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STATISTICAL NEWS

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SEASONALLY ADJUSTED VISITOR ARRIVALS FEBRUARY 2020

Seasonal adjustment is the process of estimating and then removing from a time series influences that are systematic and calendar related. Observed (original) 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.

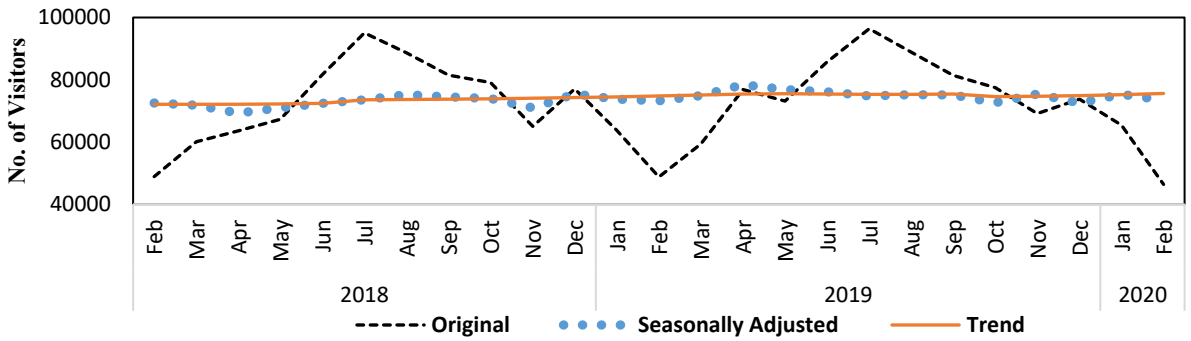
Trend estimates show the long term, underlying movement in the series after the removal of seasonal and irregular influences.

Seasonally Adjusted estimates show the trend and irregular components after removing all seasonal and systematic related behaviors from the series.

Original estimates are the actual values observed and contain the trend, seasonal and irregular components.[1]

Total Visitor Arrivals to Fiji

Graph 1: Total Visitor Arrivals 2018-2020



	February 2020	January 2020 to February 2020 % change	February 2019 to February 2020 % change
Total			
Trend	75,583	0.49	1.15
Seasonally Adjusted	73,397	-2.57	…
Original	46,343	…	…

Trend estimates of Total Visitor Arrivals during February 2020 (75,583) increased by **0.49%,** compared with January 2020 (75,214). The current trend estimate for arrivals is **1.15%** higher than February 2019.

Seasonally adjusted estimates of Total Visitor Arrivals to Fiji (73,397) in February 2020 decreased by **2.57%** compared with January 2020 (75,335).

Original estimates of Total Visitor Arrivals to Fiji in February 2020 was 46,343. 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.

[1] For more details on trend, seasonal and irregular influences, see "Appendix: 1, Explanatory Notes" pages: 9-11.

Graph 1 shows the Total Visitor Arrivals to Fiji from February 2018 to February 2020 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.

