

# STATISTICAL NEWS

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## SEASONALLY ADJUSTED VISITOR ARRIVALS JULY 2018

Seasonal adjustment is a statistical method used to remove the combined seasonal and calendar effects on time series data such as visitor arrivals. It derives seasonally adjusted and trend series data that reveal underlying changes and allows the measurement of short and long term patterns of growth and decline (refer to the explanatory notes for a detailed explanation).

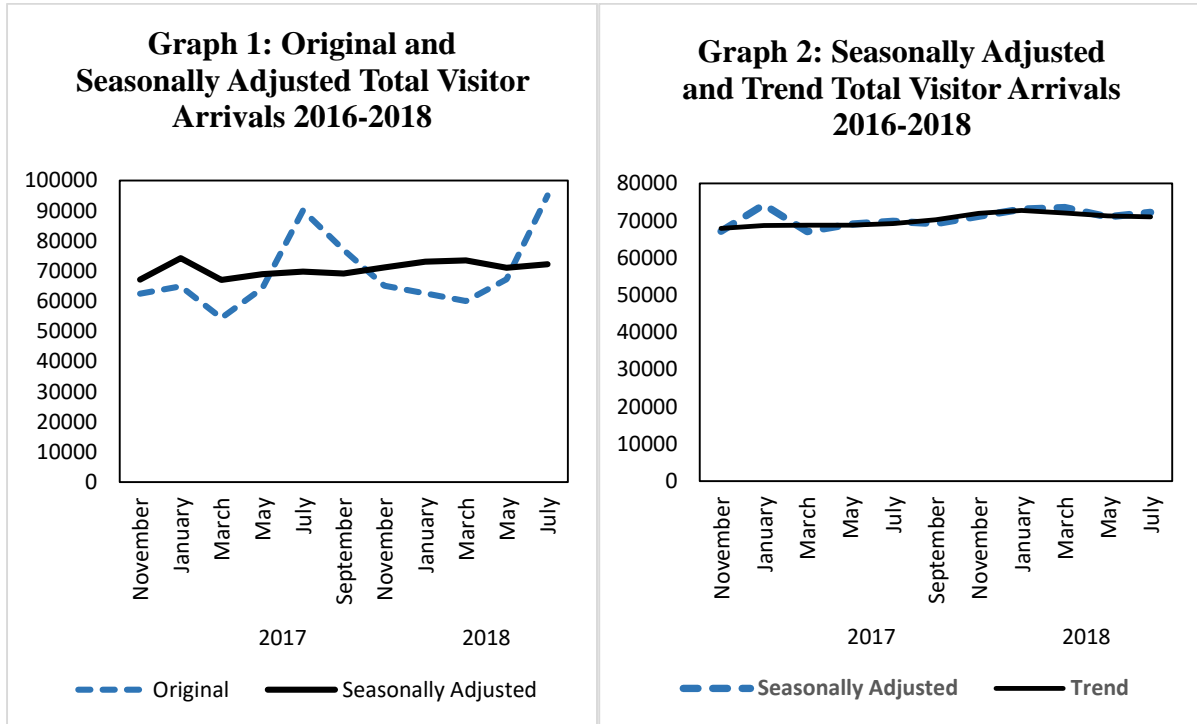
### VISITOR ARRIVALS TO FIJI

	July 2018	June 2018 to July 2018	July 2017 to July 2018
<b>Total</b>			
Trend	70,999	-0.09	2.60
Seasonally Adjusted	72,284	1.95	...
Original	95,061	...	...
<b>Australia</b>			
Trend	29,759	-0.01	-0.02
Seasonally Adjusted	30,857	6.17	...
Original	35,608	...	...
<b>New Zealand</b>			
Trend	16,387	0.09	8.87
Seasonally Adjusted	16,303	-3.67	...
Original	28,572	...	...
<b>USA</b>			
Trend	6,917	-1.64	2.99
Seasonally Adjusted	6,620	-6.89	...
Original	9,104	...	...
<b>Continental Europe</b>			
Trend	3,042	2.63	6.48
Seasonally Adjusted	3,203	9.84	...
Original	3,392	...	...

...not applicable

- Trend estimates:** Total Visitor Arrivals during July 2018 (70,999) declined by 0.09%, compared with June 2018 (71,062). This followed monthly declines of 0.47% and 0.33% in May and June 2018 respectively. The current trend estimate for arrivals is 2.60% higher than in July 2017.

- **Seasonally adjusted estimates:** During July 2018, Total Visitor Arrivals to Fiji (72,284) increased by 1.95% compared with June 2018 (70,899). This followed a monthly increase of 1.79% in May 2018 and a decrease of 0.23% in June 2018.
- **Original estimates:** The Total Visitor Arrivals to Fiji in July 2018 was 95,061.



