

STATISTICAL NEWS

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SEASONALLY ADJUSTED VISITOR ARRIVALS NOVEMBER 2019

Seasonal adjustment is the process of estimating and then removing from a time series influences that are systematic and calendar related. Observed data needs to be seasonally adjusted as seasonal effects can hide both the true underlying movement in the series, as well as certain non-seasonal characteristics which may be of interest to analysts. (Refer to “Appendix 1-Explanatory Notes” for a detailed explanation).

VISITOR ARRIVALS TO FIJI

	November 2019	October 2019 to November 2019 % change	November 2018 to November 2019 % change
Total			
Trend	76,727	1.22	3.92
Seasonally Adjusted	75,872	3.86	...
Original	69,123	...	...
Australia			
Trend	31,125	2.65	2.00
Seasonally Adjusted	31,981	6.51	...
Original	31,701	...	...
New Zealand			
Trend	17,964	0.67	4.56
Seasonally Adjusted	18,092	3.74	...
Original	13,788	...	...
USA			
Trend	8,759	0.61	17.81
Seasonally Adjusted	8,624	-0.75	...
Original	7,922	...	...
Continental Europe			
Trend	3,131	-0.57	-1.51
Seasonally Adjusted	2,854	-4.29	...
Original	2,749	...	...
Japan			
Trend	1,258	0.80	9.30
Seasonally Adjusted	1,190	21.80	...
Original	870	...	...

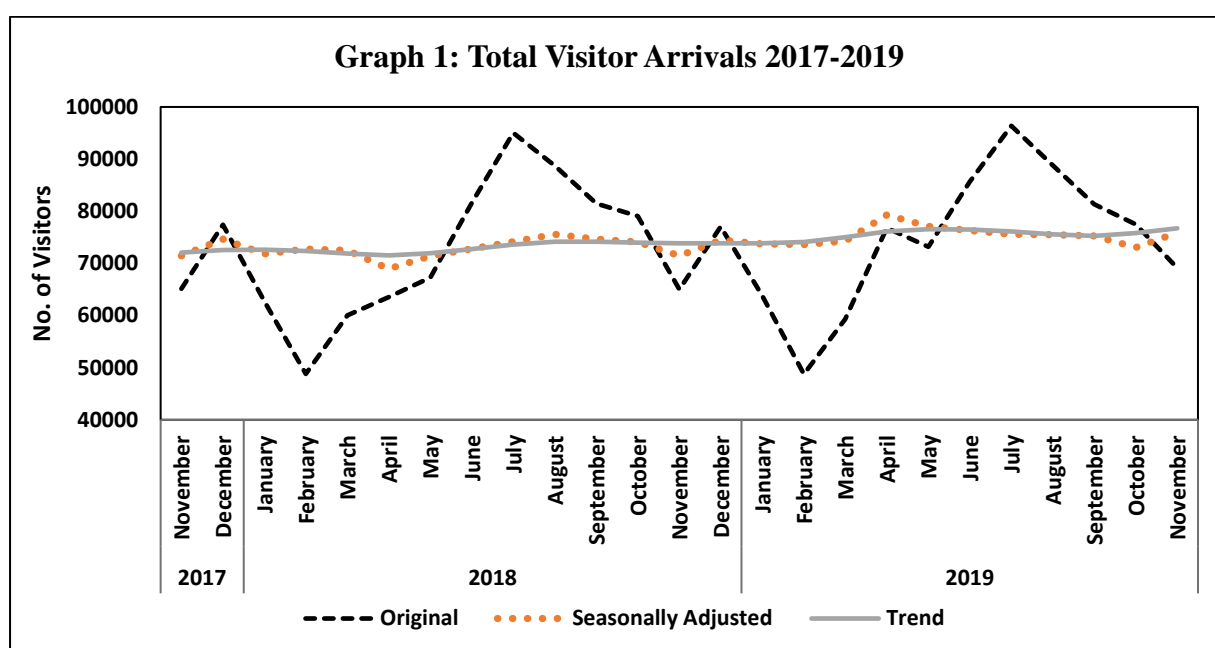
...not applicable (see notes below and “Appendix 1-Explanatory Notes” for more details)

Note:

1. Original series is dominated by seasonal and irregular influences. Due to these influences, *Month-to-month % change* and *year-to-year % change* in the original estimates are not shown here and must be used with caution.
2. *Year-to-year % change* in the seasonally adjusted estimates are not shown here and must be used with caution as irregular influences can dominate movements.

