employees, and gross operating surplus.

From Table 2, we identify that the total intermediate uses of goods and services was 33 percent of the total available goods and services. From this we identify also that the main industries to consume goods and services as part of their production process were within the primary (15 percent to total Intermediate consumption) and secondary industries (35 percent to total intermediate consumption). When comparing the total intermediate uses to the total domestic supply, we identify that in 2014, for each \$100 of domestic output produced, \$45 was needed as intermediate goods or services in the production process.

Additionally, we are able to identify that Household Final Consumption Expenditure accounted for twenty six percent of the total supply of goods and services. From the total HFCE, 50 percent was attributed to Manufactured goods, 8 percent to Agriculture and Fishing goods and 10 percent for Real Estate services. The Exports of Goods and Services represented 25 percent of the total supply of goods and services. Government Final Consumption Expenditure accounted for 7 percent of the total supply of goods and services.

	Table 1: Condensed Supply Table (SUT 2014, in Millions of Belize Dollars)																										
Supply by Products	A - Agricultur e, forestry and fishing	B - Mining and quarryin g	C - Manufacturi ng	D - Electrici ty	E - Water supply; waste manageme nt	F - Constructi on	G - Wholesale and retail trade; repair of motor vehicles and motorcycl es	H - Transportati on and storage	l - Accommodati on and food service activities	J - Information and communicati on	K - Financia I and insuranc e activitie s	L - Real estate activiti es	M - Profession al, scientific and technical activities	N - Administrati ve and support service activities	O - Governme nt Services	P - Educatio n	Q - Health Service s	R - Arts, entertainme nt and recreation	S - Other service activiti es	T - Activities of househol ds as employer s	SUPDOM	INTIM - Internation al Imports	MRGTRD - Trade margins	MRGTR A - Transpo rt margins	MRGTA X - Taxes on product s	MRGSU B - Subsidi es on product s	SUPPURCH - Total Supply Purchaser Price
A- Agriculture & Fishing Products	757.1	-	-		-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	757.1	43.9	61.6	7.1	2.6	- 3.0	869.2
B- Mining Products	-	158.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	158.7	6.6	3.1	1.6	0.1	-	170.2
C - Manufactured Products	-	-	913.5	-	-		-	-		5.3	-	-	-		-	-	-	-	-		918.8	1,881.8	718.1	27.1	497.2	-	4,043.1
D- Electricity,																											
and hot water E- Natural water	-	-	-	305.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	305.5	45.8	-		0.1	-	351.4
and Sanitation Services	-		-	-	48.8		-	-		-	-	-	-	2.0	-	-	-	-	-		50.8	0.5	-	-	-	-	51.3
F- Constructions	-	-	-	-	-	395.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	395.2	-	-	-	-	-	395.2
G- Wholesale and retail trade																							-				
services H- Transport	-	-	-	-	-	-	782.8	-	-	-	-	-	-	-	-	-	-	-	-	-	782.8	-	782.8	-	-	-	-
Services	-	-	-	-	-	-	-	343.2	-	-	-	-	-	-	-	-	-	-	-	-	343.2	16.8	-	35.8	-	-	324.3
food and beverage			_				_		514.6	_			_								514.6	AA A			19.4		578 4
J- Telecommunicatio ns, broadcasting and information supply services	-	-	-	-	-	-	-	-	-	257.9	-	-	-	-	-	-	-	-	-	-	257.9	13.7	-	-	-	-	271.6
K- Financial and related services	-	-	-	-	-	-	-	-	-	-	537.3	-	-	-	-	-	-	-	-	-	537.3	72.9	-	-	-	-	610.2
L -Real estate services	-	-	-	-	-	-	-	-	-	-	-	282.1	-	-	-	-	-	-	-	-	282.1	2.5	-	-	-	-	284.6
M- Professional Services	-	84.5	-	-	-	-	-	-	-	19.9	-	-	91.3	-	29.5	-	-	-	-	-	225.2	52.8	-	-	-	-	278.0
N- Administrative		_	5.8		_		69.9	_	_	_			_	130.5		_		_	23.0		229.1	15.7		_			244.9
O- Public administration and other services provided to the community as a whole; compulsory social sec		_	-	-	_	_		_		_	_	_	_		504.4	_	_	_		_	504.4		_	_	_	-	504.4
P -Education services	_		_	_			-		_	-	-	-	_	_	-	287 7	_	-	-	_	287.7	7.0			-	-	294.7
Q- Human health and social care	-	-		-			-			-	_	_	-			207.7	_		-	-	207.7	7.0		_		-	237.7
services R - Recreational, cultural and sporting services	-	-	-	-		-	-	-	-	6.1	-	-	-	-	-	-	-	- 78.9	-	-	118.4 85.0	1.5	-	-	-	-	86.1
S -Other Services	-	-	-	-	-	-	-	-	-	-	-	-	-	10.7	-	-	-	-	97.3	-	108.1	0.5	-	-	-	-	108.6
services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.8	26.8	-	-	-	-	-	26.8
Z- Grand Total	757.1	243.2	919.2	305.5	48.8	395.2	852.7	343.2	514.6	289.2	537.3	282.1	91.3	143.2	533.9	287.7	118.4	78.9	120.3	26.8	6,888.7	2,207.5	-	-	519.4	- 3.0	9,612.7

	I able 2: Condensed Use Table (SUT 2014, in millions of Belize Dollars)																										
Use by Products	A - Agricultur e, forestry and fishing	B - Mining and quarryin g	C - Manufacturi ng	D - Electricit Y	E - Water supply; waste manageme nt	F - Constructio n	G - Wholesale and retail trade; repair of motor vehicles and motorcycl es	H - Transportati on and storage	I - Accommodati on and food service activities	J - Information and communicati on	K - Financia I and insuranc e activitie s	L - Real estate activitie s	M - Profession al, scientific and technical activities	N - Administrati ve and support service activities	O - Governme nt Services	P - Educatio n	Q - Health Service s	R - Arts, entertainme nt and recreation	S - Other service activitie s	T - Activities of househol ds as employer s	Total IC	Household Final Consumptio n Expenditure	NPISH Final Consumptio n Expenditure	Governmen t Final Consumptio n Expenditure	Gross Fixed Capital Formatio n and Inventori es	Export s	Total Use
A- Agriculture & Fishing Products	24.8	-	321.2	-	-	-	-	-	26.1	4.0	-	-	-	0.1	2.7	6.0	0.1	-	0.4	-	385.3	190.8	-	-	4.5	288.6	869.2
B- Mining Products	-	-	0.6	1.0	-	39.9	-	0.7	-	0.0	-	0.5	0.0	0.0	5.4	-	-	-	0.0	-	48.2	2.3	-	-	16.6	103.1	170.2
C - Manufactured Products	228.0	50.8	197.1	29.2	4.6	153.2	121.7	105.7	201.8	46.6	30.1	12.9	8.3	24.4	72.3	10.0	17.4	10.6	30.0	-	1,354. 7	1,260.6	-	-	219.0	1,208.8	4,043. 1
D- Electricity, town gas, steam and hot																											
water	1.0	3.0	24.9	116.6	3.9	3.0	22.0	2.9	8.8	23.5	14.4	4.5	5.7	4.7	27.8	5.3	7.7	5.0	6.3	-	290.9	55.6	-	-	-	4.8	351.4
E- Natural water and Sanitation																											
Services	3.4	1.0	3.1	0.9	4.9	0.9	2.4	0.4	1.8	1.1	1.7	0.5	0.6	0.3	2.7	0.7	0.4	0.2	1.2	-	28.1	23.3	-	-	-	-	51.3
F- Constructions G- Wholesale and	0.1	0.2	0.2	0.1	0.0	0.9	0.0	0.0	0.1	0.0	0.0	11.1	0.0	0.1	1.8	0.4	0.1	0.0	0.0	-	15.4	2.7	-	-	377.1	-	395.2
retail trade services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H- Transport Services	5.4	2.8	3.8	0.0	0.0	0.4	11.2	7.9	0.8	4.1	4.5	2.3	0.8	0.3	13.3	4.8	0.6	0.1	2.7	-	65.9	134.2	-	-	-	124.1	324.3
I- Accommodation, food and beverage services	0.1	0.5	0.6	0.3	0.5	0.5	1.4	0.2	1.1	0.7	7.1	1.2	0.0	0.5	10.5	3.2	0.6	0.6	1.7	-	31.4	149.1	-	-	-	397.9	578.4
J- Telecommunicatio ns, broadcasting																											
supply services	1.5	1.0	7.0	8.4	1.0	7.0	13.7	6.3	14.9	7.0	17.2	3.4	6.5	6.2	22.2	3.2	2.3	1.6	3.6	-	133.9	96.1	-	-	-	41.6	271.6
related services	40.7	10.0	40.4	32.6	3.2	35.6	40.7	17.1	24.1	20.0	89.7	21.2	5.7	8.8	43.9	13.5	4.3	3.9	5.2	-	460.6	115.7	0.6	2.6	-	30.8	610.2
services	1.9	0.2	1.7	0.4	0.3	0.2	0.9	1.3	0.7	1.2	3.0	2.4	2.0	1.8	14.2	0.9	1.1	0.2	1.5	-	35.9	245.2	-	-	-	3.5	284.6
M- Professional Services	5.9	63.9	8.3	3.2	0.5	1.8	1.0	3.2	2.2	2.1	5.8	1.7	1.7	1.7	5.0	1.2	1.5	1.2	1.7	-	113.4	0.1	-	-	114.0	50.5	278.0
N- Administrative Support Services	8.8	10.9	8.4	5.7	5.4	6.7	24.5	13.8	5.8	7.5	14.8	6.1	1.8	1.6	15.1	6.5	1.2	0.9	2.1	-	147.6	28.8	-	-	-	68.5	244.9
O- Government			_		_	_	_		_	-		-		_				_					-	504.4			504.4
P -Education services	-	-	-	-	-	-	_	-	-	-	-	-	-	-	2.0	-	-	-	-	-	2.0	36.0	141.7	108.4	-	6.6	294.7
Q- Human health and social care	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	9.4	0.0	0.0	-	10.1	24.6		80.1		5.2	119.9
R - Recreational						0.0	0.0	210			0.0	0.0	5.0		0.0	0.0	5.7		0.0			2		0012			
cultural and sporting services	0.0	-	0.1	0.0	0.0	0.0	-	-	0.4	0.6	0.7	0.0	0.1	0.0	-	0.4	0.0	0.7	0.0	-	3.0	63.1	-	-	-	19.9	86.1
S -Other Services	-		-		-	-	-	-	0.3	-	0.9		-	0.1	-	0.0	0.2	0.0	0.0	-	1.5	47.0	41.3	-	-	18.7	108.6
T- Domestic services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.8	-	-	-		26.8
Gross Value Added	435.3	99.0	301.7	107.0	24.5	145.1	613.2	183.7	225.9	171.0	347.2	214.2	57.9	92.4	295.1	231.5	71.5	54.0	63.8	26.8	3,760. 8	-	-	-	-		
Compensation of	107 7	0.5	136.6	21.0	11.0	04.6	170 4	110.2	152.6	56.2	09.2	0.5	24.2	50.0	291.0	220.2	63.3	26 5	77 4	21.0	3,269.						
Gross Operating	247.6	9.5 89 5	175 1	21.9	13.4	50.5	1/8.4 434.8	65 5	72.2	114 R	98.3 248 9	9.5	24.2	33.5	13.2	11 2	62.3 Q 2	20.5	37.1	5.8	3,335. 9		-				-
Total	757.1	243.2	919.2	305.5	48.8	395.2	852.7	343.2	514.6	289.2	537.3	282.1	91.3	143.2	533.9	287.7	118.4	78.9	120.3	26.8	6,888. 7	2,501.9	183.6	695.5	731.1	2,372.7	9,612. 7

Results of the Supply and Use 2014

Figure 1 below provides a summary of the final results of the 2014 SUT for Belize. It shows total supply of goods and services at purchasers' price of \$9,612 million dollars. This comprised domestic output 6,888 million, imports 2,207 million and net taxes on products \$516 million. The supply of goods and services used as intermediate consumption by businesses (\$3,128 million), Final Consumption expenditure³ (\$3,380 million), Gross Fixed Capital Formation (\$731 million), and exports (\$2,372 million).





