Exploring the Relationship between Tourism and Economic Growth in Small Island Economies: A Study of Fiji

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ABSTRACT

This study examines the effect of tourism, measured by visitor arrivals) on the economic growth of Fiji, a small island economy, over the period 1975 to 2015. We use a neoclassical framework and regression analysis to examine the short-run and the long-run effects of tourism whilst accounting for structural breaks. We confirm the presence of a long-run association using the two-step procedure of Engle and Granger (1987) and the ARDL bounds test of Pesaran, Shin and Smith (2001). From the long-run results, we note that a 1% increase in visitor arrivals contribute about 0.22% to the GDP per capita. The short run elasticity is noted to be 0.19%. The study finds evidence of a unidirectional causality from economic growth to tourism, and mutually reinforcing effect between capital investment and tourism. Thus, we can expect greater impact of tourism on the economic growth through tourism related investment activities such as improvements in airports, roads, transportation, financial sector and telecommunications, and parks and beaches.

Keywords: *International visitor arrivals, economic growth, Autoregressive Distributed Lag model, causality; Fiji.*

JEL Classification: F43, Z32, O56.

1 INTRODUCTION

Many developing countries rely on tourism as a key driver of socio-economic progress. The sector is pivotal in job creation, generating export revenue, triggering infrastructure development and other positive externalities. Tourism impacts a number of sectors and is an important link for many sectors progress. According to the UNWTO 2016 tourism highlights, (World Tourism Organization, 2016) international tourism receipts have grown from US$495 billion in 2000 to US$1,260 billion worldwide in 2015. Similarly, the visitor arrivals have grown from 674 million in 2000 to 1,186 million in 2015. Asia and the Pacific contributed 24% of arrivals and 33% of receipts in 2015. Oceania witnessed the largest growth in arrivals (7%), followed by the Americas (6%) and Europe (5%) in 2015. Among the Pacific Island destinations,

The contribution of tourism to improving GDP and labor productivity has been empirically examined in the tourism-growth literature across countries and regions (Lanza & Pigliaru, 2000). Most of the studies confirm positive association (Durbarry (2004) for Mauritius, Lee and Chang (2008) for Non-OECD countries and Kumar and Kumar (2012) for Fiji). The tourism-led growth hypothesis is confirmed for Spain (Balaguer & Cantavella-Jorda, 2002), Mexico (Brida et al., 2008), and OECD countries (Lee & Chang, 2008). However, there are studies which confirm that growth is necessary for tourism to grow (see for example Kumar and Kumar (2012) for Fiji), tourism and growth are mutually reinforcing (for example Kim et al. (2006) for Taiwan) or tourism and growth evolve independent of each other (c.f. Kumar et al. (2015) for Malaysia).

Interestingly, while the general consensus on the effect of tourism on the economic growth is on the affirmative, the studies differ in terms of the causality and magnitude effects (elasticity) because of the sample size, type of measure used (tourism receipts, visitor arrivals, or some form of index), method of analysis, inclusion of structural breaks, and accounting for other sectors such as financial development, energy, information and communications technology, remittances, among other things (Durbarry, 2004; Kumar & Kumar, 2012; Tang & Tan, 2015). Also, the studies using panel data focus on a number of countries usually grouped into regions or some form of classifications such as top ten tourist destinations etc. (Shahzad et al., 2017). These types of studies give a broad indication of the impact of tourism on economic activities. For instance, Fayissa et al. (2008) show that the growth effects of tourism 0.03 per cent for 42 African countries. Lee and Chang (2008) investigate OECD and Non-OECD countries and find that the elasticity of output with respect to tourism is 0.36 and 0.50 respectively. Narayan et al. (2010) consider for Pacific Island countries, namely Fiji, Tonga Solomon Islands and Papua New Guinea and note the contribution of tourism to the long-run economic growth is around 0.72 per cent. However, the panel analysis does not control for structural breaks, capital and labour stock, and heterogeneity among the countries; and it was noted that the contribution of tourism was highest for PNG (0.92%), followed by Fiji (0.79%), Tonga (0.63%) and Solomon Islands (0.55%). The study also finds support for growth-led tourism hypothesis for the four countries, however, in the long-run, tourism causes growth. In terms of country specific studies, the focus is on magnitude and causality effects with relatively more precise discussion on related policy for tourism development (Balaguer & Cantavella-Jorda, 2002; Cortez-Jimenez & Pulina 2006; Nowak et al., 2007; Kumar et al., 2015), Tang & Tan, 2015a; and Tang & Tan , 2015b; Kumar et al., 2015).