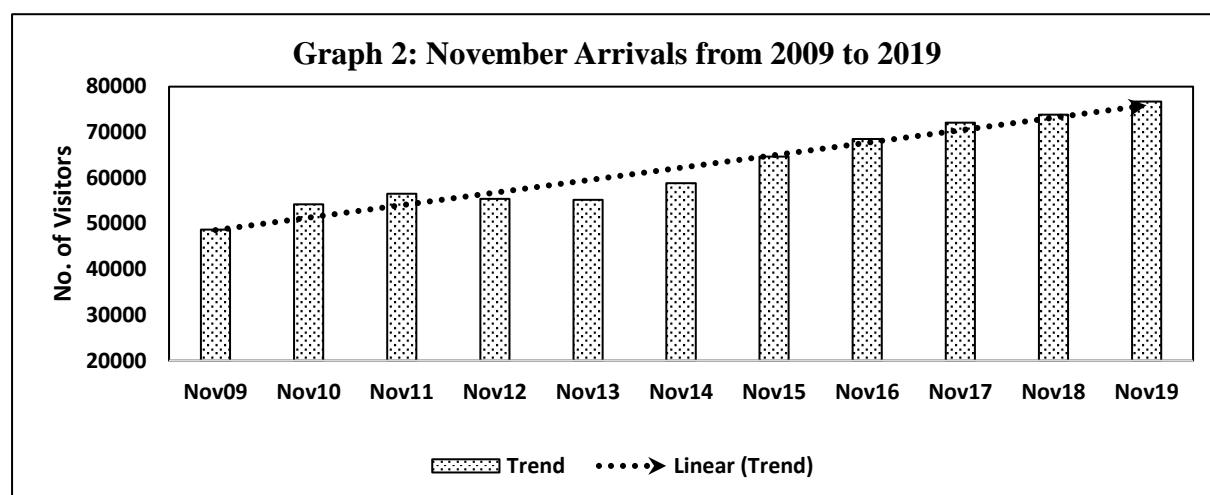
- **Trend estimates:** Trend estimates show the long term, underlying movement in the series after the removal of seasonal and irregular influences. The trend estimates of Total Visitor Arrivals during November 2019 (76,727) **increased by 1.22%**, compared with October 2019 (75,804). The current trend estimate for arrivals is **3.92% higher** than November 2018.
- **Seasonally adjusted estimates:** Seasonally Adjusted estimates show the trend and irregular components after removing all seasonal and systematic related behaviors from the series. During November 2019, seasonally adjusted Total Visitor Arrivals to Fiji (75,872) **increased by 3.86%** compared with October 2019 (73,051).
- **Original estimates:** The Total Visitor Arrivals to Fiji in November 2019 was 69,123. In this publication, the *month-to-month % change* and *year-to-year % change* is not reported as they contain seasonal and irregular influences that may hide the underlying, long term movement of the series.

Total Visitor Arrivals: Original, Seasonally Adjusted and Trend Series



Graph 1 shows the Total Visitor Arrivals to Fiji from November 2017 to November 2019 using three series: original, seasonally adjusted and trend. In terms of the original series, arrivals in February are low which could be due to visitors returning to their home countries after the holiday period in December and January. February also has less days compared to other months of the year. Arrivals in June and July on the other hand, are higher as these are winter months in the southern hemisphere. These variations contribute to calendar related, seasonal and irregular influences in the series, therefore seasonally adjusted and trend estimates are produced to show the true underlying movement of the series.