³Domestic final consumption expenditure includes Household Final Consumption Expenditure (HFCE), Government Final Consumption Expenditure (GFCE)

Final results of the 2014 SUT indicated that the combination of methodological changes, coverage improvements, and reclassifications will have a considerable impact on previously estimated GDP figures following the Production Approach: GDP equals Total Domestic Output less Intermediate Consumption plus Net Taxes. Additionally, the SUT enables the computation of the Nominal GDP in Income and Expenditure categories with the latter being computed as follows: GDP equals final consumption expenditure plus gross fixed capital expenditure plus total exports less total imports. The three methods derived from the SUT result in Nominal GDP of \$4,277 million for the year 2014. This is an increase of the country's economic activity by 28 percent, from the previously published value for 2014 at \$3,352.8 million at current prices (see Figure 2). This is in line with general expectations of the Institute's external partners and with the experiences of other countries in the region who have undertaken a first SUT compilation exercise.

Figure 2: GDP 2014 Published Estimate and 2014 SUT Estima	te
---	----

Published	SUT	Revision (%)
3,352.8	4,277.2	27.8%

For instance, as observed in table 3, significant change in the level of GDP was obtained due to the update in the base year, as experienced in countries like the Bahamas, that experienced 27.6% growth in their nominal GDP (when they transitioned from base year 2006 to 2012). As presented in the table there might be some economies that were previously overestimating GDP and after the change in the base year, the level of the GDP seems to shrink, as observed in El Salvador case.

 Table 3: Results of change in Nominal GDP Level by Selected

 Countries, due to base year update

Country	Previous Base Year	Latest Base Year	Nominal Changes of GDP (%)
El Salvador	1990	2005	-14.0
Guyana	1977	1988	-2.0
Costa Rica	1991	2012	2.7
Jamaica	1974	2007	3.7
Bermuda	2006	2013	14.5
Honduras	1978	2000	16.2
Nicaragua	1994	2006	22.7
Cayman	2007	2015	27.5
Bahamas	2006	2012	27.6
Belize	2000	2014	27.8

Additionally, when the Central Statistics Office, moved the Belize National Accounts base from the year 1984 to 2000, as a result of improvement in methodology moving from SNA 1968 to SNA 1993, the GDP increased at 15.4 % in the base year (1984).



SUT Industry Main Highlights of Change

The following Industries were significantly impacted due to *improved coverage*:

Manufacturing: Meat processing, grain milling, bakery and tortilla factories, purified water, furniture making, paper milling, etc. were previously not included in the structure of the economy based on the 2000 measure.
 (*Note: in the 2000 series, Petroleum extraction was being captured as part of manufacturing, in the table below this has been removed to the comparison)

Table 4: Manufacturing 2014 Estimates (Thousands of Belize Dollars)

	Published	SUT	Change	% Change
Output	567,650	919,230	351, 580	62%
Intermediate Consumption	367,251	617,462	250,211	68%

Value Added	200,400	301,767	101,367	51%

b. **Transportation, Storage and Communications:** Inland transportation apart from freight to sugarcane and quarry were being independently measured, and other land transportation being imputed. With the SUT 2014, independent estimates are compiled for passenger transportation services (Bus, Taxi) and Freight (not only sugarcane freight). In communication, cable providers, radio broadcasting, newspaper, and other media outlets, which were previously not included, are now included.

Table 5: Transportation, Storage and Communications 2014 Estimates (Thousands of Belize Dollars)

	Published	SUT	Change	% Change
Output	476,598	632,238	155,641	32.7 %
Intermediate Consumption	178,812	277,738	98,926	55.3%
Value Added	297,786	354,501	56,715	19.0 %

c. **Real Estate, Renting and Other Business Activities:** Most of the estimates were previously imputed. The 2014 SUTs, Professional Services, Administrative Services (including BPOs), and Real Estate services are independently estimated. Its value added has increased by 77% as per the SUT revision.

The following Industries were significantly impacted due to *adoption of the SNA 2008 methodology*:

a. **Financial Intermediation:** The adoption of the SNA 2008 recommendations for the calculation of FISIM² and Insurance leads to an overall increase in estimates for this industry.

	Published	SUT	Change	% Change
Output	427,575	537,254	109,679	26%
Intermediate Consumption	196,767	190,029	-6,738	-3%
Value Added	230,808	347,226	116,418	50%

Table 6: Financial Intermediation 2014 Estimates (Thousands of Belize Dollars)

The following Industries were significantly impacted due to *reclassification* (methodology updates):

a. **Agriculture:** Meat processing was previously being measured as part of Agriculture. Under the 2014 SUTs, meat processing is moved to Manufacturing, while an independent estimate for the raising of animals is now included in Agriculture.

Table 7: Livestock 2014 Estimates (Thousands of Belize Dollars)

² Financial intermediation services indirectly measured.

	Published	SUT	Change	% Change
Output	204,855	187,026	-17,829	-9%
Intermediate Consumption	115,388	80,334	-35,054	-30%
Value Added	89,467	106,692	17,225	19%

b. **Mining and Quarrying:** Extraction of petroleum oil was previously measured as part of manufacturing. However, using the 2014 SUTs, this industry was properly reclassified under Mining and Quarrying. Additionally, the estimate of petroleum exploration, not previously included, was included as per the SNA 2008.

	Published	SUT	Change	% Change
Output	17,562	243,206	225,660	1285%
Intermediate Consumption	3,512	139,919	136,407	3884%
Value Added	14,050	103,287	89,237	635%

Table 8: Mining and Quarrying 2014 Estimates (Thousands of Belize Dollars)

c. Health, Education and Government: Health and education services provided by the government were previously estimated as part of Government sector. However, as per recommendations of the SNA 2008, for the 2014 SUTs Health and Education services are reclassified into the respective industries where they should be estimated. Thus, only administrative services provided by government remain in the Government sector.

Rebasing and Chain-linking

Overview

Over time, an economy undergoes changes to its economic environment. This can be reflected in changing consumption patterns, technological developments and innovations, advancements in production techniques, outmoded or newly available goods and services, etc. As a result, the base year price structure and weights become less representative of the current economic situation. It is therefore necessary, to update the base year price structure to reflect these changes and maintain the accuracy and relevance of the estimates of real GDP. Rebasing enables the national accounts to capture the real picture of the economy by addressing relative price movements and other changing economic structures, which over time, may contribute to an under or over estimation of GDP.

With the completion of the SUT 2014, the SIB had the necessary tools to reconstruct the Belize System of National Accounts. Thus, the economic structure should no longer reflect the older construct of the 2000 series, but rather an updated one. For which, production and cost of production and industries would have a better representation of the current economic evolution of Belize. Allowing for the introduction of updated classification and the recommendations of the SNA 2008, improvement in coverage, data sources, methodology, and ultimately more robust national accounts data for Belize . Nonetheless the historical series needs to be kept, in the following parts of the document we will delve into the methods of bridging this gap, for the introduction of a new base year for the economic measure.

At its most basic, the rebasing process is the replacing of the old base year with a more recent year. This is necessary to adequately capture the continuous structural changes as the economy evolves.

What are the Benefits and Implications of Rebasing the GDP to 2014?

Rebasing the GDP allows Belize's policymakers to use a set of economic statistics that is more representative of the economic structure of Belize than those based on the 2000 base year. The 2014 base year series allows for a total of 34 summary economic activity industry groupings and subgroupings versus the previous 2000 base that only allowed for 18. Additionally, with the updated GDP 2014 series, it becomes possible to estimate 78 independent economic activities identified for Belize, in comparison to the 42 economic activities being studied from the 2000 base period. In support of evidence-based decision making, the rebased GDP provides a better understanding of which industries are driving growth since emerging industries such as the Administrative Support Services activities industry are now explicitly featured.

The rebasing exercise then incorporates the recommendations and structure presented in the Supply and Use table of 2014 into the calculation of the GDP estimates. The impact of rebasing the GDP will be felt primarily in the development of macroeconomic indicators such as tax to GDP ratios, debt to GDP ratios, current account surplus to GDP ratios and the GDP per capita. These indicators may be used by government officials to inform policymaking. The historical GDP series was extrapolated backwards to 1990 to reflect the new benchmarks which will affect economic models that were based on the old data.

What are the Methodological and Conceptual Changes and Improvements of the Rebased GDP?

• Compilation of the 2014 benchmark estimates within a SUT framework which reconciles GDP via the production and expenditure approach.

• Expansion of coverage to include informal and own-account production where necessary.

• Compilation of Financial Intermediation Services Indirectly Measured (FISIM) using the recommended methodology from the 2008 SNA.

• Disaggregation of FISIM into the intermediate consumption of enterprises, final use and export allocating the intermediate consumption across industries.

- Expansion of the measure of taxes on products and production.
- Use of the most recent International Standard Industrial Classification (ISIC) Rev. 4.

What are the Changes in the GDP Classification?

The GDP classification by industry is based on ISIC. The GDP 2000 series uses ISIC Rev. 3.1 while the classification of the 2014 series applies ISIC Rev. 4. The comparison of the GDP classification at the aggregate level can be seen in Figure 4.

Figure 4: Comparison of Summary Industry Classification for the GDP base: 2000 vs 2014

			2000)	
			Code	2	2014 Summary Industry, ISIC rev 4
			A	В	A - Agriculture, forestry and fishing
2000 Summary Industry, ISIC			−►C		B - Mining
rev 3.1	Code		D		C - Manufacturing
Agriculture and forestry	A		F		D - Electricity
Fishing	В				E Water supply
Mining and quarrying	С				
Manufacturing	D				F - Construction
Electricity and water supply	F		→ G		G - Wholesale and retail trade
Construction	-		→		H - Transportation
Wholesale and retail trade,	F		H		I - Accommodation and food service activities
repairs	G				J - Information and communication
Hotels and restaurants	Н		>J		K - Financial and insurance activities
Transport, and communication	l		KI		L - Real estate activities
Financial intermediation	J		KL		M - Professional scientific and techr
Real estate, renting and			KL		activities
Community, social and personal	KL		KL	MPQ	N - Adminstrative and support servio activities
services	MPQ				O - Public administration and defen
General government services	0		→ 0	MPO	P - Education
		N N		<u> </u>	Q - Human health and social work
			→ 0	MPQ	activities
			> MPQ	l	R - Arts, entertainment, recreation
			MPQ		S - Other service activities
					T - Activities of households as
			MPQ	L	employers

Rebasing

Changes in current price or nominal GDP reflect the changes in the total value of goods and services produced in the economy. These changes result from two effects: (i) price effects or changes in prices; and (ii) quantity effects or changes in the volume of economic activity. The assessment of economic growth requires the removal of the price effect, or equivalently, the compilation of GDP at constant prices. Changes in constant price GDP are often referred to as real GDP growth.

Constant price GDP estimates are essentially volume indices, which measure changes in the volume of economic activity while maintaining relative prices constant. Over time, relative prices change. The changes in the prices of goods and services subsequent to the base year will result in the relative base year price weights becoming less representative over time. For this reason, it is necessary to periodically rebase the national accounts, i.e. revalue constant price GDP estimates at the prices prevailing in a new base year.

In doing so, estimates of economic growth are improved, enhancing their relevance in reflecting the underlying changes in relative prices. While the rebasing effect generally results in revisions to real GDP growth rates subsequent to the base year, improvements, and changes to underlying concepts, methodologies and data sources could have a larger impact and result in revisions to GDP prior to the new base year.

