



Government of the  
Cook Islands

# Fiscal Tool 2018

## Explanatory note

### Medium-term Fiscal Strategy 2019/20–22/23

Technical Paper No. 18/1

7 December 2018



Prepared by the Economics Division, Ministry of Finance and Economic Management.  
This publication is copyright and is the property of Cook Islands Government.

## Table of contents

<b>1</b>	<b>Introduction and context</b> .....	<b>1</b>
1.1	Current fiscal strategy.....	1
1.2	A new medium-term fiscal framework .....	1
1.3	Purpose and structure of this paper .....	1
<b>2</b>	<b>The modelling framework</b> .....	<b>3</b>
2.1	Fiscal and macroeconomic baseline .....	3
2.2	Modelling framework.....	6
<b>3</b>	<b>Calibration Model – determining the new rules</b> .....	<b>9</b>
3.1	Introduction .....	9
3.2	Calibration.....	10
3.3	Summary .....	13
<b>4</b>	<b>Fiscal space</b> .....	<b>14</b>
4.1	Introduction .....	14
4.2	Cyclically-adjusted measure space .....	14
<b>5</b>	<b>The Fiscal &amp; Macro Impact Model</b> .....	<b>16</b>
5.1	Introduction .....	16
5.2	Fiscal shocks .....	16
5.3	Macro shocks.....	18
5.4	Fiscal impact tab.....	19

## List of tables

Table 2-1:	2018/19 HYEPU Statement of Financial Performance .....	4
Table 3-1:	Structural balance parameters .....	11
Table 3-2:	Nominal balance parameters .....	12
Table 3-3:	Expenditure ratio parameters .....	12
Table 3-4:	Expenditure ratio and growth approaches .....	13
Table 3-5:	MTFS fiscal rules.....	13
Table 4-2:	Cyclically-adjusted fiscal space.....	15
Table 5-1:	Fiscal multipliers.....	18

## List of figures

Figure 1-1:	Cook Islands Fiscal Tool 2018 .....	2
Figure 2-1:	Cook Islands nominal GDP, 2015 to 2023 .....	5
Figure 2-2:	Cook Islands potential GDP, 2006 to 2023 .....	6
Figure 2-3:	Cook Islands Fiscal Tool 2018 schematic.....	7
Figure 3-1:	Fiscal rules calibration.....	10
Figure 5-1:	Shocks input tab.....	16

## List of boxes

Box 4-1:	Approach to assessing fiscal space .....	14
----------	--	----

# 1 Introduction and context

---

## 1.1 Current fiscal strategy

The Cook Island Government's current fiscal strategy is guided by the fiscal responsibility provisions in Part III of the *Ministry of Finance and Economic Management Act 1995-96* (MFEM Act), and a number of supporting fiscal responsibility ratios (FRRs) – or fiscal rules – arising out of the 1998 Manila Agreement with the Asian Development Bank and subsequent reviews. The FRRs establish the key parameters for fiscal management and ongoing budget development.

## 1.2 A new medium-term fiscal framework

The Government has committed to strengthening the strategic focus of its expenditure and tax decisions by incorporating a more robust medium-term perspective that takes into account interactions with the economy. To this end, a Medium-term Fiscal Framework is being developed as part of the 2019/20 budget cycle.

A key aim of the framework will be to foster long-term growth by smoothing Government expenditure over the course of the economic cycle. This approach will also help deliver macroeconomic stability, encourage private investment and entrench low public debt.

The framework is described in *Medium Term Fiscal Strategy 2019/20 – 22/23, Cook Islands Government, December 2018*.<sup>1</sup> The framework comprises three elements: a Medium-term Fiscal Strategy (MTFS), Medium-term Expenditure Ceilings and a Medium-term Budget.

The primary objectives of the MTFS are:

- fiscal sustainability through responsible fiscal management and debt sustainability; and
- stronger linkages between fiscal policy and economic conditions.

The MTFS contains a new set of fiscal rules and total Cook Islands Government expenditure ceilings for the 2019/20 budget year plus three forward years.

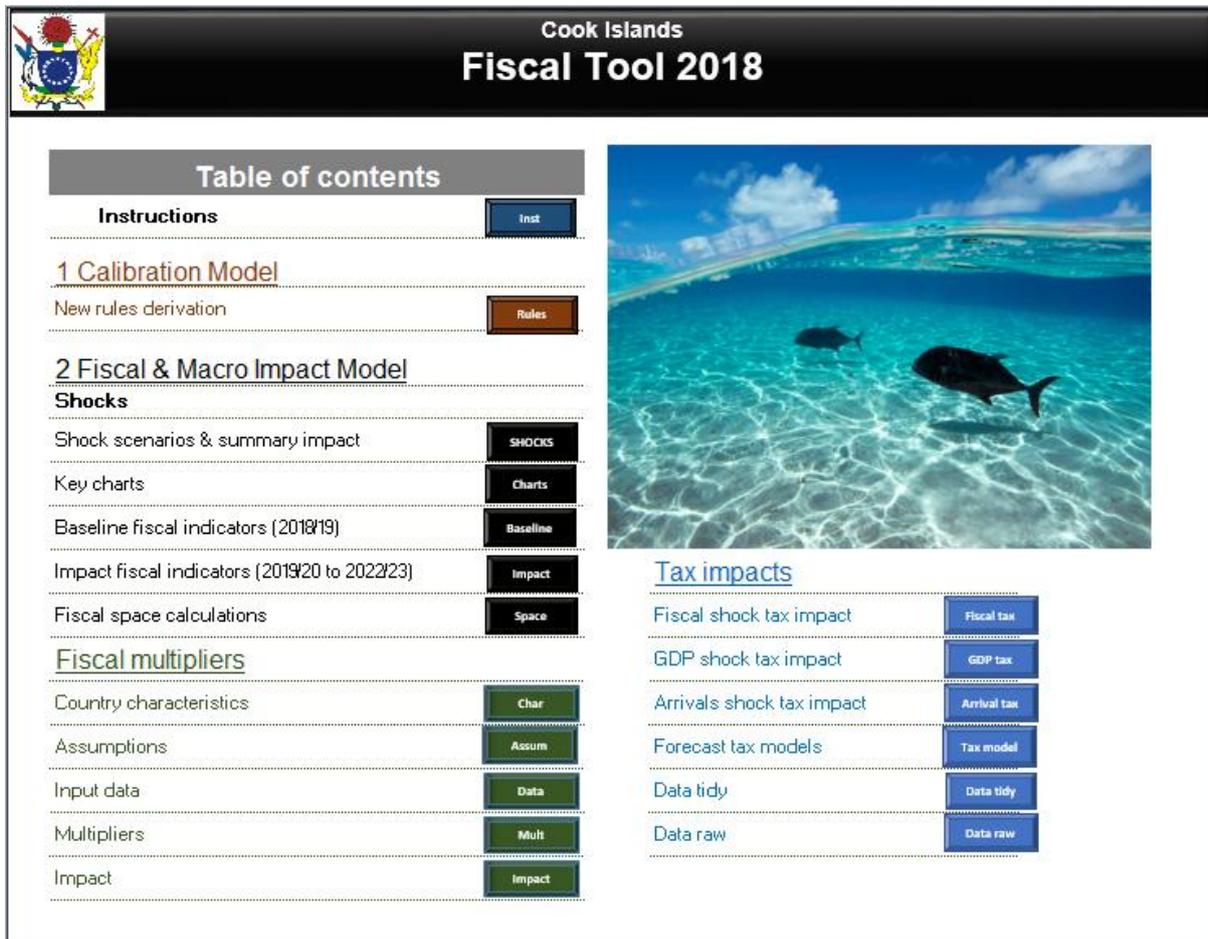
## 1.3 Purpose and structure of this paper