Visitor Arrivals by Country of Residence

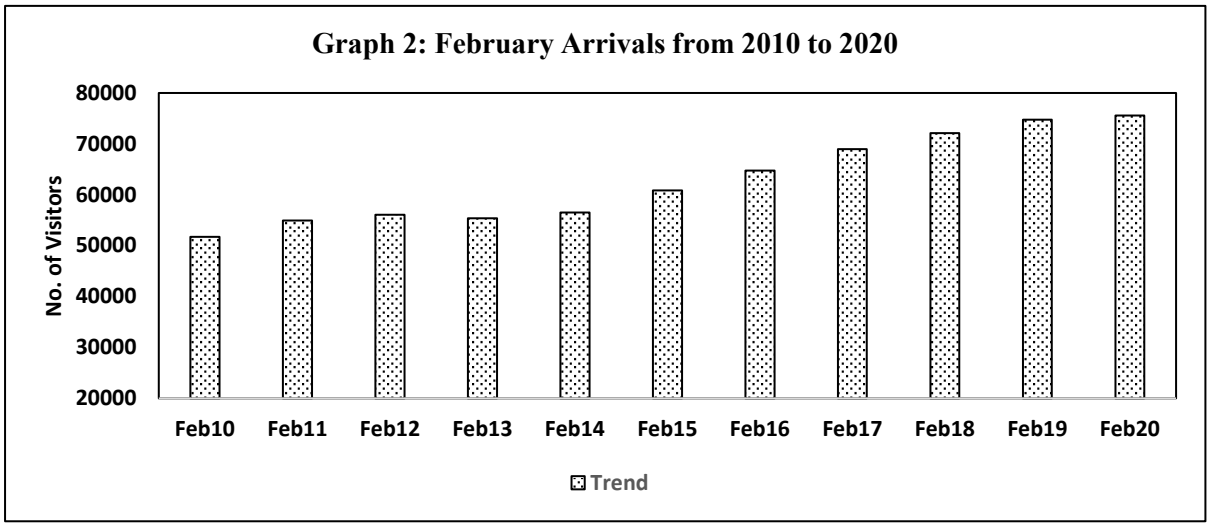
	February 2020	January 2020 to February 2020 % change	February 2019 to February 2020 % change
Australia			
Trend	30,954	0.13	1.25
Seasonally Adjusted	31,041	-1.64	…
Original	16,690	…	…
New Zealand			
Trend	18,416	1.19	6.23
Seasonally Adjusted	19,707	10.44	…
Original	8,242	…	…
USA			
Trend	8,526	1.28	9.83
Seasonally Adjusted	8,723	6.03	…
Original	7,020	…	…
Continental Europe			
Trend	2,587	0.43	-11.07
Seasonally Adjusted	2,766	-0.61	…
Original	2,524	…	…
Japan			
Trend	1,025	-3.48	-21.34
Seasonally Adjusted	1043	34.23	…
Original	1,042	…	…
Pacific Islands			
Trend	4,460	-0.09	-6.34
Seasonally Adjusted	4,361	-2.02	…
Original	4,685	…	…

…not applicable (see notes below and "Appendix 1-Explanatory Notes" for more details)

Note:

1. The 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.

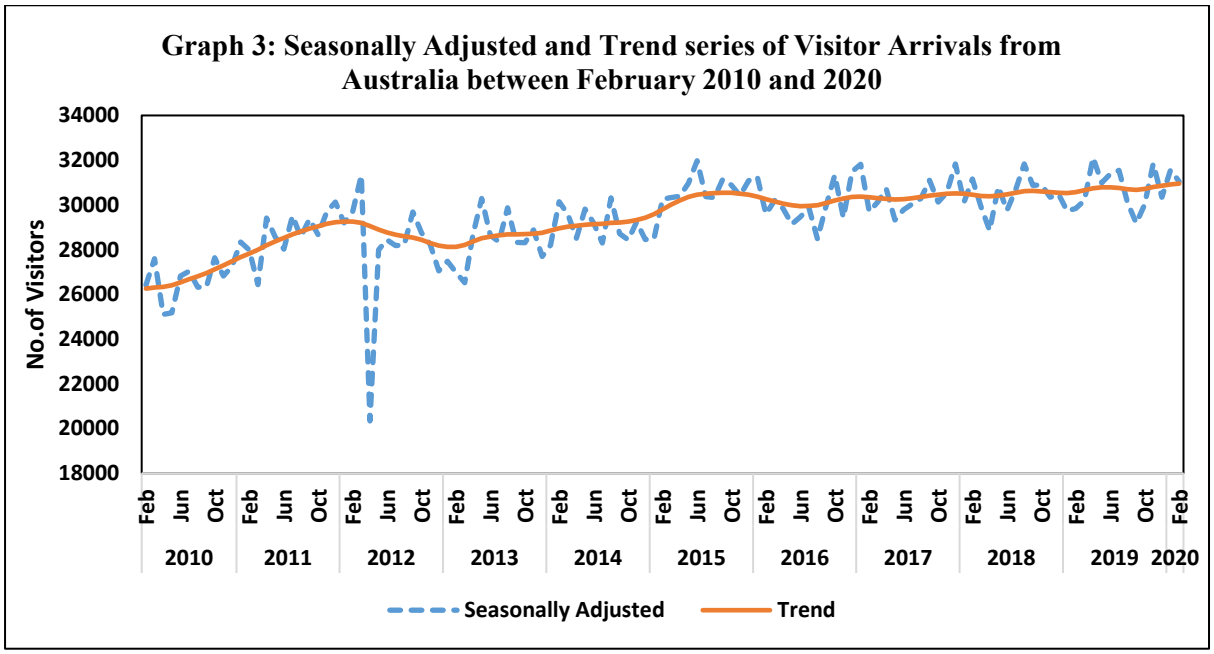
February Visitor Arrivals



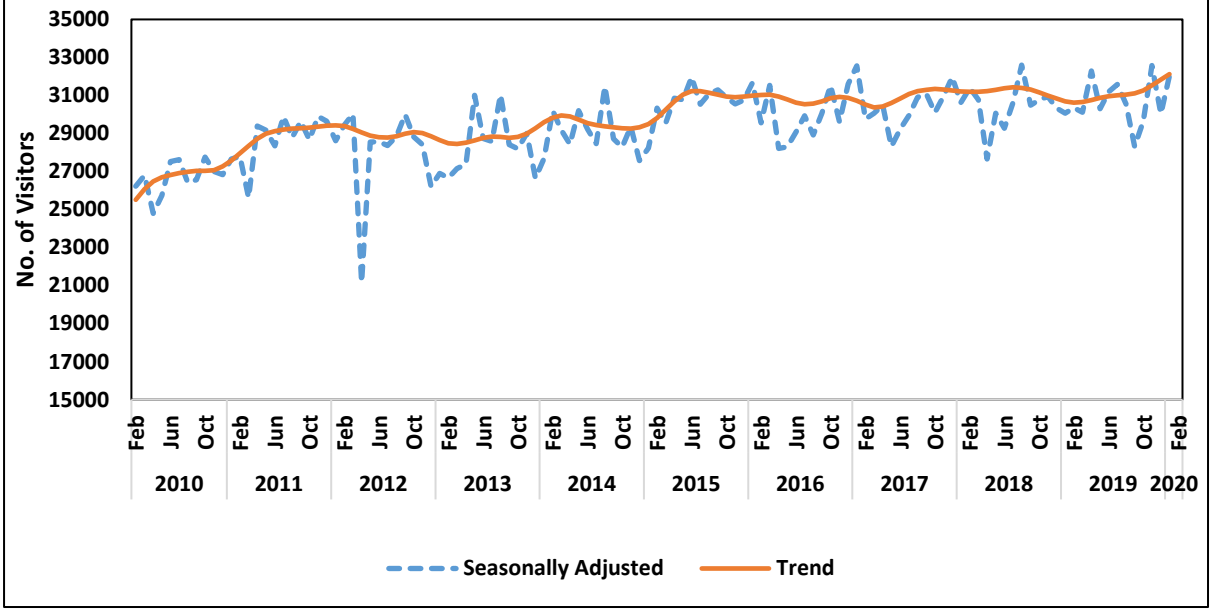
Graph 2 shows the trend of visitor arrivals to Fiji in February from 2010 to 2020. The number of arrivals has increased over the years except for a slight decline in the year 2013. Visitor arrivals in February 2013 **fell by 1.16%** when compared with the previous year. Highest increment in the ten year period was noted in 2015 **(up by 7.72%)**. Upon comparison between 2019 and 2020, a **1.15%** increment was noted. The overall visitor arrivals in February is trending upwards indicating its positive effect on Fiji's tourism. To graph the long term movement of arrivals, trend series is used because it is adjusted and does not contain seasonal and irregular influences.

Arrivals from Australia and New Zealand

Australia and New Zealand are the two major contributors of Visitor Arrivals in Fiji, consisting of **36.01%** and **17.78%** 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. The arrivals from New Zealand **(Graph 4)** has also been generally stable since 2010 with a slow rising trend. The seasonally adjusted series contains both the trend as well as random fluctuations and the impact of one-off real world events. Both **graphs (3 and 4)** show 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 and New Zealand in April.