The rebasing of GDP is necessary for several reasons:

- i. It brings the constant price series in line with the structure of the economy for a more recent year, meaning that weights used to aggregate components of volume estimates of GDP will be updated
- ii. Correcting biases which may exist in estimating current and constant prices series since the last rebasing
- iii. Incorporating new data sources
- iv. Updating methods and classifications
- v. Correcting for known errors

In order to rebase, Current Price (CP) estimates for the new base year for the levels of Output and Intermediate Consumption by economic activity, consistent with the detail required for regular annual/quarterly estimation of GDP, is needed. Also, CP estimates for the new base year of expenditure components of GDP is needed as well. These estimates can be derived from an SUT or may be based on other methods.

The rebasing procedure needs to ensure that for the Constant Price (KP) series:

- i. The latest weights are used to aggregate components of volume estimates of GDP
- ii. The series is 'joined' to the previously published series without any discontinuities
- iii. Published historical growth rates are preserved before some agreed period (the link year)

For Current Prices, the rebasing procedures needs to ensure:

- i. That the current price series are 'additive' for all periods
 - i.e. aggregate series, like total manufacturing, total services, and total GDP are the sum of the component series
 - Note: this is not a requirement for the constant price series
- i. The series is 'joined' to the previously published series without any discontinuities
- ii. Published historical levels are preserved before some agreed period
 - This can be the same 'link year' as for the constant price series, or it may be some other, earlier, period

Before we look at the steps needed for rebasing it is helpful to define two levels of aggregation within GDP

- i. **Elementary series**: are measured at the most basic level of the available data. They are not based on aggregates of other components. For example, if we compile estimates for Bananas, Coffee, Tea, and Flowers; these would be the basis of the 'elementary' series
- ii. **Aggregate series**: are made up from a number of *elementary series*. For example, 'Cash Crops' might be the 'sum' of Bananas, Coffee, Tea, and Flowers.

The key difference is that:

- i. In volume (constant price) terms, aggregate series are compiled using a fixed structure of the economy (i.e. set of weights)
- ii. In current prices, the aggregate series are the sum of their component elementary series

Rebasing: step by step

- Rebase the KP series
 - a. Choose a link period
 - b. Rebase the Annual KP Elementary series (ELS)
 - c. Rebase the Annual KP Aggregate series (AGS)
 - d. Rebase the quarterly KP ELS
 - e. Rebase the quarterly KP AGS
- Rebase the CP series
 - a. Decide for which periods you require to preserve the levels
 - a. Calculate the Annual CP ELS
 - b. Calculate the Quarterly CP ELS
 - c. Add the ELS to derive the AGS

Chain linking

To address the issue of breaking the GDP series when the series is rebased, the new base year series must be joined to the old base year series so that they are expressed in terms of the prices of the new base year. The process of joining the two series is referred to as linking. With linking, the total GDP series and its components are extrapolated backward (from the new base year) at the most detailed level possible using the real growth rates of GDP and its components.

As noted, when rebasing you need to decide on a 'link period' for the constant price series. This specifies the periods 'open' and 'closed' to revision. Deciding which periods will be closed to revision are based on relevance of the structure of the economy at each point in time. The link year should be some mid-point between the last base year and new base year. For example, if the last rebasing was in 2012 and the latest is for 2019, we may choose 2015 as the 'link year'. Up to and including this year, the KP series will be 'additive', and the growth rates will be revised (e.g. growth between 2014-15 will be revised, but growth between 2013-14 will not). The year 2006 was chosen to be as the link year, between the base 2000 series and the base 2014 series. One of the main reasons why 2006 was selected was because the Economic Structure resulting from the SUT 2014 could be mapped out as early to 2006.

In current prices, the method involves simply using the rebased estimates for the years 2006-2018 and preserving the growth rates of the previous series at the most detailed level available (the so-called 'elementary aggregation level'). Higher level series are calculated by simple addition of the components.

The method is similar for the constant price series, except that it should be applied to all levels of aggregation, not just the elementary aggregation level. This is because constant price series are actually indices of change rather than series representing actual levels of economic activity, as is the case with the current price series. As such, constant prices series are not 'additive' in the sense that aggregate series are not necessarily the sum of component series. In fact, if the constant price elementary aggregate series were simply added together then, implicitly, the resulting aggerate series would be a Laspeyres index with weights taken from the latest base year. However, in this case it is necessary to preserve the previous base year weights for the years 1990-2006. As such, the growth rates of the aggregate indexes (up to the level of total GDP) should reflect the structure of the economy (that is the proportions of each economic activity or sector) for base 2000 for the years 1990-2006, and the updated weights for base 2014 for the years succeeding 2006.

This requires the series to be chain-linked. It is for this reason that the phenomenon of 'loss of additive' arises in relation to the constant price series.

Results of Rebasing and Chain Linking Exercise

Brief Updated Production Cost Structure

As a result of producing the SUT of 2014, now we are able to have an updated industrial production cost structure that is more representative of the current situation. When we compare the production cost presented at the 2000 base vs the updated structure of 2014, we note a shift. In the base 2000, the total economy production cost totaled 44.9 % of the total output produced, compared to the updated production cost totaling 45.4% to total output. The production cost as a percentage of output is larger than that of the base 2000, as the update present a more precise measure due to methodological improvements in the compilation of the SUT. As observed from Figure 5, the Primary Sector updated cost of production cost, which is slightly lower from that of the base 2000. For the Tertiary Sector, the updated cost structure is increased in comparison to the old structure of the base 2000.



Change in the Structure of the Rebased GDP

The rebased estimates not only led to changes in the level of GDP but also to the structure of GDP as reflected by the industry contributions. In the base 2000 series FISIM was not allocated at the industry level, however for comparability of this report, FISIM has been allocated at the industry level utilizing the FISIM structure derived from the SUT 2014. As highlighted in the SUT section of this document, the revised estimate of the GDP at Current prices presents an increase of 28% in the total level of the GDP for the year 2014.

Table 6 shows the comparisons between nominal GDP and share for the old GDP series (2000 base year) and the rebased series (2014 base year). As observed from table 8, the percentage share to total GDP is somewhat similar when comparing the structure presented in 2000 and 2014. However, a notable shift occurred within Agriculture, Forestry and Fishing, showing a lower contribution to the GDP in the updated structure, 3 percent points lower from its 13.2 percent in the 2000 base. Which was mainly due to a revision in the methodology of the Intermediate consumption ratios throughout the industry. Similarly, Government Services, classified as Public Administration and Defence, shows a lowered contribution to the GDP in the revised structure, 3.2 percentage points from its 10.1 percent contribution to the GDP using the base 2000 structure. This was mainly due to updates in the methodology and the industrial

reclassification which enables consistency with SNA 2008. Both Manufacturing and Construction now have a higher contribution to the GDP, 1 percentage point each from the 2000 structure. This was mainly due to updates in methodology valuation and coverage. The Financial Services Industry now contributes 8 percent to total GDP, which is an increase from its contribution using the old structure. Real Estate Services which now contributes 5 percent to total GDP in the updated structure, compared to 3 percent in the 2000 base.

Table 9: Comparison of 2014 Nominal GDP and Contribution for Base Year 2000 and 2014					
	Base	e 2000	Base 2014		
Industry	\$ 000's	(%) Share	\$ 000's	(%) Share	
Agriculture, forestry and					
fishing	441.2	13.2	435.3	10.2	
Mining and quarrying	96.7	2.9	99.0	2.3	
Manufacturing	200.4	6.0	301.8	7.1	
Electricity	96.0	2.9	107.0	2.5	
Water supply	30.1	0.9	24.5	0.6	
Construction	81.3	2.4	145.1	3.4	
Wholesale and retail trade	482.1	14.4	613.2	14.3	
Transportation	129.2	3.9	183.5	4.3	
Accommodation and food					
service activities	168.8	5.0	225.8	5.3	
Information and	100 5	5.0	174.0		
communication	168.5	5.0	1/1.0	4.0	
activities	230.8	6.9	347.2	8.1	
Real estate activities	107.0	3.2	214.2	5.0	
Professional scientific and					
technical activities	75.1	2.2	57.9	1.4	
Administrative and support					
service activities	11.5	0.3	92.4	2.2	
defence	339.7	10.1	295.1	6.9	
Education	135.5	4.0	231.5	5.4	
Human health and social					
work activities	9.0	0.3	71.5	1.7	
Arts, entertainment,					
recreation	28.6	0.9	54.0	1.3	
Other service activities	24.4	0.7	63.8	1.5	
Activities of households as					
employers	17.8	0.5	26.8	0.6	
Gross Value Added	2,873.7	85.7	3,760.6	87.9	
Taxes and Subsidies	479.1	14.3	516.4	12.1	
Gross Domestic Product	3,352.8	100.0	4,277.0	100.0	

Figure 6 provides an overview of which industries contributed the most to the overall change in the level of the GDP in the updating from the 2000 base series to the 2014 base series, for the year 2014. As clearly depicted, ranking first is Wholesale and Retail Trade and Repair Industries, with a contribution of 3.9 percentage points to the overall change of 28 percent in the level of GDP. The second highest ranking contribution came from the Financial and Insurance activities industry, 3.5 percentage points. Real Estate activities, Manufacturing and Education Services, were also part of the top tier in its contribution to the change in the level of GDP. Ranking last, Public administration and defence with a negative contribution of 1.3 percentage points to the overall change in the level of GDP.



Figure 6: Contributions to percentage change in the 2014 level fo GDP (SUT level compared with 2000 based series)

In Figure 7, below we are able to compare the Nominal GDP in three different measures, one the full revised series (that is taking the new structure and apply it as far back as possible), two the base 2000 series, and three the chained series (which preserves the published growth rates at a particular link year). As observed, on average the Level of the GDP presents a correction of approximately 26 percent from the 2000 series.



Change in the Expenditure Structure Rebased GDP

The Consumption Structure was also updated based on the rebasing exercise from the 2000 base. Notably, NPISH expenditure was not estimated explicitly in the 2000 base. The SUT 2014, allowed for the correction, which enabled the estimation of NPISH expenditure. As noted from table 5, utilizing the 2000 consumption structure, Household Private Final Consumption expenditure accounted for almost 70 percent of total GDP. The updated estimate of Household Private Final Consumption Expenditure accounts about 59 percent of total GDP. This improved estimate is based on the construct utilized for the SUT of 2014, for which the Household Consumption expenditure was derived from the recent study on consumption pattern of the populace of Belize (the initial estimate was derived from the Household Budget Survey of 2008-2009 and corrected for inflation and population growth, and then reconciled in the balancing process of the SUT). Based on the updated structure of 2014, Government Final Consumption Expenditure now stands at 16.3 percent of total GDP, compared to the share of 15.2 percent presented in the 2000 structure, it's an increase of about one percent from the old structure. Gross Fixed Capital Formation Expenditure accounted for about 18 percent of total GDP in the 2000 structure, its share being higher than that observed from the updated structure of 2014. For which, Gross Fixed Capital Formation accounts for about 17 percent of total GDP. This is obtained as improvements in the methodology for the estimates are introduced from the SUT 2014. For instance, following the SNA 2008, it recommends for the capitalization of intellectual property products such as, oil exploration, research and development and software development³.

Table 10: Comparison of 2014 Nominal GDP and Contribution for Base Year 2000 and2014					
	Base	2000	Base	2014	
Expenditure Categories	\$ 000's	\$ 000's (%) Share		(%) Share	
Government final					
consumption expenditure	511.0	15.2	695.5	16.3	
Private final consumption					
expenditure	2,329.2	69.5	2,501.9	58.5	
NPISH expenditure*	-	-	183.6	4.3	
Gross fixed capital					
formation	590.9	17.6	704.1	16.5	
Changes in inventories	51.1	1.5	27.0	0.6	
Gross domestic expenditure	3,482.2	103.9	4,112.0	96.1	
Exports of goods and	2 072 4	61.0	2 272 4		
services	2,072.4	61.8	2,373.1	55.5	
Less: Imports of goods and services	2,170.7	64.7	2,207.5	51.6	
Expenditure on GDP	3,384.0	100.9	4,277.6	100.0	
Discrepancy	- 31.2	- 0.9	-	-	
GDP at market prices	3,352.8	100.0	4,277.0	100.0	

Change in the Per Capita GDP

The increase in the level of the GDP in the new rebased series inevitably led to an increase in the per capita GDP. The per capita GDP at current market prices estimated for the year 2014, using the updated series now stands at \$11,917, reflecting an increase of 28 percent over the \$9,341 of the 2000 series. The magnitude of the change between the 2000 series and updated 2014 series for 2000 to 2020 in average is 26 percent, as seen in the Figure 8.