This paper presents an analytical fiscal tool – the *Cook Islands Fiscal Tool 2018* – that has been constructed to first calibrate, and then operationalise the revised set of fiscal rules that form a core part of the MTFS. This paper should be read in conjunction with the fiscal tool, which is contained in a stand-alone Excel file, and which can be provided on request.

---

<sup>1</sup> Available at: <http://www.mfem.gov.ck/economics>.

Figure 1-1: Cook Islands Fiscal Tool 2018



The remainder of this paper is structured as follows:

- Chapter 2 describes the current fiscal situation and the fiscal modelling framework that is implemented through the *Cook Islands Fiscal Tool 2018*.
- Chapter 3 presents the *Calibration Model*.
- Chapter 4 describes measures of fiscal space.
- Chapter 5 sets out the *Fiscal & Macro Impact Model*.

## 2 The modelling framework

---

### 2.1 Fiscal and macroeconomic baseline

#### 2.1.1 Introduction

The fiscal and macroeconomic baseline used for the purposes is that presented in the 2018/19 Half-year Economic and Fiscal Update (HYEFU) Statement of Financial Performance. The forward period has also been extended by one year in preparation for the 2019/20 budget cycle.

#### 2.1.2 Fiscal baseline

A number of years of strong economic growth has resulted in a positive fiscal outlook for the Cook Islands, as reflected in the 2018/19 Half-year Economic and Fiscal Update (HYEFU) and summarised in the Statement Financial Performance in Table 2-1.

In 2018/19, it is estimated that the operating balance (the difference between revenues and expenditures) will be \$21.8 million, or 4.1 per cent of GDP, reflecting an increase in the collection of taxes, in particular VAT. Going forward, changes in expenditure and revenue estimates are predicted to result in an operating surplus of 6.1 per cent of GDP in 2019/20, increasing to 7.7 per cent in 2021/22.

The fiscal balance in 2018/19 is estimated to be a deficit of \$10 million, financed by a combination of concessional lending and the utilisation of cash reserves. The fiscal position is expected to return to surpluses from 2019/20, as current capital projects are completed prior to the full commencement of new projects and revenues continue to increase.

Due to the strong fiscal surplus in 2017/18, unallocated cash reserves are estimated to be \$89.9 million in 2018/19. The cash reserve is forecast to increase over the future years rising to \$169.7 million in 2021/22.

The level of debt after savings is estimated to be 22.2 per cent of GDP in 2018/19. The debt to GDP ratio declines moving forward, as debt is paid off every year, falling to 13.9 per cent by 2021/22.

**Table 2-1: 2018/19 HYEFU Statement of Financial Performance**

	2018/19 HYEFU Estimate	2019/20 Projection	2020/21 Projection	2021/22 Projection	2022/23 Projection
<b>Statement of Financial Position (\$m)</b>					
<b>Total operating revenue</b>	<b>185.4</b>	190.5	196.4	202.9	208.2
<i>Of which: Taxation Revenue</i>	<b>148.2</b>	154.3	160.1	165.6	170.9
<b>Total operating expenditure</b>	<b>163.5</b>	<b>155.7</b>	<b>153.7</b>	<b>153.6</b>	<b>153.6</b>
<b>Operating balance</b>	<b>21.8</b>	<b>34.9</b>	<b>42.7</b>	<b>49.4</b>	<b>54.6</b>
<i>As a percentage of GDP</i>	4.1	6.1	7.0	7.7	8.1
<b>CIG capital expenditure</b>	<b>45.7</b>	<b>42.9</b>	<b>28.1</b>	<b>11.8</b>	<b>11.8</b>
<b>Fiscal balance surplus/deficit</b>	<b>-10.0</b>	<b>5.8</b>	<b>28.5</b>	<b>51.4</b>	<b>56.7</b>
<i>Percentage of GDP</i>	-1.9	1.0	4.7	8.0	8.4
<b>Cash &amp; equivalents</b>	<b>89.9</b>	<b>103.4</b>	<b>128.1</b>	<b>169.7</b>	<b>169.7</b>
<i>Cash &amp; Equivalents (months)</i>	7.2	8.8	11.0	14.6	14.6
<b>Statement of Borrowings (\$m)</b>					
<b>Net Crown Debt, end of FY</b>	<b>119.4</b>	<b>104.4</b>	<b>98.6</b>	<b>89.4</b>	<b>89.4</b>
<i>As a percentage of GDP</i>	22.2	18.2	16.2	13.9	13.2
<b>Macroeconomic parameters</b>					
<b>Nominal GDP (\$m)</b>	538.2	572.3	606.8	641.4	675.8
<i>Percentage change</i>	5.99	6.32	6.04	5.70	5.37
<b>Potential nominal GDP (\$m)</b>	532.9	567.2	601.9	636.8	671.2
<b>Output gap (%)</b>	1.1%	1.0%	1.0%	0.9%	0.9%

Source: CIG, 2018b.