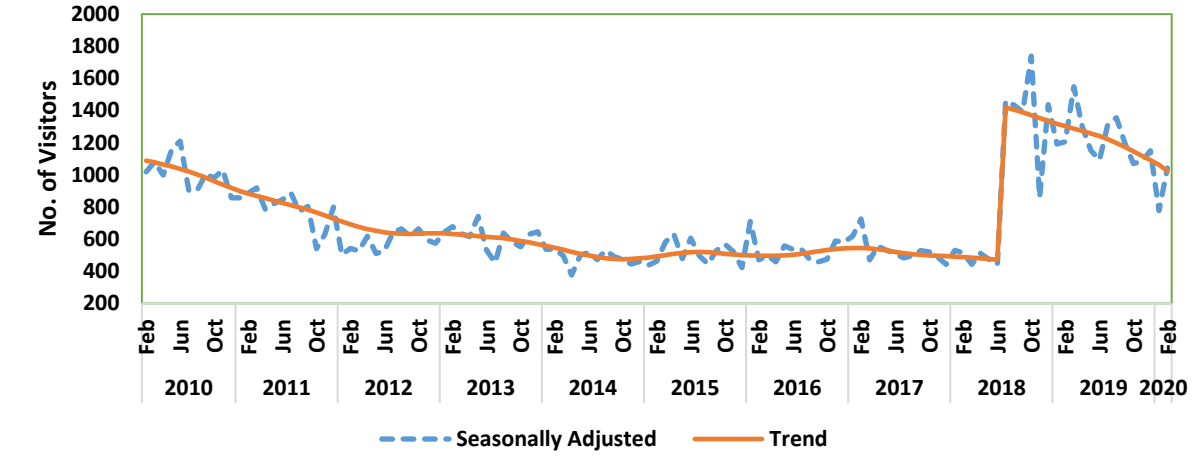


Graph 4: Seasonally adjusted and Trend series of visitors arrival from New Zealand between February 2010 to February 2020



Arrivals from Japan

Graph 5: Visitor arrivals from Japan between February 2010 to February 2020



Graph 5 shows the number of visitor arrivals from Japan between February 2010 and 2020. In terms of the trend series, the arrivals from Japan declined by **21.34%** compared to the same time last year. A reduction of **3.48%** was also noted from January 2020 to February 2020. According to the seasonally adjusted figures, arrivals from Japan increased by **34.23%** from January to February 2020. Graph 5 also illustrates a trend break which occurred after the operational of direct flights from Narita to Fiji in July 2018. The series shifted to a new level since then but is gradually following a declining trend afterwards.

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

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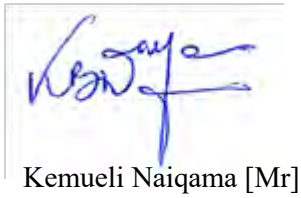


Kemueli Naiqama [Mr]
Chief Executive

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							
2018	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**
	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**
2019	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**
	December	34,901	15,052	7,030	1,184	1,275	2,569	1,093	275	5,659	4,243	459	**73,740**
2020	January	29,886	11,316	6,209	1,075	1,423	2,802	726	316	6,139	5,022	472	**65,386**
	February	16,690	8,242	7,020	1,167	1,286	2,524	1,042	161	3,179	4,685	347	**46,343**
						SEASONALLY ADJUSTED VISITOR ARRIVALS							
2018	February	31,161	16,049	7,323	1,044	1,331	2,927	514	648	6,835	4,105	556	**72,493**
	March	29,912	16,395	7,310	1,066	1,359	2,770	442	775	6,725	4,609	395	**71,758**
	April	28,856	16,189	6,875	985	1,290	2,689	512	814	6,306	4,306	445	**69,267**
	May	30,818	15,606	7,144	939	1,357	3,283	475	619	6,298	3,959	428	**70,926**
	June	29,756	17,419	7,379	1,269	1,240	2,821	443	721	6,408	4,583	406	**72,445**
	July	30,673	16,680	7,024	1,198	1,351	3,086	1,461	733	6,680	4,238	433	**73,557**
	August	31,831	16,211	7,370	1,218	1,443	3,698	1,432	740	6,484	4,391	408	**75,226**
	September	30,873	17,130	7,150	1,184	1,261	3,644	1,391	616	6,387	4,432	383	**74,451**
	October	30,895	16,670	7,177	1,041	1,468	3,298	1,739	695	6,369	4,224	415	**73,991**
	November	30,337	16,486	7,418	1,069	1,352	3,085	859	615	5,222	4,167	374	**70,984**
	December	30,484	18,078	7,666	1,115	1,481	3,207	1,436	545	6,490	4,480	374	**75,356**
2019	January	29,729	18,244	7,464	1,167	1,338	2,877	1,192	674	6,082	4,611	407	**73,785**
	February	29,838	17,169	7,292	1,073	1,445	2,598	1,205	793	6,768	4,660	422	**73,263**
	March	30,198	17,289	8,229	1,111	1,377	2,956	1,549	631	6,348	4,744	444	**74,876**
	April	32,119	17,260	8,622	1,180	1,458	3,046	1,301	694	7,188	5,075	451	**78,394**
	May	30,992	17,741	8,522	1,110	1,451	2,820	1,152	841	7,268	4,450	485	**76,832**
	June	31,381	17,893	7,849	1,096	1,535	3,110	1,093	578	6,421	4,601	504	**76,061**
	July	31,550	16,389	7,803	1,143	1,428	3,175	1,313	620	6,218	4,665	464	**74,768**
	August	30,087	16,754	8,285	1,057	1,387	3,858	1,355	678	7,035	4,270	424	**75,190**
	September	29,184	17,124	9,181	1,197	1,512	3,489	1,200	780	6,219	4,737	476	**75,099**
	October	30,008	17,127	8,561	972	1,313	2,888	1,070	230	5,438	4,580	436	**72,623**
	November	31,847	17,993	8,495	1,053	1,396	2,765	1,085	237	5,426	4,734	355	**75,386**
	December	30,336	17,492	7,675	1,123	1,270	2,474	1,149	243	6,291	4,107	388	**72,548**
2020	January	31,560	17,844	8,227	1,118	1,460	2,783	777	278	6,430	4,451	407	**75,335**
	February	31,041	19,707	8,723	1,218	1,372	2,766	1,043	189	2,618	4,361	359	**73,397**