Change in the Real GDP Growth Rates

The methodological and conceptual changes along with the data improvements incorporated in the rebased GDP series also resulted in changes in the growth rates for both Nominal and Real GDP. For the period preceding the link year, the growth rate in real GDP is unaffected due to the methodology through which the old series is linked to the new series (where the link year is set to 2006. To emphasise, the updated GDP series is linked by applying the historical growth rates of real GDP(from the 2000 series) to the new base year GDP, from the earliest period in the old series up to the link year (the old 2000 series could be mapped from 1990 - up to the link year).

Figure 9 shows the comparison of the growth rates of Real GDP for the base 2000 and base 2014 series for 1990-2020. As observed the historical growth rates are respected preceding the link year 2006. From 2007 onwards we can observe the deviation of the growth rates between the two series, where the growth rates seem to shift direction. The revision of the growth rates seem moderate, ranging from -3.1 percentage points to 4.0 percentage points in difference of the old base growth rates.



Overview of the Updated GDP Growth Rates (2007-2020)

Considering the updated growth rates from 2007 to 2019 (Figure 10), we can identify the main factors that contributed to the growth rate. For the year 2007 the GDP growth rate is now updated from 1.2% to 2.8%, considering updated methodology and coverage, Mining activities and Financial Services intermediation and Insurance intermediation were the main contributors. For the year 2008 the results now show that the GDP had a marginal decrease (almost net zero) in comparison to the updated 2007, as increases and decreases amongst the industries were netted throughout. For the year 2009, the GDP now presents a decrease of -0.6 percent in comparison to the 2008, due mainly to significant decreases observed in Construction and Wholesale and Retail Trade, Accommodation and food service activities, and Information and Communication activities.



The year 2010 now presents an updated growth rate of 2.2% from the 3.3% presented in the old base, mainly due to increases observed in the taxes less subsidies, Agriculture production, Wholesale and retail trade activities. The year 2011 presents and updated growth rate in the GDP from 1.6% to 0.2%, mainly influenced by negative contributions to the growth rate from Agriculture, Fishing and Forestry, Mining, Accommodation and Food and Beverage Services and

Information and Communication services. For the Year 2012, the growth rate is updated from 2.4% to 4.1%, where Wholesale and Retail Trade Services, Accommodation and Food and Beverage Services and Manufacturing Industries each had a contribution of 1 percentage point to the growth rate. Considering the year 2013, the updated growth rate now stands at 4.8% from that of 0.8%, for which the Electricity industry contributed 2 percentage points to the 5 percent growth rate, and Wholesale and Retail Trade Services had a contribution of 1 percentage point to the growth rate. Other industries contributing positively to the growth rate were, Accommodation, Food and Beverage Services, Construction and Financial Intermediation and Insurance services. For 2014 the real GDP growth rate is updated from 4.5% to 3.9%, mainly due to the contribution of Agriculture, Fishing and Forestry (contributing 2.5 percentage points to the growth rate) and Taxes less subsidies (contributing 1.7 percentage point to the growth rate), additionally most activities experienced increases with a few exceptions. For the year 2015, the growth rate now stands at 2.6 percent, mainly due to negative contributions from Agriculture, Fishing and Forestry (-2.2 percentage points out of the 0.9 percent), Mining activities, and Accommodation and Food services. However, these were offset by positive contributions of Financial Intermediation and Insurance Services (1.3 percentage points of the 0.9 percent) and Transportation Services. The growth rate for 2016 has now been updated from -0.2% to -2.3%, where the main contributors to the new estimate come from the Taxes less Subsidies (-1.1 percentage points of the -2.0 percent), Agriculture, Fishing and Forestry, Mining and Wholesale and retail trade services. For the year 2017, the growth rate is now updated from 2.1 % to -1.0%, for which negative contributions came from Taxes and Subsidies (-1.1 percentage points out of the -1.3 percent), Transportation Services (-0.7 percentage points to the -1.3 percent), Construction activities (-0.6 percentage points to the -1.3 percent), and declines throughout several tertiary industries. For the year 2018, the updated growth rate now stands at 0.3% from 2.1%, due negative contributions from Accommodation, Food and Beverage Services (accounting -0.7 % to the growth rate), Electricity (accounting -0.5% to the growth rate), Agriculture, Forestry and Fishing; and Financial Services (each accounting -0.3% to the growth rate). These negative contributions were partially offset by small positive contribution from the rest of the industries. For the year 2019, the growth rate is updated from 2.0% to 4.5%, as most industries experienced growth for that period, where Accommodation and Food service activities had the highest positive contribution that of 1.9 percentage points to the growth rate. For the year 2020, the growth rate is updated from -16.7% to -13.7%; where the following industries each had a negative contribution of about -2.0% to the Growth Rate; Accommodation and Food services activities, Government, Wholesale and retail trade, Transportation services, and Taxes less subsides.

Relationship of Quarterly and the Annual GDP

The Statistical Institute of Belize prepares a quarterly GDP (QGDP) estimate based on a subset of indicators utilized in the Annual GDP(AGDP) compilation. The main purpose of QGDP is to provide a picture of current economic developments which is timelier than that provided by the AGDP. However, as the QGDP uses only a subset of the AGDP indicators it can lead to differences in the GDP estimate. To overcome this issue, the QGP data should be aligned with the annual data; the process to achieve this is known as benchmarking. The general objective of benchmarking is to preserve as much as possible the short-term movements in the source data under the restrictions provided by the annual data, at the same time, ensuring that the sum of the four extrapolated quarters is as close as possible to the unknown future annual data. This is an advantage of benchmarking as it improves the accuracy and quality of the quarterly time series estimates. Therefore, a correction of the QGDP time series estimate is applied after compiling the AGDP series.

To illustrate this lets consider what was presented in estimating the QGDP (base 2000) for the year 2020. Using the QGDP model a projected growth rate of -14.3% in the Real GDP for the year 2020, was obtained in comparison to the year 2019. However, when the AGDP for 2020 was finalized, the Real GDP growth rate was corrected to that of -16.7%.

Mainly attributed to a more comprehensive set of indicators being utilized to model the AGDP. As observed in Table 6, almost all of the estimated QGDP growth rates by industry moved in the same direction of the corrected AGDP. There were changes in direction of the growth rate of a few industries; for instance, Agriculture went from an estimated marginal negative growth rate to a strong positive growth rate in the annual revision. Similarly was the estimated correction in the growth rate of the Government services. Based on all the updates and corrections presented in the compilation of the AGDP, the overall GDP growth rate changed from the estimated Quarterly 2020 which stood at -14.3 percent decrease, was further decreased to a true reflection of the impact of the pandemic in Belize economy, that of -16.7%.

Table 11: Comparison of the Estimated Growth Rates by Industry between QGDP and AGDP, 2020				
Industry	QGDP	AGDP		
Agriculture and forestry	- 0.1	4.2		
Fishing	- 27.2	- 10.4		
Mining and quarrying	- 5.1	- 21.5		
Manufacturing	- 12.8	- 19.6		
Electricity and water supply	15.3	19.9		
Construction	- 0.7	- 11.4		
Wholesale and retail trade, repairs	- 22.1	- 18.0		
Hotels and restaurants	- 69.0	- 61.0		
Transport, and communication	- 17.4	- 20.4		
Financial intermediation	4.5	- 0.1		
Real estate, renting and business services	- 22.5	- 20.8		
Community, social and personal services	- 2.7	- 8.6		
General government services	1.1	- 30.7		
Less: Financial services indirectly measured	6.1	- 1.6		
Taxes less subsidies on products	- 20.4	- 18.0		
GDP at market prices	- 14.0	- 16.7		

APPENDIX A: Sources and methods for GDP by Economic Activity

Introduction

This document provides details of the data and methodology used to estimate the components of GDP based on economic activities (the so called 'Production approach' for measuring GDP, or 'GDP-P').

In broad terms the methods involved required data for any two of three possible measures of change in an economic activity:

- 1. A value in current prices of a series related to the activity of interest (V)
- 2. A quantity in terms of physical units of a series related to the activity of interest (Q)
- 3. A price for the series, or a measure of how prices have changed (P)

A key relationship is V = Q x P

which means that, if any two of these three variables are available, the outstanding variable can be derived.

For the **Current Price** (CP) Output of an activity it is possible to estimate how this has changed by multiplying its estimated level at some point in time by the observed change in the related value series (V). This is known as the 'extrapolation method'. Alternatively, the same can be achieved by multiplying the same level by Q x P.

For the **Constant Prices** (KP) (that is, after removing the price effects) the Output series can be estimated by multiplying its estimated level at some point in time by the observed change in the related value series (Q). Alternatively, the same can be achieved by multiplying the same level by V/P.

The same approach can be used to estimate Intermediate Consumption (IC) in both current and constant prices. Or, alternatively, multiplying the estimated Output by an estimate of the ratio of IC/Output. This second method is the one used for most activities in what follows.

The difference between Output and IC for any activity is the Gross Value Added.

This general approach to requires at least one value in the time series for Output (or IC) to be known independently. In Belize these values were estimated for 2014, based on Supply and Use Tables (SUTs). The SUTs establish a definitive level of current price Output and IC for each economic activity for 2014. The extrapolation method described above to estimate the other years has then been applied to the 2014 level (both 'forwards' for years from 2015, and 'backwards' for years before 2014).

As an example, for the activity 'Growing of vegetables and melons, roots and tubers', there are 12 crops for which production quantity data are available each year (from the Ministry of Agriculture). Prices for these products also exist. To calculate the CP Output the method starts by first calculating, for each

of these products the value (Q x P) for each period t, i.e. Q(t) x P(t). These values can then be summed to create an estimate of the level in year t, i.e. sum $[Q(t) \times P(t)]$. Next, to estimate the change in this level since 2014 the ratio sum $[Q(t) \times P(t)]/sum[Q(2014) \times P(2014)])$ is calculated. This is factor, like 1.05 for example, representing the change in the series since 2014, in this case, 5%. To derive a final estimate of current price Output for this activity it is necessary to multiply this factor by the base year (2014) estimate of output for the SUTs (this is refer to in what follows as O(BM), meaning the Output in the 'benchmark' year). Therefore, CP O(t) = sum $[Q(t) \times P(t)]/sum[Q(2014) \times P(2014)]) \times O(BM)$.

In constant prices (based on the same data), the formula is KP(O) = sum[Q(t) x P(2014)]/ sum[Q(214) x P(2014)]) x O(BM). Notice that the only difference here is that the prices in the numerator are taken form 2014, rather than from the current year (t). This is why the series is referred to as presented in 'constant base year prices'.

As another example, this time where there are data for values and prices (rather than quantities and prices), consider A03X0a 'Fishing from vessels, etc.'. In this case there are data for the export sales value of red snapper, V(t), and a price index (the CPI for 'snapper' CPIsnap(t)). For Current Prices Output the calculation is to calculate the change since 2014 of the value series, i.e. V(t)/V(2014), and multiply this by the SUT estimate of Output in 2014, i.e. CP O(t) = $V(t)/V(2014) \times O(BM)$.