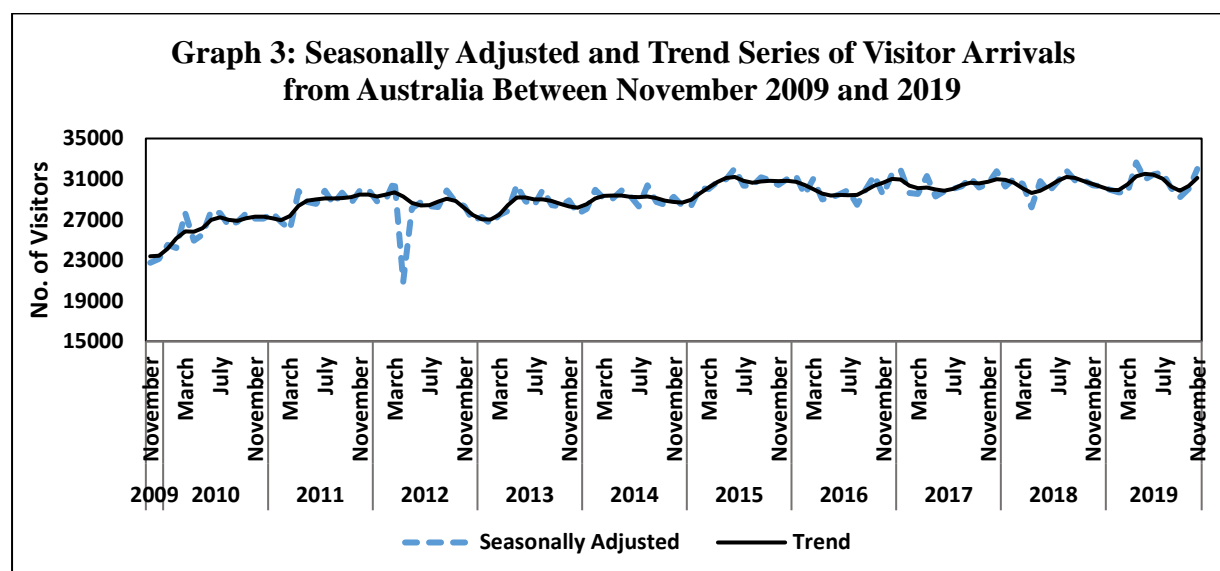
November Visitor Arrivals



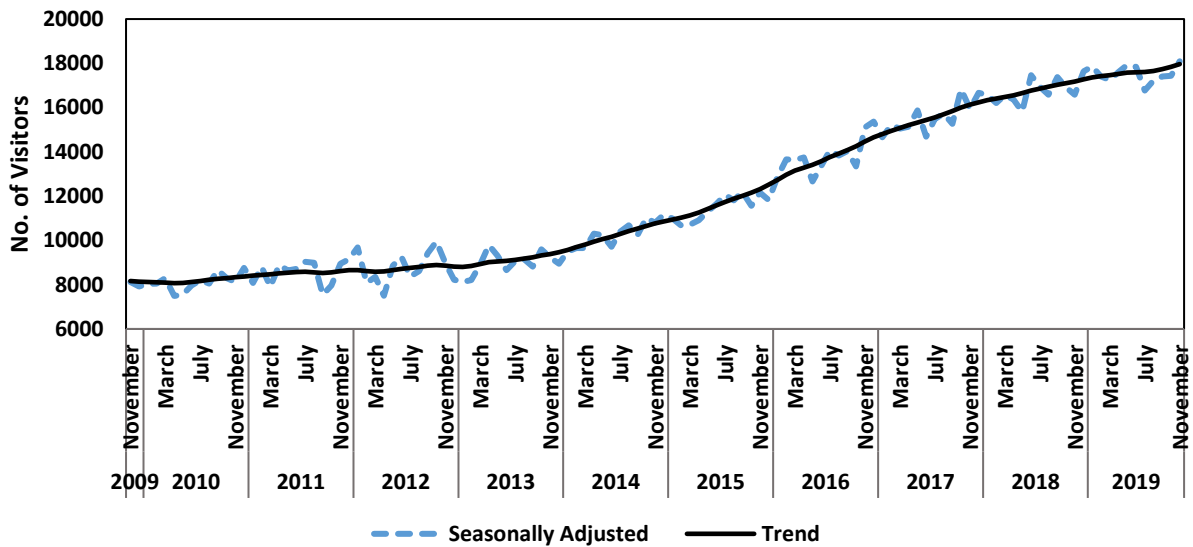
Graph 2 shows the trend of visitor arrivals to Fiji in November from 2009 to 2019. The number of arrivals has increased over the years except for a slight decline in the year 2012 and 2013. Visitor arrivals in November 2012 **fell by 2.00%** when compared with the previous year followed by a **decline** in November 2013 by **0.37%** compared to the same time a year earlier. However, the overall visitor arrivals in November is trending upwards indicating its positive effect on Fiji's Tourism. Upon comparison between November 2018 and November 2019, a **3.92%** increment was noted. To graph the long term movement of arrivals, trend series is used because it is adjusted and does not contain seasonal and irregular influences. (For more details on trend, linear trend, seasonal and irregular influences, see "Appendix: 1, Explanatory Notes" pages: 9-11).

Arrivals from Australia and New Zealand

Australia and New Zealand are the two major contributors of Visitor Arrivals in Fiji, consisting of 45.86% and 19.95% of total arrivals respectively. After removing seasonal and irregular influences, arrivals from Australia (Graph 3) shows a slightly increasing **trend** which has been generally stable since 2010. On the other hand, arrivals from New Zealand (Graph 4) is **trending** upwards. The seasonally adjusted series contains both the trend as well as random fluctuations and the impact of one-off real world events. Graph 3 shows the presence of a one-off event depicted by seasonally adjusted estimates in 2012. The flood period towards the end of March caused a huge reduction in arrivals from Australia in April. (For more explanation on difference between seasonally adjusted and trend series see "Appendix: 1, Explanatory Notes").

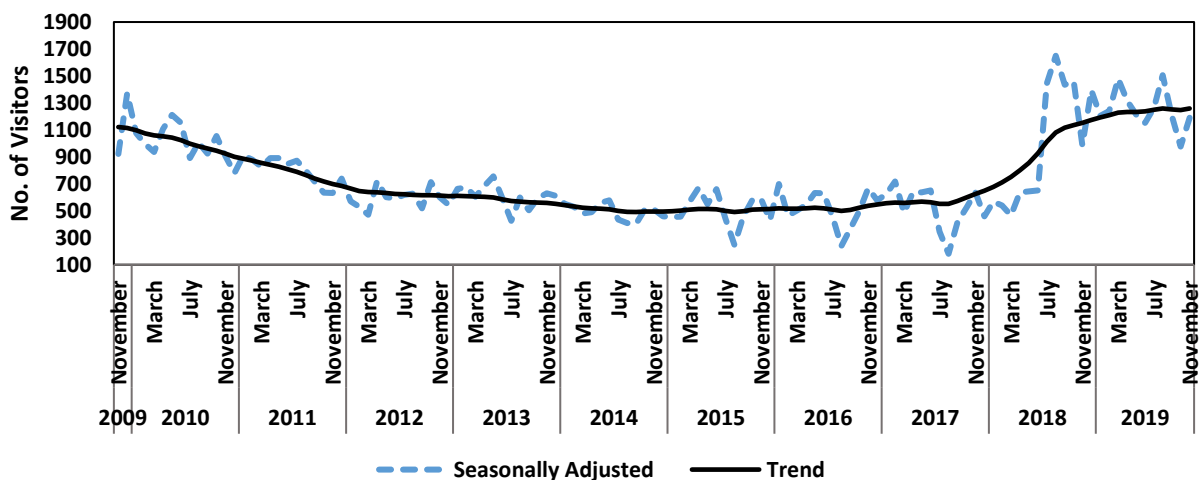


Graph 4: Seasonally Adjusted and Trend Series of Visitor Arrivals from New Zealand between November 2009 and 2019



Arrivals from Japan

Graph 5: Visitor Arrivals from Japan between November 2009 and 2019



Graph 5 shows the number of visitor arrivals from Japan between November 2009 to 2019. In terms of the trend series, there is an increment of **9.30%** compared to the same time last year. An increment of **0.80%** was noted in arrivals from October to November 2019. According to the seasonally adjusted figures, arrivals from Japan increased by **21.80%** from October to November, 2019. (For difference between seasonally adjusted and trend series see “Appendix: 1, Explanatory Notes”).