For breaks in trend and outliers (see Explanatory notes, subheading 7&8)

For more information, the following can be referred to:

- Table 1: Original and Seasonally Adjusted Visitor Arrivals- Number by Country of Residence
- Table 2: Seasonally Adjusted and Trend Series of Visitor Arrivals- Number by Country of Residence
- Appendix 1: Explanatory Notes

In using the seasonally adjusted series, care should be exercised because of the difficulties associated with reliably estimating the seasonal pattern.

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## **Appendix 1: Explanatory Notes**

### **1. *What is a time Series?***

It is a well-defined data items observed at regular intervals. In this release monthly Visitor Arrivals to Fiji by country of residence for the past 48 years (from 1970) was used. The original time series dataset has 3 components. The components are Seasonality, Trend and Irregulars.

### **2. *What is Seasonality?***

Seasonality is defined as movements observed in time series that occur throughout the year at the same time and intensity. It is caused by natural factors e.g., climatic patterns or administrative factors, e.g., school holidays in December affect timing of Visitor Arrivals in Fiji increasing the number in December every year or social traditions, e.g., Christmas and Easter increase retails spending in April and December every year.

It is systematic for e.g., visitor arrivals high in Fiji in December and low in January every year. Under normal situations they can be expected to recur over successive years, although they can gradually change over time (evolve) as factors that induce seasonality are not stable in time.

Other calendar related effects are trading day and moving holidays. Trading days arises from length and types of days in each months. Some months are longer than the others and some months having more trading days compared to the others. Moving holidays are holidays for which dates are not fixed and vary from year to year. For example Easter holiday between March and April depending on the Moon Cycle.

### **3. *What is Trend?***

The trend component reflects the long term movement or underlying direction of the series due to influences such as population growth, price inflation and general economic development. The trend contained both long term growth and business cycle.

### **4. *What are irregulars?***

There are two components

- Normal statistical variation as a result of estimation
- One off real world events that are unpredictable in timing and magnitude and could hide the underlying direction of movement of the series for e.g., natural disasters, coup

### **5. *What is Seasonal Adjustment and why is it important?***

Seasonal Adjustment is removing seasonality from the original series. The presence of seasonal factors often hide the underlying direction (movement) and level of the series (Trend). Subtracting seasonality from the Original Series equal the Trend and Irregular which are Seasonally Adjusted estimates. With Seasonal adjustment, one would be able to detect turning points in the series and also see the impact of irregular one off events like cyclone.

## **6. *How is Seasonal Adjustment conducted?***

Filter based methods of seasonal adjustment often known as X11 style method is applied here. The procedure consists of the following steps:

- 1) Estimate the trend by a moving average
- 2) Remove the trend leaving the seasonal and irregular components
- 3) Estimate the seasonal component using moving averages to smooth out the irregulars.

Seasonality generally cannot be identified until the trend is known, however a good estimate of the trend cannot be made until the series has been seasonally adjusted. Therefore X11 uses an iterative approach to estimate the components of a time series. As a default, it assumes a multiplicative model.

## **7. *Trend Breaks***

There are cases where real world events with long term effects (e.g. climate change) could lead to a break or a sudden change and sustain shift in the direction and level of trend series for more than 6 months. In this case, breaks adjustments are applied and the factor is returned to the trend and seasonally adjusted series. While the breaks are applied to the individual countries (e.g. Australia), consequently it will also be applied to the Total Series as individual countries make up the Total. Breaks currently included in the visitor arrivals trend series for the past 10 years is provided below:

- April 2009 break for Visitor Arrivals from Japan. Decrease in Visitor arrival movements- travel restrictions in Japan due to swine flu.

## **8. *Extreme Values***

There are also cases where a real world event one off event (e.g. Tropical Cyclone) could lead to a sudden and drastic decline or increase in the number of Tourist Arrival. In this case, the extreme value or the outlier adjustments are applied and the factor is returned to the seasonally adjusted series to show the extent of the effect of the real world event. Extreme values currently included in the visitor arrivals trend series for the past 10 years are as follows:

- October 2011, increment in Tourist arrival from the United Kingdom
- January 2012 flood caused decline in Visitor arrivals from New Zealand and April 2012 flood reduced arrivals from Australia
- Sharp increment in Visitor Arrivals was observed from other countries in December 2012 and 2013 respectively.
- Operational of Direct flights from Narita to Fiji thrice a week caused large increment in Visitor Arrivals from Japan in July 2018.