



Government of the  
Cook Islands

# Cook Islands Tourism Forecasts 2020 to 2024

Information Paper

7 November 2019



Prepared by the Economic Planning Division, Ministry of Finance and Economic Management.  
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# 1 Summary

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## 1.1 Introduction

This paper presents forecasts of tourist expenditure in the Cook Islands, by major tourism market, using a combination of time series models to forecast the following components:

- tourist activity – the number of visitor arrivals – using monthly arrivals data;
- average length of stay by tourists using monthly intended length of stay data; and
- average daily expenditure using quarterly survey estimates.

Multiplying these three elements together provides quarterly forecasts of total expenditure, by major market, that can be aggregated to annual forecasts.

## 1.2 Forecasts

### Activity

Table 1-1 shows aggregate tourist arrivals forecasts broken down by major market. Total arrivals for 2019/20 are estimated to be about 170,611, 2 per cent higher than the 166,874 seen in 2018/19. This expected rise on the 2018/19 growth rate largely reflects a strong start to 2019/20. July 2019 saw a new overall record of 18,612 visitors, with August reporting 18,464 visitors, the highest ever for that month. Growth is then expected to fall to about 1 per cent per year by 2023/24.

**Table 1-1: Estimated total tourism numbers, by major market, 2018/19 to 2023/24**

Quarters	2018/19e	2019/20f	2020/21f	2021/22f	2022/23f	2023/24f
New Zealand	110,607	112,301	114,746	115,124	116,654	116,558
Australia	28,482	29,864	30,092	30,850	31,199	31,809
USA & Canada	11,291	11,395	11,867	12,287	12,571	12,936
Europe	12,358	12,591	13,098	13,747	14,239	14,813
Other	4,136	4,460	4,488	4,602	4,662	4,754
<b>Total</b>	<b>166,874</b>	<b>170,611</b>	<b>174,292</b>	<b>176,610</b>	<b>179,324</b>	<b>180,870</b>

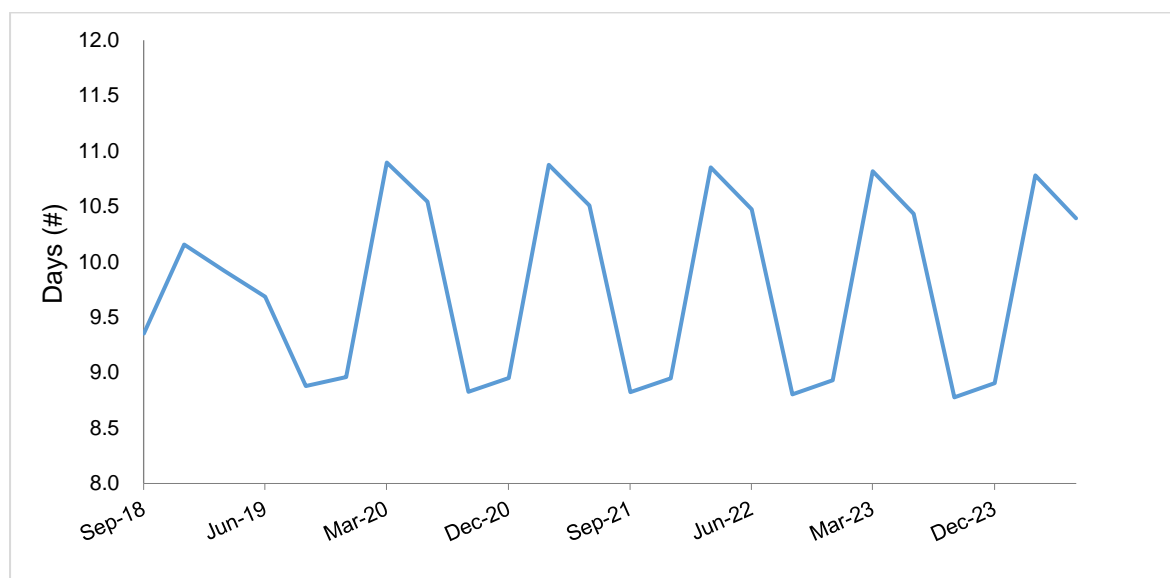
Source: MFEM analysis.

Running the forecasts out 10 years to 2029/30, at a one per cent growth rate, takes total visitor arrivals to about 190,000.

### Average stay

Quarterly average stay forecasts for the period to June 2024 are shown below. Total average stay is expected to remain consistent with levels seen in the most recent data, with a slight rising trend over the forecast period.

**Figure 1-1: Total average stay forecasts, 2016 to 2024**

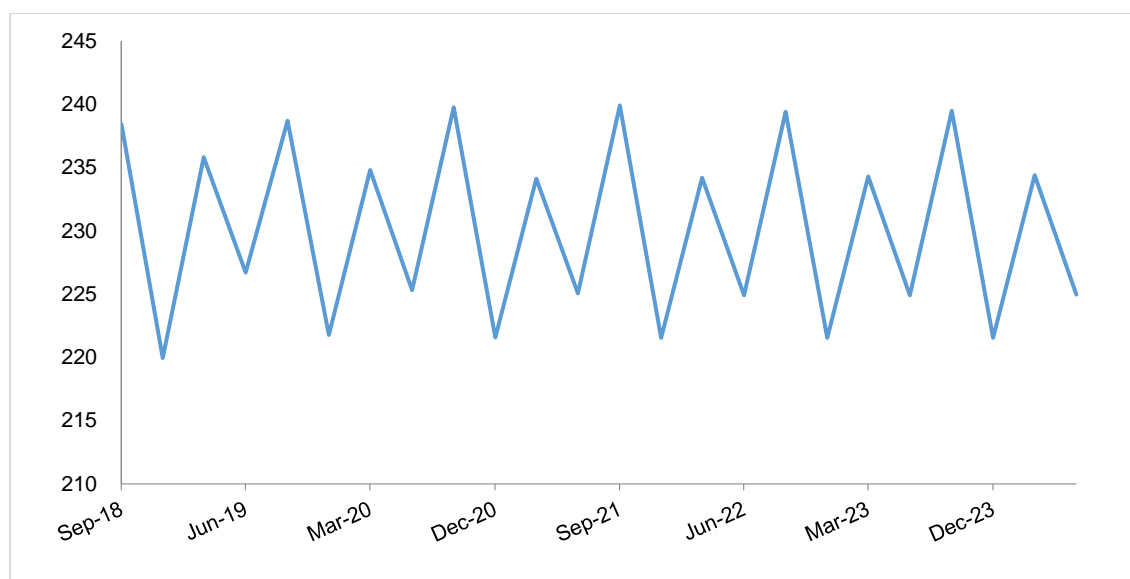


Source: MFEM analysis.

**Daily expenditure**

Quarterly average daily expenditure forecasts for the period to June 2024 are shown below. Expenditure is expected to remain consistent with levels seen in the most recent data.

**Figure 1-2: Average daily expenditure forecasts, 2016 to 2024**

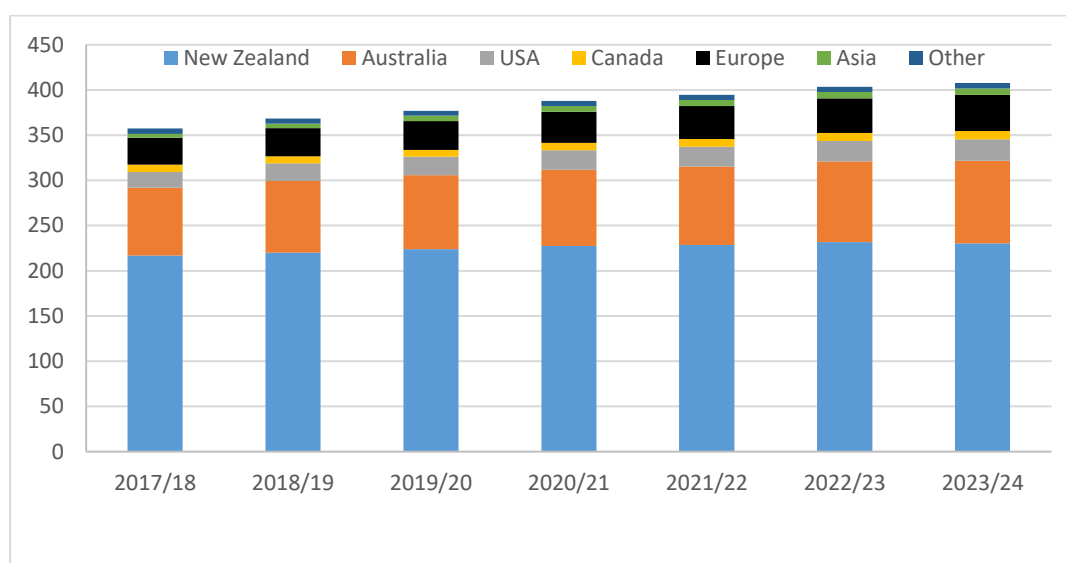


Source: MFEM analysis.

**Total expenditure**

Forecasts for the period 2019/20 to 2023/24 are shown in Figure 1-3 and Table 1-2. Total expenditure is expected to rise from \$368 million in 2018/19 to \$373 million in 2019/20, an increase of 1 per cent. Growth of about 2 per cent per year is expected thereafter, falling to 1 per cent by the end of the forecast period.

**Figure 1-3: Total expenditure, major market, \$ million current prices, 2017/18 to 2023/24**



Source: MFEM analysis.

**Table 1-2: Total expenditure, major market, \$ million current prices, 2017/18 to 2023/24**

Year	All	New Zealand	Australia	USA	Canada	Europe	Asia	Other
2017/18	333	201	65	19	6	28	8	6
2018/19	357	217	75	17	8	30	4	6
2019/20	368	220	79	19	8	31	5	6
2020/21	377	224	82	20	8	32	6	5
2021/22	388	228	84	21	8	34	7	6
2022/23	395	229	87	22	9	36	7	6
2023/24	404	232	89	23	9	38	7	6

Source: MFEM analysis.

Expenditure is dominated by New Zealand, accounting for 59 per cent of the total in 2019/20 followed by Australia on 22 per cent and Europe on 8 per cent. On average, across all visitors, average expenditure per visitor to the Cook Islands is expected to rise from \$2,169 in 2018/19 to \$2,255 by 2023/24.

## Conclusion

A key message moving forward concerns the capacity constraints already facing the tourism industry. The industry has reached peak capacity during the high season, with a new record of 18,612 arrivals in July 2019. Without an increase in bed numbers, or greater visitor spread across the year, any increase in numbers above the 'capacity-constrained' forecasts in this paper is likely to result in higher prices and a reduction in international tourism competitiveness. The visitor survey evidence already shows a substantial increase in the average daily expenditure on accommodation since 2012/13, which is a cause for concern.

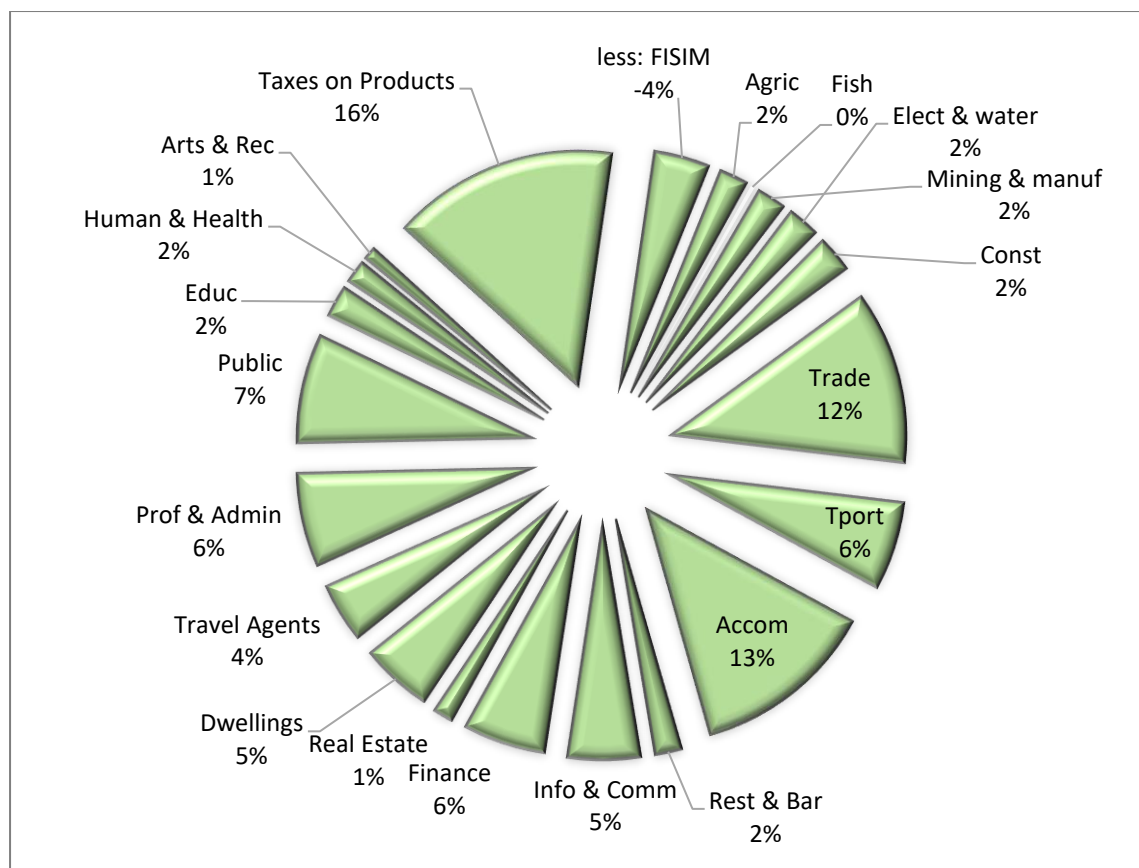


## 2 Introduction and forecasting approach

### 2.1 Introduction

The Cook Islands is a small open economy that is dominated by the tourism industry. The breakdown of the Cook Islands economy by industry in 2017/18 is shown in Figure 2-1. The tertiary or services sector, accounted for about 77 per cent of the total economy in 2017/18, with the two largest tertiary industries, trade and accommodation services accounting for more than a quarter of total economic output.

Figure 2-1: Cook Islands economy by industry, 2017/18



The 15 islands in the Cooks are located in the heart of the Pacific, halfway between Hawaii and New Zealand.

International airlines that service the Cook Islands are Air New Zealand, Virgin Australia, Jetstar and Air Tahiti. Air New Zealand has daily flights from Auckland, and Virgin Australia and Jetstar have several flights a week from Australia, via Auckland. Air Tahiti has 1 flight a week from Tahiti.

Figure 2-2: Cook Islands location



Air New Zealand also operates direct flights out of Sydney and Los Angeles once a week that are underwritten by the Cook Islands Government. The key policy objectives for underwriting these two routes are to:

- increase the number of visitor arrivals to the Cook Islands;
- diversify source markets beyond those that are delivered through the normal commercial route of Auckland – these markets include Europe, North America and Australia to a lesser extent; and
- target the Australian and Northern Hemisphere market as a yield strategy to attract higher spending visitors that stay longer, travel to the outer islands and predominantly travel during the low and shoulder seasons.

There is one domestic air service to the Pa Enua operated by Air Rarotonga, with daily flights to Aitutaki, scheduled flights to Atiu, Mangaia, Mauke, Mitiaro, Manihiki, with Penryhn and Pukapuka serviced by charter flights.<sup>1</sup>

The Cook Islands is also on the schedule of a number of international cruise ship services. The majority call in at Rarotonga and Aitutaki, spending a day at each location.<sup>2</sup>

## 2.2 Forecasting purpose

The Ministry of Finance and Economic Management (MFEM) is the central agency responsible for advising the Cook Islands Government on financial and economic issues. The Economics Division's core role within MFEM is to provide economic advice underpinning strategic policy

<sup>1</sup> For more information see: <https://www.airraro.com/en>.

<sup>2</sup> See: <https://s3.amazonaws.com/cit-edms/Wedsite/CRUISE+SHIP+SCHEDULE+2019.pdf>.

developments and economic opportunities in the Cook Islands. Central to this role is an understanding of the current, and expected future, state of the economy and its key industries.

In addition, forecasts of key industries are also required on a regular basis to support the budget process, as set out in section 18 of the *Ministry of Finance and Economic Management Act 1995-96*.

Economic growth forecasts for four years are used to inform both the Government revenue estimates and Government expenditure (operating and capital) decisions in the annual budget process. Together, this information describes the Cook Island Government's fiscal position for the upcoming financial year (1 July to 30 June) and the following three years.

The aggregate number of visitor arrivals as a key economic growth driver is also an explanatory variable in MFEM's time series economic forecasting model, and as such directly feeds into the economic growth forecasts.

While aggregate tourism forecasts are a key focus of this paper, analysis of, and forecasts for, the key Cook Islands tourism markets is also necessary.

To meet the various needs described above, and informed by historical performance, this paper presents tourism forecasts for the period 2019/20 to 2023/24, which matches that required for the 2020/21 budget cycle. The forecasts contain predicted number of visitor arrivals, in aggregate and by key market, and projections of the value of tourism expenditure, utilising expenditure data from quarterly market surveys.