### 2.1.3 Macroeconomic baseline

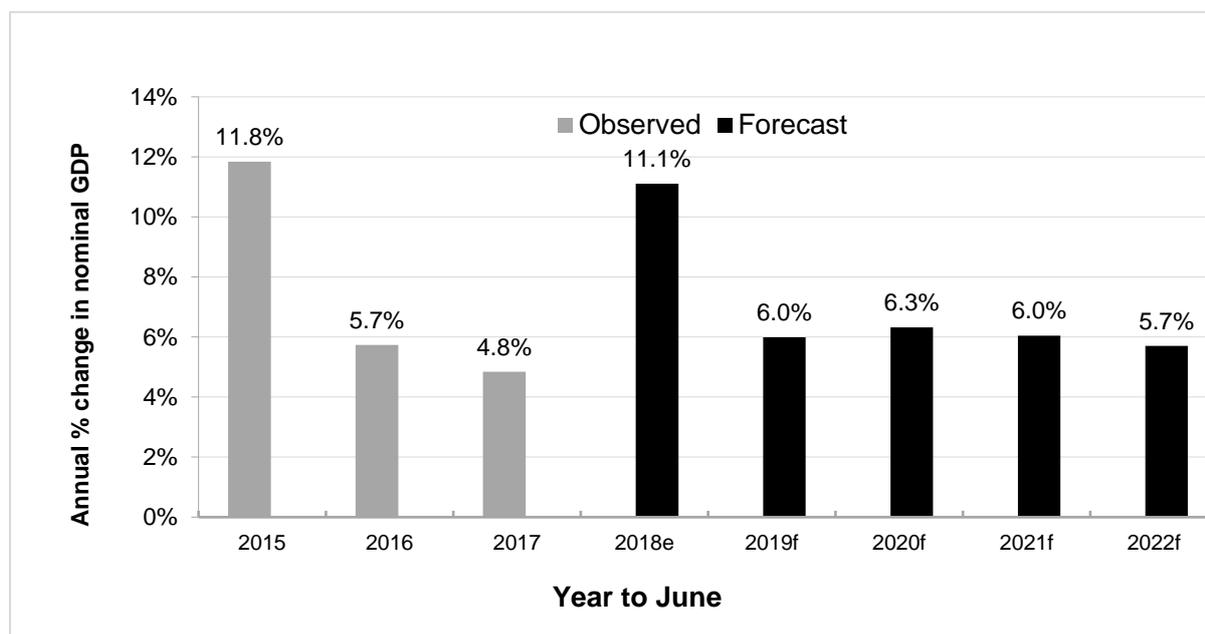
For the purposes of the MTFs and the calibration and operation of the fiscal rules, the most important macroeconomic parameter is the Cook Islands GDP – actual and potential. In October 2018, subsequent to Budget 2018/19, the Cook Islands Statistical Office released a substantially revised GDP time series. Key changes included:

- incorporation of new data – including new Census and Household Income and Expenditure Survey data;

- new industry classification to meet international standards – includes a new Information and Communications industry and a new Administrative Services industry;
- different valuation basis for industry value added – value added tax and import duties are now added to the total value added by industry;
- changed base year for constant price GDP from 2006 to 2016; and
- improved methodology for estimating VAT and government expenditure using quarterly data.

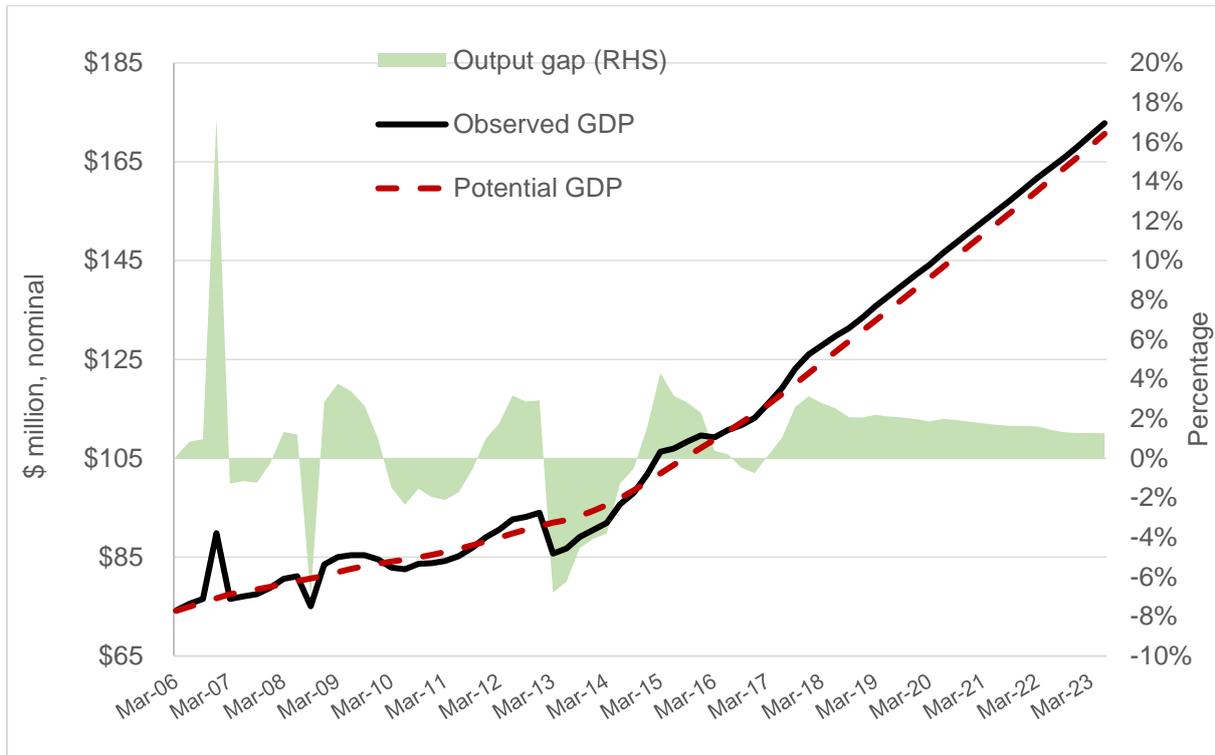
The revised data series has been used to produce revised GDP forecasts for the forward period to 2022/23 as shown in Figure 2-1.