In constant prices, the calculation needs to 'remove; the change in prices (based on the CPIsnap), i.e.

i.e. KP O(t) = $[V(t)/V(2014)] / [CPIsnap(t)/CPIsnap(2014)] \times O(BM)$ or more simply, KP O(t) = CP O(t)/ [CPIsnap(t)/CPIsnap(2014)]

In most cases the calculation of Intermediate consumption is made by multiplying the estimate of Output (in either CP or KP terms) by an estimate of the ration of IC/O. In most cases these ratios are only known for two years: base years 2000 and 2014. Where these two estimates are significantly different a method has been used to 'wedge' the IC/O ratios to avoid a step in the series. For example, for the activity 'Raising of pigs, the IC/O ratio estimated for 2000 was 85%, while for 2014 it was 48%. The wedging method makes the smallest possible adjustment to the IC/O in each year while being constrained to the start and end values. If there are n years in the 'wedge', and the start year for the wedge is t, the formula for the ratio (R) in each year is R(t) = R(t-1) x $[R(t+n)/R(t)]^{(1/n)}$. Notice that this is 'iterative; in the sense that the estimate in each year is dependent on the previous estimates. The method ensures that the sum of the squared growth rates (strictly, it is the log ratios of the *R*(t) values which are minimized) of the Rs over the span (t, n+t) is as small as possible, subject to the end values being equal to the known values (in this case for the benchmark years 2000 and 2014).

For more information see on such methods, see form section 3.1.2 in <u>https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-14-005</u>

Abbreviations

Q(t): Quantity series (in year t)	CP: Current Price	IC/O(SUT): Ratio of Intermediate Consumption to Output for the SUT
V(t): Value series (at year t)	KP: Constant Prices	O: Output
P(t): Price (in year t)	SUT: Supply and Use Tables	O(BM): benchmark level of Output
P(2014): Price in 2014	IC: Intermediate Consumption	IC(BM): benchmark level of IC
CPITot: All Items CPI	PopInd: Index of mid-year Population	COE: Compensation of Employees

	Proposed Method				
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
Growing of vegetables and melons, roots and tubers	Production data from Ministry of Agriculture for the separate crops for quantities (Q) and prices (P). CP O(t) = sum[P(t) x Q(t)]/sum[P(2014) x Q(2014)] x O(BM)	IC based on fixed ratio of IC/O from the 2014 SUT CP IC(t)= O(t) x IC/O(SUT)	KP O = (sum [P(2014) x Q(t)]/sum[P(2014)) x Q(2014)] x O(BM)	IC based on fixed ratio of IC/O from the 2014 SUT IC= O x IC/O(SUT)	
Growing of sugar cane	Production data from Ministry of Agriculture for P(t) and Q(t) in tonnes. CP O(t) = sum[P(t) x Q(t)]/sum[P(2014) x Q(2014)] x O(BM)	CP IC = cost per acre x area + production tonnes x transport cost per tonne. Series 'wedged' to maintain previous estimate of IC in 1990 and IC from 2014 SUT.	KP O = (sum [P(2014) x Q(t)]/sum[P(2014)) x Q(2014)] x O(BM)	As for CP IC, but deflated with price index based on Price /Acre calculated from the Ministry of Agriculture data.	

	Proposed Method					
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*		
Growing of other non- perennial crops	Production data from Ministry of Agriculture for the separate crops for quantities (Q) and prices (P). CP O(t) = sum[P(t) x Q(t)]/sum[P(2014) x Q(2014)] x O(BM)	IC based on fixed ratio of IC/O from the 2014 SUT IC= O(t) x IC/O(2014)	KP O = (sum [P(2014) x Q(t)]/sum[P(2014)) x Q(2014)] x O(BM)	IC based on fixed ratio of IC/O from the 2014 SUT IC= O x IC/O(2014)		
Growing of banana	Data from the Ministry of Agriculture for quantities (Q) and prices (P). CP O(t) = sum[P(t) x Q(t)]/sum[P(2014) x Q(2014)] x O(BM)	IC based on fixed ratio of IC/O from the 2014 SUT CP IC(t)= O(t) × IC/O(SUT)	KP O = (sum [P(2014) x Q(t)]/sum[P(2014)) x Q(2014)] x O(BM)	IC based on fixed ratio of IC/O from the 2014 SUT IC= O x IC/O(2014)		
Growing of other tropical and subtropical fruits	Production data from Ministry of Agriculture for the separate crops for quantities (Q) and prices (P). CP O(t) = sum[P(t) x Q(t)]/sum[P(2014) x Q(2014)] x O(BM)	IC based on fixed ratio of IC/O from the 2014 SUT CP IC(t)= CP O(t) x IC/O(SUT)	KP O = (sum [P(2014) x Q(t)]/sum[P(2014)) x Q(2014)] x O(BM)	IC based on fixed ratio of IC/O from the 2014 SUT IC= O x IC/O(2014)		
Growing of all other perennial crops	Production data from Ministry of Agriculture for citrus crops for quantities (Q) and prices (P). CP O(t) = sum[P(t) x Q(t)]/sum[P(2014) x Q(2014)] x O(BM)	IC based on wedged ratio of IC/O 2005-2014. From 2014, the SUT ratio is used. CP IC(t) = IC/O(wedged) x CP O(t)	KP O = (sum [P(2014) x Q(t)]/sum[P(2014)) x Q(2014)] x O(BM)	As for the CP IC. KP IC = IC/O(wedged) x KP O		
Raising of poultry	Data from Ministry of Agriculture for poultry in quantities (Q) and prices (P). CP O(t) = sum[P(t) x Q(t)]/sum[P(2014) x Q(2014)] x O(BM)	IC based on wedged ratio of IC/O 2005-2014. From 2014, the SUT ratio is used. CP IC(t) = sum [IC/O(wedged) x CP O(t)]	KP O = (sum [P(2014) x Q(t)]/sum[P(2014)) x Q(2014)] x O(BM)	As for CP IC. KP IC = sum [IC/O(wedged) x KP O(t)]		

	Proposed Method					
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*		
All other animal production	Data from Ministry of Agriculture for production of 3 types of animals(cattle, pig, sheep) plus Milk, Eggs, and Honey, in quantities (Q) and prices (P). CP O(t) = sum[P(t) x Q(t)]/sum[P(2014) x Q(2014)] x O(BM)	IC based on wedged ratio of IC/O 2005-2014. From 2014, the SUT ratio is used. CP IC = sum [IC/O(wedged) x CP O(t)]	KP O = (sum [P(2014) x Q(t)]/sum[P(2014)) x Q(2014)] x O(BM)	As for CP IC. KP IC = sum [IC/O(wedged) x KP O(t)]		
Forestry and logging	Separate estimates of household production and marketed production. Data from Forest Department on the cubic feet of production (Q) used to estimate marketed production, Price data (P) obtained from companies for reference period. index of population changes (Pop) used for household production. CPITot used to deflate CP O (market) = Q(t)/Q(2014) x CPITot/100, BM to SUT CP O (households) = PopInd(t)/100 x CPITot/100 x O(BM)	IC based on wedged ratio of IC/O 2005-2014. From 2014, the SUT ratio is used. CP IC = sum [IC/O(wedged) x CP O(t)]	KP O (market) = Q(t)/Q(2014) x O(BM) KP O (households) = PopInd(t)/100 x O(BM)	As for CP IC. KP IC = IC/O(wedged) x KP O(t)		
Fishing and aquaculture	Data for 2 sub-activities: 'Fishing from vessels.' and 'Shrimp farming' Both derived from IMTS data by type of product, value of export sales (V(t)). CPI for 'Fish' as price index. CP O(t) = V(t)/V(2014) x O(BM)	IC based on wedged ratio of IC/O 2005-2014. From 2014, the SUT ratio is used. CP IC = sum [IC/O(wedged) x CP O(t)]	For Fishing from vessels: KP O(t) = CP(O)/ [CPI'fish'/100] For Shrimp Farming: KP O(t) = Q(t)/Q(2014) x O(BM)	As for CP IC. KP IC = IC/O(wedged) x KP O(t)		

	Proposed Method					
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*		
Extraction of crude petroleum and natural gas	Based on data for the quantity of oil extracted (Q(t), and the price (P(t)) CP O(t) = Q(t)/Q(2014) x P(t)/P(2014) x O(BM)	Based on fixed IC/O ratio from the SUT. CP IC(t) = IC/O(SUT) x CP O(t)	KP O(t) = Q(t)/Q(2014) x O(BM)	KP IC(t) = IC/O(SUT) x KP O(t)		
All other mining and mining support activities	Based on data on Royalties collected in \$000s, V(t). A Price Index for 'Sand and Gravel' is also available, P(t). CP O(t) = V(t)/V(2014) x O(BM)	IC based on wedged ratio of IC/O 2005-2014. From 2014, the SUT ratio is used. CP IC = sum [IC/O(wedged) x CP O(t)]	KP O(t) = CP O(t)/ [P(t)/P(2014)]	KP IC(t) = IC/O(wedged) x KP O(t)		
Processing and preserving of meat	Based on quantity (Q) and price (P) data for Poultry, Turkey, Beef and Pork. CP O(t) = sum[P(t) x Q(t)]/sum[P(2014) x Q(2014)] x O(BM)	Based on fixed IC/O ratios for the 4 separate component series for the SUT CP IC(t) = sum [IC/O(SUT) x CP O(t)]	KP O(t) = (sum [P(2014) x Q(t)]/sum[P(2014) x Q(2014)])x O(BM)	CP IC(t) = sum [IC/O(SUT) x KP O(t)]		
Processing and preserving of fish, crustaceans and molluscs	Uses export value data for Marine (V) and CPI for Snapper as a price index (P) CP O(t) = V(t)/V(2014) x O(BM)	Based on fixed IC/O ratio from the SUT. CP IC(t) = IC/O(SUT) x CP O(t)	KP O(t) = CP O(t)/ [P(t)/P(2014)]	KP IC(t) = IC/O(SUT) x KP O(t)		
Manufacture of dairy products	Uses value of production of milk (V). CPI for Food used as the price index (P). CP O(t) = V(t)/V(2014) x O(BM)	Based on fixed IC/O ratios rom the SUT. CP IC(t) = IC/O(SUT) x CP O(t)	KP O(t) = CP O(t)/ [P(t)/P(2014)]	KP IC(t) = [IC/O(SUT) x KP O(t)		
Manufacture of grain mill products, starches and starch products	Uses indexes of quantity of flour production (Q). CPI for Food used as the price index (P). CP O(t) = Q(t)/Q(2014) x P(t)/P(2014)x O(BM)	Based on fixed IC/O ratios rom the SUT. CP IC(t) = IC/O(SUT) x CP O(t)	KP O(t) = Q(t)/Q(2014) x O(BM)	KP IC(t) = [IC/O(SUT) x KP O(t)		

	Proposed Method				
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
Manufacture of sugar	Based on local and export sales of Sugar and Molasses products separately in both values (V) and quantities long tonnes (Q). In addition, an average base year price for the SUT for each product is used (P(SUT)) CP O(t) = sum V(t)/ sum[V(2014)]x O(BM)	Based on wedged ratio of IC/O for Sugar and Molasses combined, calculated to keep the previously published IC/O ratio unchanged for years 1990-2005 and the ratio in 2014 equal to that from the SUT. From 2014, the SUT ratio is used. CP IC(t) = IC/O(wedged) x CP O(t)	KP O(t) =sum [Q(t)*P(SUT)]/ (sum[Q(2014) x P(SUT)])x O(BM)	KP IC(t) = IC/O(wedged) x KP O(t)	
Manufacture of other	Consists of citrus products and other prepared	Based on fixed IC/O ratios for	Citrus Product :	All components calculated as:	
food products	 fruit, vegetable and nuts: Citrus products: Data for quantities (Q) and prices (P) for concentrates, oils, etc. CP O(t) = sum[P(t) x Q(t)]/sum[P(2014) x Q(2014)] x O(BM) Other prepared fruit, vegetables and nuts: value of production indexes of producing entities (V) for a variety of products. CPI for Food used as the price index (P). CP O(t) = V(t)/V(2014) x O(BM) 	the separate component series for the SUT All components calculated as: CP IC(t) = [IC/O(SUT) x CP O(t)	KP O(t) = sum [P(2014) x Q(t)]/sum[P(2014) x Q(2014)]x O(BM) Other prepared fruit, vegetables and nuts: KP O(t) = CP O(t)/ [P(t)/P(2014)]	KP IC(t) = [IC/O(SUT) x KP O(t)	
Manufacture of prepared animal feeds	Used on indexes of value of production of the entities involved (V). The All Items CPI is used as the price index (CPITot). CP O(t) = V(t)/V(2014) x O(BM)	Based on fixed IC/O ratios from the SUT. calculated as: CP IC(t) = [IC/O(SUT)x CP O(t)	KP O(t) = CP O(t)/ [P(t)/P(2014)]	All components calculated as: KP IC(t) = [IC/O(SUT) x KP O(t)	