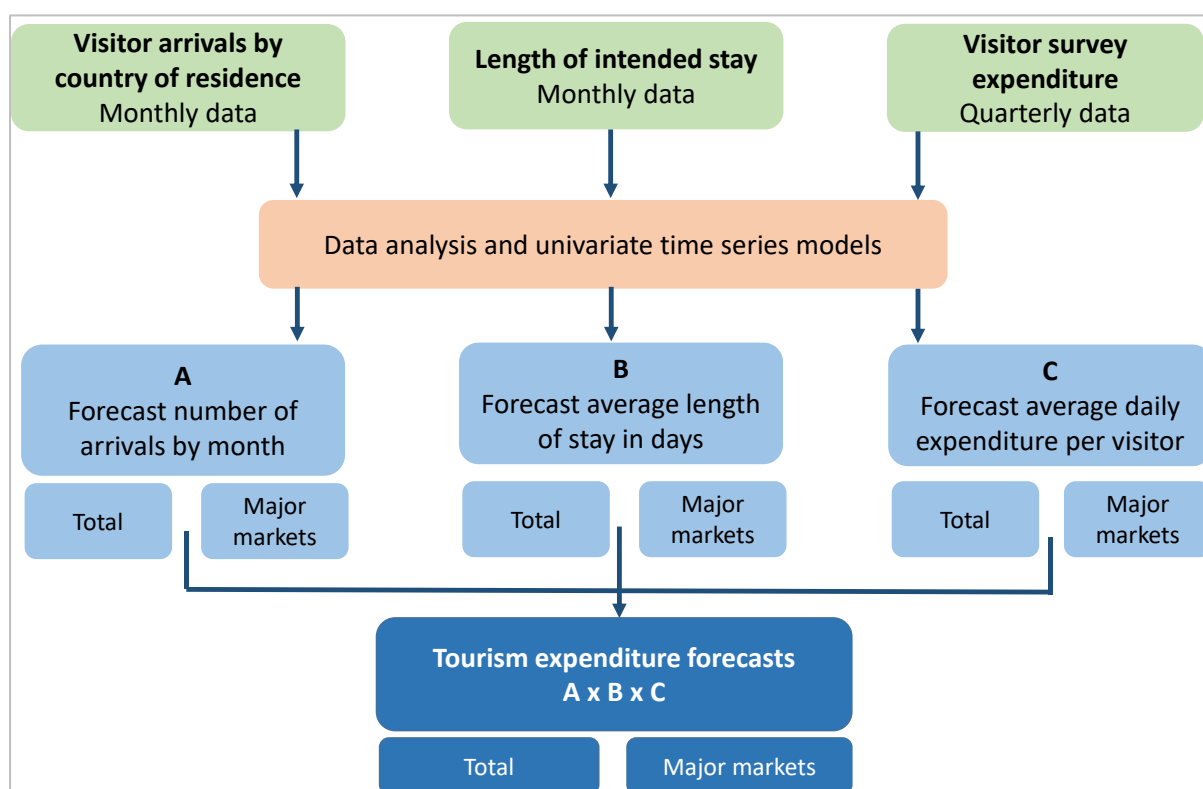
### **2.3 Forecasting approach**

This paper presents forecasts of tourist expenditure using a combination of univariate time series models to forecast the following components:

- tourist activity – the number of visitor arrivals – using monthly arrivals data;
- average length of stay by tourists using intended length of stay data; and
- average daily expenditure using quarterly survey estimates.

The forecasting approach utilised in this paper is shown in Figure 2-3.

Figure 2-3: Tourism modelling approach



Source: MFEM.

MFEM used the following open-source software to undertake the time series analysis for this paper:

- R Project; and<sup>3</sup>
- R Studio interface.<sup>4</sup>

## 2.4 Remainder of this paper

The remainder of this paper is structured as follows:

- Chapter 3 analyses historical visitor activity using arrivals data, the data source for the time series arrivals model presented in Chapter 6 of this paper, in aggregate and by key tourism market.
- Chapter 4 analyses the average length of stay data, by major market.
- Chapter 5 analyses visitor age and gender characteristics by nationality and international airline using daily arrivals and departures data.
- Chapter 6 presents the time series activity and average length of stay forecast methodology and the forecasts generated.

<sup>3</sup> R Core Team (2018).

<sup>4</sup> RStudio (2016).

- Chapter 7 analyses tourist expenditure patterns using quarterly survey data and provides expenditure forecasts using a time series model.
- Chapter 8 brings the arrivals, average length of stay and expenditure data together to produce tourism expenditure forecasts.

## 3 Tourist activity data analysis

### 3.1 Introduction

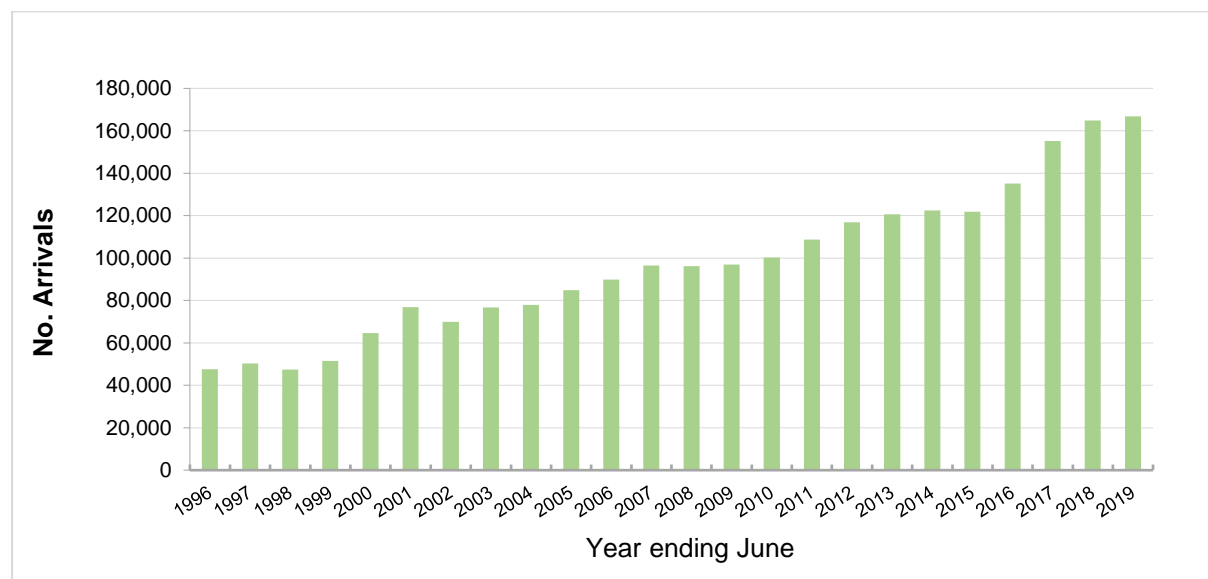
The Statistics Office publishes monthly data on international visitor arrivals in the Cook Islands, disaggregated by country of usual residence.<sup>5</sup> This chapter analyses this time series data over the period January 1995 to March 2019.

### 3.2 Total visitor arrivals

#### 3.2.1 Annual series

Following strong growth over the last few years, growth in tourist arrivals in the most recent complete financial year 2018/19 shows signs of easing. After contracting by 0.9 per cent in 2014/15, the tourism market saw growth of 11 per cent in 2015/16, and 15 per cent in 2016/17. 2017/18 saw lower, but still strong, growth, with arrivals reaching 164,800, 6 per cent higher than the 155,230 visitors recorded in the year to June 2017. 2018/19 saw growth falling to 1 per cent. Figure 3-1 shows the growth in annual visitor arrivals from about 48,000 in 1995/96 to about 170,000 in 2018/19.

Figure 3-1: Annual total visitor arrivals, 1995/96 to 2018/19



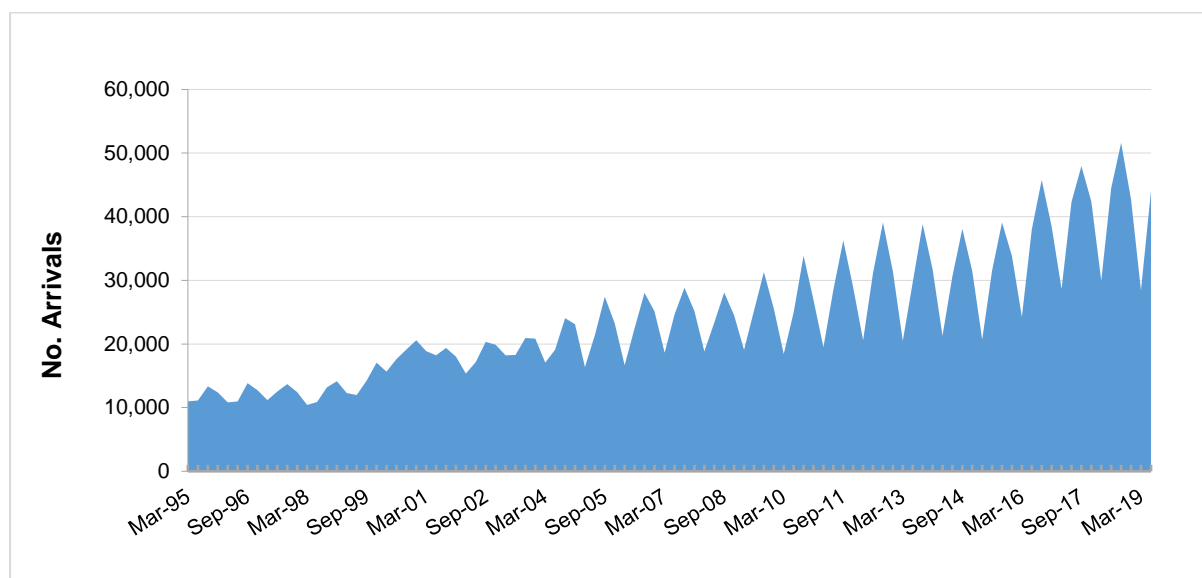
Source: Cook Islands Statistics Office.

#### 3.2.2 Quarterly series

Figure 3-2 shows total arrivals on a quarterly basis. This data series shows a strong seasonal pattern, with peaks and troughs the September and March quarters, respectively. The data also suggests that the amplitude of the peaks and troughs has been growing as the level of the series increases.

<sup>5</sup> Note that country of usual residence is not the same as nationality.

**Figure 3-2: Quarterly total visitor arrivals, March 1995 to June 2019**

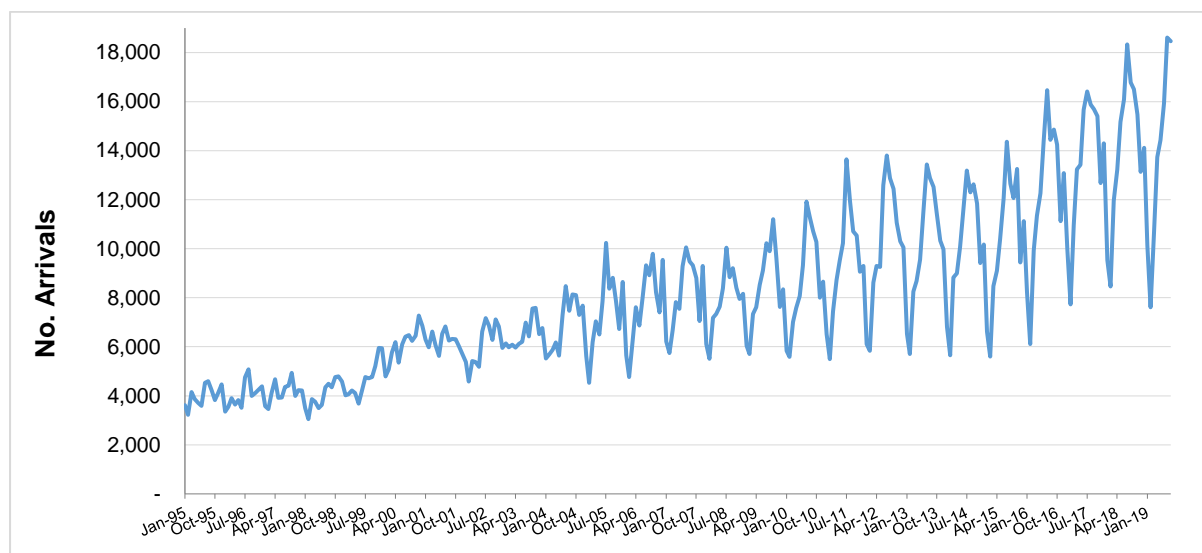


Source: Cook Islands Statistics Office.

### 3.2.3 Monthly series

Figure 3-3 shows monthly total arrivals data from January 1995 to August 2019. As for the quarterly data, this series shows a strong inclining trend and a very clear seasonal pattern. The peaks are in the cooler ‘dry’ months from May to September, and troughs in the warmer and wetter period from October to April.

**Figure 3-3: Monthly total visitor arrivals, 1995 to 2019**

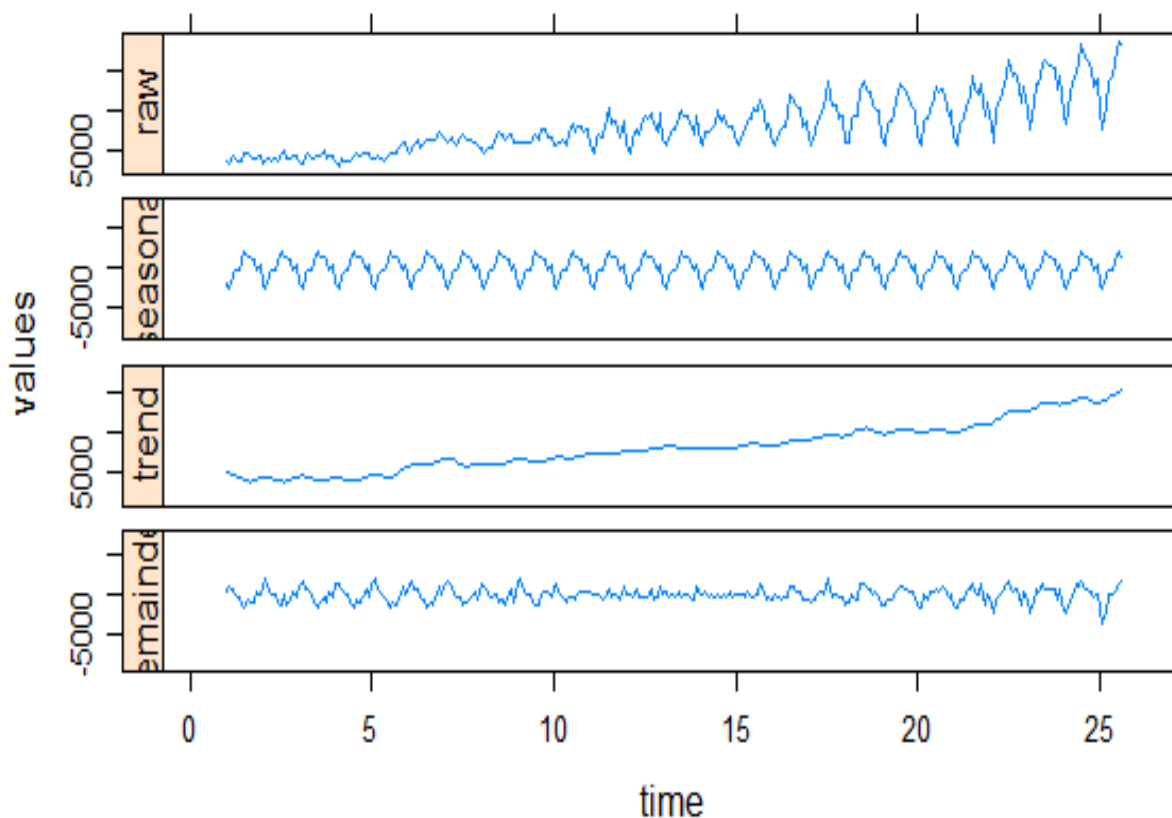


Source: Cook Islands Statistics Office.

July 2019 recorded the highest number of tourists that the country has received with 18,612 arrivals. The other notable feature clearly shown in the monthly series is that over the last two years, in addition to an increase in the peaks, there has also been an appreciable rise in the troughs.

Decomposing the monthly time series arrivals data into its trend, seasonal and remainder components, using the 'stlplus' function in R, confirms the seasonal and trend pattern (see Figure 3-4).<sup>6</sup>

**Figure 3-4: Monthly visitor arrivals – decomposed**



Source: MFEM analysis.