A summary of the reviewed literature is presented in Table 1, below. Some key points emerge from these studies. In most of the studies, tourism receipts are used to measure tourism development. Moreover, quite a number of studies do not incorporate the role of capital stock when estimating the impact of tourism on the economic growth, the latter measured in terms of GDP per capita or worker. Interestingly, recent studies tend to incorporate the role of structural breaks to better account the effects of tourism on the economic growth. Also, tourism-growth nexus is considered in conjunction with other factors such as exchange rates (Stauvermann, et al., 2017), remittances (Kumar, 2014), information and communication technology (Kumar and Kumar, 2012), foreign direct investment (Endo, 2006; Khoshnevis, Homa & Soheilzad, 2017), carbon emission (Lee & Brahmasrene, 2013), trade openness and financial development (Shahbaz, et al., 2017). The use of additional variables indicate the different channels through which tourism influence economic activities in a particular country. Overall, there is a general agreement that tourism is an important driver of economic growth. In terms of causality, the results are either unidirectional where either tourism granger cause growth (tourism-led growth) or growth causes tourism (growth-led tourism); or bidirectional, where both tourism and economic growth are mutually reinforcing. However, of much debate and focus has been on the magnitude effects of tourism, that is, the elasticity of output with respect to tourism. There is less attention to this aspect with greater focus on causality dynamics. For policy and forecasting purposes, it is important that the magnitude effects are captured properly, and much of which will depend on accounting for structural breaks, incorporating additional key sectors of the economy based on country characteristics and reliable data. Against this backdrop, in this study, we examine relationship and contribution of tourism using Fiji as a reference study.

Notably, tourism is the key sector for economic development in Fiji. The sector is the major provider of employment and income in the country. Fiji is also considered an attractive tourism destination. Among the Pacific region, Fiji ranked third for growth in arrivals (9%) and was only surpassed by Palau (15%) and Samoa (11%). Tourism earnings was about FJ$1,405 and FJ$1,560 million and accounted for 23% and 25% of real income in 2014 and 2015 respectively.[22] Also, Fiji is considered relatively well developed in terms of infrastructure and financial services, and among the top tourist destinations.

Figure 1 (above) shows a fairly stable tourism receipts averaging around 24% GDP Moreover, according to the Fiji Bureau of Statistics (2017), the top three dominating source markets in terms of total arrivals to Fiji are Australia (41%), New Zealand (18%) and the USA (11%). The major purpose of visit is vacation (76%), followed by visiting family/friends (7%) and business (3%) (Table 1). Fiji's tourism industry has evolved considerably in the past 30 years with past and present Government's paying attention to support and promote the sector. The impact of tourism on Fiji's economy has been unprecedented over the past two decades, and with the decline in agriculture, the sector has gained even greater prominence for development.

Similar trends are noted for visitor arrivals and real GDP of Fiji (Figure 2, below). We note that visitor arrivals have grown from 294,070 in 2000 to 792,320 in 2016. However, there appears to be a slight drop in visitor arrivals during 1987 and 2000, which characterize the two periods of political crisis in the country. Interestingly, we note a rebound in visitor arrivals following the two periods.

The current study examines the impact of tourism to real GDP for the Fiji, a small island state in the Pacific. It is important to note that Fiji heavily depend on tourism for employment, foreign exchange and income. Interestingly, the visitor arrivals have been resilient and consistently growing in spite of a few episodes of political instability and natural disasters, thus making Fiji a popular tourist destination (Table 2). In addition to scholastic interest, the study aims to inform and facilitate policy dialogues viz. development.

In what follows, in Section 2, we describe the model and methods and data is discussed in Section 3. The results follow in Section 4, and in Section 5, we have the conclusion and policy suggestions.