	Proposed Method			
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*
Manufacture of beverages	Contains 5 types of activities, where For 3 activities (Rum, Beer, Soft drink), data exist on quantity (Q), and the CPI for beverages(P): CP O(t) = Q(t)/Q(2014)*P(t)/P(2014)x O(BM) The remaining activities (purified water, and other beverages) Data for average index of producers sales, population and tourism (QInd) and CPI for beverages (P): CP O(t) =QInd(t)/QInd(2014)*P(t)/P(2014)x O(BM)	Based on fixed IC/O ratios for each separate component series from the SUT All components calculated as: CP IC(t) = [IC/O(SUT)x CP O(t)	For 3 activities (Rum, Beer, Soft drink): KP O(t) = Q(t)/Q(2014) x O(BM) For remaining activities: KP O(t) = QInd(t)/QInd(2014) x O(BM)	All components calculated as: KP IC(t) = [IC/O(SUT) x KP O(t)
Manufacture of wood and of products of wood (except furniture)	Based on data for production quantities from Forest Department in cubic feet (Q).Price series for also available (P). CP O(t) = [Q(t) x P(t)]/ [Q(2014) x P (2014)]x O(BM)	Based on fixed average IC/O ratios the total activity from the SUT CP IC(t) = [IC/O(SUT)x CP O(t)	KP O(t) = [Q(t) x P(2014)]/ [Q(2014) x P(2014)]X O(BM)	KP IC(t) = [IC/O(SUT) x KP O(t)
Manufacture of paper and paper products	Based on an index of sales of producers, population (Q) and the All Items CPI (CPITot) CP O(t) = Q(t)/Q(2014) x CPITot/100 x O(BM)	Based on fixed IC/O ratios from the SUT CP IC(t) = [IC/O(SUT)x CP O(t)	CP O(t) = Q(t)/Q(2014) x O(BM)	KP IC(t) = [IC/O(SUT) x KP O(t)
Printing and reproduction of recorded media	Based on a value index of sales of producers, Government_Spending_2014_onwards (Intermediate consumption) (V) And the All Items CPI for prices (CPITot) CP O(t) = V(t)/V(2014) x O(BM)	Based on fixed IC/O ratios from the SUT CP IC(t) = [IC/O(SUT)x CP O(t)	KP O(t) = CP O(t)/[CPITot/100]	KP IC(t) = [IC/O(SUT) x KP O(t)

	Proposed Method			
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*
Manufacture of chemicals and chemical products	Based on data for the quantity of production of fertilizers (metric tonnes), Q. Price index is the All Items CPI (CPITot) CP O(t) = Q(t)/Q(2014) x CPITot/100 x O(BM)	Based on fixed IC/O ratios from the SUT CP IC(t) = [IC/O(SUT)x CP O(t)	KP O(t) = Q(t)/Q (2014) x O(BM)	KP IC(t) = [IC/O(SUT)x KP O(t)
Manufacture of other non-metallic mineral products	Based on an index of sales of entities, population (Q) and the All Items CPI (CPITot) CP O(t) = Q(t)/Q(2014) x CPITot/100 x O(BM)	Based on fixed IC/O ratios from the SUT CP IC(t) = [IC/O(SUT)x CP O(t)	KP O(t) = Q(t)/Q(2014) x O(BM)	KP IC(t) = [IC/O(SUT) x KP O(t)
Manufacture of fabricated metal products	Base on the imports of goods used as IC for this activity and the sales of entities in this activity (V) and the All Items CPI (CPITot). CP O(t) = V(t)/V(2014) x O(BM)	Based on fixed IC/O ratios from the SUT CP IC(t) = [IC/O(SUT)x CP O(t)	KP O(t) = CP O(t)/[CPITot/100]	KP IC(t) = [IC/O(SUT) x KP O(t)
Manufacture of furniture	Based on an index of population and sales of entities in this activity (Q) and the All Items CPI (CPITot) CP O(t) = Q(t)/Q(2014) x CPITot/100 x O(BM)	Based on fixed IC/O ratios from the SUT CP IC(t) = [IC/O(SUT)x CP O(t)	KP O(t) = CP O(t)/[CPITot/100]	KP IC(t) = [IC/O(SUT)x KP O(t)
All other manufacturing industries	Based 'Manufacture of textiles, wearing apparel, footwear and leather' Uses an index of population (Q) and the CPI for Clothing and footwear' (CPcf) CP O(t) = Q(t)/Q(2014) x CPIcf/100 x O(BM)	Based on fixed IC/O ratios from the SUT CP IC(t) = [IC/O(SUT)x CP O(t)	CP O(t) = Q(t)/Q(2014)x O(BM)	KP IC(t) = [IC/O(SUT)x KP O(t)
Electricity, gas, steam and air conditioning supply	Based on production and the value of sales of electricity. Where quantity Qm, and sales Vm). CP O(t) = Vm(t)/Vm(2014)x O(BM)	Based on a fixed ratio of IC/O from the SUT CP IC(t) = Me(t)/Me(2014) x IC(BM)	KP O(t, main) = [Qm(t)/Qm(2014)] x O(BM, main)	KP IC(t) = KP O(t, main)xCP IC(t, main)/CP O(t, main)

	Proposed Method				
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
Water supply; sewerage, waste management and remediation activities	E18000(Water): uses data for sales (V) and the CPI for Water a price index (CPIw) CP O(t) = V(t)/V(2014)x O(BM)	E18000 (Water): has data for IC in CP CP IC(t) = ICw(t)/ICw(2014) xIC(BM)	E18000 uses data for sales (V) and the CPI for Water a price index (CPIw) KP O(t) = V(t)/V(2014)/CPIw(t) /CPIw(2014)x O(BM)	E18000 (Water): KP IC(t) =CP IC(t)/[CPIw(t)/CPIw(2014)]	
	for construction Vm(t) = CP Imports of Construction materials of various types (based on detailed import data). Vw(t)= CP value of local timber(wood). Vs(t) = CP value of sand and gravel The sum is defined as V(t) = Vm(t) + Vw(t) + Vs(t) For prices, there are data for: Pm(t) = import price index Pw(t) = unit price of local timber (wood) Ps(t) = Price Index for sand and gravel CPITot(t) = CPI for All Items In addition, the SUT provides ratio of IC/O(SUT) Step 1 is to create an aggregate price index for IC, i.e. PIC(t): P IC(t) = 1/(Pm(2014) /Pm(t) × Vm(t)/ V + Pw(2014) /Pw(t) × Vw(t)/ V + Ps(2014) /Ps(t) × Vs(t)/ V)X 100	calculation gives KP IC(t). CP IC(t) = KP IC(t) x P IC(t)			

		Proposed Method			
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
	Step 2: calculate the KP IC(t)				
	KP IC(t) = [V/V(2014] / [P IC(t) / 100] × IC(SUT)				
	Step 3: calculate the KP Output,				
	KP O(t) = CP IC(t) / IC / O(SUT)				
	Step 4: calculate the Price Index for Output				
	P O(t) = 1 / (1/ [P IC(t)]/100 x IC/O(SUT) + 1/[CPITot/100] x (1- IC/O(SUT)))x 100				
	Step 5: calculate the CP Output,				
	CP O(t) = KP O(t) / [[P O(t)]/100]				
Wholesale and retail trade: repair of motor	The calculation of Output and IC for these activities is based on the 'margin' of the traders	Based on a fixed ratio of IC/O form the SUT	Based on deflated CP O(t) using the All Items CPL, CPITot, i.e.	KP IC(t) = KP O(t)x IC/O(SUT)	
vehicles and motorcycles	(i.e. the difference between the selling price of the goods sold and the cost of goods purchased for resale).	CP IC(t) =CP O(t) xIC/O(SUT)	kP I(t) = CP O(t)/[CPITot(t)/CPItot(2014)]		
	For the CP O(t), the methods is to calculate a rate of the margin (calculated for each activity as the ratio between purchases and sales). The rates for each activity are then multiplied by the Output of each activity related to 'goods' and the total is the margin of the Wholesale and Retail trade activity.				
Land transport and transport via pipelines	Tis activity consists of the following sub-activities:	All components based on fixed IC/O ratios from the	Ha – Transport of Passenger	All components based on fixed IC/O ratios from the SUT. i.e.	
	Ha- Transport of Passengers	SUT, i.e.	KP O(t) = Qtx-comp(t)/Qtx-comp(2014)x O(BM)	КР IC(t) = КР O(t) x IC/O(SUT)	
	Hb- Freight Transportation	CP IC(t) = CP O(t) x IC/O(SUT)	Hb- Freight		

	Proposed Method				
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
	The following quantity indicators are used:		$KP O(t) = Qg(t) / Qg(2014) \times O(BM)$		
	i) the number of registered passenger transport vehicles (Qtx)				
	ii) the number of registered goods vehicles (Qg)				
	iii) An index of population (Qpop)				
	iv) A composite quantity indictor for passenger transport is calculated by weighted together these two, i.e.				
	Qtx-comp = wQtx + (1-w)Qpop				
	v) As a price index, the CPI for Private Transport is used, CPITran(t)				
	vi) A price for transport of sugar cane (cost per ton), Psc(t)				
	CP Output is then:				
	<u>Ha – Transport of Passengers</u>				
	CP O(t) = Qtx-comp(t)/100 x CPITran/100 x O(BM)				
	Hb- Freight				
	CP O(t) = Qg/100 x CPITran/100 x O(BM)				

	Proposed Method				
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
Water Transport	Based on indicators for the number(quantity) of tourist days (Qtd) and the CPI for sea fare (CPIsf) In addition, from 2014, there are actual data on the Estimated Revenue reported to the Income tax department, V(t) Pre-2014:CP O(t) = Qtd(t)/Qtd(2014) x CPIsf(t)/CPIsf(2014) x O(BM) From 2014:CP O(t) =V(t)/V(2014)x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) =CP O(t) xIC/O(SUT)	For all years: KP O(t) =CP O(t)/ [CPIsf(t)/CPIsf(2014)]x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. KP IC(t) = KP O(t) xIC/O(SUT)	
Air Transport	Based on indicators for the number(quantity) of movements of aircraft (Qa) and the CPI for air fares (CPIaf) CP O(t) =Qa(t)/Qa(2014)x CPIaf(t)/CPIaf(2014) x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) =CP O(t) xIC/O(SUT)	KP O(t) =Qa(t)/Qa(2014) x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. KP IC(t) =KP O(t) xIC/O(SUT	
Warehousing and support activities for transportation	Based on Balance of Payments export credits for Air and Sea transport (Va and Vs). Also uses CPIs for air and sea fares (CPIaf, CPIsf). CP O(t) = [Va(t) + Vs(t)] / [Va(2104) + Vs(2014)]X O(BM)	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) = CP O(t) xIC/O(SUT)	Based on a weighted average f air and sea transport (weight, w, of 66% to sea): First calculate weighted average of the deflated air and sea movements (i.e. removing price changes): Indicator(t) =Va(t)/[CPIaf(t)/CPIaf(2014)] x (1-w)+Vs(t)/[CPIsf(t)/CPIsf(2014)]x w The constant price output is given by KP O(t) = Indicator(t)/ Indicator(2014)x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. KP IC(t) = KP O(t) xIC/O(SUT	

	Proposed Method				
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
Postal and courier activities	 indicators for: i) Estimates for pre-2014 of revenues (Vold) ii) Actual data for revenues of largest postal services traders (Vnew) iii) CPI for postal services (CPIp) Pre-2014: CP O(t) =Vold(t)/Vold(2014) x O(BM) From 2014: Vnew(t)/Vnew(2014) x O(BM) 	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) =CP O(t) xIC/O(SUT)	KP O(t) = CP O(t)/ [CPIp(t)/(CPIp(2014)]	Based on fixed IC/O ratios from the SUT, i.e. KP IC(t) = KP O(t) xIC/O(SUT	
Accommodation	 Based on data for i) Balance of Payments travel expenditure on food and beverages purchased by tourists ii) Household expenditure on food and beverages purchased away from home from the household expenditure survey in 2008, price and volume updated each year based on the CPI for hotels and population changes) Taken together these give an estimate of the total expenditure on Accommodation services each year, V(t) The CPI for Hotels is used for deflation, CPIh(t) Then current price Output is given by: CP O(t) = V(t)/V(2014) x O(BM) 	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) = CP O(t) x IC/O(SUT)	KP O(t) = CP(O) / [CPih(t)/CPIh(2014)]	Based on fixed IC/O ratios from the SUT, i.e. KP IC(t) =KP O(t) xIC/O(SUT	
Food and beverage service activities	Based on data for iii) Balance of Payments travel expenditure on food and beverages purchased by tourists	Based on fixed IC/O ratios from the SUT, i.e.	KP O(t) = CP(O) / [CPifb(t)/CPIfb(2014)]	Based on fixed IC/O ratios from the SUT, i.e.	