Time series economic data are often characterised by autocorrelation (serial correlation) of the disturbances across periods, which violates the ordinary least squares (OLS) assumption that the error term is independently distributed across observations. It results in the estimates being inefficient and also adversely affects any inferences derived from the estimates. Total arrivals shows a persistent pattern with clear evidence of autocorrelation.<sup>7</sup>

### 3.3 Key markets

#### 3.3.1 Introduction

New Zealand dominates the Cook Islands visitor numbers, with 66 per cent of total arrivals in 2018/19, followed by Australia with 17 per cent and Europe and North America at 7 per cent

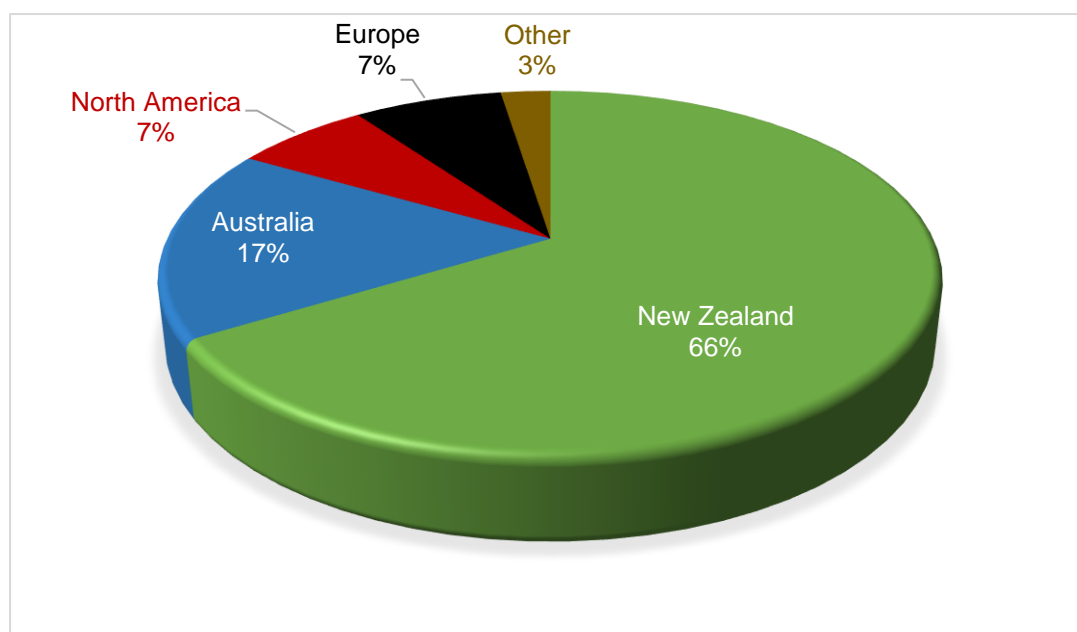
<sup>6</sup> Seasonal Trend Decomposition using Loess (STL) is an algorithm that was developed by Cleveland et al. (1990) to decompose a time series into trend, seasonal and remainder components. STL consists of a sequence of applications of the loess smoother.

<sup>7</sup> Refer to Appendix 1 for more analysis.



each (see Figure 3-5). Other markets including Asia and French Polynesia make up the remaining 3 per cent.

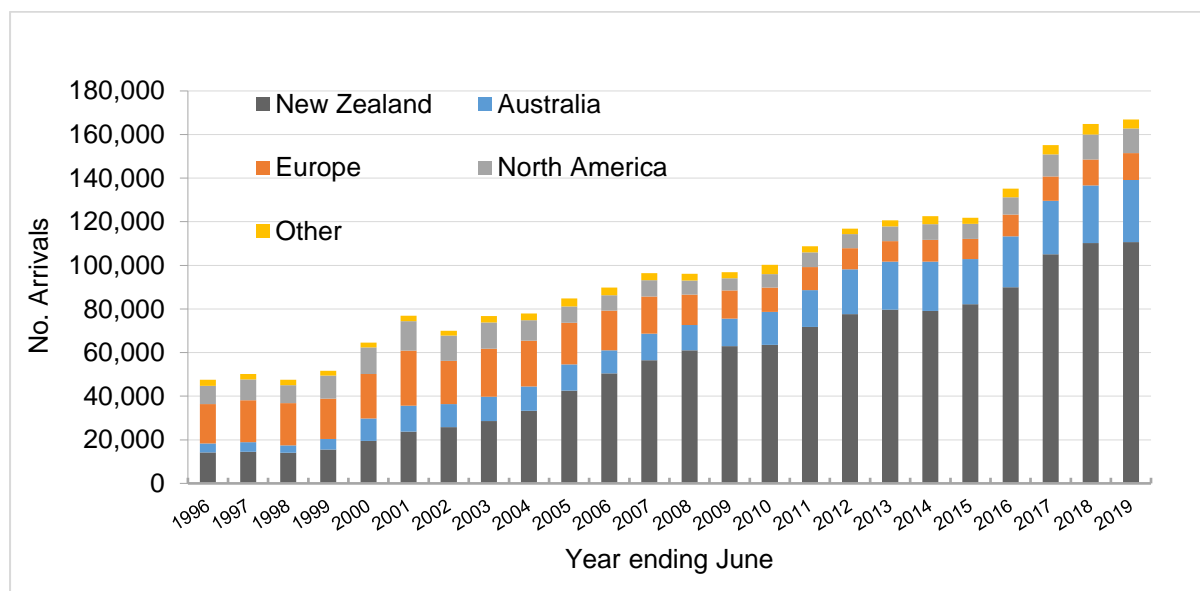
**Figure 3-5: Proportion of arrivals by market, 2018/19**



Source: Cook Islands Statistics Office.

Figure 3-6 shows arrivals by key market from 1995/96 to 2018/19. Over this period, New Zealand arrivals have grown at an average rate of 9.3 per cent per year, followed by Australian arrivals at 8.9 per cent. In contrast, arrivals from Europe fell by an average of 1.6 per cent per year.

**Figure 3-6: Arrivals by key market, 1995/96 to 2018/19**



Source: Cook Islands Statistics Office.

As shown in Table 3-1, following substantial growth in all key market segments since 2014/15, 2018/19 showed strong growth in the Australian and European markets, with New Zealand flat lining and the North American and Other markets declining.

**Table 3-1: Annual growth in arrivals by key market, 2014/15 to 2019/20**

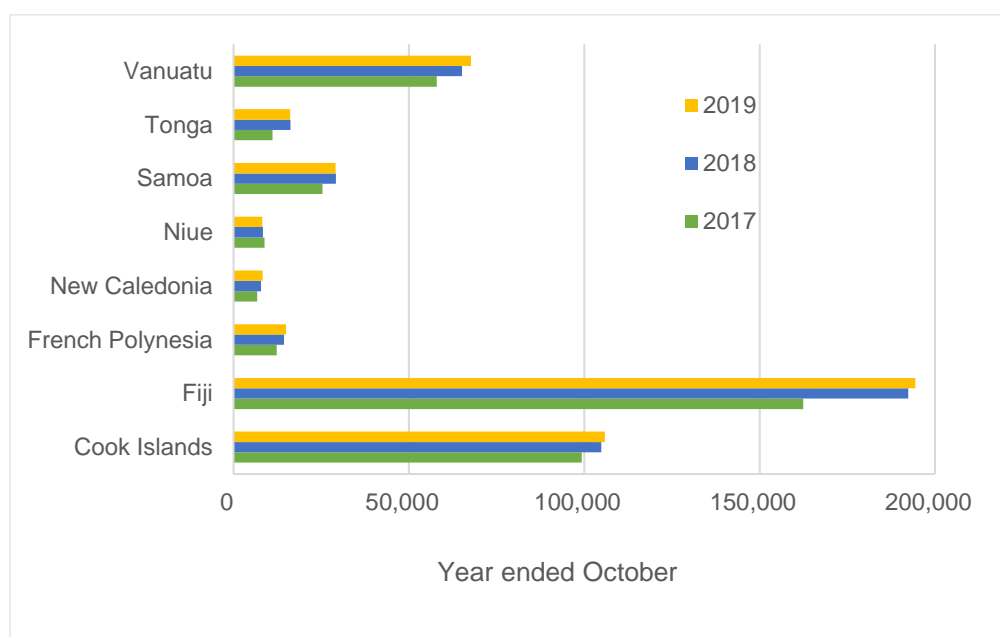
Year to	New Zealand	Australia	North America	Europe	Other
Jun-15	4%	-9%	-3%	-7%	-27%
Jun-16	9%	13%	14%	7%	48%
Jun-17	17%	5%	27%	12%	10%
Jun-18	5%	7%	13%	7%	11%
Jun-19	0%	8%	-1%	4%	-14%

Source: MFEM analysis.

### 3.3.2 New Zealand

New Zealand arrivals reached 110,607 in 2018/19, less than 1 per cent increase over 2017/18. Recent growth in tourism numbers from New Zealand is consistent with the 1 per cent growth in New Zealand outward tourists to the Pacific in the year to July 2019. The Cook Islands share of tourists to Oceania remains steady at about 6 per cent in the year to July 2019, behind Australia and Fiji.

**Figure 3-7: New Zealand Pacific outbound tourist numbers, by destination**



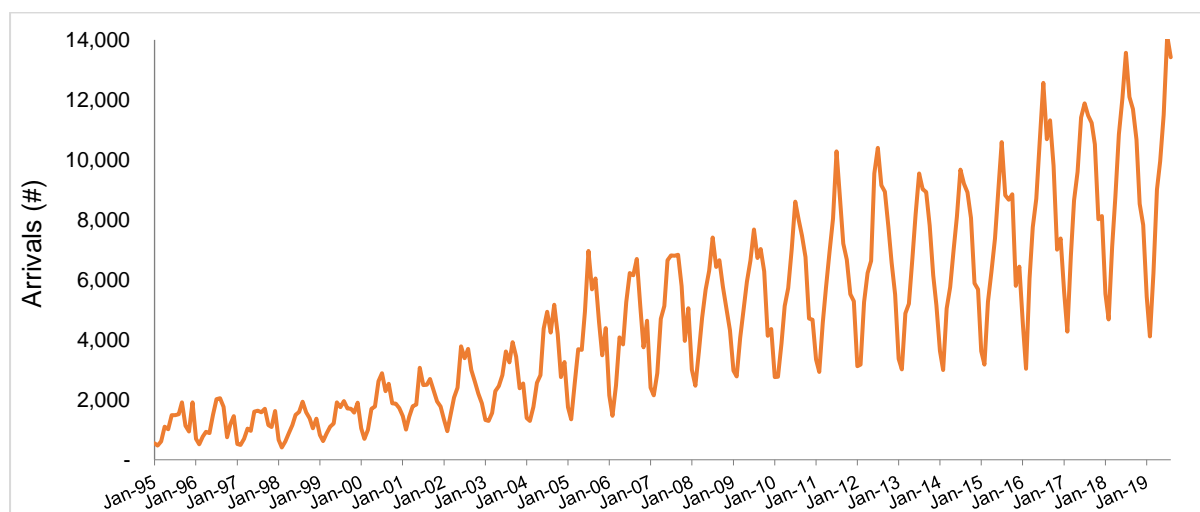
Source: Stats NZ (2019).

Note: Excludes Australian data.

Strong growth in the New Zealand market over the past few years has encouraged several airlines to increase the number of flights to the Cook Islands, which also has a positive impact on the Australian market as it provides more options for indirect flights.

Figure 3-8 shows monthly New Zealand arrivals. The seasonal pattern matches that in the total arrivals data series.

**Figure 3-8: Monthly arrivals, New Zealand, Jan 1995 to August 2019**



Source: Cook Islands Statistics Office.

### 3.3.3 Australia

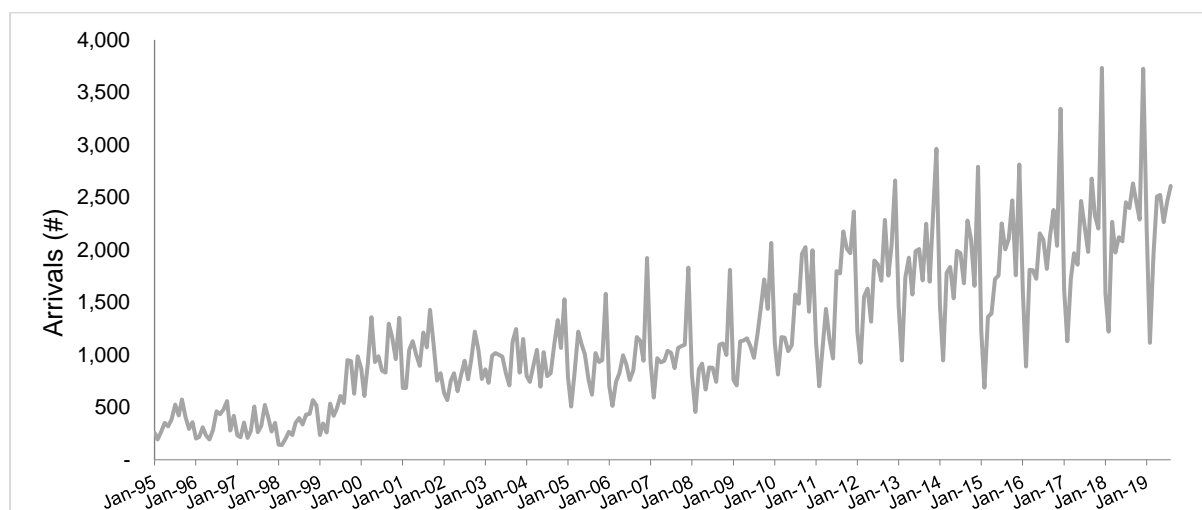
Australia is the second largest tourism market for the Cook Islands. After experiencing a 9 per cent decrease in arrivals in 2014/15, visitor numbers recovered with an increase of about 13 per cent in 2015/16 and 5 per cent in 2016/17, followed by a further rise of 7.4 per cent in 2017/18, rising from 24,578 to 26,398. 2018/19 showed continued strong growth of 8 per cent to 28,482.

The increases in arrivals are off the back of strong growth in Australian outbound tourism, with 3.7 per cent growth in short-term resident returns in 2018/19 compared to the year before, and the increase in flights from New Zealand to Rarotonga which has increased interconnection options from Australian cities.<sup>8</sup>

The monthly Australian arrivals data series, which shows a strong inclining trend, displays a different seasonal pattern to that of New Zealand with a pronounced peak in December (see Figure 3-9).

<sup>8</sup> ABS (2019).

**Figure 3-9: Monthly arrivals, Australia, Jan 1995 to August 2019**



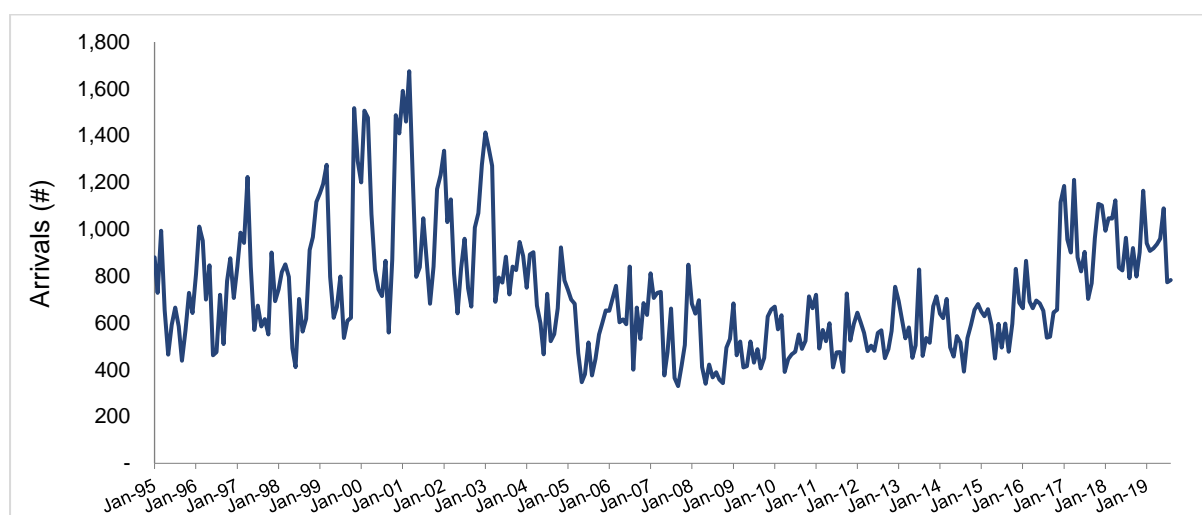
Source: Cook Islands Statistics Office.

### 3.3.4 North America

Arrivals from the United States increased by 9.3 per cent in 2017/18, to 8,131 from 7,436, and up a further 1 per cent to 8,233 in 2018/19. Following strong growth in the Canadian market since 2015/16, numbers fell by 7 per cent in 2018/19 from 3,287 to 3,058. Overall, the North American market fell by 1 per cent in 2018/19 from 11,418 to 11,291.

The monthly North American data series shows an inclining trend from about 2006, with peaks in the hotter and wetter months (see Figure 3-10).