[22] 1 $FJ is approximately $0.50US

Tab.1 - Literature review summary

Authors and year	Country	Period	Explanatory Variables	LR elasticity	Causality
Balaguer & Cantavella-Jorda (2002)	Spain	1975Q1-1997Q1	Tourism receipts, exchange rates	0.30	$T \rightarrow Y$
Dritsakis (2004)	Greece	1960Q1-2000Q4	Tourism receipts, exchange rates	0.31	$T \leftrightarrow Y$
Durbarry (2004)	Mauritius	1952-1999	Physical & human capital stock, Labour stock, Tourism receipts	0.77	$T \leftrightarrow Y$
Demiroz & Ongan (2005)	Turkey	1980-2004	Tourism receipts, exchange rates	-	$T \leftrightarrow Y$
Gunduz and Hatemi (2005)	Turkey	1963-2002	Tourism receipts, exchange rates	-	$T \leftrightarrow Y$
Oh (2005)	South Korea	1956-2003	Tourism receipts	-	$Y \rightarrow T$
Cortez-Jimenez & Pulina (2006)	Spain	1964-2000	Tourism receipts, capital and human capital stock	1.07	$T \leftrightarrow Y$
Cortez-Jimenez & Pulina (2006)	Italy	1954-2000	Tourism receipts, capital and human capital stock	0.08	$T \leftrightarrow Y$
Kim et al (2006)	Taiwan	1971Q1-2003Q1	Tourism receipts	0.02	$T \leftrightarrow Y$
Kim et al (2006)	Taiwan	1956-2002	Tourism receipts	0.10	$T \leftrightarrow Y$
Nowak et al (2007)	Spain	1960-2003	Tourism receipts, machine imports	0.06	$T \leftrightarrow Y$
Fayissa et al (2008)	42 African countries	1995-2004	Tourism receipts, investment, economic freedom index, human capital, FDI	0.03	$T \rightarrow Y$
Sanchez, Brida& Risso (2008)	Mexico	1980Q1-2007Q2	Tourism receipts, exchange rates	0.69	$T \rightarrow Y$
Proenca and Soukiazis (2008)	Portugal	1993-2001	Tourism receipts	0.01	$T \rightarrow Y$
Lee and Chang (2008)	OECD	1990-2002	Tourism receipts	0.36	$T \rightarrow Y$
	Non OECD	1990-2002	Tourism receipts	0.50	$T \leftrightarrow Y$
Lee & Chien (2008)	Taiwan	1959-2003	Visitor arrivals, exchange rates	4.66	$T \leftrightarrow Y$
Brida et al (2009)	Colombia	1987Q1-2001Q1	Visitor arrivals, exchange rates	0.51	$T \rightarrow Y$
Narayan et al. (2010)	Fiji, Solomon Islands, PNG, Tonga	1988-2004	Tourism receipts	0.72	$T \rightarrow Y$
Lorde, Francis & Drakes (2011)	Barbados	1974Q1-2004Q4	Visitor arrivals, exchange rates	0.61	$T \rightarrow Y$
Seetanah (2011)	19 island economies	1990-2007	Tourism receipts	0.03-0.14	$T \leftrightarrow Y$
Kumar & Kumar (2012)	Fiji	1980-2008	Capital & labour stock, ICT, Tourism receipts	0.23	$T \leftrightarrow Y$
Massidda and Mattana (2013)	Italy	1987-2009	Visitor arrivals, trade	0.45	$T \leftrightarrow Y$
Kumar (2014a)	Vietnam	1980-2010	Capital & labour stock, Tourism receipts	0.03	$T \leftrightarrow Y$
Kumar (2014b)	Kenya	1978-2010	Capital & labour stock, Tourism receipts	0.08	$Y \leftrightarrow T$
Kumar et al. (2016)	Cook Islands	2009Q1-2014Q2	Visitor arrivals	0.83	$T \leftrightarrow Y$

Tang & Tan (2015)	Malaysia	1975-2011	Tourism receipts, political stability	0.14	$T \rightarrow Y$
Stauvermann et al. (2016)	Sri-Lanka	1980-2014	Capital & labour stock, Tourism receipts and exchange rates	0.06	$T \rightarrow Y$

Note: VECM – Vector error correction model; ARDL – Autoregressive distributed lags bounds approach. $T \rightarrow Y$: Causality from Tourism to GDP; $T \leftrightarrow Y$: bidirectional causality in between tourism and GDP. LR refers to long run.