**Figure 2-1: Cook Islands nominal GDP, 2015 to 2023**



Potential nominal GDP has also been estimated using the revised data series, using a range of univariate measures. As shown in Figure 2-2, the Cook Islands is currently facing a positive output gap, which is forecast to decline in magnitude over the forecast period to 2023.

Figure 2-2: Cook Islands potential GDP, 2006 to 2023

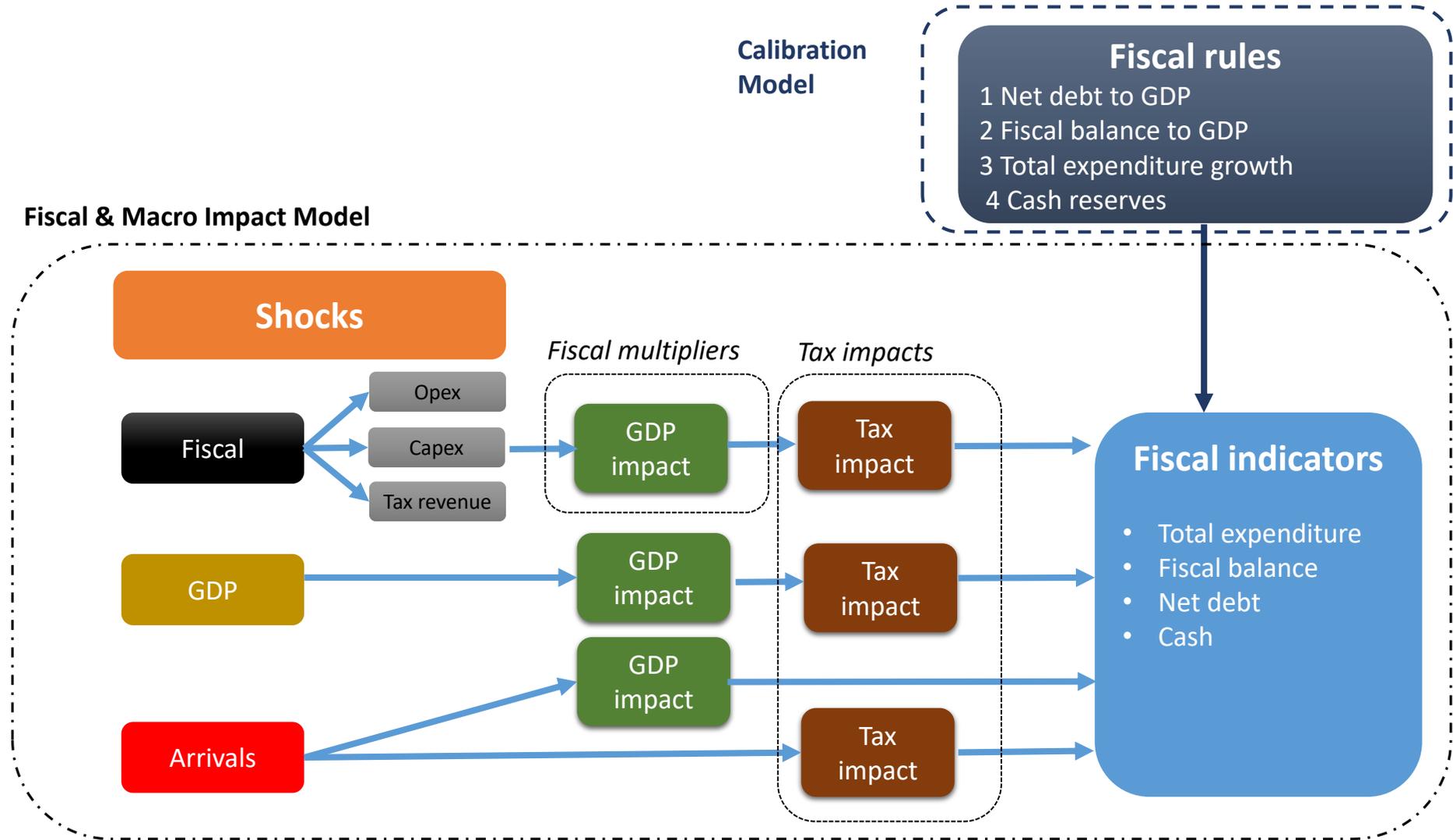


## 2.2 Modelling framework

The Fiscal tool comprises a number of interrelated elements, as illustrated in Figure 2-3:

- the Calibration Model;
- the Fiscal & Macro Impact Model:
  - fiscal and macro shocks;
  - fiscal multiplier model; and
  - tax impact.

Figure 2-3: Cook Islands Fiscal Tool 2018 schematic



The purpose of the *Calibration Model* is to ensure that a consistent combination of rules – for debt, fiscal balance and expenditure – is selected that together, and taking into account economic conditions (the business cycle), stabilises debt over a medium to long-term horizon at a sustainable level. This exercise also provides an estimate of the Government's fiscal space – or sustainable fiscal balance – essentially the budgetary room available to the Government over the forward budget period that will not compromise its long-term term debt sustainability.

The operational part of the fiscal tool – the *Fiscal & Macro Impact Model* – models the interactions between fiscal policy decisions and economic output, and the fiscal impact of economic shocks, within the framework of the revised set of fiscal rules. This is accomplished by running fiscal and macroeconomic shocks through a simple version of the Cook Islands Government accounting framework using fiscal multipliers and tax impact models.