**Figure 3-10: Monthly arrivals, North America, Jan 1995 to August 2019**



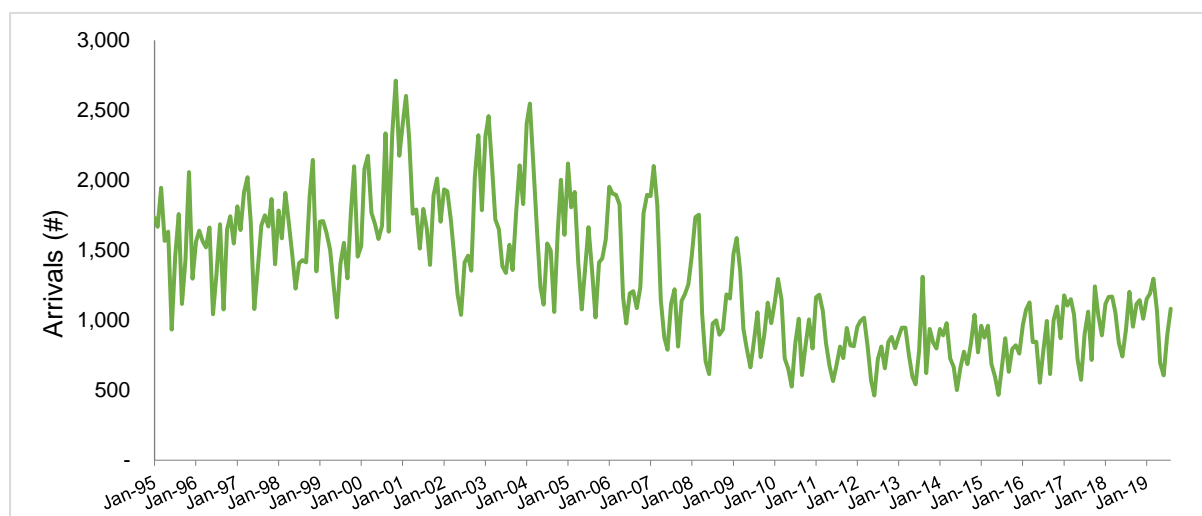
Source: Cook Islands Statistics Office.

### 3.3.5 Europe

After a steady decline from the early 2000's, arrivals from Europe have shown strong growth in recent years, with visitor numbers rising by 12 per cent in 2016/17, followed by a further rise of 7 per cent in 2017/18, from 11,122 to 11,928. 2018/19 showed further positive growth of 4 per cent to 12,358.

The monthly data series (see Figure 3-11) shows a similar but less consistent seasonal trend than that for North America, with a bias towards visiting the Cook Islands in the hotter and wetter months.

**Figure 3-11: Monthly arrivals, Europe, Jan 1995 to August 2019**

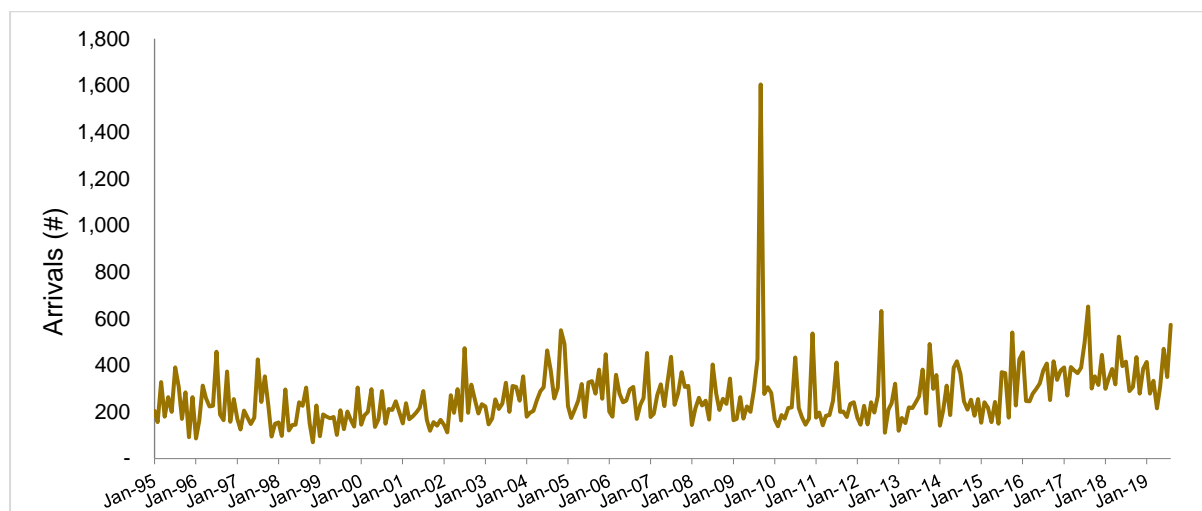


Source: Cook Islands Statistics Office.

### 3.3.6 Other

The other category, which primarily constitutes visitors from Asia and French Polynesia, has shown strong growth in recent years, albeit from a low base, until a decline in 2018/19 of about 15 per cent. The monthly data series for other visitors shows a similar seasonal pattern to that for New Zealand, with peaks in the cooler and drier season (see Figure 3-12).

**Figure 3-12: Monthly arrivals, Other, January 1995 to March 2019**



Source: Cook Islands Statistics Office.

## 4 Tourist average stay analysis

### 4.1 Introduction

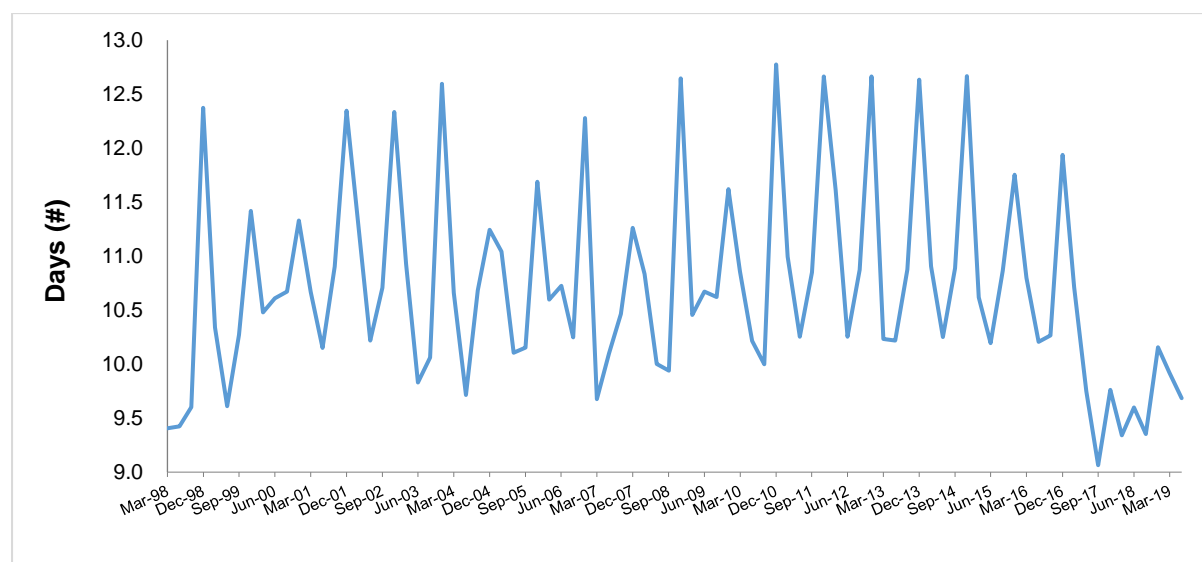
The Statistics Office publishes monthly data on visitor arrivals by average length of intended stay in the Cook Islands, by country of usual residence. This chapter analyses this time series data over the period January 1998 to June 2019.

### 4.2 All visitors

#### 4.2.1 Quarterly series

Figure 4-1 shows the average intended stay across all visitors to the Cook Islands from March 1998 to June 2019. The scaled quarterly data shows a clear seasonal pattern with peaks in the December quarter. The last two years shows a significant decline in the average stay.

Figure 4-1: Total average intended stay, quarterly, March 1998 to June 2019

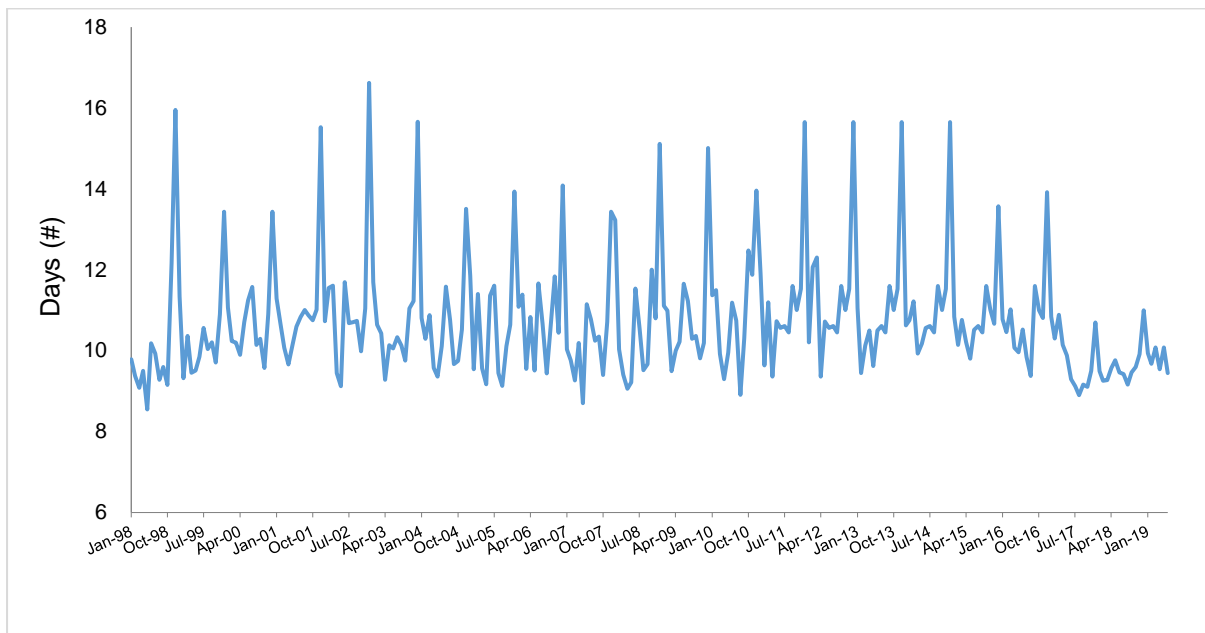


Source: MFEM analysis.

#### 4.2.2 Monthly series

Figure 4-2 shows the monthly data series from January 1998 to June 2019. The data shows a seasonal pattern with strong peaks in the month of December, along with a significant decline in both peaks and troughs over the last two years.

**Figure 4-2: Total average intended stay, January 1998 to June 2019**



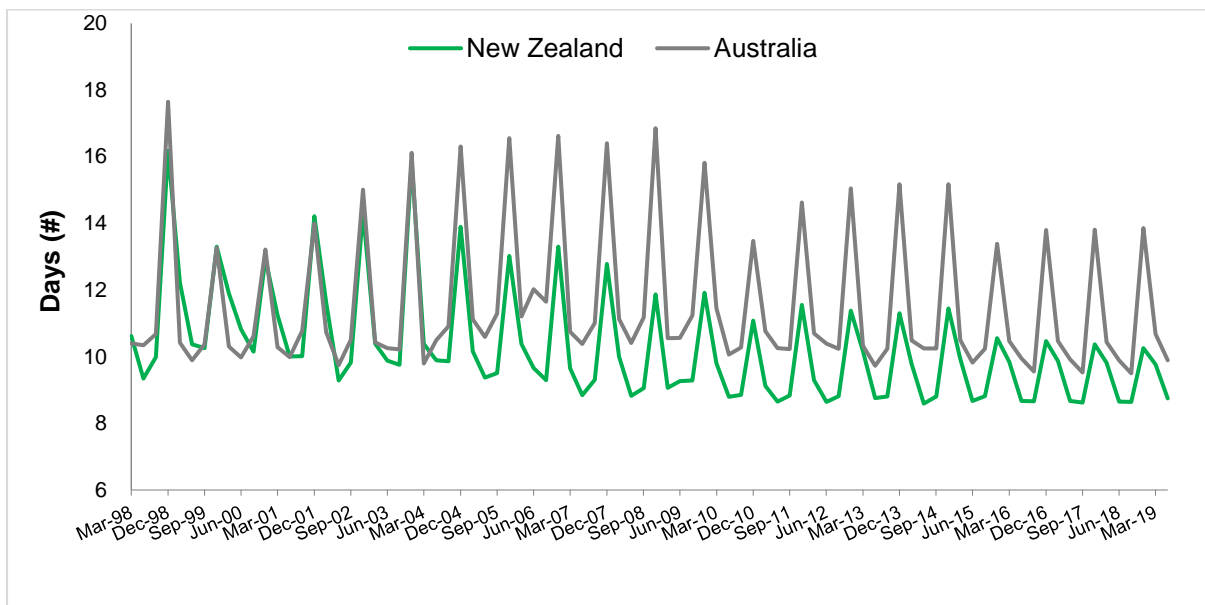
Source: Cook Islands Statistics Office.

### 4.3 Key markets

#### 4.3.1 New Zealand and Australia

The New Zealand and Australian quarterly data show the same December quarter peak, with Australians tending to stay significantly longer on average than their New Zealand counterparts.

**Figure 4-3: New Zealand and Australia, average intended stay, quarterly**

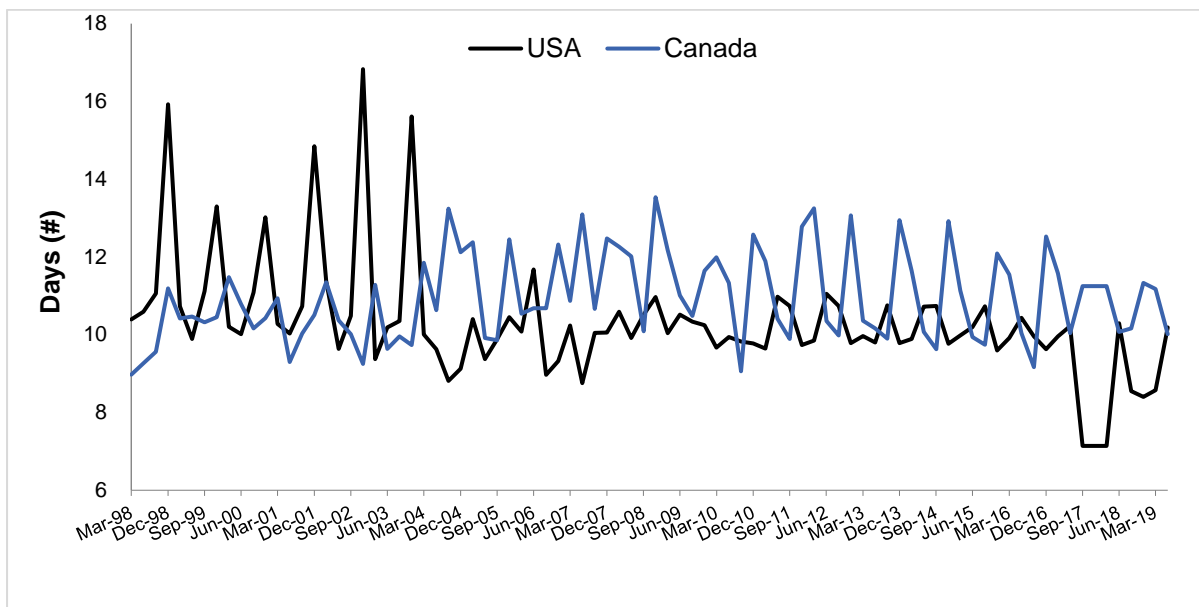


Source: MFEM analysis.

### 4.3.2 USA and Canada

The Canadian data shows peaks in the March quarter, with Canadians tending to stay significantly longer on average than their American counterparts.

Figure 4-4: USA and Canada average intended stay, quarterly

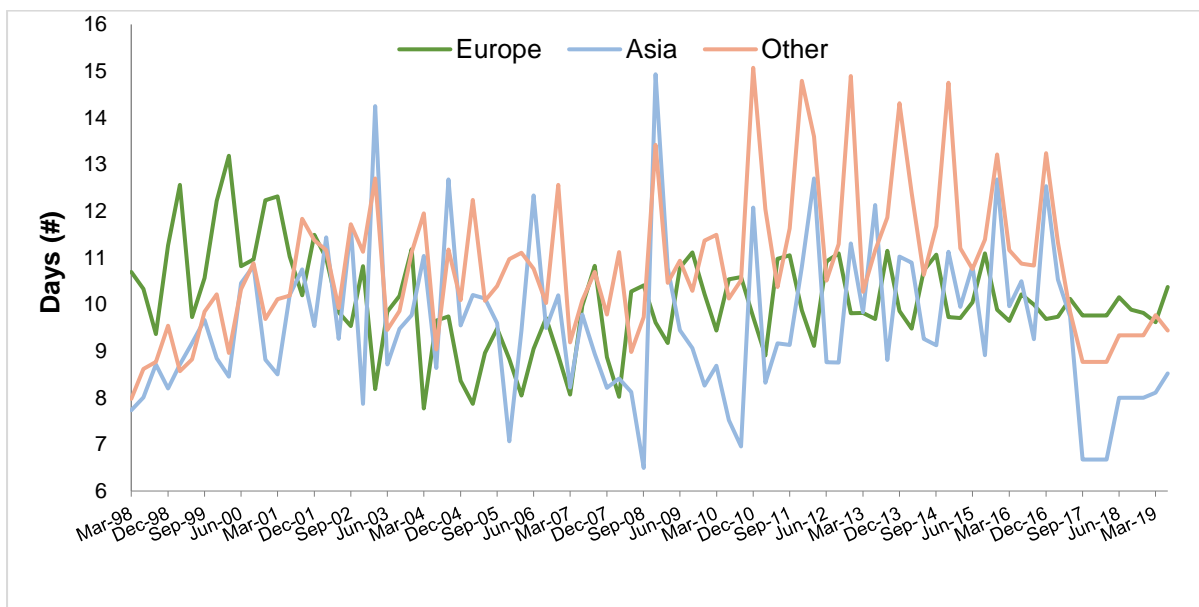


Source: MFEM analysis.