*China India and Hong Kong are included in Rest of Asia

*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							
2018	February	31,161	16,049	7,323	1,044	1,331	2,927	514	648	6,835	4,105	556	**72,493**
	March	29,912	16,395	7,310	1,066	1,359	2,770	442	775	6,725	4,609	395	**71,758**
	April	28,856	16,189	6,875	985	1,290	2,689	512	814	6,306	4,306	445	**69,267**
	May	30,818	15,606	7,144	939	1,357	3,283	475	619	6,298	3,959	428	**70,926**
	June	29,756	17,419	7,379	1,269	1,240	2,821	443	721	6,408	4,583	406	**72,445**
	July	30,673	16,680	7,024	1,198	1,351	3,086	1,461	733	6,680	4,238	433	**73,557**
	August	31,831	16,211	7,370	1,218	1,443	3,698	1,432	740	6,484	4,391	408	**75,226**
	September	30,873	17,130	7,150	1,184	1,261	3,644	1,391	616	6,387	4,432	383	**74,451**
	October	30,895	16,670	7,177	1,041	1,468	3,298	1,739	695	6,369	4,224	415	**73,991**
	November	30,337	16,486	7,418	1,069	1,352	3,085	859	615	5,222	4,167	374	**70,984**
	December	30,484	18,078	7,666	1,115	1,481	3,207	1,436	545	6,490	4,480	374	**75,356**
2019	January	29,729	18,244	7,464	1,167	1,338	2,877	1,192	674	6,082	4,611	407	**73,785**
	February	29,838	17,169	7,292	1,073	1,445	2,598	1,205	793	6,768	4,660	422	**73,263**
	March	30,198	17,289	8,229	1,111	1,377	2,956	1,549	631	6,348	4,744	444	**74,876**
	April	32,119	17,260	8,622	1,180	1,458	3,046	1,301	694	7,188	5,075	451	**78,394**
	May	30,992	17,741	8,522	1,110	1,451	2,820	1,152	841	7,268	4,450	485	**76,832**
	June	31,381	17,893	7,849	1,096	1,535	3,110	1,093	578	6,421	4,601	504	**76,061**
	July	31,550	16,389	7,803	1,143	1,428	3,175	1,313	620	6,218	4,665	464	**74,768**
	August	30,087	16,754	8,285	1,057	1,387	3,858	1,355	678	7,035	4,270	424	**75,190**
	September	29,184	17,124	9,181	1,197	1,512	3,489	1,200	780	6,219	4,737	476	**75,099**
	October	30,008	17,127	8,561	972	1,313	2,888	1,070	230	5,438	4,580	436	**72,623**
	November	31,847	17,993	8,495	1,053	1,396	2,765	1,085	237	5,426	4,734	355	**75,386**
	December	30,336	17,492	7,675	1,123	1,270	2,474	1,149	243	6,291	4,107	388	**72,548**
2020	January	31,560	17,844	8,227	1,118	1,460	2,783	777	278	6,430	4,451	407	**75,335**
	February	31,041	19,707	8,723	1,218	1,372	2,766	1,043	189	2,618	4,361	359	**73,397**
						TREND SERIES VISITOR ARRIVALS							
2018	February	30,455	16,305	7,195	1,062	1,373	2,928	488	723	6,373	4,793	425	**72,120**
	March	30,401	16,347	7,190	1,067	1,366	2,928	485	723	6,396	4,787	427	**72,117**