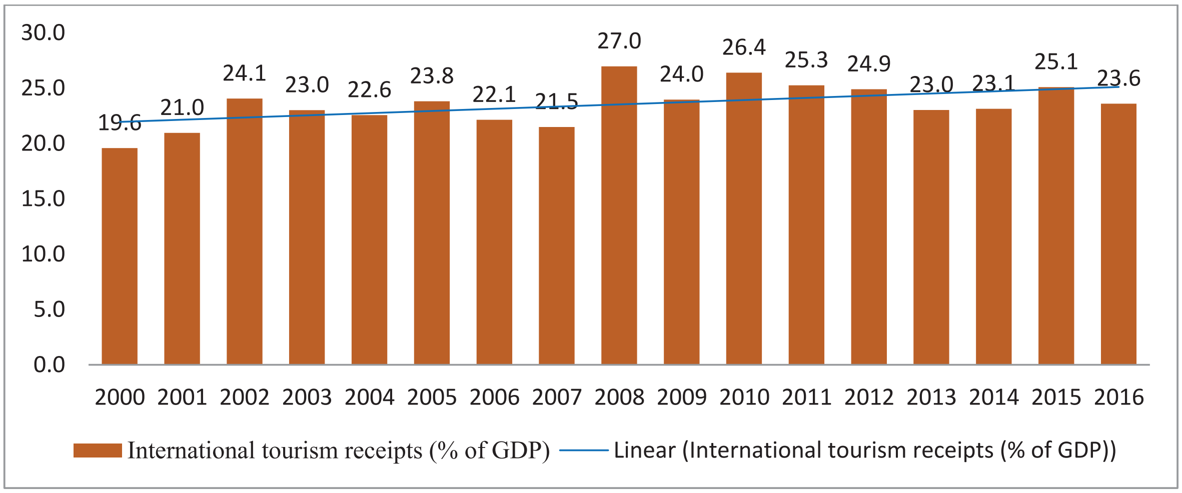

Fig.1 - Tourism Receipts (% of GDP)

Source: World Bank's WDI database (2000-2015), Fiji Bureau of Statistics (2016) and authors' calculations.

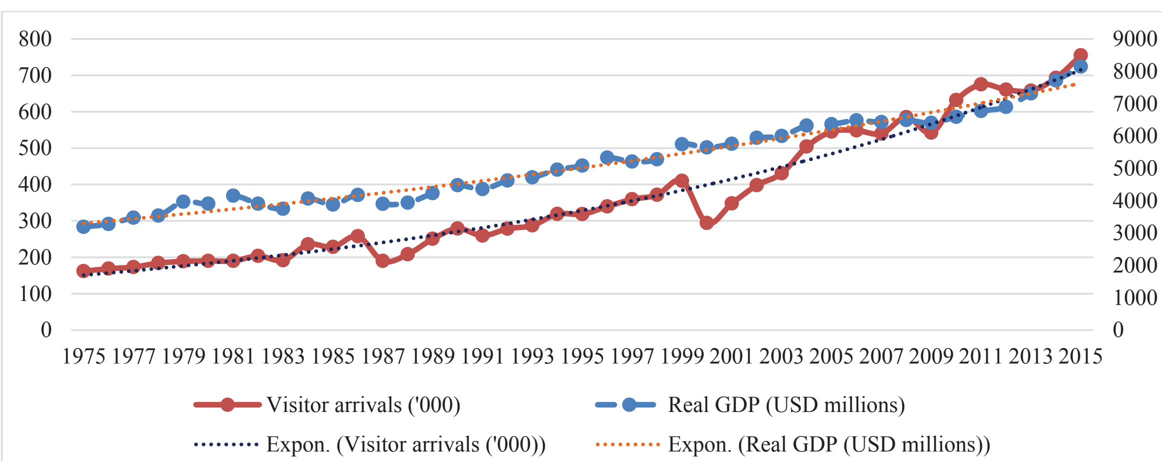

Fig.2 - Visitor Arrival & Real GDP - Fiji

Source: Fiji Bureau of Statistics (2016)

Tab.2 - Key source markets for Fiji: Visitor arrivals (1975-2016)

	1975-2010	2011	2012	2013	2014	2015	2016
Australia	*114,762*	*344,829*	*337,291*	*340,151*	*349,217*	*367,273*	*360,370*
New Zealand	*54,432*	*103,181*	*106,122*	*108,239*	*123,968*	*138,537*	*163,836*
USA	*44,486*	*55,086*	*56,478*	*55,385*	*61,924*	*67,831*	*69,628*
Canada	13,713	14,090	13,426	13,052	12,457	11,709	11,780
UK	21,158	24,054	17,076	17,209	16,782	16,716	16,712
Continental Europe	20,344	32,354	29,327	28,905	30,585	31,195	31,916
Japan	21,999	9,616	7,069	7,314	5,888	6,092	6,274
PICs	19,045	38,823	38,886	39,450	39,298	48,570	49,741
TOTAL	322,520	675,050	660,590	657,707	692,630	754,835	792,320

Source: Fiji Bureau of Statistics (2016). Italicized rows indicate top three source markets for Fiji.