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

For further enquiries please contact Ms. Shaista Bi on email shaistab@statsfiji.gov.fj or telephone 3315822 (ext. 232) or direct line 3230832



Kemueli Naiqama [Mr]
Chief Executive

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TABLE 1

ORIGINAL AND SEASONALLY ADJUSTED VISITOR ARRIVALS : NUMBER BY COUNTRY OF RESIDENCE

YEAR	MONTH	AUSTRALIA	NEW ZEALAND	USA	CANADA	UNITED KINGDOM	CONTINENTAL EUROPE	JAPAN	SOUTH KOREA	REST OF ASIA	PACIFIC ISLANDS	OTHERS	TOTAL
ORIGINAL VISITOR ARRIVALS													
2017	November	29,686	12,214	6,465	993	1,243	3,036	394	771	5,142	4,847	360	65,151
	December	36,786	14,573	7,262	988	1,616	3,141	409	833	5,972	5,253	597	77,430
2018	January	28,313	10,612	5,617	1,000	1,321	2,952	505	792	5,569	5,529	438	62,648
	February	17,014	6,641	5,951	993	1,252	2,682	510	553	8,245	4,416	541	48,798
	March	25,196	9,868	7,264	1,196	1,474	2,706	427	720	6,667	4,112	428	60,058
	April	26,809	13,731	6,170	908	1,261	2,763	438	760	6,346	3,926	423	63,535
	May	29,730	14,383	7,059	834	1,239	3,013	391	598	5,907	3,725	411	67,290
	June	32,785	22,404	9,962	1,099	1,239	2,431	336	683	5,923	4,450	341	81,653
	July	35,608	28,572	9,104	1,675	1,871	3,392	1,736	712	7,513	4,403	475	95,061
	August	34,641	24,065	7,727	1,437	1,486	4,301	2,454	685	7,297	4,219	381	88,693
	September	35,585	21,675	6,060	883	1,000	3,176	1,723	585	6,340	4,014	396	81,437
	October	34,899	18,562	7,004	957	1,379	3,621	1,335	772	6,241	3,923	384	79,077
2019	November	29,828	12,631	6,913	1,063	1,145	3,092	693	699	4,314	4,290	321	64,989
	December	35,252	15,574	7,244	1,175	1,630	3,304	1,355	617	5,837	4,647	435	77,070
	January	27,860	11,573	5,709	1,121	1,265	2,906	1,127	766	5,806	5,203	471	63,807
	February	15,489	7,145	5,855	1,023	1,375	2,355	1,203	677	8,205	5,011	410	48,748
	March	22,972	9,457	8,323	1,247	1,471	2,758	1,468	586	6,302	4,240	482	59,306
	April	32,850	16,126	7,938	1,090	1,444	3,223	1,125	648	7,291	4,646	432	76,813
	May	30,035	16,372	8,585	984	1,374	2,536	944	813	6,876	4,179	471	73,169
	June	34,620	23,076	10,504	949	1,605	2,708	803	547	5,945	4,471	424	85,652
	July	36,799	27,963	9,926	1,601	2,020	3,541	1,571	602	6,995	4,849	509	96,376
	August	32,725	24,790	8,721	1,244	1,446	4,468	2,363	627	7,970	4,091	389	88,834
	September	33,329	21,632	8,027	897	1,246	3,031	1,491	741	6,169	4,298	493	81,354
	October	33,739	19,024	8,428	886	1,164	3,214	810	255	5,284	4,256	407	77,467
	November	31,701	13,788	7,922	1,043	1,171	2,749	870	269	4,430	4,882	298	69,123
SEASONALLY ADJUSTED VISITOR ARRIVALS													
2017	November	30,547	15,944	6,958	1,024	1,383	3,097	637	730	6,015	4,697	399	71,431
	December	31,773	16,672	7,276	978	1,471	3,124	459	789	6,682	4,919	496	74,639
2018	January	30,268	16,561	7,113	1,104	1,411	2,953	569	738	5,861	4,843	413	71,834
	February	31,041	16,206	7,362	1,112	1,298	3,098	539	640	6,890	4,065	486	72,737
	March	30,519	16,565	7,325	1,102	1,335	2,728	467	725	6,733	4,553	421	72,473
	April	28,214	16,362	6,886	1,005	1,266	2,803	637	788	6,334	4,237	423	68,955
	May	30,807	15,818	7,162	983	1,347	3,325	645	614	6,313	3,955	427	71,396
	June	29,747	17,467	7,404	1,295	1,261	2,912	651	728	6,409	4,557	403	72,834
	July	30,749	16,942	7,056	1,222	1,434	3,252	1,444	732	6,675	4,196	450	74,152
	August	31,846	16,584	7,411	1,249	1,456	3,396	1,650	743	6,483	4,334	414	75,566
	September	30,866	17,380	7,198	1,184	1,265	3,614	1,434	602	6,319	4,375	411	74,648
	October	30,927	16,921	7,232	1,091	1,504	3,348	1,460	679	6,319	4,235	398	74,114
2019	November	30,392	16,589	7,491	1,111	1,298	3,182	986	683	5,144	4,162	395	71,433
	December	30,280	17,645	7,334	1,170	1,475	3,276	1,395	607	6,539	4,351	417	74,489
	January	29,931	17,859	7,351	1,228	1,362	2,931	1,204	712	6,129	4,550	450	73,707
	February	29,679	17,403	7,364	1,147	1,431	2,754	1,240	751	6,828	4,610	410	73,617
	March	29,684	17,251	8,260	1,133	1,346	2,994	1,480	608	6,356	4,685	456	74,253
	April	32,641	17,616	8,645	1,219	1,452	3,071	1,317	667	7,228	4,994	433	79,283
	May	30,942	17,923	8,559	1,163	1,486	2,821	1,214	802	7,293	4,444	452	77,099
	June	31,457	17,847	7,898	1,099	1,610	3,238	1,152	593	6,422	4,576	440	76,332
	July	31,643	16,775	7,867	1,177	1,529	3,365	1,267	628	6,211	4,621	460	75,543
	August	30,096	17,224	8,370	1,068	1,413	3,484	1,507	668	7,040	4,217	415	75,502
	September	29,173	17,404	9,293	1,206	1,561	3,408	1,210	743	6,151	4,682	461	75,292
	October	30,026	17,439	8,689	1,025	1,282	2,982	977	227	5,385	4,597	422	73,051
	November	31,981	18,092	8,624	1,078	1,342	2,854	1,190	271	5,333	4,735	372	75,872