	Proposed Method				
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
	 iv) Household expenditure on food and beverages purchased away from home from the household expenditure survey in 2008, price and volume updated each year based on the CPI for hotels and population changes) Taken together these give an estimate of the total expenditure on food and beverages services each year, V(t) The CPI for Food and beverages purchased away from home is used for deflation, CPIfb(t) Then current price Output is given by: CP O(t) = V(t)/V(2014) x O(BM) 	CP IC(t) =CP O(t) x IC/O(SUT)		KP IC(t) = KP O(t) x IC/O(SUT	
 Publishing activities Motion picture, video and television programme production, sound recording and music publishing activities Radio Broadcasting Television programming and broadcasting activities Computer programming Telecommunications 	Based on Revenue of Companies from 2014 onwards. And a composite index prior to 2014, where the index is composed as the geometric mean of index of population, index of sales of telecom all set to 2014=100. Current price Output is then calculated as: CP O(t) = Vcomp(t)/Vcomp(2014) x O(BM) Based on Revenue of Companies and CPI for	IC based on wedged ratio of IC/O 2005-2014. From 2014, the SUT ratio is used. CP IC(t) = IC/O(wedged) x CP O(t) CP IC(t) = IC/O(wedged) x CP	KP O(t) = CP O(t) / [CPIcomp(t)/ CPIcomp(2014)] KP O(t) = CP O(t) /	As for the CP IC. KP IC = IC/O(wedged) x KP O KP IC = IC/O(wedged) x KP O	
	Telecoms, i.e. CPItel Current Price Output is calculated as: CP O(t) = Vtel(t)/Vtel(2014) x O(BM)	O(t)	[CPItel(t)/CPItel(2014)]		
Central banking and other monetary intermediation	The current price output is based on the sum of cost expenditures on goods and services consumed as pa	s approach, i.e. for non-market a rt of the production of services (I	ctivities, the Output is by convention taker C). In constant prices, the CP series is divid	n as the sum of Compensation of employees (COE) plus led by the All Items CPI.	

	Proposed Method				
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
Other monetary intermediation	This comprises two parts: i) Explicit Fees and Commissions ii) Financial Intermediation Services Indirectly Measured (FISIM) Data on COE and IC for the first component in current prices is available from the Central Bank for all monetary institutions (as part of the Bank's regulatory undertakings). For FISIM, we first define: L = the stock of loans each year D = the stock of deposits each year IntL = the Interest earned on loans each year IntD = the Interest earned on deposits each year rL= IntL/L (the average interest rate on Loans) rD= IntD/D (the average interest rate on Deposits) and rr = (rL + rD)/ (L + D), i.e. a 'reference rate' FISIM in current prices is then On loans: FISIML = L*(rL-rr) On Deposits FISIMD = D*(rr-rD)	Calculated based on data for IC in current prices is available from the Central bank for all monetary institutions (as part of the Bank's regulatory undertakings).	For Explicit Fees and Commissions: The CP value is delated using the All Items CPI For KP FISIM Output is calculated as follows: On Loans: L/[CPITot/CPI[2014)] x [rL(2014) - rr(2014)] On Deposits: D/[CPITot/CPI[2014)] x [rr(2014) - rD(2014)]	KP IC = CP IC(t) deflated by All Items	

	Proposed Method				
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
Insurance, reinsurance and pension funding, except compulsory social security	 The following data for the Insurance Regulator are used: i) Premiums earned including premium supplements, Vp(t) ii) Claims incurred Vc(t) iii) Changes in the technical reserve (for life insurance) Vtr(t) iv) Commissions earned Vcom(t) v) Intermediate consumption IC(t) An indicators of Insurance output is provided by Vi(t) = Vp(t) - Vc(t) - Vtr(t) 	CP IC(t) = IC(t)/IC(2014) x IC(BM)	KP IC(t) = CP IC(t) / [CPITot(t)/CPITot(2104)]	KP O(t) = CP O(t) / [CPITot(t)/CPITot(2104)]	
Other activities related to financial service and insurance activities	Based on data for K65X0 and K6419. Uses changes in total output for these activities as a basis for estimating to changes in Output for K6X00, i.e. CP O(t) = [CP O(t, K65X0) + CP O (t, K6419)]	IC based on wedged ratio of IC/O 2005-2014. From 2014, the SUT ratio is used. CP IC(t) = IC/O(wedged) x CP O(t)	KP O(t) = CP O(t)/ [CPITot(t)/CPITot(2014)]	As for the CP IC. KP IC = IC/O(wedged) x KP O	
Real estate activities and	/[CP O(2104, K65X0) + CP O (2014, K6419)] X O(BM, K6X00) Based on population Index (Poplind) and CPI for	Based on fixed IC/O ratios	KP(t) = Pop(t)/Pop(2014)x	Based on fixed IC/O ratios from the SUT i e	
Owner-occupied dwelling	Rent (CPIr) CP O(t) = PopInd(t)/PopInd(20140 X CPIr(t)/CPIr(2014)X O(BM)	from the SUT, i.e. CP IC(t) = CP O(t) xIC/O(SUT)	O(BM)	KP IC(t) = KP O(t) xIC/O(SUT)	

	Proposed Method			
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*
Professional Services: -Legal and accounting activities - Activities of head offices; management consultancy activities - Architectural and engineering activities; technical testing and analysis - All other professional services, including scientific research and development	Data needed: Export of professional business services from Balance of Payments (pbop), CPI on all items (CpiTot), estimate of output of all other industries less professional services(oall). Revenue of Companies involved in professional services(these are adjusted not a 'matched pairs' basis to deal with sample changes) (Vmp). Where Vmanu is computed as an indicator of the change based on the share of exports to local sales in the base year 2014. Vmanu=[pbop(t)/pbop(2014)*ExportsSales(BM)+o all(t)/oall(2014)*LocalSales(BM)] *100 Pre-2014:CP O(t) = Vmanu(t)/Vmanu(2014)x O(BM) From 2014:CP O(t) = Vmp(t)/Vm(2014)x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) = CP O(t) xIC/O(SUT)	KP O(t) = CPO(t) /[CPITot(t)/CPITot(2014)]	Based on fixed IC/O ratios from the SUT, i.e. KP IC(t) = KP O(t) xIC/O(SUT)
Travel agency, tour operator, reservation service and related activities	Data for the number of tourist arrivals (Q(t) and the CPI for Hotels CPIh(t) are used. CP O(t) = Q(t)/Q(2014) x CPIh(t)/CPIh(2014)	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) = CP O(t) x IC/O(SUT)	KP O(t) = CPO(t) / [CPIh(t)/CPIh(2014)]	Based on fixed IC/O ratios from the SUT, i.e. KP IC(t) = KP O(t) xIC/O(SUT)
activities	Same method as Travel agency, tour operators			
Security and investigation activities	Same as method of professional services			
Office administrative, office support and other	Data on the exports communication computer services for the Balance of Payment (V) and Revenues of companies in this activity (R)(these	Based on fixed IC/O ratios from the SUT, i.e.	KP O(t) = CPO(t) /[CPITot(t)/CPITot(2014)]	Based on fixed IC/O ratios from the SUT, i.e.

	Proposed Method					
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*		
business support activities (Call Centres)	are adjusted not a 'matched pairs' basis to deal with sample changes). Pre-2014 : CP O(t) = V(t)/V(2014) x O(BM) From 2014 : CP O(t)= R(t)/R(2014) x O(BM) *computation starts from 2005, the earliest know operation started in Belize	CP IC(t) = CP O(t) xIC/O(SUT)		KP IC(t) = KP O(t) xIC/O(SUT)		
Other administrative related services	Based on population index (IndPop) and on an average of the CPI for hotels and the CPI for telecoms (CPIadmin). Revenues of companies in this activity (R)(these are adjusted not a 'matched pairs' basis to deal with sample changes). Pre-2014: CP O(t) = IndPop(t)/IndPop(2014) x CPIadmin(t)/CPIadmin(2014)x O(BM) From 2014 : CP O(t)= R(t)/R(2014) x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) = CP O(t) xIC/O(SUT)	KP O(t) = IndPop(t)/IndPop(2014) x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. KP IC(t) = KP O(t) xIC/O(SUT)		
Public administration and defence	The current price output is based on the sum of costs approach, i.e. for non-market activities, the Output is by convention taken as the sum of Compensation of employees (COE) plus expenditures on goods and services consumed as part of the production of services (IC). The data come from the Ministry of Finance.					
Education	Separate estimates for Primary, Secondary and Higher education are made, based on the number of Student Enrolments (Qse) and a price index calculated as the average cost of government	Based on fixed IC/O ratios from the SUT, i.e.	KP O(t) = Qse(t)/Qse(2014)x O(BM)	Based on fixed IC/O ratios from the SUT, i.e.		

	Proposed Method					
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*		
	grants per student divided by the numbers of student in Government funded schools (it is assumed that the changes in the cost/price per student for the private schools moves in line with the publicly funded schools. This is the price Index used for all Education services, Pe(t) CP O(t) = Qse(t)/Qse(2014)x Pe(t)/Pe(2014)xO(BM)	CP IC(t) =CP O(t) xIC/O(SUT)		KP IC(t) =KP O(t) xIC/O(SUT)		
Human health and social work activities	Based on Compensation of Employees data destined to Health Services from the Ministry of Finance (CEh(t)). Additionally, quantity data on outpatient visits and surgical procedures utilized (Qh(t)). Where the entity is private sector, we also utilize the Revenue from these companies (Rh(t). Prior to 2014: CP O(t)= CEh(t)/CEh(2014) x O(BM) From 2014 : Private Health : CP O(t)= Rh(t)/Rh(2014) x O(BM) Public Health : CP O(t)= CEh(t)/CEh(2014) x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) = CP O(t) xIC/O(SUT)	KP O(t) = Qh(t)/ Qh(2014) x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. KP IC(t) = KP O(t) xIC/O(SUT)		