2. MODEL & METHOD

2.1 Model, variable definitions& hypotheses

We use an augmented version of the Cobb-Douglas production function which is similar to the Solow (1956) growth methodology and is used by Rao (2010) and Sturm (1998). The model is given as:

$$Y_t = A_t K_t^{\alpha} L_t^{\beta} \quad (1)$$

Where A_t is the stock of technology and knowledge, K_t is the capital stock and L_t is the labour stock, $\alpha > 0$ and $\beta > 0$ are the capital and labour shares. Assuming constant returns to scale ($\alpha + \beta = 1$) and dividing (1) by L_t, we arrive at:

$$y_t = A_t k_t^{\alpha} \quad (2)$$

The model assumes the evolution of technology given by:

$$\Phi_t = A_0 e^{gt} \quad (3)$$

Where A_0 is the initial stock of technology and t is time trend. We introduce visitor arrivals (% of population) as shift variables (Rao, 2010).

$$\Psi_t = f(Vis) = vis_t^{\vartheta} \quad (4)$$

Where $\vartheta > 0$ represents the elasticity of tourism, hence:

$$\mathrm{A}_t = \Phi_t \Psi_t = A_0 e^{gt} vis_t^{\vartheta} \quad (5)$$

Finally, including this information in (2), we arrive at:

$$y_t = A_0 e^{gt} vis_t^{\vartheta} k_t^{\alpha} \quad (6)$$

Taking the log of (6), we arrive at the basic model for estimation as:

$$\mathrm{lny_t} = \varphi + \alpha \mathrm{lnk_t} + \vartheta \mathrm{lnvis_t} + \mathrm{B_t} + \mathrm{u_t} \quad (7)$$

Where $\mathrm{y_t}$ is real GDP per worker, $\mathrm{k_t}$ is real capital stock per worker, $\mathrm{vis_t}$ is international visitor arrivals (% of Fiji's total population), $\mathrm{B_t}$ is the structural-break dummies, and $\mathrm{u_t}$ is the error term, φ is the constant. Total population is used as a measure of labour force in this paper due to the importance of the informal sector in Fiji (Chen & Singh, 2014). Also, we account for the structural break using formal break tests.

2.2 Methods

2.2.1 Unit root & cointegration

The order of integration of $\ln y_t$, $\ln k_t$ and $\ln vis_t$ and cointegration in $\hat{u}_t$ (estimated from equation 1) will be confirmed using the augmented Dickey-Fuller (ADF) unit root test. This test estimates equation (2):

$$\Delta Z_t = \phi_0 + \phi_1 T + \delta Z_{t-1} + \sum_{i=1}^{m} \phi_{2i} \Delta Z_{t-i} + v_t \qquad (8)$$

where Z_t is either $\ln y_t$, $\ln k_t$, $\ln vis_t$, or $\hat{u}_t$, ϕ_0 is the drift, T is the time trend and v_t is the error term. Inclusion of ϕ_0 or T is based on time-plot inspection of the series. First-differenced lagged terms are included to render v_t serially-uncorrelated. Non-rejection of the null hypothesis of the existence of a unit root implies that Z_t is non-stationary. Most economic time series are stationary in first differences, that is, $I(1)$.

If $\ln y_t$, $\ln k_t$ and $\ln vis_t$ are $I(1)$, cointegration could exist and can be confirmed using the Engle & Granger (1987) two step procedure. Specifically, the residuals $\hat{u}_t$ in equation 1 should be level stationary or $I(0)$.[23]

2.2.2. Error correction model (ECM)

Next, equation (3) is the error correction or short run disequilibrium model. The one period lagged cointegrating residuals (ECT_{t-1}), is included to associate the short run behaviour of y_t to its long run value through a series of partial adjustments (mean reversion) once cointegration is confirmed.

$$\Delta \ln y_t = \beta_0 + \Delta B_t + \sum_{i=1}^{q} \beta_{2i} \Delta \ln y_{t-i} + \sum_{i=0}^{q} \beta_{3i} \Delta \ln k_{t-i} + \sum_{i=0}^{q} \beta_{4i} \Delta \ln vis_{t-i} - \lambda \widehat{ECT}_{t-1} + \varepsilon_t$$
(9)

To validate cointegration and for stability of the long run (equation 1), the effect of ECT_{t-1} should be within zero and negative one, the ECT_{t-1} captures the rate of adjustment of a short run disequilibrium situation, the selection of the optimal lags (q) can be made using the criteria such as Akaike, Schwarz, Hannan-Quinn or based on the frequency of the data (Wooldridge, 2015). For our purpose, we use the latter approach.