*China India and Hong Kong are included in Rest of Asia due to less than 10 years of data

* Seasonally Adjusted figures and trend estimates change as new data becomes available. This ensures that the most up-to-date and best possible estimates are derived.

TABLE 2

SEASONALLY ADJUSTED AND TREND VISITOR ARRIVALS : NUMBER BY COUNTRY OF RESIDENCE

YEAR	MONTH	AUSTRALIA	NEW ZEALAND	USA	CANADA	UNITED KINGDOM	CONTINENTAL EUROPE	JAPAN	SOUTH KOREA	REST OF ASIA	PACIFIC ISLANDS	OTHERS	TOTAL
SEASONALLY ADJUSTED VISITOR ARRIVALS													
2017	November	30,547	15,944	6,958	1,024	1,383	3,097	637	730	6,015	4,697	399	71,431
	December	31,773	16,672	7,276	978	1,471	3,124	459	789	6,682	4,919	496	74,639
2018	January	30,268	16,561	7,113	1,104	1,411	2,953	569	738	5,861	4,843	413	71,834
	February	31,041	16,206	7,362	1,112	1,298	3,098	539	640	6,890	4,065	486	72,737
	March	30,519	16,565	7,325	1,102	1,335	2,728	467	725	6,733	4,553	421	72,473
	April	28,214	16,362	6,886	1,005	1,266	2,803	637	788	6,334	4,237	423	68,955
	May	30,807	15,818	7,162	983	1,347	3,325	645	614	6,313	3,955	427	71,396
	June	29,747	17,467	7,404	1,295	1,261	2,912	651	728	6,409	4,557	403	72,834
	July	30,749	16,942	7,056	1,222	1,434	3,252	1,444	732	6,675	4,196	450	74,152
	August	31,846	16,584	7,411	1,249	1,456	3,396	1,650	743	6,483	4,334	414	75,566
	September	30,866	17,380	7,198	1,184	1,265	3,614	1,434	602	6,319	4,375	411	74,648
	October	30,927	16,921	7,232	1,091	1,504	3,348	1,460	679	6,319	4,235	398	74,114
	November	30,392	16,589	7,491	1,111	1,298	3,182	986	683	5,144	4,162	395	71,433
	December	30,280	17,645	7,334	1,170	1,475	3,276	1,395	607	6,539	4,351	417	74,489
2019	January	29,931	17,859	7,351	1,228	1,362	2,931	1,204	712	6,129	4,550	450	73,707
	February	29,679	17,403	7,364	1,147	1,431	2,754	1,240	751	6,828	4,610	410	73,617
	March	29,684	17,251	8,260	1,133	1,346	2,994	1,480	608	6,356	4,685	456	74,253
	April	32,641	17,616	8,645	1,219	1,452	3,071	1,317	667	7,228	4,994	433	79,283
	May	30,942	17,923	8,559	1,163	1,486	2,821	1,214	802	7,293	4,444	452	77,099
	June	31,457	17,847	7,898	1,099	1,610	3,238	1,152	593	6,422	4,576	440	76,332
	July	31,643	16,775	7,867	1,177	1,529	3,365	1,267	628	6,211	4,621	460	75,543
	August	30,096	17,224	8,370	1,068	1,413	3,484	1,507	668	7,040	4,217	415	75,502
	September	29,173	17,404	9,293	1,206	1,561	3,408	1,210	743	6,151	4,682	461	75,292
	October	30,026	17,439	8,689	1,025	1,282	2,982	977	227	5,385	4,597	422	73,051
	November	31,981	18,092	8,624	1,078	1,342	2,854	1,190	271	5,333	4,735	372	75,872
TREND SERIES VISITOR ARRIVALS													
2017	November	30,739	16,127	7,057	1,061	1,411	2,998	625	778	6,280	4,598	426	72,100
	December	30,991	16,240	7,115	1,049	1,404	3,011	648	756	6,311	4,590	433	72,548
2018	January	30,910	16,333	7,157	1,071	1,383	3,018	677	731	6,342	4,540	436	72,598
	February	30,625	16,409	7,189	1,088	1,355	3,022	711	714	6,377	4,470	437	72,397
	March	30,061	16,486	7,192	1,078	1,335	3,029	750	713	6,399	4,415	435	71,893
	April	29,631	16,559	7,180	1,062	1,328	3,053	801	712	6,402	4,369	432	71,529
	May	29,843	16,650	7,206	1,093	1,331	3,091	856	706	6,405	4,342	429	71,952
	June	30,274	16,766	7,239	1,166	1,345	3,125	927	709	6,412	4,341	427	72,731
	July	30,826	16,860	7,261	1,208	1,369	3,163	1,013	710	6,416	4,343	425	73,594
	August	31,210	16,939	7,293	1,204	1,380	3,198	1,080	698	6,408	4,347	423	74,180
	September	31,099	17,025	7,324	1,175	1,382	3,214	1,117	678	6,394	4,354	421	74,183
	October	30,802	17,099	7,369	1,143	1,389	3,204	1,136	668	6,372	4,362	420	73,964
	November	30,515	17,180	7,435	1,141	1,395	3,179	1,151	667	6,365	4,387	421	73,836
	December	30,221	17,283	7,505	1,163	1,401	3,149	1,174	672	6,392	4,436	425	73,821
2019	January	29,930	17,369	7,598	1,176	1,407	3,115	1,192	684	6,430	4,496	429	73,826
	February	29,899	17,423	7,754	1,168	1,411	3,093	1,210	689	6,461	4,552	433	74,093
	March	30,491	17,471	7,965	1,165	1,423	3,093	1,228	684	6,489	4,596	436	75,041