	Proposed Method					
Activity	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*		
Arts and Recreation Services: -Creative, arts and entertainment activities - Libraries, archives, museums and other cultural activities - Gambling and betting activities - Sports activities and amusement and recreation activities	Based on population index (IndPop) and the CPI All Items (CPITot) and tourist visitor movement (Q). Revenues of companies in this activity (R)(these are adjusted not a 'matched pairs' basis to deal with sample changes). Pre 2014 : CP O(t) = IndPop(t)/IndPop(2014) x CPITot(t)/CPITot(2014)x O(BM) For Gambling: CP O(t) = Q(t)/Q(2014) x CPITot(t)/CPITot(2014) x O(BM) From 2014: CP O(t)= R(t)/R(2014) x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) = CP O(t) xIC/O(SUT)	KP O(t) = IndPop(t)/IndPop(2014)x O(BM) For Gambling : KP O(t) = Q(t)/Q(2014) x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. KP IC(t) =KP O(t) xIC/O(SUT)		
Other Services: - Activities of membership organizations - Repair of computers and personal and household goods - Other personal service activities	Based on population index (IndPop) and the CPI personal Services (CPIps). Revenues of companies in this activity (R)(these are adjusted not a 'matched pairs' basis to deal with sample changes). Pre 2014 : CP O(t) = IndPop(t)/IndPop(2014) x CPIps(t)/CPIps(2014)x O(BM) From 2014: CP O(t)= R(t)/R(2014) x O(BM)	Based on fixed IC/O ratios from the SUT, i.e. CP IC(t) = CP O(t) xIC/O(SUT)	KP O(t) = IndPop(t)/IndPop(2014) x O(BM)	ratios from the SUT, i.e. KP IC(t) = KP O(t) xIC/O(SUT)		

Activity	Proposed Method				
	Current Price Output	Current Price Intermediate Consumption*	Constant 2014 Price Output	Constant Price Intermediate Consumption*	
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	Based on population index (IndPop) and the CPI personal Services (CPIps). CP O(t) = IndPop(t)/IndPop(2014) x CPIps(t)/CPIps(2014)x O(BM)	Not Applicable	KP O(t) = IndPop(t)/IndPop(2014) x O(BM)	Not Applicable	

APPENDIX B: Sources and methods for GDP by expenditure component

Introduction

Estimates of the components of expenditures are made for each of the following series:

- General Government final consumption expenditure (GGFCE)
- Household final consumption expenditure (HFCE)
- NPISH final consumption expenditure (NPISH FCE)
- Gross fixed capital formation (GFCF)
- Changes in inventories (ChInv)
- Exports of goods (EoG)
- Exports of services (EoS)
- Imports of goods (MoG)
- Imports services (MoS)

The total for these components (with a negative sign for those related to imports) provides an estimate for GDP based on expenditure components (GDP-E).

The difference between this estimate and the estimate of GDP based on economic activities (GDP-P) is known as the statistical discrepancy (SD).

Abbreviations:

Q(t): Quantity series (in year t)	CP E(t): Expenditure at Current Price
V(t): Value series (at year t)	KP E(t): Expenditure at Constant Prices
P(t): Price (in year t)	E(BM): benchmark level of Expenditure
P(2014): Price in 2014	COE: Compensation of Employees
CPITot: All Items CPI	PopInd: Index of mid-year Population

The Methodology

Code	Component	Sub-Component	Current Prices	Constant Prices	
GGFCE	General Government	Public Administration	The current price output is based on the sum of costs approad	ch, i.e. for non-market activities, the Output is by convention taken as the	
	final consumption		sum of Compensation of employees (COE) plus expenditures on goods and services consumed as part of the production of services		
	expenditure		(IC). The data come from the Ministry of Finance.		

Code	Component	Sub-Component	Current Prices	Constant Prices		
			An estimate of the Consumption of Fixed Capital (CFC) of the government is also made, based on an inventory model. This is added the IS as a further cost.			
			An estimate of FISIM consumed by government is also added to the cost (see above for calculation of FISIM)			
			The results are scaled to ensure the at the total is 2014 is the same as from the SUT.			
			In constant prices, the CP series is divided by the All Items CP	I. costs		
		Public Sector Education	Separate estimates for Primary, Secondary and Higher	KP E(t) = Qse(t)/Qse(2014)		
			education are made, based on the number of Student	x O(BM)		
			Enrolments (Qse) and a price index calculated as the			
			average cost of government grants per student divided by			
			The numbers of student in Government funded schools.			
			This is the price muck used for all Education services, re(t)			
			CP E(t) = Qse(t)/Qse(2014)			
			x Pe(t)/Pe(2014)			
			x O(BM)			
		Public Sector Health	Based on a weighted quantity index for the numbers of	$KP E(t) = Qh(t)/Qh(2014) \times O(BM)$		
		Services	outpatient visits and surgical procedures weighted by			
			The constant price Ouptut series is calculated first as:			
			KP E(t) = Qh(t)/ Qh(2014) × O(BM)			
			This is then 'reflated' by the CPI for Health services (CPIhe)			
			to estimate CP Output, i.e.			
			CP E(t) = KP O(t) x CPIhe(t)/CPihe(2014)			
HFCE	Household final consum	ption expenditure	Based on a model of consumption which uses fixed ratios	The CP components of expenditure are deflated using the relevant CPI		
			for the percentage of total domestic production of various	series for each component to derive HFCE in KP.		
			goods and services with adjustments for margins and taxes,			
			plus the percentage of imports of consumer goods (as			
			classification). These percentages are derived for the SUT			

Code	Component	Sub-Component	Current Prices	Constant Prices
			for 2014, and multiplied by the estimated output r Imports	
			In each year to derived a CP estimate of HFCE.	
NPISH	NPISH final	NPISH Education Services	Based on the same method as for Government Education Ser	vices, above.
FCE	consumption	NPISH Other Services	Uses the Output methods specified in Appendix I for those ac	tivities which are purely NPISH (i.e. ISIC Section 'S', 'Other Service
	expenditure		Activities'.).	
			The Value Added series (which, for non-market producers is e	equivalent to Compensation of Employees) is used to extrapolate the SUT
			level for NPSIH of these services, in both CP and KP.	
GFCF	Gross Fixed Capital form	ation	See Appendix I	
ChInv	Changes in inventories		Reflated estimates of the KP series is used, based on the CPI	Based on the difference between (deflated estimates, using the CPI All
			All Items (see next column).	Items) of the imports and exports of goods into the Coral Free Zone
				(CFZ).
EoG	G Exports of goods		Based on reported 'International Merchandise Trade (IMTS)	Deflated based on ana average of the CPI All Items, the US Export Price
			statistics for Exports and Re-exports valued Free on Board	Indexes (XPI) for 'Food, feeds and beverages 'and the US XPI for 'Fuels
			(FOB), and using the 'General Trade' regime.	and Lubricants'.
			The series is scaled to the level of the 2014 SUT.	
EoS	Exports of services		Based on the balance of Payments estimates for Exports of	Deflated based on the CPI All Items
			Services.	
			The series is scaled to the level of the 2014 SUT.	
MoS	Imports of goods		Based on reported 'International Merchandise Trade (IMTS)	Deflated based on product level Price indexes for seven broad
			statistics for Imports and valued Free on Board (FOB), and	categories of imports using the United States Export Price Indexes as
			using the 'General Trade' regime.	the deflator for each product.
			The series is scaled to the level of the 2014 SUT.	
MoS	Imports services		Based on the Balance of Payments estimates for Imports of	Deflated based on product level Price indexes for three broad
			Services.	categories of imports using the United States Export Price Indexes as
			The series is scaled to the level of the 2014 SUT.	the deflator for each product.

Appendix I. Proposed methods for components of Gross Fixed Capital Formation (GFCF)

There are 12 components of the GFCF series which were included in the 2014 Supply and Use Tables. However, there isno data available for the other years for these components.

Various indicators of change (all in the form of Indexes with 2014=100) have been identified which can be used to track the changes in each component of GFCF. These are listed (and given codes for brevity) in the following table:

Code	Indicator (index form, 2014=100)
CPI	Consumer Prices Index
Рор	Population Index

Const CP	Index of Construction Output Current Prices
Const KP	Index of Construction Output Constant Prices
B&C_CP	Building and Construction Value (derived from the stock of loans and advancements)
RE_CP	Real Estate Value (derived from the stock of loans and advancements)
Cosnt_RE	Sum of Building and Construction Value and Real Estate Value
Imp_M&E_SIB_CP	Index of Imports of Machinery and Equipment (SIB) CP
MPI_Cap	US Export Price Index for Capital goods
MPI_Cap_Ex_Comp	US Export Price Index for Capital goods exc. computers
MPI_Cap_Trans	US Export Price Index for Vehicles designed to transport goods
GGFCE_CP	Index of General Government Final Consumption Expenditure CP
GGFCE_KP	Index of General Government Final Consumption Expenditure KP
GGFCE_IPD	GG FCE IPD

The following methods are recommended for the estimation of GFCF for each of the 12 component series.

Code	Description	Value Index (V)	Quantity Index (Q)	Price Index (P)
GFCF_HH	Capital Formation by Households	Derived	Рор	CPI All
GFCF_P_RES	Private Sector Residential buildings	Const CP	Derived	CPI All
GFCF_P_RES_Adj	An adjustment series for under coverage of construction			
	(buildings)	Derived	Рор	CPI All
GFCF_P_NONRES	Private Sector Non-Residential buildings	Const CP	Derived	CPI All
GFCF_Land	New Agricultural Land	Derived	Рор	CPI All
GCFC_Sant	Capitalized Santander Buildings	Derived	Рор	CPI All
GFCF_Non_Build_Adj	An adjustment series for under coverage of construction	Derived	Don	
	(non-buildings)	Derived	Рор	
GFCF_BS	Buildings and structures	Conts CP	Const KP	Derived
GFCF_INF	Infrastructure	Conts CP	Const KP	Derived
GFCF_ME	Machinery and Equipment	Imp_M&E_SIB_CP	Derived	MPI_Cap
GFCF_GG_Soft	Government software	GGFCE_CP	Derived	CPI All

Code	Description	Value Index (V)	Quantity Index (Q)	Price Index (P)
GFCF_GG_RD	Government R&D	GGFCE_CP	Derived	CPI All
GFCF_Explore	Exploration - corporate sector	Oil_CP	Derived	Oil_IPD

The following table shows how the current price (CP) and constant price (KP) GFCF is calculated (note: GFCF(BM) is the relevant current price level of GFCF for the SUT):

Code	Current Prices GFCF (CP GFCF)	Constant Price GFCF (KP GFCF)
GFCF_HH	GFCF(BM) x [KP GFCF] x [CPI AII]/100	GFCF(BM) x [Pop]/100
GFCF_P_RES	GFCF(BM) x [Const_RE]/100	CP GFCF / [CPI All]/100
GFCF_P_RES_Adj	GFCF(BM) x [KP GFCF] x [CPI All]/100	GFCF(BM) x [Pop]/100
GFCF_P_NONRES	GFCF(BM) x [Const_RE]/100	CP GFCF / [CPI All]/100
GFCF_Land	GFCF(BM) x [KP GFCF] x [CPI All]/100	GFCF(BM) x [Pop]/100
GCFC_Sant	GFCF(BM) x [KP GFCF] x [CPI All]/100	GFCF(BM) x [Pop]/100
GFCF_Non_Build_Adj	GFCF(BM) x [KP GFCF] x [CPI All]/100	GFCF(BM) x [Pop]/100
GFCF_BS	GFCF(BM) x [Conts CP]/100	GFCF(BM) x [Const KP]/100
GFCF_INF	GFCF(BM) x [Conts CP]/100	GFCF(BM) x [Const KP]/100
GFCF_ME	GFCF(BM) x [Imp_M&E_SIB_CP]/100	CP GFCF / [CPI All]/100
GFCF_GG_Soft	GFCF(BM) x [GGFCE_CP]/100	CP GFCF / [CPI All]/100
GFCF_GG_RD	GFCF(BM) x [GGFCE_CP]/100	CP GFCF / [CPI All]/100
GFCF_Explore	GFCF(BM) x [Oil_CP]/100	CP GFCF / [CPI All]/100

For example, for 'GFCF_P_RES' the current price series is calculated first, based on the base year SUT value for this series multiplied by the [Const_RE] index to give a series for CP GCF, and then the constant price series is derived for this by dividing the CP GCF by the [CPI All] index.

Alternatively, for 'GFCF_Land' the constant price series is calculated first, based on the base year SUT value for this series multiplied by the [Pop] index to give a series for KP GCF, and the current prices series is then derived from this by multiplying by the [CPI All] Index.