2.2.3 Granger causality

Granger causality test is conducted through estimating a vector autoregression (VAR) (Toda & Yamamoto, 1995). The test of causality is a test of joint restrictions in equations 4-6. Specifically, in (4) Granger causality from $\ln vis_t$ to $\ln y_t$ and from $\ln k_t$ to $\ln y_t$ implies that $\beta_{3i} \forall i \neq 0$ and $\beta_{2i} \forall i \neq 0$, respectively. In (5) Granger causality from $\ln vis_t$ to $\ln k_t$ and from $\ln y_t$ to $\ln k_t$ implies that $\beta_{6i} \forall i \neq 0$ and $\beta_{5i} \forall i \neq 0$, respectively. Lastly, in (6) Granger causality from $\ln k_t$ to $\ln vis_t$ and from $\ln y_t$ to $\ln vis_t$ implies that $\beta_{8i} \forall i \neq 0$ and $\beta_{7i} \forall i \neq 0$, respectively.

$$\ln y_t = \beta_{10} + \sum_{i=1}^{q} \beta_{1i} \ln y_{t-i} + \sum_{i=1}^{q} \beta_{2i} \ln k_{t-i} + \sum_{i=1}^{q} \beta_{3i} \ln vis_{t-i} + \varepsilon_{1t} \qquad (10)$$

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[23] Cointegration testing must exclude constant and trend terms because the error term has a mean of zero which implies randomness without any apparent trend.

$$\mathrm{lnk}_t = \beta_{20} + \sum_{i=1}^{q} \beta_{4i}\mathrm{lny}_{t-i} + \sum_{i=1}^{q} \beta_{5i}\mathrm{lnk}_{t-i} + \sum_{i=1}^{q} \beta_{6i}\mathrm{lnvis}_{t-i} + \varepsilon_{2t} \quad (11)$$

$$\mathrm{lnvis}_t = \beta_{30} + \sum_{i=1}^{q} \beta_{7i}\mathrm{lny}_{t-i} + \sum_{i=1}^{q} \beta_{8i}\mathrm{lnk}_{t-i} + \sum_{i=1}^{q} \beta_{9i}\mathrm{lnvis}_{t-i} + \varepsilon_{3t} \quad (12)$$

The VAR is a system of autoregressive distributed lag (ARDL) equations each estimated by the OLS technique. The stability of the VAR system is contingent on the inverse roots of the VAR which should be within the positive and negative unity. However, for corrective measures to ensure the stability, either a trend term structural break dummies or lagged terms one more than the endogenous variables can be used as exogenous instruments in the VAR system (Stauvermann, et al., 2017).

3 DATA

3.1 Description

Annual data is used in this study over 1975-2015$(n = 41)$. The data for real GDP (Y_t), total population (Pop_t) and gross fixed capital formation (I_t) is sourced from the World Development Indicators and Global Development Finance database (World Bank, 2017). GDP and investment are measured in constant 2011 local currency units and are available from 1960-2015 and 1963-2008 & 2012-2015, respectively. Data on annual population is available from 1960-2015 and international visitor arrivals from 1795-2015, the latter sourced from the Fiji Bureau of Statistics. The physical capital stock series is constructed via the perpetual inventory method where the initial capital stock is set to 1.5 times the 1962 real GDP. The depreciation rate is assumed at 5 percent. The investment series was measured by the gross fixed capital formation which was available from 1975-2008 and 2013-2015. Thus, the missing data for investment (2009-2012) is interpolated using the automatic log-linear interpolation algorithm in Eviews 9. Given the different starting points of the series, for consistency, sample from 1975-2015 is used for the analysis.

3.2 Summary statistics

Table 3 presents a statistical summary of y_t, k_t and vis_t. As noted, vis_t and y_t show a strong positive and significant correlation (0.948), there is also a strong and significant positive correlation between k_t and vis_t (0.920). The pair-wise correlation between lny_t and lnk_t is 0.89; lnvis_t and lny_t is 0.95; and lnvis_t and lnk_t is 0.93. For regression analysis, all variables are transformed using natural logarithms.