### 4.3.3 Other key markets

The quarterly data for the other key markets show a less stable seasonal pattern and more variability than the other major markets.

Figure 4-5: Other key market average intended stay, quarterly



Source: MFEM analysis.



## 5 Tourist demographic analysis

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### 5.1 Introduction

This chapter utilises daily visitor arrivals and departures data over the period 1 January 2011 to 31 December 2018 to analyse the age profile, gender and average length of stay by visitor nationality, airline and underwritten flight service — direct flights between Rarotonga and Los Angeles and Sydney.<sup>9</sup>

### 5.2 Age profile

#### By nationality

The proportion of total visitor arrivals over the period 2011 to 2018, broken down by nationality and age group, is shown in Table 5-1. Overall, the 18-29 and 50-59 age groups dominate. At the key market level, the 18-29 age group is particularly well represented by Europeans and Asians. At the other end of the age profile, Canadians are predominantly in the 50-59 and older age groups.

Table 5-1: Age profile by nationality

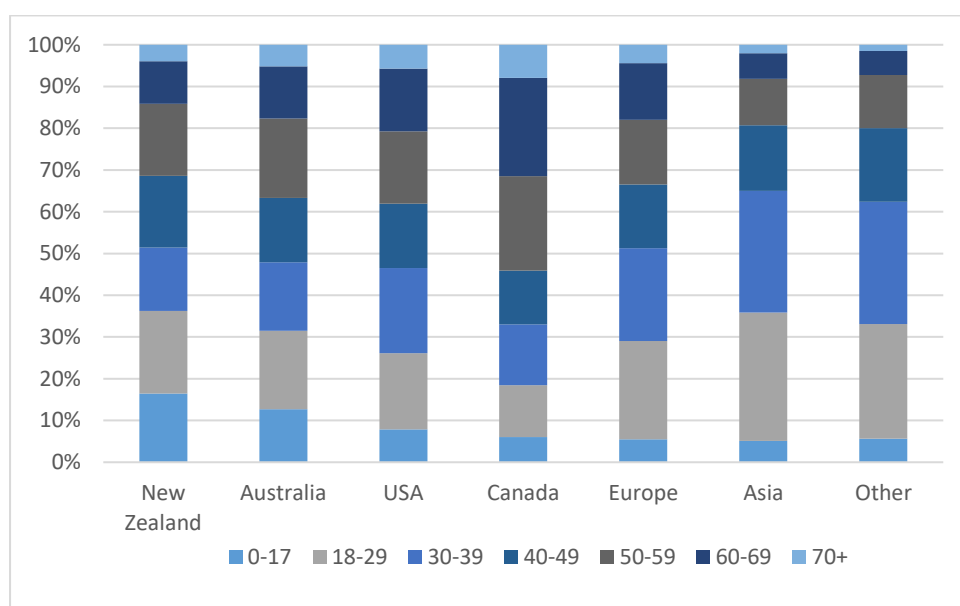
Age group	All	New Zealand	Australian	American	Canadian	European	Asian	Other
0-17	14%	16%	13%	8%	6%	5%	5%	6%
18-29	20%	20%	19%	18%	12%	24%	31%	27%
30-39	17%	15%	16%	20%	15%	22%	29%	29%
40-49	16%	17%	15%	15%	13%	15%	16%	18%
50-59	17%	17%	19%	17%	23%	16%	11%	13%
60-69	11%	10%	13%	15%	24%	14%	6%	6%
70+	4%	4%	5%	6%	8%	4%	2%	2%

Source: MFEM analysis.

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<sup>9</sup> This data set records visitor nationality rather than country of usual residence. Nationality can be treated as a proxy for key market.

**Figure 5-1: Age profile by nationality**



Source: MFEM analysis.

The average age by nationality, shown in Table 5-2, reflects the age profile data, with Canadians the oldest at about 50 years old, with New Zealanders the youngest, averaging about 37 years of age.

**Table 5-2: Average age profile by nationality**

Year to	All	New Zealand	Australian	American	Canadian	European	Asian	Other
Jun-12	39.5	37.7	40.2	44.3	50.1	42.9	38.1	37.3
Jun-13	39.8	38.1	40.3	44.8	50.4	43.0	37.4	37.7
Jun-14	39.5	38.0	39.6	45.4	50.2	42.6	38.4	38.2
Jun-15	39.0	37.3	39.3	44.1	50.3	43.0	37.7	37.5
Jun-16	38.9	37.3	40.1	43.0	51.2	42.6	36.9	36.1
Jun-17	38.7	36.9	40.5	42.9	49.1	42.0	37.1	36.5
Jun-18	38.6	36.8	40.9	43.4	49.5	40.9	37.2	37.9

Source: MFEM analysis.

### By airline

The proportion of total visitor arrivals over the period 2011 to 2018, broken down by the airline the visitors arrived on and age group, is shown in Table 5-3. The key point to note is that Jetstar customers are dominated by the 18-29 age group. This contrasts with Air New Zealand which has the 50-59 age group as the highest proportion of its passengers.

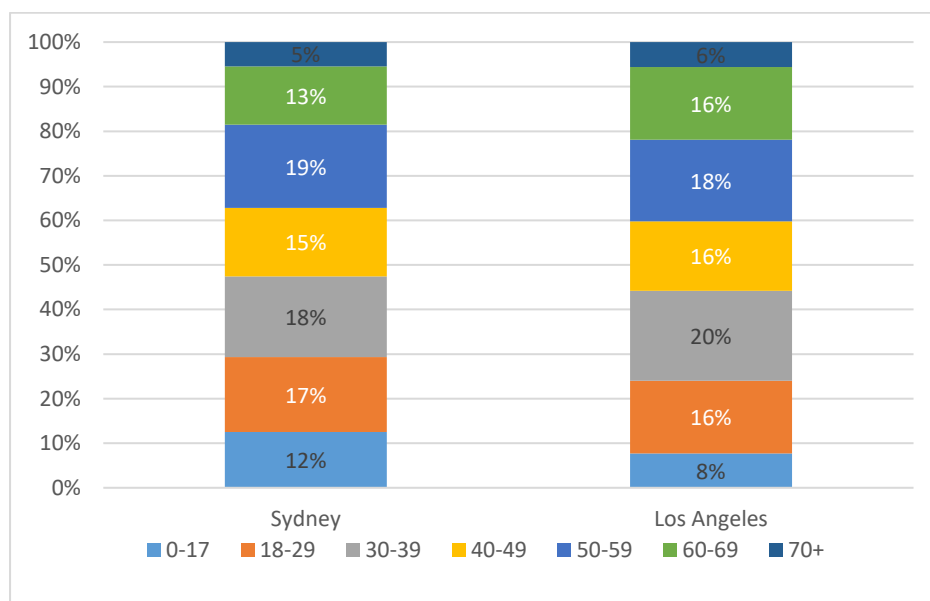
**Table 5-3: Age profile by airline**

Age group	Air NZ	Jetstar	Air Tahiti	Virgin
0-17	13%	16%	9%	17%
18-29	17%	37%	13%	26%
30-39	17%	18%	17%	17%
40-49	17%	12%	16%	15%
50-59	19%	11%	20%	14%
60-69	13%	5%	18%	8%
70+	5%	2%	7%	3%

Source: MFEM analysis.

The age profile by underwritten route is shown in Figure 5-2. The Sydney and Los Angeles routes show very similar profiles.

**Figure 5-2: Age profile by underwritten route**

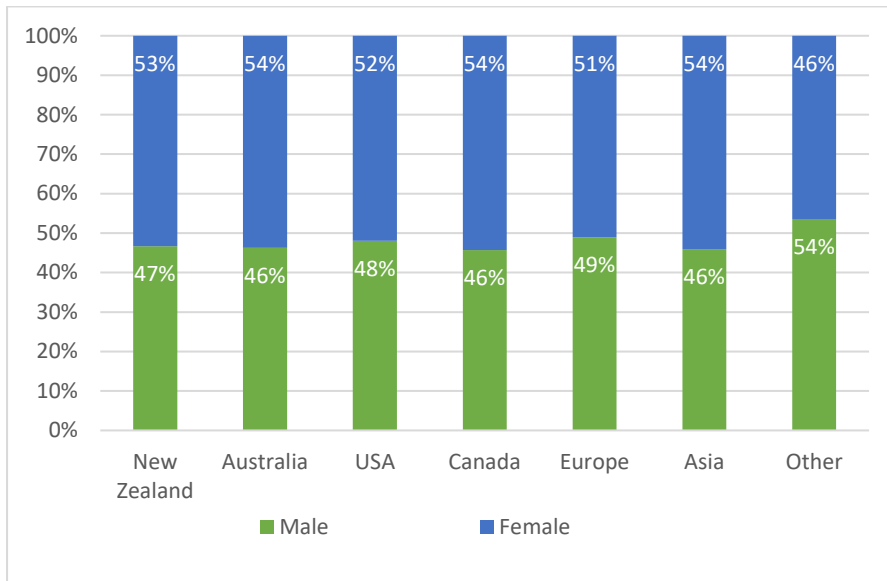


Source: MFEM analysis.

### 5.3 Gender profile

The gender profile of visitors by nationality is shown in Figure 5-3. Overall, 53 per cent of visitors to the Cook Islands are female, with 47 per cent male. Females are in the majority for all nationalities, with the exception of the other nationality category.

**Figure 5-3: Gender profile by nationality**



Source: MFEM analysis.

## 6 Tourist activity and average stay forecasts

---

### 6.1 Introduction

This chapter describes the time series models and forecasts generated for arrivals and average length of stay.

### 6.2 Arrivals forecasts

#### 6.2.1 Model

Forecast numbers of international arrivals are required at both the aggregate level and by key tourism market. A range of univariate time series techniques were applied, using the monthly arrivals by country of usual residence time series data, to produce monthly forecasts for individual key markets for the period February 2019 to June 2023. The individual forecasts are then aggregated.<sup>10</sup>

#### 6.2.2 Forecasts

##### Aggregate

Total arrivals for 2019/20 are estimated to be about 170,611, 2 per cent higher than the 166,874 seen in 2018/19. This expected rise on the 2018/19 growth rate largely reflects a strong start to 2019/20. July 2019 saw a new overall record of 18,612 visitors, with August reporting 18,464 visitors, the highest ever for that month. As shown in Table 6-1 and Figure 6-1, growth is then expected to fall to about 1 per cent per year by 2023/24.

**Table 6-1: Estimated total arrivals, quarterly, 2018/19 to 2023/24**

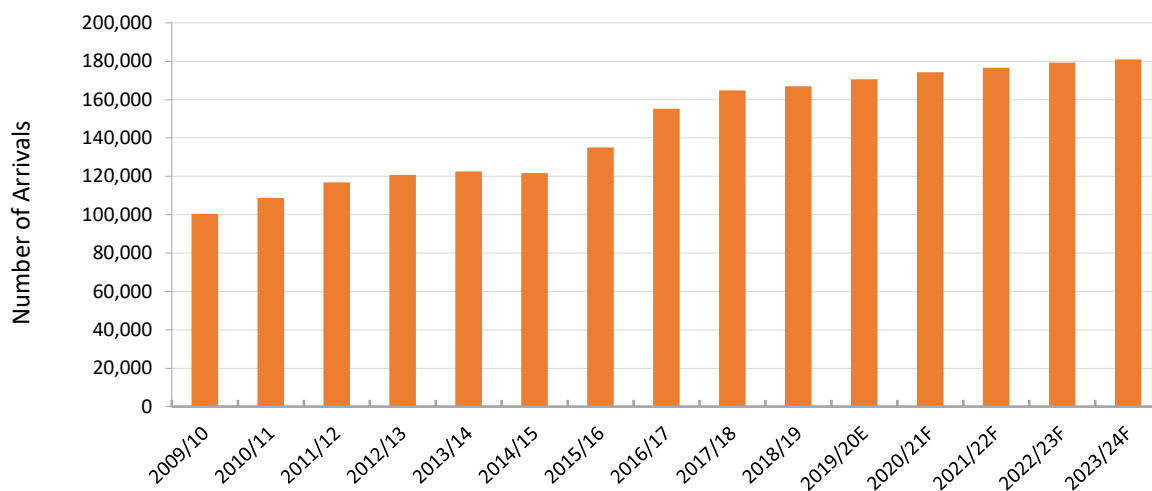
Quarters	2018/19	2019/20e	2020/21f	2021/22f	2022/23f	2023/24f
September	51,608	53,519	50,616	50,789	51,000	51,000
December	42,718	43,606	44,966	45,867	47,228	47,795
March	28,451	29,389	32,348	33,255	34,096	34,804
June	44,097	44,097	46,362	46,699	47,000	47,272
Annual total	<b>166,874</b>	<b>170,611</b>	<b>174,292</b>	<b>176,610</b>	<b>179,324</b>	<b>180,870</b>

Source: MFEM analysis.

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<sup>10</sup> See Appendix 2 for more detail.

**Figure 6-1: Total visitor arrivals, 2009/10 to 2023/24**

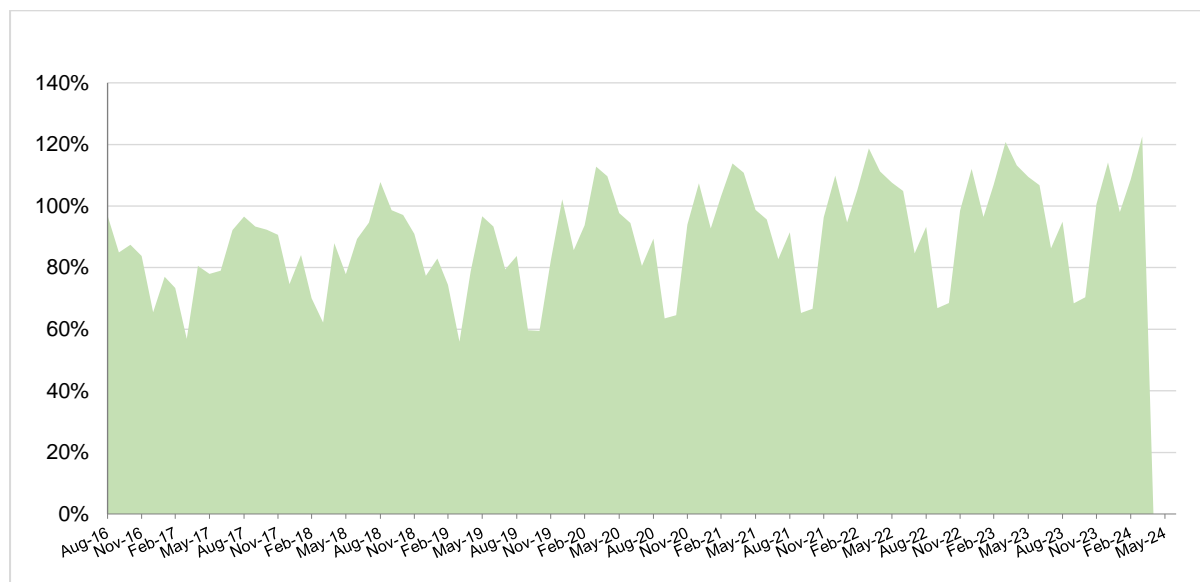


Source: MFEM analysis.

The visitor arrivals forecasts in this chapter take account of industry capacity constraints. The highest number of tourists that the country has received is 18,612 in July 2019. The economic forecasts are based on a more conservative maximum of 17,000 per month for all months except for the low season January through March, to which a maximum of 13,600 is applied.

As Table 6-1 indicates, the September quarter (July to September) is the busiest time for tourists. Figure 3.23 highlights the capacity limitations experienced in the Cook Islands, by month.

**Figure 6-2: Tourism capacity utilisation, monthly, 2016 to 2024**



Source: MFEM analysis

The Cook Islands Tourism Corporation is currently focusing on increasing the diversification of tourist arrivals, with a view to increasing the number of high value tourists arriving in the Cook Islands. It is also encouraging tourist arrivals during the March quarter (January to

March), which has traditionally been known as the low season. If successful, this strategy should decrease the strong reliance on New Zealand by increasing arrivals from the North American market.

In the meantime, further investment in infrastructure, including tourist accommodation, will be required to accommodate increasing tourist numbers in the future. There are signs that the industry has gained confidence in attracting more visitors in the form of investment in room stock, however more will need to be done for the country to capitalise on the expected higher arrivals numbers.