	April	30,380	16,397	7,173	1,073	1,362	2,927	481	720	6,400	4,771	425	**72,109**
	May	30,414	16,476	7,194	1,082	1,361	2,924	477	712	6,405	4,762	421	**72,228**
	June	30,474	16,584	7,224	1,093	1,365	2,923	472	706	6,413	4,756	415	**72,425**
	July	30,550	16,671	7,243	1,101	1,374	2,922	1,419	701	6,417	4,734	409	**73,541**
	August	30,613	16,751	7,275	1,106	1,380	2,920	1,405	692	6,410	4,713	403	**73,668**
	September	30,627	16,849	7,311	1,108	1,383	2,916	1,388	681	6,396	4,705	400	**73,764**
	October	30,604	16,953	7,366	1,108	1,387	2,912	1,370	672	6,375	4,705	399	**73,851**
	November	30,572	17,078	7,458	1,109	1,391	2,906	1,352	665	6,367	4,711	402	**74,011**
	December	30,544	17,218	7,555	1,111	1,393	2,903	1,335	664	6,391	4,729	408	**74,251**
2019	January	30,536	17,309	7,638	1,112	1,394	2,903	1,318	673	6,428	4,749	417	**74,477**
	February	30,572	17,336	7,763	1,113	1,395	2,909	1,303	682	6,464	4,762	428	**74,727**
	March	30,656	17,350	7,951	1,114	1,398	2,919	1,288	686	6,497	4,767	440	**75,066**
	April	30,745	17,371	8,108	1,115	1,405	2,933	1,274	690	6,524	4,748	450	**75,363**
	May	30,790	17,390	8,163	1,115	1,414	2,949	1,258	690	6,525	4,705	456	**75,455**
	June	30,793	17,380	8,164	1,114	1,416	2,965	1,241	685	6,496	4,663	458	**75,375**
	July	30,758	17,359	8,206	1,114	1,412	2,979	1,221	685	6,467	4,627	455	**75,283**
	August	30,696	17,390	8,328	1,113	1,408	2,992	1,198	693	6,440	4,597	448	**75,303**
	September	30,667	17,486	8,435	1,113	1,403	3,003	1,173	702	6,395	4,582	438	**75,397**
	October	30,715	17,627	8,446	1,112	1,393	2,545	1,146	235	6,353	4,563	426	**74,561**
	November	30,795	17,798	8,393	1,114	1,385	2,555	1,118	236	6,353	4,526	415	**74,688**
	December	30,861	17,984	8,359	1,118	1,386	2,565	1,092	236	6,390	4,485	403	**74,879**
2020	January	30,915	18,200	8,418	1,123	1,394	2,576	1,062	235	6,436	4,464	391	**75,214**
	February	30,954	18,416	8,526	1,126	1,401	2,587	1,025	232	6,478	4,460	378	**75,583**

*China India and Hong Kong are included in Rest of Asia

*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 10 years (from 2010) 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

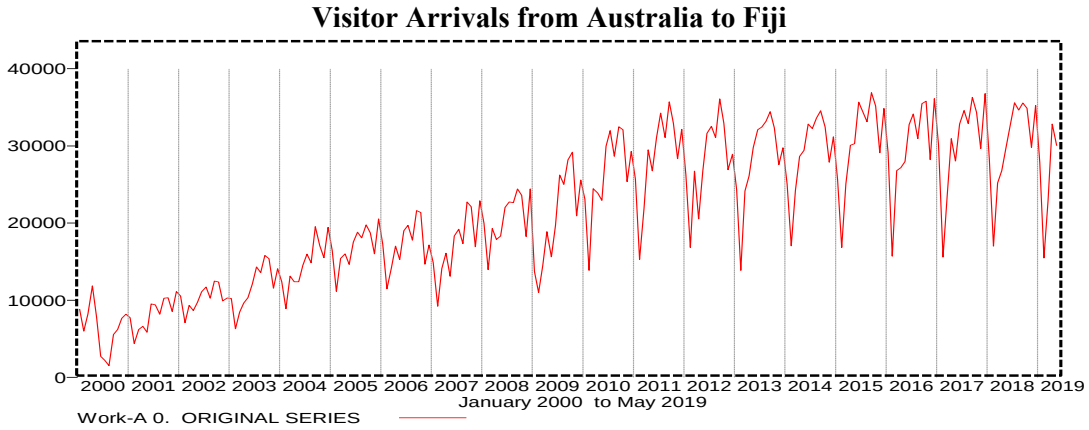
Trend estimates- ***Preferred option***
The best indicator of underlying behavior for month-to-month or quarter-to-quarter changes. Recent estimates, usually the last 3 or 4, may be revised.