Tab.3 - Descriptive statistics & correlation matrix over 1975-2015

Panel a. descriptive statistics	y_t	k_t	vis_t
Mean	6722.519	16045.30	46.56979
Median	6553.290	14330.62	41.06974
Maximum	9127.276	23356.71	84.60900
Minimum	5402.352	9757.803	26.30725
Standard deviation	986.0775	3727.650	17.73233
Skewness	0.481507	0.443979	0.687230
Kurtosis	2.294008	2.194087	2.061394
Jarque-Bera	2.435776	2.456522	4.732290
Probability	0.295854	0.292801	0.093842
Panel b. pair-wise correlation matrix	y_t	k_t	vis_t
y_t	1.000000		
	-----		
k_t	0.919987	1.000000	
	[0.0000]	-----	
vis_t	0.947522	0.953233	1.000000
	[0.0000]	[0.0000]	-----

Source: authors' estimation in Eviews 9. P value in square parenthesis.

4. RESULTS & DISCUSSION

4.1 Unit root & cointegration

The variables $\ln y_t$, $\ln k_t$ and $\ln vis_t$ are confirmed I(1) using the ADF unit root test. A drift and trend term is included for the levels data, no constant or trend for $\hat{u}_t$, $\Delta \ln y_t$ or $\Delta \ln vis_t$. A drift term is included for the $\Delta \ln k_t$ series. From the ADF test (Table 4), we note that the break-corrected residuals ($\hat{u}_t$) are stationary. Also, enough lagged differenced terms were included to render equation (8) residuals serially un-correlated.

Tab.4 - ADF unit root test

Variable	Level			1st difference		
	Trend	T-statistic	Tau CV	Trend	T-statistic	Tau CV
$\ln y_t$	T	-2.144 [0]	-3.540	-	-7.353 [0]^B	-1.950
$\ln k_t$	T	-2.710 [1]	-3.544	C	-2.290 [0]^B	-1.678
$\ln vis_t$	T	-3.129 [0]	-3.568	-	-7.002 [0]^B	-1.950
$\hat{u}_t$	-	-6.4075[0]^B	-1.950			

*Source: authors' estimation in Eviews 9 & Stata 13. C, T & - refers to constant, constant & trend, and no constant and no trend respectively; ** refers to stationarity at 5 percent. CV refers to 5 percent critical tau value obtained from Stata 13. Lags used are reported in square parenthesis and are determined automatically by Eviews 9.*

4.2 Bai and Perron (2003) break test

We identify plausible breaks in the series using the Bai and Perron (2003) (B-P) break test via break-least squares. The test identifies the existence of 3 significant breaks (Table 5).

Using the method of B-P break test, we identify 4 regimes (repartition breaks) in the data. We accordingly create three structural break dummy variables; B_{1t} set to one over 1982 to 1993, B_{2t} set to one over 1994-2008, and B_{3t} set to one from 2009-2015. These breaks are automatically created by the method of break-least squares (B-L-S) which is integrated with the B-P test in Eviews 9. The B-L-S procedure incorporates the identified breaks in both (1) an additive form and (2) an interactive form. Inclusion of the latter results in severe multicollinearity problems and model misspecification, we therefore include the identified breaks in terms of the former and hence, the slope estimates are not affected by the inclusion of the breaks in our final estimation.

Tab.5 - Bai-Perron break test via break least squares

Break Test	Scaled F-statistic	Critical Value
0 vs. 1[A]	18.87217	13.98
1 vs. 2[A]	31.96049	15.72
2 vs. 3[A]	21.92793	16.83
3 vs. 4	4.405556	17.61
Break dates:	Repartition	
1	1982	
2	1994	
3	2009	

Source: Authors estimation in Eviews 9. [A] indicates significance at 5%.