### Key market forecasts

Table 6-2 shows aggregate tourist arrivals forecasts broken down by major market.

**Table 6-2: Estimated total tourism numbers, by major market, 2017/18 to 2022/23**

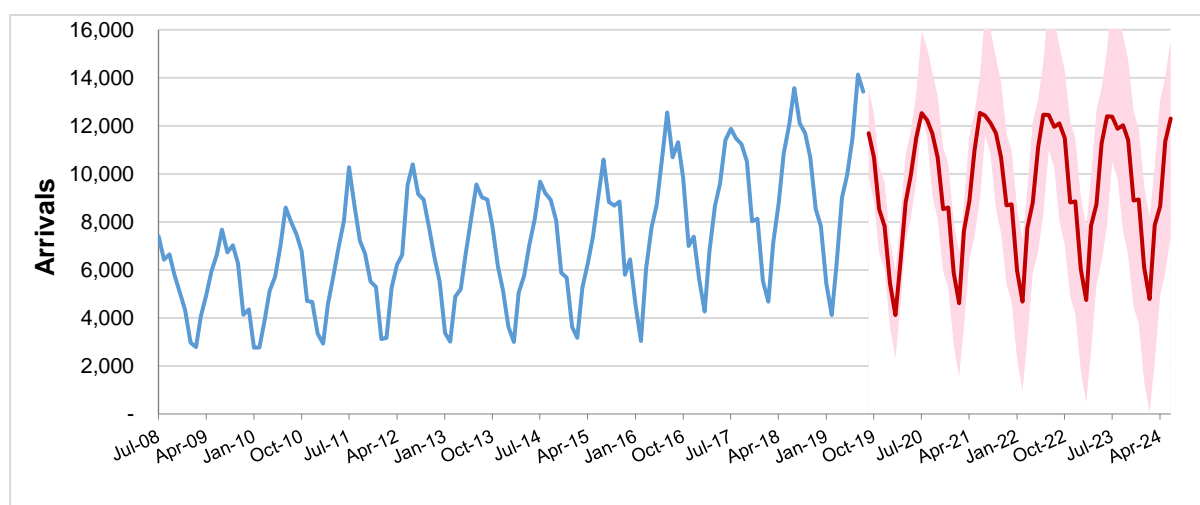
Quarters	2018/19e	2019/20f	2020/21f	2021/22f	2022/23f	2023/24f
New Zealand	110,607	112,301	114,746	115,124	116,654	116,558
Australia	28,482	29,864	30,092	30,850	31,199	31,809
USA & Canada	11,291	11,395	11,867	12,287	12,571	12,936
Europe	12,358	12,591	13,098	13,747	14,239	14,813
Other	4,136	4,460	4,488	4,602	4,662	4,754
<b>Total</b>	<b>166,874</b>	<b>170,611</b>	<b>174,292</b>	<b>176,610</b>	<b>179,324</b>	<b>180,870</b>

Source: MFEM analysis.

### New Zealand

Arrival numbers for New Zealand visitors to the Cook Islands are expected to recover slightly from 2018/19, rising by 1.5 per cent in 2019/20 and averaging about 1 per cent over the forward period. Total New Zealand arrivals are expected to rise from 110,607 to 116,558 over this period. Peaks are expected to even out with a slight rise in the troughs.

**Figure 6-3: New Zealand visitor arrivals, 2008 to 2024**

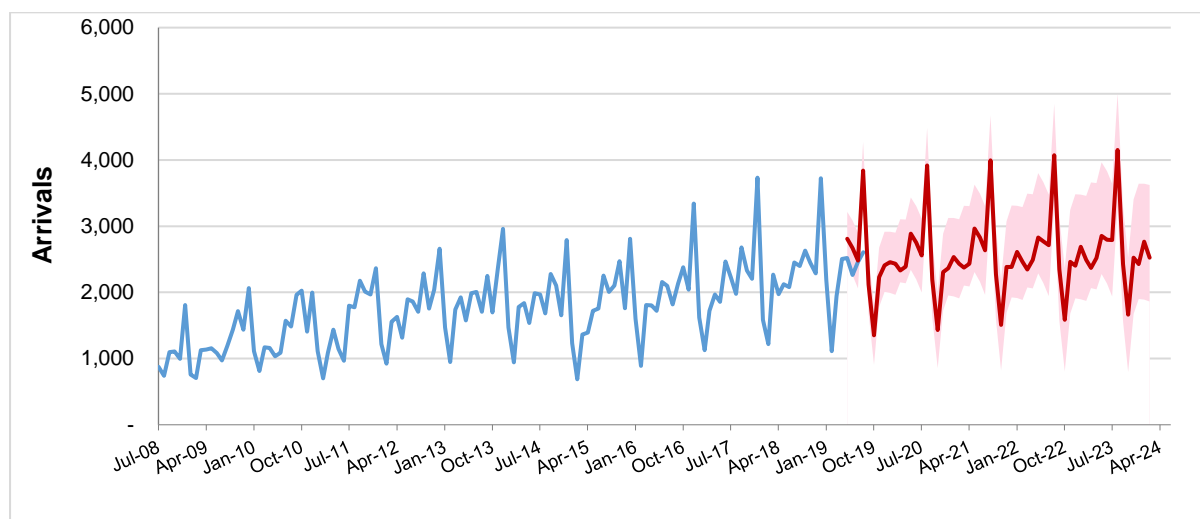


Source: MFEM analysis.

### Australia

Arrival numbers for Australian visitors to the Cook Islands are expected to moderate going forward. Growth is estimated at about 5 per cent in 2019/20, and averaging 2 per cent per year over the forward period. Australian visitors are expected to increase from about 28,482 to 31,809 over this period.

**Figure 6-4: Australian visitor arrivals, 2008 to 2024**



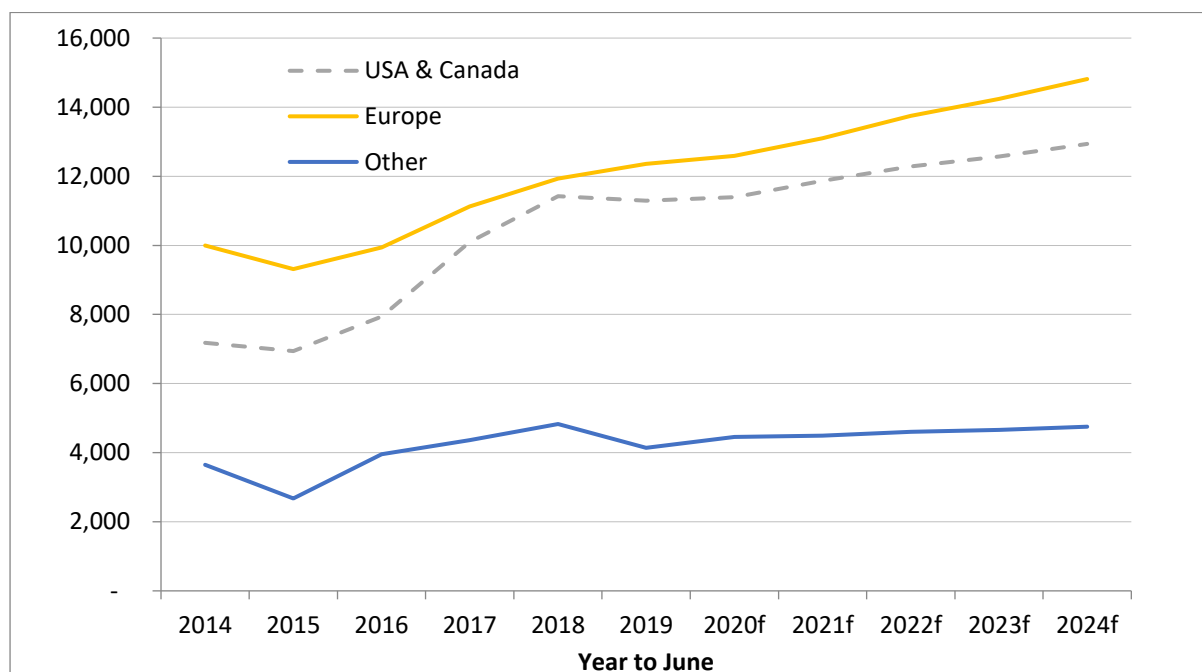
Source: MFEM analysis.

### Other markets

Arrivals from the United States and Canada, the North American market, are expected to grow by 1 per cent in 2019/20, averaging about 3 per cent per year over the forward period (see Figure 3.27). Any further strengthening US dollar could have a positive impact on tourist numbers. Visitor numbers from Europe are expected grow by 2 per cent in 2019/20, averaging about 4 per cent over the forward budget period. Arrivals from Asia and French Polynesia are expected recover slightly in 2019/20, remaining stable over the forward budget period.



**Figure 6-5: Other major markets arrivals, 2008 to 2023**

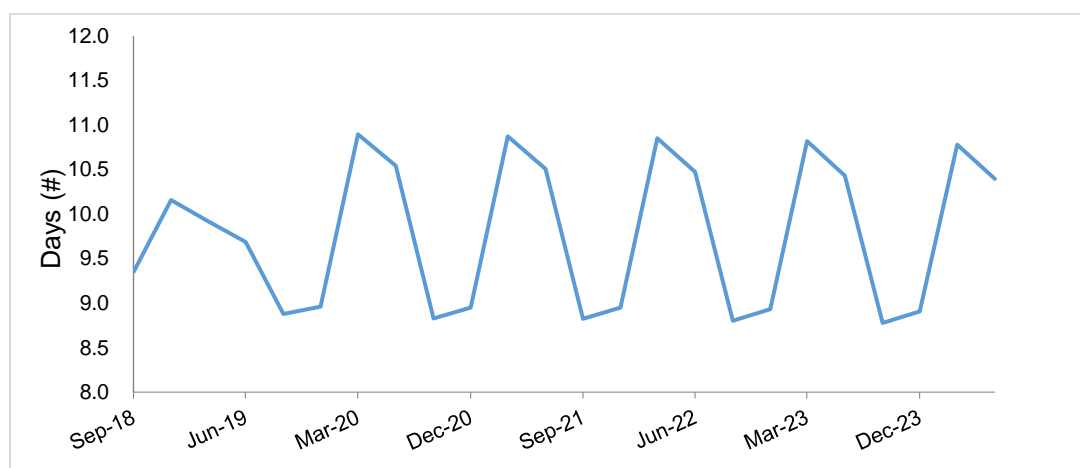


Source: MFEM analysis.

### 6.3 Average stay forecasts

Using the monthly average intended stay by country of usual residence time series data, this section applies a hierarchical time series forecasting approach, developed by Hyndman et. al. (2010), to produce monthly forecasts for the period February 2019 to June 2023.<sup>11</sup> Quarterly average stay forecasts for the period to June 2024 are shown Figure 6-6 and by major market in Table 6-3.

**Figure 6-6: Total average stay forecasts, 2016 to 2024**



Source: MFEM analysis.

<sup>11</sup> See Appendix 2 for more detail.

**Table 6-3: Average stay forecasts, major market, March 2019 to June 2024**

Quarter	New Zealand	Australia	USA	Canada	Europe	Asia	Other
<b>Sep-19</b>	8.0	9.7	8.6	15.3	10.3	7.9	7.7
<b>Dec-19</b>	8.3	12.3	8.7	13.7	10.4	7.8	8.3
<b>Mar-20</b>	11.9	11.2	9.5	9.8	9.4	9.2	8.4
<b>Jun-20</b>	10.3	10.2	10.6	7.6	9.8	10.3	10.2
<b>Sep-20</b>	8.2	10.5	8.7	14.6	11.7	9.7	9.3
<b>Dec-20</b>	8.3	12.3	8.8	13.6	10.4	8.2	8.0
<b>Mar-21</b>	11.3	11.1	9.5	9.7	9.5	9.7	8.2
<b>Jun-21</b>	9.9	10.5	10.8	7.9	10.1	10.9	10.1
<b>Sep-21</b>	8.2	10.5	8.7	14.7	11.9	10.0	9.2
<b>Dec-21</b>	8.3	12.4	8.8	13.5	10.4	8.5	7.9
<b>Mar-22</b>	11.2	11.1	9.5	9.7	9.5	9.9	8.0
<b>Jun-22</b>	10.1	10.6	10.9	8.1	10.2	11.2	10.0
<b>Sep-22</b>	8.6	10.9	9.0	15.3	12.3	10.6	9.3
<b>Dec-22</b>	8.0	12.5	8.9	13.7	10.7	8.7	8.0
<b>Mar-23</b>	11.1	11.1	9.5	9.6	9.6	10.0	7.9
<b>Jun-23</b>	10.1	10.7	11.0	8.2	10.3	11.5	9.8
<b>Sep-23</b>	8.6	11.1	9.1	15.6	12.6	10.8	9.4
<b>Dec-23</b>	8.0	12.6	8.9	13.7	10.8	8.9	8.0
<b>Mar-24</b>	10.9	11.1	9.5	9.6	9.6	10.1	7.8
<b>Jun-24</b>	10.0	10.8	11.0	8.3	10.4	11.6	9.7

Source: MFEM analysis.

## 7 Tourism daily expenditure analysis and forecasts

---

### 7.1 Introduction

This chapter first analyses average daily tourism expenditure by key tourism market, international airline and by purpose of visit. This analysis relies on quarterly visitor survey data from a web-based survey run on behalf of the Cook Islands Tourism Corporation by the New Zealand Tourism Research Institute (NZTRI), Auckland University of Technology.<sup>12</sup> Survey data on visitor expenditure patterns, both prepaid and in the Cook Islands has been utilised for the period June 2011 to June 2018.

Second, the quarterly survey data is utilised to forecast average daily expenditure by key tourism market for the period to 2023/24.

### 7.2 Average expenditure analysis

#### 7.2.1 Introduction

The survey splits visitor expenditure into the amount spent prior to arrival in the Cook Islands (**prepaid**) and that spent when in the Cook Islands (**postpaid**).

While the prepaid expenditure is accompanied by information on what items are included in the expenditure, no quantified break down is available. In contrast, the postpaid expenditure is disaggregated down into a range of items from accommodation through to groceries.

For analysis and forecasting purposes, we are interested in the total on-island expenditure, which means we need to estimate the proportion of the pre-paid expenditure spend that flows to the Cook Islands. NZTRI suggests a 40 per cent attribution:

For the purposes of this study, and based on previous research in the region, we conservatively estimate that 50 [per cent] of the pre-paid spend is allocated to airfares, and that 80 [per cent] of the remaining 50 [per cent] of the pre-paid spend flows back to local operators. In total this means that for every pre-paid dollar, 40 cents flows to the Cook Islands.<sup>13</sup>

For the purposes of this paper, a more conservative 20 per cent estimate is applied.

#### 7.2.2 Postpaid expenditure

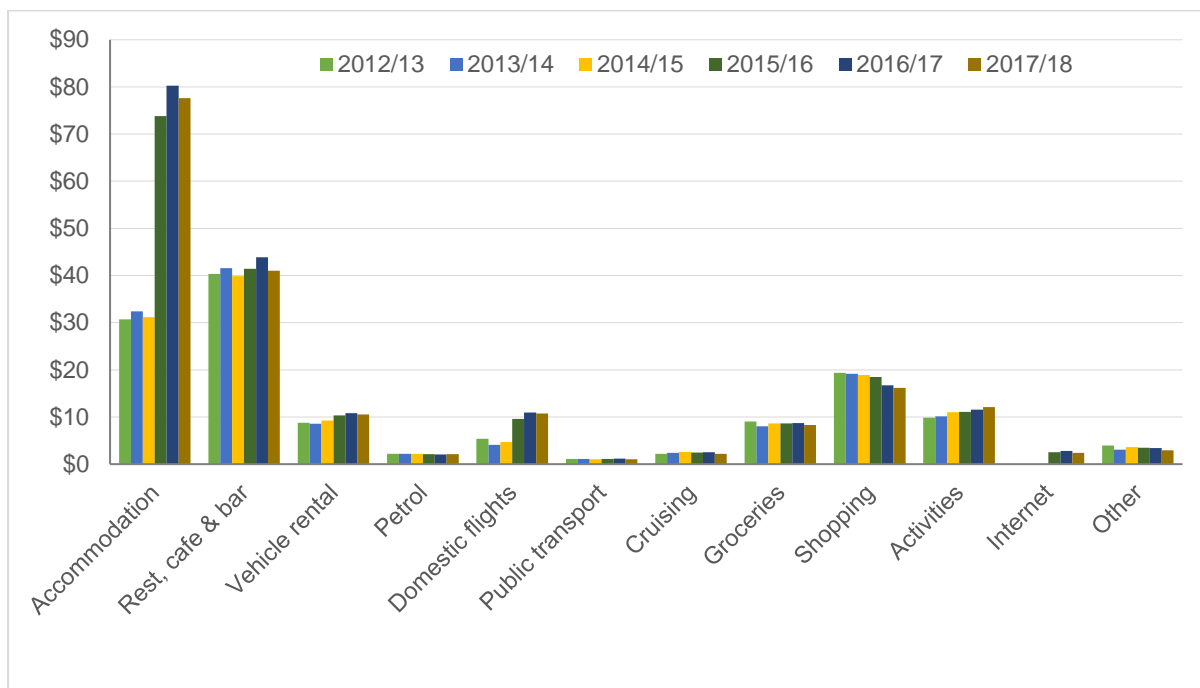
The average daily estimated expenditure in the Cook Islands by item over the period 2012/13 to 2017/18 is shown in Figure 7-1. Over this period, total average daily postpaid expenditure has increased from \$133 per day to \$187 per day. Average daily expenditure on accommodation and domestic flights has increased over this time period, with shopping expenditure moving in the opposite direction.