The fiscal model has been set up to model fiscal and macroeconomic scenarios for the 2019/20 Budget year and three forecast years to 2022/23.

## 3 Calibration Model – determining the new rules

---

### 3.1 Introduction

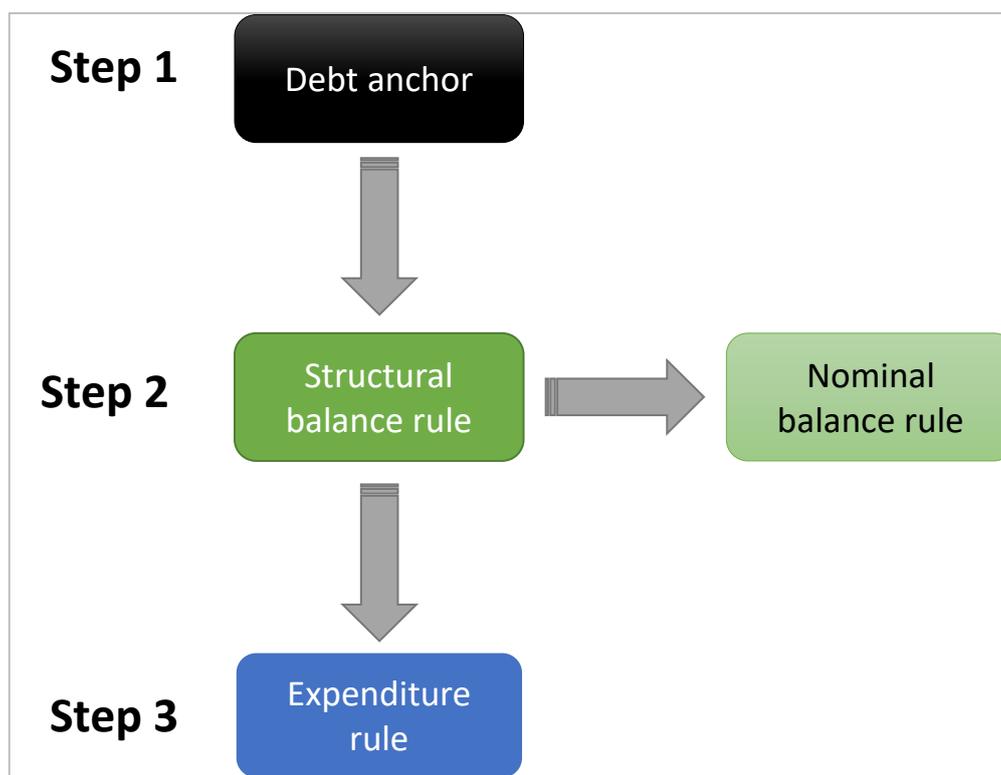
This paper follows IMF (2018a), which provides guidance on how to calibrate fiscal rules – that is, how to determine the thresholds (ceiling, floor, or target) for specific fiscal aggregates constrained by rules. The IMF paper focuses specifically on the calibration of debt, fiscal balance, and expenditure rules.

The calibration methodology presented in the IMF paper is based on four general principles:

- **Comprehensive and consistent** – as most countries have more than one fiscal rule, to minimise the risks of inconsistency and conflict among rules, the fiscal strategy should be assessed as a whole and the thresholds should be calibrated in a consistent manner.
- **Sequenced** – a well-designed fiscal strategy should set targets for both the final and intermediate – or operational – objectives of fiscal policy. The final objective is usually the maintenance of fiscal sustainability, and is often measured by the net-debt to GDP ratio – also known as the fiscal anchor. The intermediate objectives, which should be directly linked to the fiscal anchor, are commonly fiscal deficit ceilings or expenditure caps. Proper sequencing requires the debt ceiling to be set first before the intermediate rules are determined.
- **Prudent** – fiscal risks should be taken into account in setting fiscal targets, with buffers included to accommodate shocks. In recognition that not all risks can be mitigated for in the budget, fiscal headroom should be created by setting prudent debt and deficit ceilings.
- **Updates** – calibration should be periodically updated, but too frequently, as the rules are designed to be long-lasting constraints on fiscal policy.

IMF (2018a) sets out a three-step process for calibrating fiscal rules, shown in Figure 3-1, that has been applied in this paper, as described below.

Figure 3-1: Fiscal rules calibration



## 3.2 Calibration

### 3.2.1 Step 1: Calibrate the public debt ceiling

Ceilings on public or government debt are a common characteristic of rule-based fiscal frameworks. The IMF reports that as of 2015, about 70 countries worldwide had a fiscal framework with an explicit cap on public debt.<sup>2</sup> As noted in Section 1.1, the Cook Islands currently has ceiling on net public debt (gross debt obligations net of funds in the Loan Repayment Fund): a hard ratio of 35 per cent of GDP and soft, more prudent ratio of 30 per cent of GDP. This rule is being maintained in the MTFs based on evidence which suggests that debt levels greater than 30 per cent of GDP have a negative impact on economic growth in countries in the Asia-Pacific.<sup>3</sup>

The 30 per cent ratio ensures that there is at least 5 per cent of GDP available for debt financing should there ever be a major economic or natural disaster before the Government breaches the upper debt limit.

For the purposes of the MTFs, the 30 per cent ratio is adopted as the debt anchor.

### 3.2.2 Step 2: Calibrate the structural and nominal balance rules

Having set the debt anchor, the next step is to calibrate the structural fiscal balance, which if maintained, would lead to a gradual convergence to the debt anchor in the long-term. It should

<sup>2</sup> IMF, 2018a: 3.

<sup>3</sup> IMF, 2015b: 5.

be noted that as the Cook Islands is currently well below its 30 per cent ratio, estimated at 22 per cent in 2018/19, this implies an upward trajectory over the forward period.

The structural fiscal balance is calculated as set out in equation 1:

$$sb^* = \lambda d^* \quad (1)$$

Where:

- $\lambda = \frac{-\gamma}{1+\gamma}$ ;
- $sb^*$  is the structural fiscal balance (as a percentage of potential GDP); and
- $\gamma$  is long-term nominal GDP growth.

Applying equation 1, with the parameter values shown in Table 3-1, returns a structural fiscal balance of -1.26 per cent of GDP.