	April	31,274	17,528	8,139	1,170	1,448	3,102	1,234	685	6,512	4,615	438	76,145
	May	31,516	17,577	8,214	1,158	1,480	3,119	1,233	683	6,508	4,605	440	76,533
	June	31,439	17,597	8,237	1,142	1,498	3,149	1,237	667	6,472	4,592	439	76,469
	July	31,044	17,611	8,308	1,133	1,489	3,177	1,250	663	6,440	4,582	437	76,134
	August	30,271	17,659	8,469	1,126	1,465	3,188	1,259	676	6,410	4,583	434	75,540
	September	29,851	17,741	8,629	1,115	1,434	3,176	1,253	687	6,358	4,606	429	75,279
	October	30,322	17,845	8,706	1,092	1,396	3,149	1,248	680	6,306	4,637	423	75,804
	November	31,125	17,964	8,759	1,080	1,373	3,131	1,258	662	6,295	4,663	417	76,727

*China India and Hong Kong are included in Rest of Asia due to less than 10 years of data

*Seasonally Adjusted figures and trend estimates change as new data becomes available. This ensures that the most up-to-date and best possible estimates are derived.

APPENDIX 1: EXPLANATORY NOTES

WHAT IS A TIME SERIES?

A time series is a collection of observations of well-defined data items obtained through repeated measurements over time. For example, measuring the value of retail sales each month over several years would comprise a time series. This is because sales revenue is well defined, and consistently measured at equally spaced intervals. Data collected irregularly or only once are not time series. In this release, monthly Visitor Arrivals to Fiji by country of residence for the past 48 years (from 1970) are analyzed as a time series. An observed time series can be decomposed into three components: the trend (long term direction), the seasonal (systematic, calendar related movements) and the irregular (unsystematic, short term fluctuations).

WHAT ARE SEASONAL EFFECTS?

A seasonal effect is a systematic and calendar related effect. Some examples include the sharp escalation in most Retail series leading up to December due to the Christmas holiday period, or the increase in tourist arrivals to Fiji during the winter months of Australia and New Zealand.

WHAT IS SEASONAL ADJUSTMENT AND WHY DO WE NEED IT?

Seasonal adjustment is the process of estimating and then removing from a time series influences that are systematic and calendar related. Observed data needs to be seasonally adjusted as seasonal effects can conceal both the true underlying movements in the series, as well as certain non-seasonal characteristics which may be of interest to analysts.

WHY CAN'T WE JUST COMPARE ORIGINAL DATA FROM THE SAME PERIOD IN EACH YEAR?

A comparison of original data from the same period in each year does not completely remove all seasonal effects. Certain holidays such as Easter and Chinese New Year fall in different periods in each year, hence they will distort observations. Also, year to year values will be biased by any changes in seasonal patterns that occur over time. For example, consider a comparison between two consecutive March months i.e. compare the level of the original series observed in March for 2000 and 2001. This comparison ignores the moving holiday effect of Easter. Easter occurs in April for most years but if Easter falls in March, the level of activity can vary greatly for that month for some series. This distorts the original estimates. A comparison of these two months will not reflect the underlying pattern of the data. The comparison also ignores trading day effects. If the two consecutive months of March have different composition of trading days, it might reflect different levels of activity in original terms even though the underlying level of activity is unchanged. In a similar way, any changes to seasonal patterns might also be ignored. The original estimates also contain the influence of the irregular component. If the magnitude of the irregular component of a series is strong compared with the magnitude of the trend component, the underlying direction of the series can be distorted.