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<sup>12</sup> For more detail see: <http://www.nztri.org.nz/case-study-1>.

<sup>13</sup> NZTRI, 2013 Cook Islands Visitor Survey Results: October - December 2014, New Zealand Tourism Research Institute, Auckland University of Technology. p10.

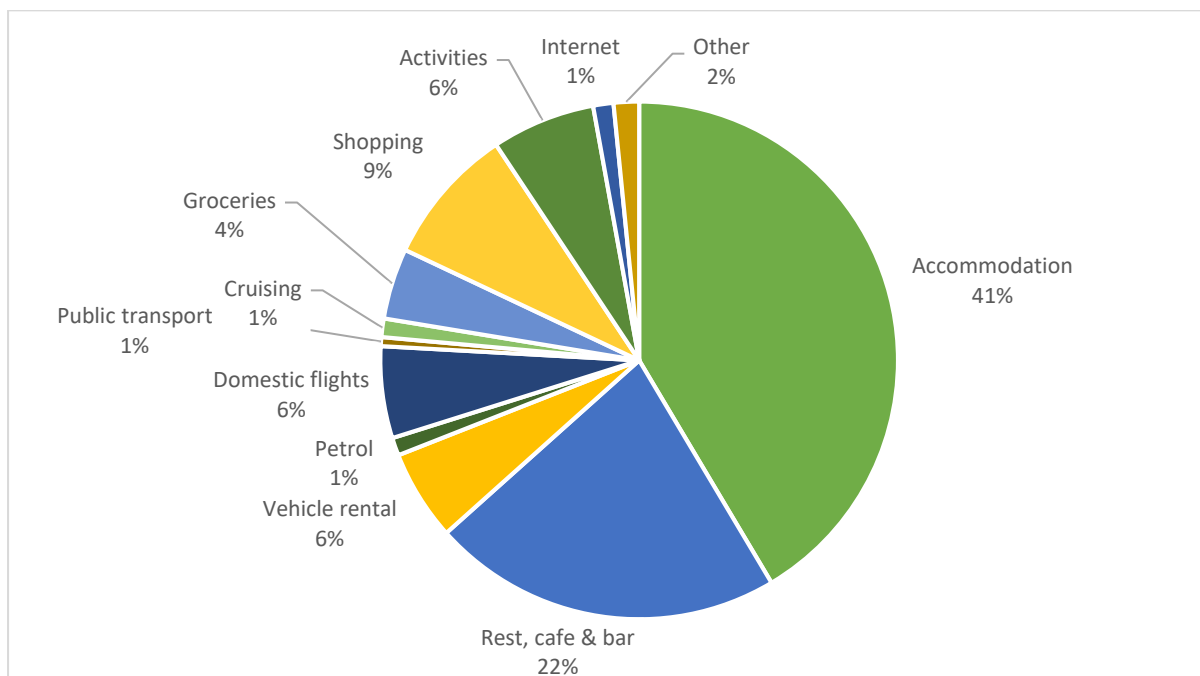
**Figure 7-1: Average daily expenditure, postpaid by item**



Source: NZTRI data, MFEM analysis.

On a proportionate basis in 2017/18, accommodation accounts for 41 per cent of average daily postpaid expenditure, followed by restaurants, cafes and bars at 22 per cent and shopping at 9 per cent (see Figure 7-2).

**Figure 7-2: Average daily expenditure, postpaid by item, 2017/18**



Source: NZTRI data, MFEM analysis.

## 7.2.3 Total expenditure

### By key market

Table 7-1 shows the total average daily expenditure, accounting for all prepaid and postpaid expenditure, by key tourism market. Across all visitors, average daily expenditure has risen from \$384 in 2012/13 to \$435 in 2017/18. In terms of key markets in 2017/18, the highest spending visitors are from Asia, at \$736 per day, followed by American visitors at \$536 per day. Other countries take the lowest spot on \$390 per day, with New Zealand on \$406 per day the second lowest.

**Table 7-1: Average total daily expenditure, major market, \$ current prices, 2012/13 to 2017/18**

Year	All	New Zealand	Australia	USA	Canada	Europe	Asia	Other
2012/13	384	352	398	536	413	488	499	550
2013/14	386	349	427	460	455	508	650	383
2014/15	393	361	436	485	429	462	660	395
2015/16	459	412	514	599	471	607	767	457
2016/17	461	417	516	658	486	602	593	441
2017/18	435	406	496	536	417	446	736	390

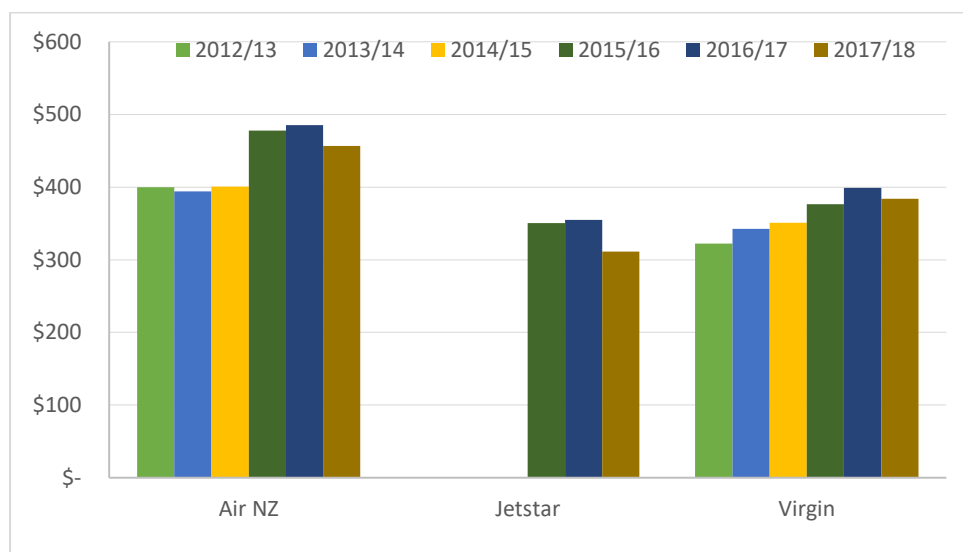
Source: NZTRI data, MFEM analysis.

### By airline

Figure 7-3 shows the total average daily expenditure by major international airline. Visitors arriving on Air New Zealand flights consistently outspend, by a significant margin, those utilising Jetstar and Virgin services.<sup>14</sup>

<sup>14</sup> The data for Air Tahiti has been excluded due to a small sample size.

**Figure 7-3: Average total daily expenditure, airline, \$ current prices, 2012/13 to 2017/18**

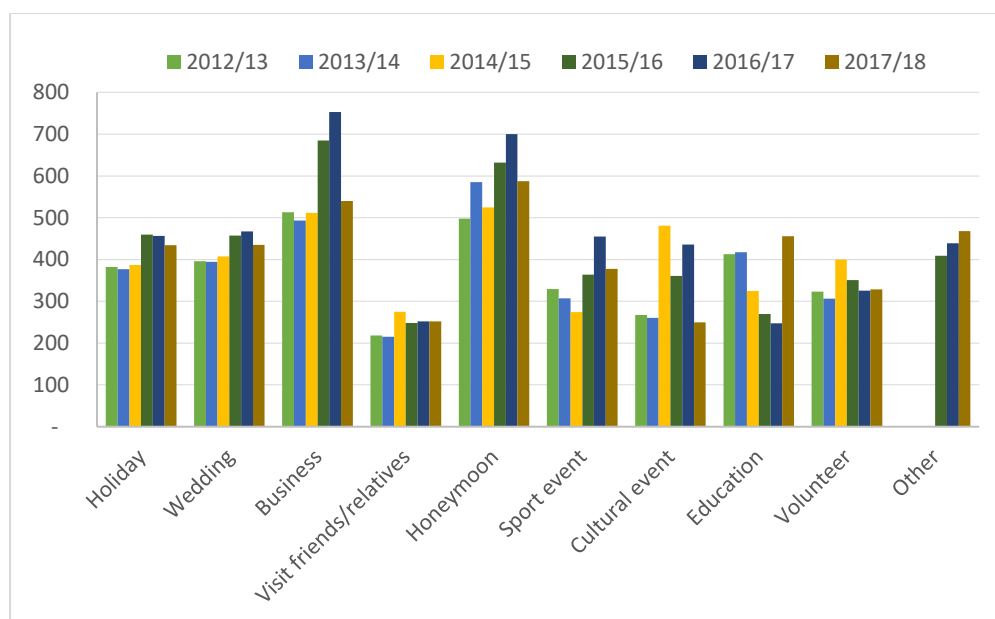


Source: NZTRI data, MFEM analysis.

### By purpose

Figure 7-4 shows the total average daily expenditure by purpose of visit. The data indicates that the highest spending visitors are those on business, followed by honeymooners. At the other end of the scale, those visiting friend and relatives spend the least.

**Figure 7-4: Average total daily expenditure, purpose, \$ current prices, 2012/13 to 2017/18**

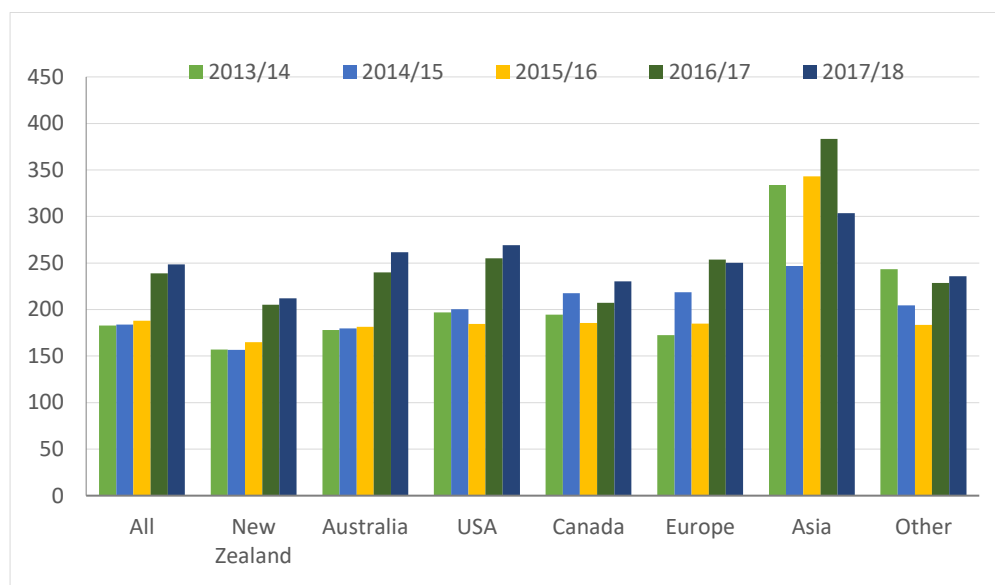


Source: NZTRI data, MFEM analysis.

### 7.2.4 Total adjusted expenditure

Figure 7-5 shows total average daily expenditure, adjusted for 20 per cent of prepaid expenditure, by major market. A further adjustment is made to reflect lower expenditure by visitors that are visiting friends and relatives. It is this estimate of expenditure that flows to the Cook Islands that is used for forecasting purposes.

**Figure 7-5: Daily adjusted expenditure, major market, \$ current prices, 2013/14 to 2017/18**

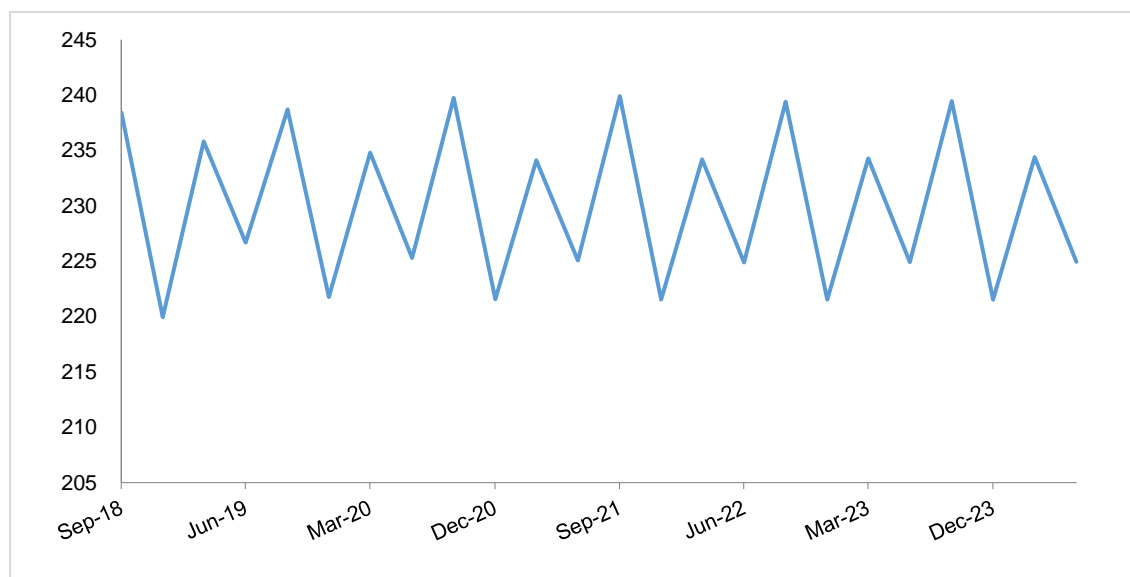


Source: NZTRI data, MFEM analysis.

### 7.3 Expenditure forecasts

Utilising the same hierarchical forecasting method described in section 6.3, quarterly average daily expenditure forecasts for the period to June 2024 are shown in Figure 7-6 and by major market in Table 7-2. Expenditure is expected to remain consistent with levels seen in the most recent data.

**Figure 7-6: Average daily expenditure forecasts, 2016 to 2024**



Source: MFEM analysis.

**Table 7-2: Average daily expenditure, major market, \$ current prices, Sep 2019 to June 2024**

Quarter	All	New Zealand	Australia	USA	Canada	Europe	Asia	Other
<b>Sep-19</b>	<b>239</b>	226	264	274	242	266	394	251
<b>Dec-19</b>	<b>240</b>	205	240	249	220	242	358	228
<b>Mar-20</b>	<b>230</b>	218	255	264	234	257	380	242
<b>Jun-20</b>	<b>246</b>	213	249	258	228	250	371	236
<b>Sep-20</b>	<b>245</b>	226	264	273	242	266	393	251
<b>Dec-20</b>	<b>253</b>	205	240	248	220	241	357	228
<b>Mar-21</b>	<b>254</b>	218	255	264	233	256	379	242
<b>Jun-21</b>	<b>243</b>	212	249	258	228	250	370	236
<b>Sep-21</b>	<b>238</b>	225	264	273	242	265	393	250
<b>Dec-21</b>	<b>220</b>	205	240	248	219	241	357	227
<b>Mar-22</b>	<b>236</b>	217	254	263	233	256	379	241
<b>Jun-22</b>	<b>227</b>	212	248	257	228	250	370	236
<b>Sep-22</b>	<b>239</b>	225	263	273	241	265	392	250
<b>Dec-22</b>	<b>222</b>	204	239	248	219	241	356	227
<b>Mar-23</b>	<b>235</b>	217	254	263	233	256	378	241
<b>Jun-23</b>	<b>225</b>	212	248	257	227	250	369	235
<b>Sep-23</b>	<b>240</b>	225	263	272	241	265	392	250
<b>Dec-23</b>	<b>222</b>	204	239	247	219	240	356	227
<b>Mar-24</b>	<b>234</b>	217	254	263	233	255	378	241
<b>Jun-24</b>	<b>225</b>	212	248	257	227	249	369	235

Source: MFEM analysis.