**Table 3-1: Structural balance parameters**

Parameter	Value
$\gamma$	0.044
$\lambda$	-0.04
<b>sb*</b>	<b>-1.26%</b>

Equation 1 ensures that debt and balance rules are consistent over the long-term. It is also useful to derive from the structural balance rules a corresponding threshold for the nominal balance rule.

The IMF notes that for a given structural balance target, the nominal deficit ceiling should be sufficiently high to allow automatic stabilizers to fully operate during a typical economic downturn, which means that the nominal deficit should be allowed to increase in response to a cyclical decline in revenues.<sup>4</sup> However, the nominal deficit ceiling should not be so high that it permits discretionary fiscal expansions that are inconsistent with the structural balance ceiling.<sup>5</sup>

Equation 2 sets out how to calculate a constant nominal balance target for a given structural balance threshold.

$$nb^* = sb^* + OG_{max} \times e \quad (2)$$

Where:

- $nb^*$  is the nominal fiscal balance;
- $sb^*$  is the structural fiscal balance;

<sup>4</sup> Automatic stabilisers are an autonomous economic adjustment that occurs during booms and recessions. For example, in an economic boom the unemployment rate drops so government expenditure on benefits is reduced, at the same time incomes rise so government taxation receipts are higher. The opposite occurs during a recession. Together, these stabilisers compress the cycle.

<sup>5</sup> IMF, 2018a: 17.

- $OG_{max}$  is the maximum output gap during a typical economic downturn; and
- $e$  is ratio of government expenditure to GDP.

Applying equation 2, with the parameter values shown in Table 3-2, returns a nominal fiscal balance of -1.9 per cent of GDP.

**Table 3-2: Nominal balance parameters**

Parameter	Value
$sb^*$	-1.26%
$OG_{max}$	-0.017
$e$	0.34
<b><math>nb^*</math></b>	<b>-1.9%</b>

### 3.2.3 Step 3: Calibrate the expenditure rule

The final step is to calibrate the total expenditure rule, which can be defined in terms of either expenditure growth or an expenditure to GDP ratio.<sup>6</sup>

Equation 3 sets out how to calculate an expenditure threshold for a given structural balance threshold.

$$e^s = r^s - sb^* \quad (3)$$

Where:

- $e^s$  is the total expenditure ratio;
- $r^s$  is the tax ratio (revenue to potential GDP); and
- $sb^*$  is the structural balance.

Applying equation 3, with the parameter values shown in Table 3-2, returns an expenditure ratio 42 per cent of GDP. This is rounded down to 40 per cent for the reasons of prudence.

**Table 3-3: Expenditure ratio parameters**

Parameter	Value
$r^s$	0.40
$sb^*$	-1.26%
<b><math>e^s</math></b>	<b>42%</b>

Applying the ratio and growth approaches to the 2018/19 Budget appropriation, as shown in Table 3-4, produces a similar result for 2018/19 and the forward period.

<sup>6</sup> Total expenditure includes Cook Islands Government operating and capital expenditure. It excludes expenditure funded through Official Development Assistance.

**Table 3-4: Expenditure ratio and growth approaches**

	2018/19	2019/20	2020/21	2021/22	2022/23
<b>2018/19 budget</b>	<b>208</b>	<b>199</b>	<b>182</b>	<b>165</b>	<b>165</b>
<b>A Ratio approach</b>					
Maximum expenditure	213	222	231	240	249
<i>Difference</i>	5	23	49	74	84
<b>B Growth approach</b>					
Maximum expenditure	208	216	225	234	243
<i>Difference</i>	0	18	43	68	78

Following IMF (2018), if there is no tax policy change and if the country already complies with the structural balance rule, the structural balance rule can be interpreted as either a constant ratio of spending to potential GDP or a rule in which spending growth is equal to potential GDP growth. That is, if the country is already in a structural position consistent with the structural balance rule, nominal spending should grow at the same pace as nominal potential GDP. As the fiscal deficit in 2018/19 budget is equivalent to the nominal balance, which has been derived from the structural balance, it is assumed that the Cook Islands is currently in structural balance. As such, the long-term potential nominal growth rate of 4 per cent is preferred.

### 3.3 Summary

Four formal fiscal rules are proposed under the MTFS to replace the current set of fiscal responsibility ratios, from the 201/20 Budget. The first three, the debt, fiscal balance and expenditure rules, have been determined as set out in the section above. The fourth, the cash rule, has been retained from the current set.

**Table 3-5: MTFS fiscal rules**

Rule	Threshold
<b>Net debt to GDP rule</b>	30 per cent of nominal GDP
<b>Nominal fiscal balance rule</b>	-1.9 per cent of nominal GDP
<b>Expenditure rule</b>	4 per cent ceiling on total expenditure growth
<b>Cash rule</b>	Minimum 3 months of cash in reserve

## 4 Fiscal space

---

### 4.1 Introduction

Following IMF (2016b), fiscal space refers to the budgetary room available to a government for undertaking discretionary fiscal policy relative to existing plans without undermining fiscal sustainability. Alternatively, fiscal space exists if a government can raise spending or lower taxes without endangering financial market access or putting debt sustainability at risk.

Determining if a country has fiscal space involves a forward-looking, dynamic assessment of whether its fiscal position remains sustainable under current as well as alternative policies, and a reasonable configuration of shocks. A standard approach to assessing fiscal space is shown in Box 4-1.

**Box 4-1: Approach to assessing fiscal space**

#### **Stage 1**

Assess the current macroeconomic setting, current fiscal strategy and position, size of fiscal multipliers and the cyclical position of the economy.

#### **Stage 2**

Assess fiscal sustainability measures under baseline conditions, subject to standard stress tests.

#### **Stage 3**

Simulate discretionary fiscal policy experiments relative to the baseline, mapping out their implications for key macroeconomic and fiscal variables.

#### **Stage 4**

Apply judgement to arrive at the final assessment of the degree of fiscal space under the relevant macroeconomic scenario, including compliance with and adequacy of existing rule-based fiscal frameworks, and to what extent this affects fiscal space.