However, the major disadvantage of comparing year to year original data, is lack of precision and time delays in the identification of turning points in a series. Turning points occur when the direction of underlying level of the series changes, for example when a consistently decreasing series begins to rise steadily. If we compare year apart data in the original series, we may miss turning points occurring during

the year. For example, if March 2001 has a higher original estimate than March 2000, by comparing these year apart values, we might conclude that the level of activity has increased during the year. However, the series might have increased up to September 2000 and then started to decrease steadily.

WHICH INDICATOR SHOULD BE USED TO COMPARE MONTH-TO-MONTH OR QUARTER-TO QUARTER PERCENTAGE CHANGES?

Original estimates- *Do not use*

Usually dominated by seasonal effects; also residual noise and irregular influences

Seasonally adjusted estimates- *Use with caution*

Provides useful information on the effects of short term, major events. Dominated by irregular and noise, except for series with very little volatility

Trend estimates- *Preferred option*

The best indicator of underlying behavior for month-to-month or quarter-to-quarter changes. Recent estimates, usually the last 3 or 4, may be revised.

WHEN IS SEASONAL ADJUSTMENT INAPPROPRIATE?

When a time series is dominated by the trend or irregular components, it is nearly impossible to identify and remove what little seasonality is present. Hence seasonally adjusting a non-seasonal series is impractical and will often introduce an artificial seasonal element.

WHAT IS SEASONALITY?

The seasonal component consists of effects that are reasonably stable with respect to timing, direction and magnitude. It arises from systematic, calendar related influences such as:

- **Natural Conditions**
Weather fluctuations that are representative of the season (uncharacteristic weather patterns such as snow in summer would be considered irregular influences).
- **Business and Administrative procedures**
Start and end of the school term.
- **Social and Cultural behavior**
Christmas.

It also includes calendar related systematic effects that are not stable in their annual timing or are caused by variations in the calendar from year to year, such as:

- **Trading Day Effects**
The number of occurrences of each of the day of the week in a given month will differ from year to year
- There were 4 weekends in March in 2000, but 5 weekends in March of 2002

- **Moving Holiday Effects**

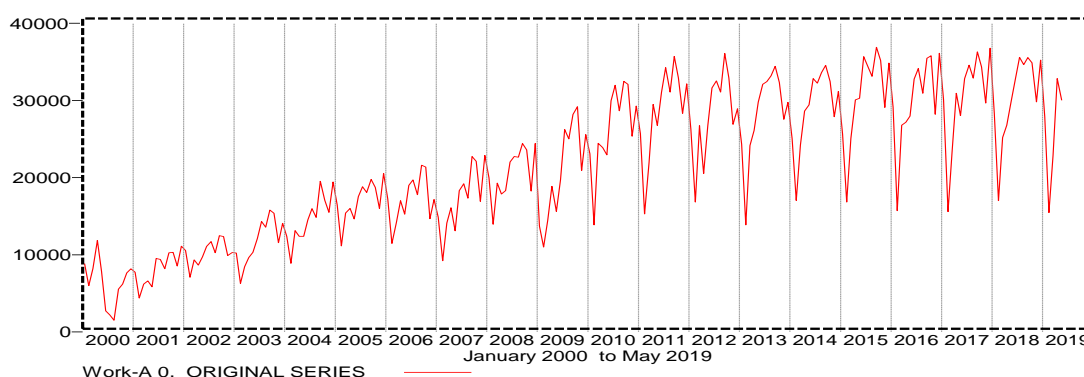
Holidays which occur each year, but whose exact timing shifts

- Easter, Chinese New Year

HOW DO WE IDENTIFY SEASONALITY?

Seasonality in a time series can be identified by regularly spaced peaks and troughs which have a consistent direction and approximately the same magnitude every year, relative to the trend. The following diagram depicts a strongly seasonal series. There is an obvious large seasonal increase in tourist arrival from Australia in December due to holiday season which starts to decline from January every year. In this example, the magnitude of the seasonal component increases over time, as does the trend.

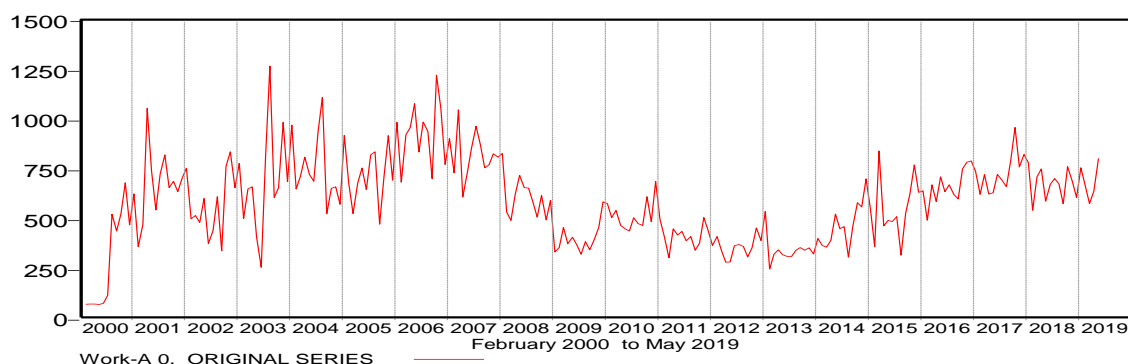
Visitor Arrivals from Australia to Fiji



WHAT IS AN IRREGULAR?