## 8 Aggregate tourism expenditure forecasts

### 8.1 Introduction

This chapter brings together the three elements that make up the aggregate tourism expenditure forecasts:

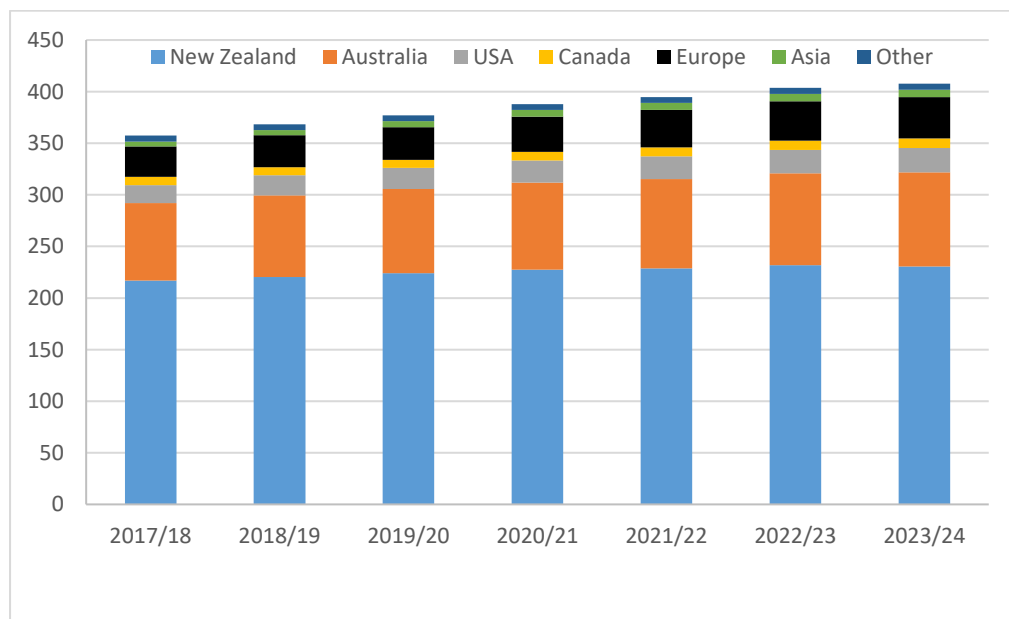
- number of visitor arrivals, using the forecasts detailed in section 6.2;
- average visitor stay, using the forecasts described in section 6.3; and
- average daily expenditure that flows to the Cook Islands, as set out in section 7.3.

Multiplying these three elements together provides quarterly forecasts of total expenditure, by major market, that can be aggregated to annual forecasts.

### 8.2 Forecasts

Forecasts for the period 2018/19 to 2022/24 are shown in Figure 8-1 and Table 8-1. Total expenditure is expected to rise from \$368 million in 2018/19 to \$377 million in 2019/20, an increase of 2 per cent. Growth of about 2 per cent per year is expected until the end of the forecast period.

**Figure 8-1: Total expenditure, major market, \$ million current prices, 2017/18 to 2022/24**



Source: MFEM analysis.

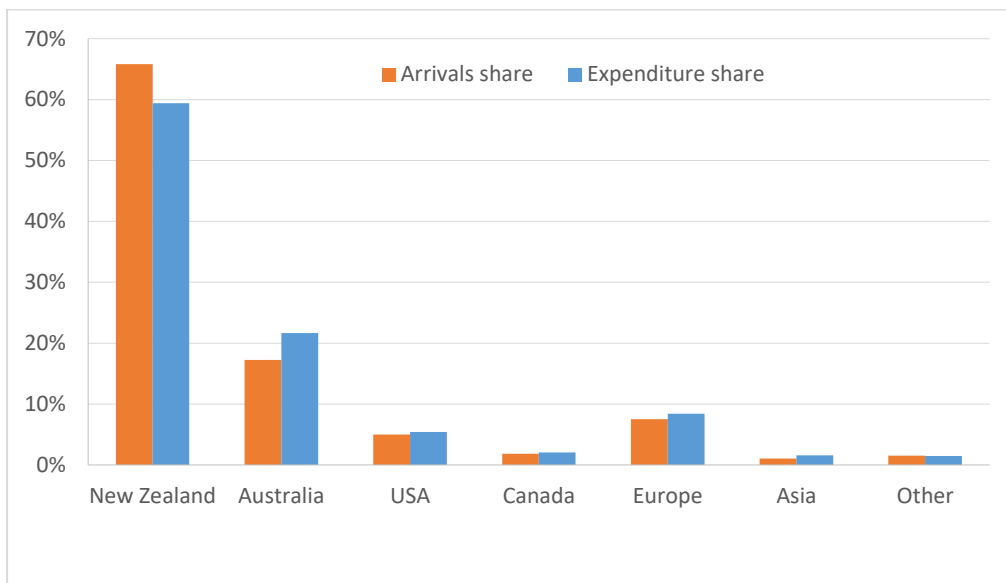
**Table 8-1: Total expenditure, major market, \$ million current prices, 2017/18 to 2023/24**

Year	All	New Zealand	Australia	USA	Canada	Europe	Asia	Other
2017/18	333	201	65	19	6	28	8	6
2018/19	357	217	75	17	8	30	4	6
2019/20	368	220	79	19	8	31	5	6
2020/21	377	224	82	20	8	32	6	5
2021/22	388	228	84	21	8	34	7	6
2022/23	395	229	87	22	9	36	7	6
2023/24	404	232	89	23	9	38	7	6

Source: MFEM analysis.

Expenditure is dominated by New Zealand, accounting for 59 per cent of the total in 2019/20 followed by Australia on 22 per cent and Europe on 8 per cent. Australian expenditure punches above its weight compared to its share of visitor arrivals, while New Zealand shows the reverse (see Figure 8-2).

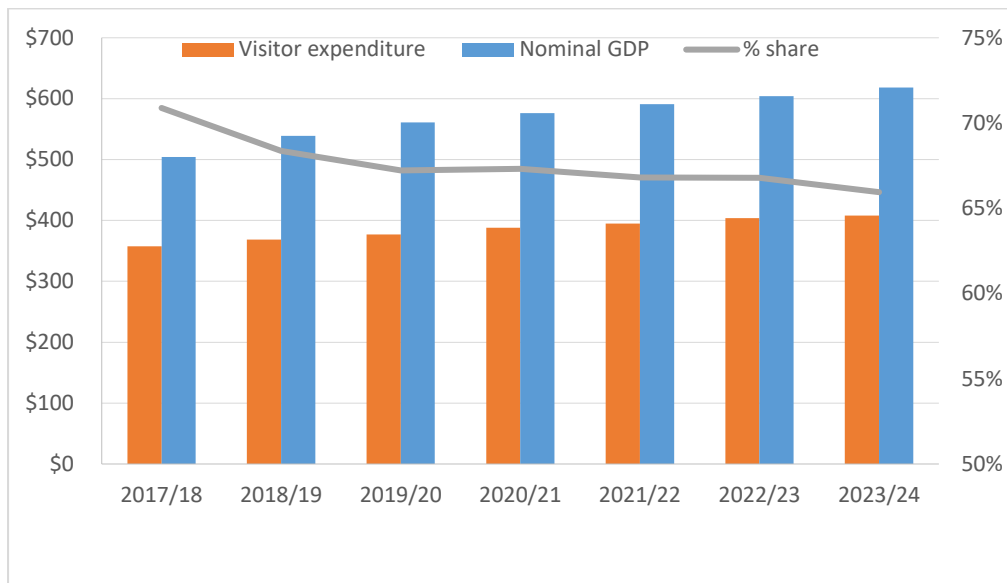
**Figure 8-2: Total expenditure forecasts, arrivals versus expenditure, 2019/20**



Source: MFEM analysis.

The estimates of total visitor expenditure provide a proxy for estimating the overall contribution of the tourism sector to the Cook Islands economy. As shown in Figure 8-3, tourism is estimated to account for about 67 per cent of nominal GDP in 2019/20.

**Figure 8-3: Tourism expenditure share of GDP, 2017/18 to 2023/24**



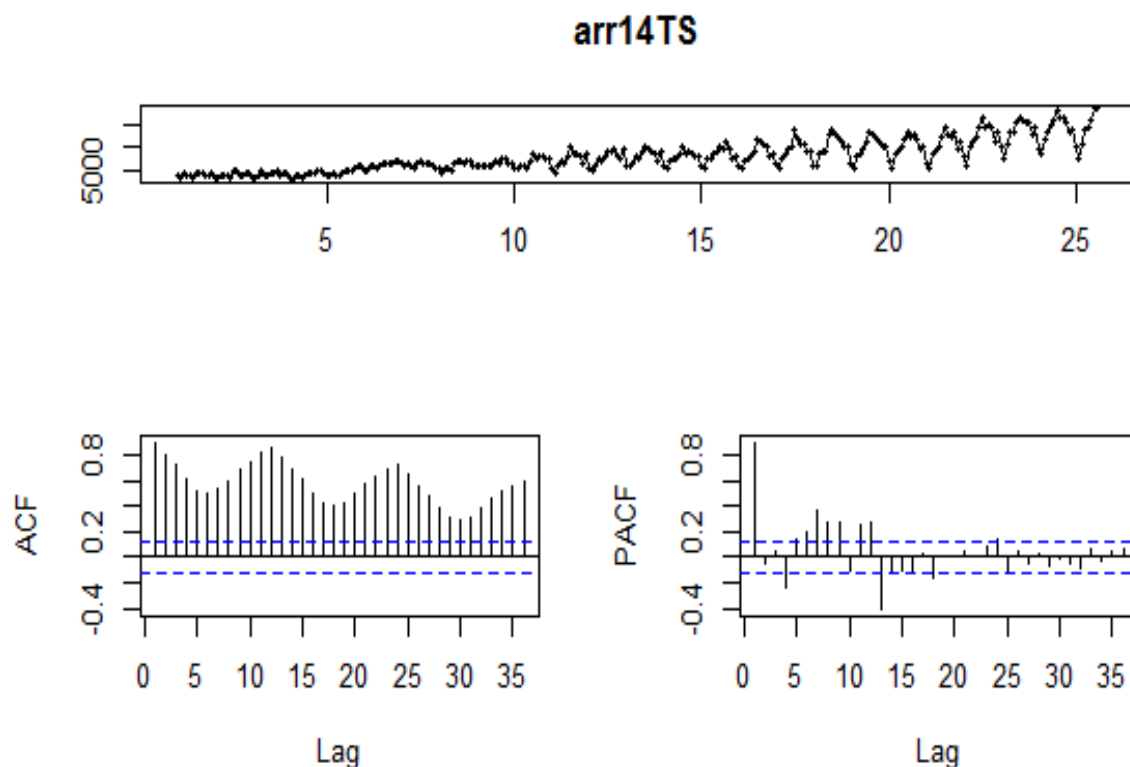
### 8.3 Conclusion

A key message moving forward concerns the capacity constraints already facing the tourism industry. As discussed in Chapter 6, the industry has reached peak capacity during the high season, with a new record of 18,612 arrivals in July 2019. Without an increase in bed numbers, or greater visitor spread across the year, any increase in numbers above the ‘capacity-constrained’ forecasts in this paper is likely to result in higher prices and a reduction in international tourism competitiveness. The evidence in Figure 7-1, which already shows a substantial increase in the average daily expenditure on accommodation since 2012/13, is a cause for concern.

## Appendix 1      Autocorrelation

Evidence of autocorrelation can be found by examining the autocorrelation function (ACF) which measures the linear relationship between lagged values of a time series and shows the degree of persistence over respective lags of a variable. The ACF for total arrivals in Figure A1-1 shows a persistent pattern with clear evidence of autocorrelation.

Figure A1-1: ACF and PACF monthly total arrivals



Source: MFEM analysis.

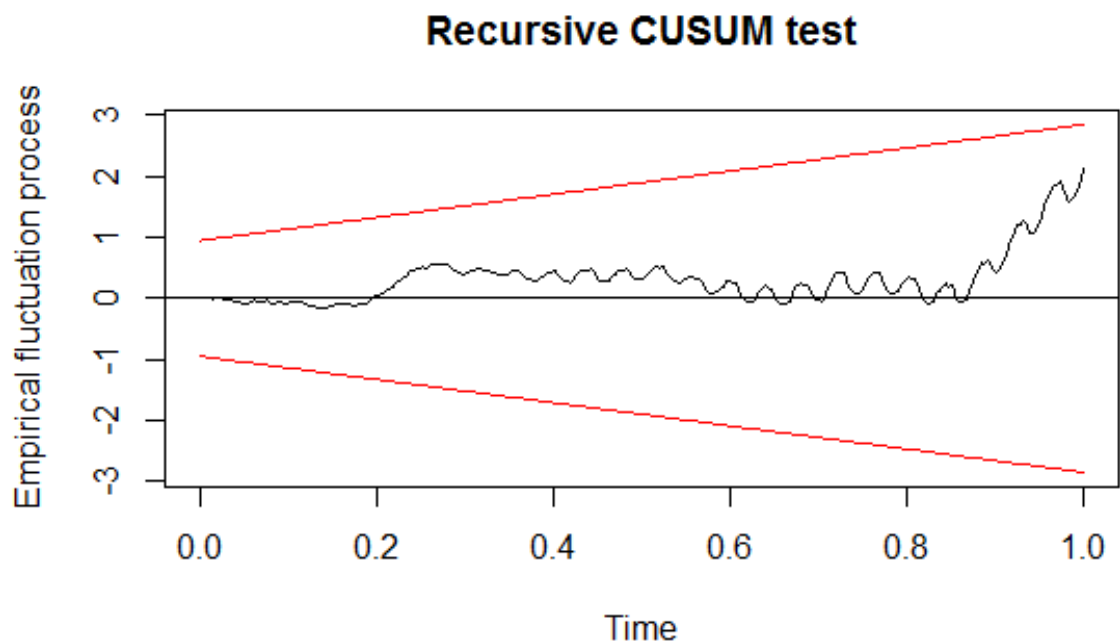
An examination of the partial autocorrelation function (PACF), also shown in Figure A1-2, which measures the relationship between a variable and a lag of itself after removing the effect of other time lags, shows a strong partial coefficient at lags three through 10 and at intervals beyond.<sup>15</sup>

For completeness, the monthly data series was assessed for evidence of structural breaks by running a cumulative sum control chart (CUSUM) test, which assesses parameter stability over the chosen data set, using the R 'strucchange' package.

<sup>15</sup> Following Greene (2012) and Hyndman and Khandakar (2012), the ACF( $k$ ), which gives the gross correlation between  $y_t$  and  $y_{t-k}$  for different values of  $k$ , can mask a completely different underlying relationship. For example, a correlation between  $y_t$  and  $y_{t-2}$ , could arise simply because both variables are correlated with  $y_{t-1}$  rather than any new information contained in  $y_{t-2}$  that could be used forecasting  $y_t$ . To overcome this problem, the PACF can be used which measures the relationship between  $y_t$  and  $y_{t-2}$  net of the intervening effect of  $y_{t-1}$  (Greene, 2012: 757; Hyndman and Athanasopoulos, 2012: 8.5 Non-seasonal ARIMA models).

Running a CUSUM test over the full data period returns a test statistic of 0.705 with a p-value of 0.241, suggesting that the null hypothesis of parameter stability over this period cannot be rejected at any of the generally acceptable confidence levels. This result is shown visually in Figure .

Figure A1-2: CUSUM plot



Source: MFEM analysis, R Studio output.

## Appendix 2 Univariate models

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### Arrivals

A range of univariate time series techniques were applied, using the monthly arrivals by country of usual residence time series data, to produce monthly forecasts for individual key markets for the period February 2019 to June 2023. The individual forecasts are then aggregated. The univariate models included:

- **ARIMA model** – using the ‘auto.arima’ function of the R ‘forecast’ package.
- **Exponential smoothing or error, trend, seasonal (ETS) model** – using the ‘ets’ function of the R ‘forecast’ package. Forecasts produced using exponential smoothing methods are weighted averages of past observations, with the weights decaying exponentially as the observations get older – i.e. the more recent the observation the higher the associated weight. Hyndman and Athanasopoulos (2012) state that this ‘framework generates reliable forecasts quickly and for a wide spectrum of time series which is a great advantage and of major importance to applications in industry.’<sup>16</sup>
- **Seasonal naïve ARIMA model** – using the ‘snaive’ function of the R ‘forecast’ package. The seasonal naïve forecast is set equal to the last observed value from the same season of the year.
- **TBATS model** – an exponential smoothing state space model with a Box-Cox statistical transformation using ARMA (autoregressive and moving average) errors and incorporating a trigonometric representation of seasonal components.

### Average stay

The approach can be applied for time series that are hierarchically organised and can be aggregated at several different levels in groups, based on geography, as in this case, for example. Hyndman et. al. (2010) state:

The resulting revised forecasts add up appropriately across the hierarchy, are unbiased and have minimum variance amongst all combination forecasts under some simple assumptions.<sup>17</sup>

The approach involves first generating independent base forecast for each series in the hierarchy that are not “aggregate consistent”. The Hyndman et. al. (2010) method combines the independent base forecasts and generates a set of revised forecasts that are as close as possible to the univariate forecasts, but also aggregate consistently with the hierarchical structure.

The ‘hts’ package was used to generate the forecasts, applying the ‘bottom up’ method to reconcile the base forecasts.

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<sup>16</sup> Hyndman and Athanasopoulos, 2012: 7.

<sup>17</sup> Hyndman et. al. 2010, 2.

## Abbreviations and acronyms

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ACF	Autocorrelation function
AIC	Akaike Information Criterion
AR	Autoregressive
ARIMA	Autoregressive integrated moving average
GDP	Gross Domestic Product
MFEM	Ministry of Finance and Economic Management
NZTRI	New Zealand Tourism Research Institute
PACF	Partial autocorrelation function

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