Source: Adapted from IMF (2016b).

### 4.2 Cyclically-adjusted measure space

For the purposes of this paper, fiscal space is generally defined as the difference between the current annual fiscal balance and the constant balance that stabilises debt over a medium-term horizon at a sustainable level.

The fiscal model presented in this paper provides a means to measure fiscal space available to the Cook Islands Government. A cyclically-adjusted measure has been applied that accounts for the effects of business cycle fluctuations on revenue and expenditure in the year in question.

IMF (2018b) presents a cyclically-adjusted balance rule that imposes limits on the overall balance, correcting for the effects of business cycle fluctuations on revenue and expenditure.

The cyclically-adjusted balance rule has some advantages over the nominal balance rule adopted for the MTFs, for example by providing better economic stabilisation by disconnecting spending from cyclical revenues and letting automatic stabilisers operate freely. Specifically,

they do not force governments to cut spending in downturns. However, the IMF identifies a number of disadvantages. This includes the fact that their stabilisation capacity is limited because:

- automatic stabilizers can be small in some countries, for instance, when the tax system relies predominantly on customs revenue.
- They do not allow changes in the fiscal stance – once a country has achieved its targeted cyclically-adjusted balance, complying with the rule requires that the fiscal position remain constant over time, which means that the country cannot use discretionary fiscal policy to mitigate the fluctuations of the business cycle.

In addition, monitoring and enforcing cyclically-adjusted balance rules is challenging, largely due to the requirement for timely and reliable estimates of the output gap, which is difficult to estimate, and often prone to substantial ex-post revisions.

Nonetheless, the rule provides a useful fiscal space measure that directly accounts for the impact of the business cycle, as described in equation 4.

$$CAB = OB - g \times gap \quad (4)$$

Where:

- CAB is the cyclically-adjusted balance in percent of potential GDP;
- OB is the fiscal balance in per cent of GDP;
- G is government expenditure in per cent of GDP
- gap is the output gap as a percent of potential GDP.

Applying equation 4, with the parameter values shown in Table 4-1, returns a fiscal space estimate of about \$4 million in 2019/20. The cyclically-adjusted estimate takes into account the fact that the Cook Islands is currently facing a positive output gap.

**Table 4-1: Cyclically-adjusted fiscal space**

	2018/19 Estimate	2019/20 Projection	2020/21 Projection	2021/22 Projection	2022/23 Projection
Fiscal balance (% of nominal GDP)	-1.9	1.0	4.7	8.0	8.4
Government expenditure (%)	38.9	34.7	30.0	25.8	24.5
Output gap (%)	1.1%	1.0%	1.0%	0.9%	0.9%
<i>Cyclically-adjusted balance (% of potential GDP)</i>	-2.3	0.7	4.4	7.8	8.2
<b>Fiscal space (\$m)</b>	<b>-\$12</b>	<b>\$4</b>	<b>\$27</b>	<b>\$50</b>	<b>\$55</b>

## 5 The Fiscal & Macro Impact Model

### 5.1 Introduction

The Fiscal & Macro Impact model starts with a fiscal indicators baseline, as described in Section **Error! Reference source not found.**, with fiscal and macroeconomic shocks applied to this baseline, generating first and second order effects that impact on fiscal performance over the forward period.

Figure 5-1 shows the **SHOCKS** input tab. This permits the user to first choose between three types of shock:

- Fiscal – change in operating expenditure, capital expenditure and/ or revenue;
- GDP – models the impact of a direct change in GDP;
- Arrivals – models the impact of a change in the number of international visitors to the Cook Islands.

Figure 5-1: Shocks input tab

Shock scenarios		First choose shock type here				FISCAL .... then input your desired shock level							
A. Fiscal shock level (change from baseline)		2020	2021	2022	2023	Impact of shocks on fiscal indicators							
Operating	%	0.0%	0.0%	0.0%	0.0%	(In levels, unless otherwise indicated)							
Capital expenditure	%	0.0%	0.0%	0.0%	0.0%	2017	2018	2019	2020	2021	2022	2023	
Tax revenue	%	0.0%	0.0%	0.0%	0.0%	Fiscal impact							
	\$m					Operating expenditure (\$m)							
	\$m					Baseline	132	152	164	156	154	154	
	\$m					Shock	132	152	164	156	154	154	
	\$m					Capital expenditure (\$m)							
	\$m					Baseline	13	22	46	43	28	12	
	\$m					Shock	13	22	46	43	28	12	
	\$m					Tax revenue (\$m)							
	\$m					Baseline	167	181	185	191	196	203	
	\$m					Shock	167	181	185	191	196	203	
B. GDP or ARRIVALS shock level (change from baseline)		2020	2021	2022	2023	Impact of shocks on economic output							
	%					2016	2017	2018	2019	2020	2021	2022	2023
	\$m or #					Output impact							
						Real GDP (\$m)							
						434	463	505	533	563	593	623	653
						436	457	508	538	572	607	641	676
						100.5	98.7	100.6	101.1	101.7	102.4	103.0	103.5
						436	457	508	538	572	607	641	676
						Total change in output relative to baseline (\$m)							
						in percent of GDP							
						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
						Baseline GDP with the impact of shocks (\$m)							
						436	457	508	538	572	607	641	676
						Real GDP with impact of shocks (\$m)							
						(Percent change, unless otherwise indicated)							
						11.1	6.0	6.3	6.0	5.7	5.4		
							11.1	6.0	6.3	6.0	5.7	5.4	

The desired shock level can then be entered into the relevant cells, as a percentage change on the baseline, with the impact on fiscal indicators and GDP shown in the summary tables.

### 5.2 Fiscal shocks

Fiscal shocks – or alternatively government fiscal policy decisions – are evaluated in terms of their direct impact on fiscal indicators – these are the first order impacts – and their second order impacts via changes in GDP flowing through to tax revenues. The first order impacts are simply one for one changes in the baseline operating expenditure, capital expenditure or tax

revenue as relevant. The second order impacts are estimated using fiscal multipliers and a simple tax impact model.