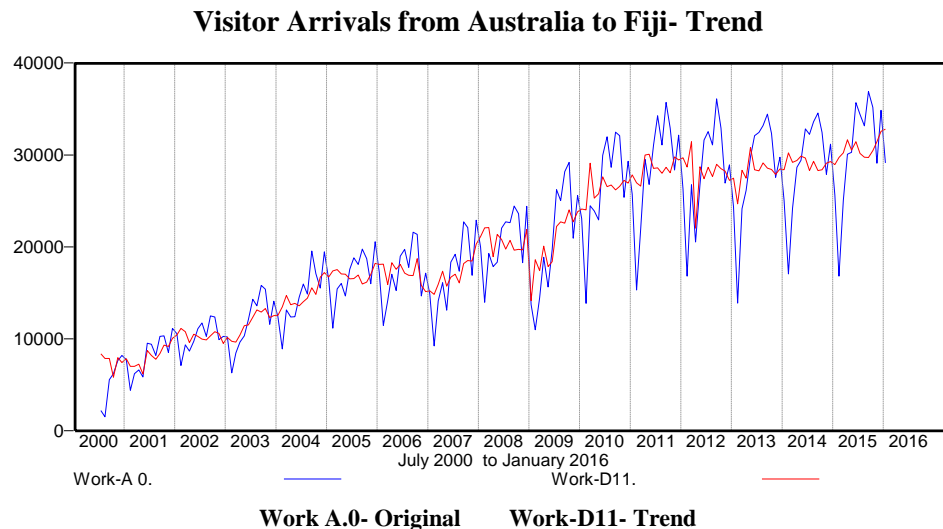
The irregular component (sometimes also known as the residual) is what remains after the seasonal and trend components of a time series have been estimated and removed. It results from short term fluctuations in the series which are neither systematic nor predictable. In a highly irregular series, these fluctuations can dominate movements, which will mask the trend and seasonality. The following graph is an example of a highly irregular time series.

Visitor Arrivals from South Korea to Fiji



WHAT IS THE TREND?

The trend is defined as the 'long term' movement in a time series without calendar related and irregular effects, and is a reflection of the underlying level. It is the result of influences such as population growth, price inflation and general economic changes. The following graph depicts a series in which there is an obvious upward trend over time:



LINEAR TREND

Linear trend is a “straight line” which gives the general direction that a group of points seems to follow. In this publication, linear trend is used only to visualize the overall direction of visitor arrivals to Fiji in terms of the trend series.

HOW IS SEASONAL ADJUSTMENT CONDUCTED?

A filter based method of seasonal adjustment based on the X13, is applied to FBoS series. 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, X13 uses the X-13-ARIMA-SEATS program from the US Census Bureau to estimate the components of a time series. The program is a superset of the X-12-ARIMA program and it implements the X-11 algorithm.

HANDLING UNUSUAL BEHAVIOURS IN A TIME SERIES

Often series display behaviour that is not consistent with the expected seasonal pattern or trend. When series are not well behaved they need to be corrected or adjusted to avoid obtaining an inferior seasonal adjustment. Since seasonal adjustment often involves filters, any strange values will have a large impact on the final result average is influenced by a real large or low value. The original series are not always well behaved. In reality, there are activities that are systematic and predictable, but doesn't affect the same calendar period the same way every year, for example, moving holidays, trading day, etc. There are cases

of unusually high or low values, sudden and sustained level shifts, and sudden and sustained changes in the seasonal pattern. Before estimating the components of the time series, we need to correct for these so that we have a series that is better but may not be perfect because we are still dealing with estimates. Prior corrected series is used for calculating higher quality estimates of the Seasonal factors and the Trend. It enables more adequate models to be found both in terms of the decomposition model and ARIMA model. It also ensures that the results of the seasonal adjustment process are not distorted by known events.

EXTREME VALUES

Extremes or outliers are values in a time series that are unusually large or small relative to the other data. They can distort the appearance of the underlying movement of the time series by altering the trend. For this reason, and to improve estimation of the three series components (trend, seasonal and irregular), it is necessary to detect and correct outliers.

For example, a real world event one off event (like a tropical cyclone) could lead to a sudden and drastic decline or increase in the number of Tourist Arrivals. In this case, an extreme value correction is applied prior to seasonal adjustment to ensure an optimal result. The value is then returned to the seasonally adjusted series to show the extent of the effect of the real world event.

TREND BREAKS

An abrupt but sustained change in the level of a time series is known as a trend break. This is reflected in at least 6 months or 3 quarters of raised or lowered levels. If the span of increased or decreased values is shorter than this, they are classified as extreme values.

For example, real world events could lead to a sudden and sustained change in the level of the series. In this case, trend break corrections are applied and the factor is returned to the trend and seasonally adjusted series.

(Source: Australian Bureau of Statistics)