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 THE SEASONAL COMPONENT?

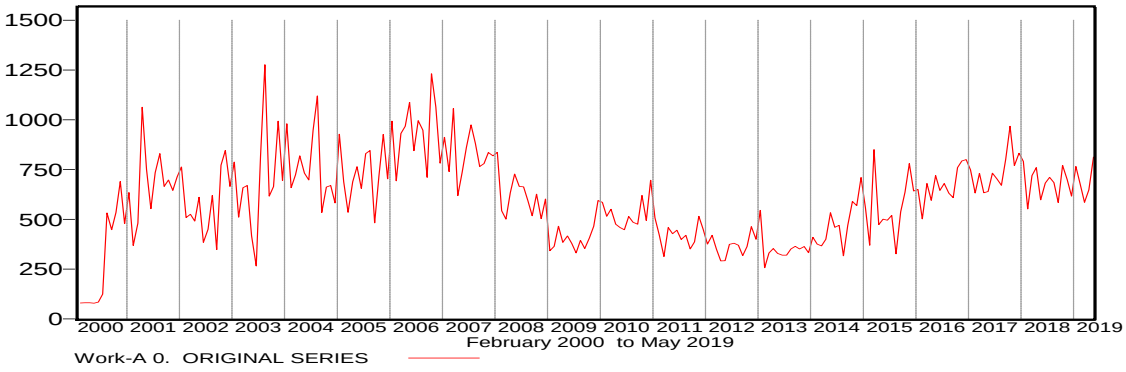
Seasonality in a time series can be identified by regularly spaced peaks and troughs which have a consistent direction and approximately the same magnitude every year, relative to the trend. The following diagram depicts a strongly seasonal series. There is an obvious large seasonal increase in tourist 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.



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.

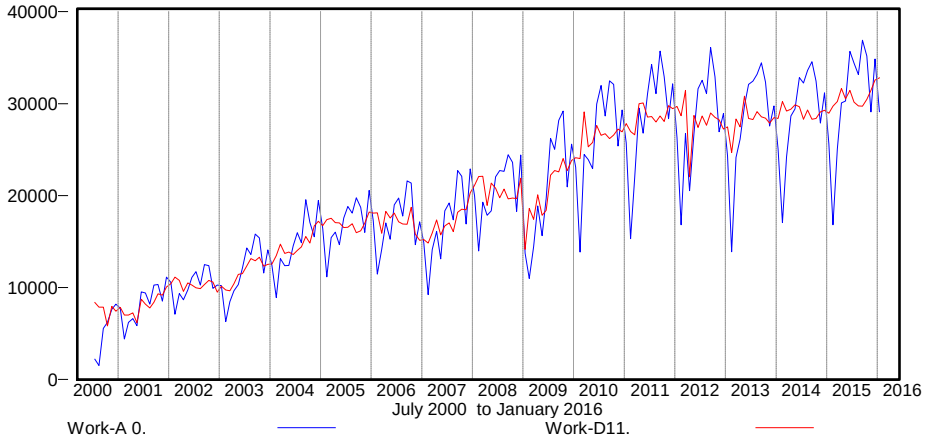
Visitor Arrivals from South Korea to Fiji



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:

Visitor Arrivals from Australia to Fiji[SB1]- Trend



Work A.0- Original **Work-D11- Trend**

HOW IS SEASONAL ADJUSTMENT CONDUCTED?

To seasonally adjust series FBoS uses JDemetra Plus package which is developed by the National Bank of Belgium in collaboration with EuroStat. JDemetra uses a filter based method of seasonal adjustment. 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.

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.

Other Factors to consider in producing optimal seasonal adjustment results

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

(Source: Australian Bureau of Statistics)