### 5.2.1 Macro impacts – multipliers

The IMF cites a number of ways to assess the impact of fiscal policy on macroeconomic forecasts including:<sup>7</sup>

- **Fiscal multipliers** – estimates the impact on GDP growth of fiscal measures by subjecting a baseline GDP projection to an estimated fiscal shock using multipliers.
- **Macroeconomic modelling** – uses General Equilibrium modelling, for example.
- **Demand-side analysis** – uses the expenditure GDP approach to estimate the impact of fiscal policy on GDP. Changes in government consumption and investment can be measured directly, while the effect on private demand and net export of the fiscal measures need to be estimated to come up with a comprehensive assessment.

Following IMF (2014), the fiscal multiplier approach has been adopted for the following reasons:

- it is relatively easy to implement;
- it is transparent and explicitly controls for different shocks;
- it can take into account a range of country- and time-specific factors, including the effect of the business cycle; and
- it addresses, somewhat crudely, the circularity between fiscal and output variables, as the multiplier is a “reduced form” estimate that measures the final effect of the fiscal shock on GDP.

This fiscal model utilises an adapted version of the IMF’s Fiscal Multiplier Template.<sup>8</sup> The multipliers for the More Open to Trade group have been utilised with the following persistence levels:

- Operating expenditure (government consumption) – 3 years.
- Capital expenditure – 5 years.
- Tax revenue – 3 years.

The cumulative multipliers applied are shown in Table 5-1. For more detail refer to the Fiscal Multipliers section of the Fiscal Tool.

---

<sup>7</sup> IMF, 2014.

<sup>8</sup> IMF, 2015a.

**Table 5-1: Fiscal multipliers**

	Year 1	Year 2	Year 3	Year 4
Operating expenditure	0.3	0.4	0.2	0.0
Capital Expenditure	0.8	1.0	0.6	0.3
Tax Revenue	-0.3	-0.4	-0.2	0.0

### 5.2.2 Tax impacts

The tax impacts of the change in GDP due to the fiscal shocks are estimated in the Tax Impacts section of the model, which comprises two tabs.

The **Tax models** tab contains multivariate ordinary least squares (OLS) regression models that generate tax forecasts by the major tax categories: value-added tax, income tax, import levies, company tax, departure tax and withholding tax. The OLS regression approach has been adopted for ease of use in an Excel-based model environment. For general tax forecasting purposes the Cook Islands Government relies on a range of univariate time series models. Nonetheless, efforts have been made to ensure that the OLS regression models and forecasting models produce consistent results.

The **Fiscal Tax** tab runs the GDP changes resulting from the selected fiscal shocks through the OLS regression models to produce an estimate of the incremental change in tax revenue. This tab utilises univariate OLS regression models that estimate the relationship between the independent variables in the multivariate tax models, and GDP.

### 5.3 Macro shocks

Two types of macroeconomic shocks are provided for in the model. The first is a direct change in forecast GDP over the forward period. The second is a change in the expected number of international visitor arrivals, a key indicator of the tourism sector, the major driver of the Cook Islands economy.

#### 5.3.1 Direct GDP shock

The macro impact of a direct GDP shock assumes a one for one change in GDP in year one, followed by 40 and 20 per cent in year 2 and 3, respectively.

The tax impacts of direct GDP shocks are estimated in the **GDP Tax** tab, using the OLS regression models in a similar manner to that described above for fiscal shocks.

#### 5.3.2 Arrivals shock

The macro impact of an arrivals shock on GDP is estimated using univariate OLS regression models contained in the **Arr Tax** tab. The change in GDP level follows the same impact pattern as that described for the direct GDP shock.

The tax impacts of arrivals shocks are also estimated in the **Arr Tax** tab, using the OLS regression models in a similar manner to that described above for fiscal shocks.

## 5.4 Fiscal impact tab

The **Fiscal impact** tab tabulates the impact of selected shocks on key fiscal indicators, including performance against the fiscal rules, over the 2019/20 to 2022/23 period.

This tab relies on a simple version of the of the Cook Islands Government accounting framework – the Statement of Financial Performance – with a number of modifications proposed as part of the MTFS.

- The new fiscal rules – as determined in Chapter 3.
- A new Stabilisation Account – cash reserves greater than 4 months of expenditure are channelled into this contingency account, which can then be utilised for reducing public debt, or, in an economic downturn, funding new operating and/ or capital expenditure.

## References

---

- CIG, 2018a. Estimating the output gap in the Cook Islands – preliminary analysis. Working Paper No. 18/2. Cook Islands Government, August 2018.
- CIG, 2018b 2018/19 Cook Islands Government Half-year Economic and Fiscal Update. Cook Islands Government, December 2018.
- IMF, 2014. Fiscal Multipliers: Size, Determinants, and Use in Macroeconomic Projections. Fiscal Affairs Department, Technical Notes and Manuals. International Monetary Fund, Washington. April 2014.
- IMF, 2015a. MCD Fiscal Multiplier Template. Available at: <https://www.imf.org/external/pubs/ft/tnm/2015/data/tnm1501.xlsm>.
- IMF, 2015b. Strengthening Fiscal Frameworks and Improving the Spending Mix in Small States. Asia and Pacific Department, International Monetary Fund, Washington D.C., June 2015.
- IMF, 2016a. Procyclical Fiscal Policy: Shocks, Rules and Institutions – A View from Mars. IMF Working Paper, International Monetary Fund, Washington D.C., January 2016.
- IMF, 2016b. Assessing fiscal space: An initial set of considerations. Staff paper, International Monetary Fund, Washington D.C., December 2016.
- IMF, 2018a. Fiscal policy: How to calibrate fiscal rules – A Primer. Fiscal Affairs Department, International Monetary Fund, Washington D.C., March 2018.
- IMF, 2018b. Fiscal Policy- How to select fiscal rules: a primer. Fiscal Affairs Department, International Monetary Fund, Washington. March 2018.

## Abbreviations and acronyms

---

CIG	Cook Islands Government
FRR	Fiscal responsibility ratios
GDP	Gross domestic product
IMF	International Monetary Fund
MFEM	Ministry of Finance and Economic Management
MTFS	Medium-term Fiscal Strategy
OLS	Ordinary least squares
VAT	Value-added tax