4.3 Long-run

The equation (1) is estimated using the OLS based Cochrane-Orcutt Iterative Procedure (COIP). Convergence in the COIP was achieved in 5 iterations. This case of autocorrelation was not due to model misspecification because the estimated model had a p-value greater than 10 percent in the Ramsey RESET test with the results are presented in Table 6. As noted, all the coefficients are significant at 10% or less. The adjusted R^2 is about 0.96 also, the DW statistic (2.05) exceeds the adjusted R-square, thus indicating the estimated model is not spurious. Breaks identified through the B-L-S procedure are significant and included without interaction effects; this solves the problems of multicollinearity and model misspecification (see section 5.2), but does not correct the slight parameter instability identified through the CUSUM squared test. To correct for this, we further include a pulse dummy B_{4t} set to one over the period of instability (2011-2014). The additional pulse dummy remains insignificant with no noticeable change in existing regressor coefficients at two decimal places or its significance level, however its inclusion corrects for parameter instability.

The cointegrating coefficient of $\mathrm{lnk_t}$is estimated at 0.33, which indicates that in the long run, a 1% increase in $\mathrm{k_t}$ increases $\mathrm{y_t}$ on average by 0.33%, ceteris-paribus. We note that the capital share figure equal to the stylized value of one-third. In terms of the lower and upper confidence limits, we note that the coefficient of $\mathrm{lnk_t}$ranges from 0.13 to 0.52, this indicating the possibility of GDP per capita increasing as high as 0.52 and as low as 0.13, with a 1% increase in capital per capita. Similarly, the cointegrating coefficient of $\mathrm{lnvis_t}$is 0.22 which implies that a 1% increase in visitor arrivals increase GDP per capita by 0.22%. The lower and upper confidence limit of the coefficient for visitor arrival is 0.13 and 0.26, respectively. Also, we note that the break three break periods identified have a negative association with visitor arrivals. Plausible events in these years are political tensions in 1982 (Lal, 1983), severe tropical cyclone in 1994 and the lagged effect of the Global Financial Crisis. The break dummies however do not influence the slope estimates of the long run model.

Tab.6 - Estimated long run model

Panel 1: Coefficient statistics

Variable	Coefficient	LCL	UCL	Standard error	T-statistic	P value
$\mathrm{lnk_t}$	0.337085^A	0.143204	0.530965	0.095296	3.537250	0.0012
$\mathrm{lnvis_t}$	0.222656^A	0.124957	0.320355	0.048021	4.636660	0.0001
Constant	4.786585^A	3.140768	6.432403	0.808948	5.917047	0.0000
$\mathrm{B_{1t}}$	-0.112080^A	-0.168857	-0.055303	0.027907	-4.016210	0.0003
$\mathrm{B_{2t}}$	-0.074559^C	-0.155209	0.006091	0.039641	-1.880854	0.0688
$\mathrm{B_{3t}}$	-0.093807^C	-0.201790	0.014177	0.053076	-1.767407	0.0864

Panel 2: Model statistics

R^2 = 0.965648, adjusted R^2 = 0.958361,$\hat{\sigma}$ = 0.029389,n = 41, F(6, 33) = 132.5197^A, DW = 2.090505,; $\hat{\rho} = 0.57822382330^A$; IR = 0.58

Source: authors' estimation in Eviews 9. Notes: A denotes statistical significance at the 1 percent level, B at 5 percent and C at 10 percent; LCL & UCL represent the lower and upper confidence interval at the 5 percent significance level.

4.4 Short-run

The results of the short-run estimations are presented in Table 7.[24] The adjusted R^2 is 0.52; the model explains 52 percent of the variation in $\Delta\mathrm{lny_t}$.

As noted, in the short-run, capital stock (investment) has not significant association with growth. However, we note a positive and statistically significant impact of visitor arrivals on the growth. The coefficient of $\Delta\mathrm{lnvis_t}$ is 0.1845 which implies that a 1% increase of visitor arrivals is expected to increase output by 0.19%, ceteris-paribus. The coefficient of $\mathrm{ECT_{t-1}}$ is

[24] Wooldridge (2015) identifies that 1 or 2 lags are sufficient for annual data, up to 4 lags for quarterly data and up to 12 lags for monthly data. Accordingly, we have used one lag for the differenced terms to estimate the error correction model (equation 3) in Table 6.

negative (-0.5841) and significant. This indicates that on average, following any shocks, the convergence to long run (static) equilibrium takes approximately 1.7 years, ceteris-paribus.

Tab.7 - Estimated error correction model

Panel 1: Coefficient statistics

Variable	Coefficient	LCL	UCL	Standard error	T-statistic	P value
Constant	0.005682	-0.009612	0.020976	0.007508	0.756754	0.4547
$\Delta \mathrm{lnk}_t$	0.190187	-0.311889	0.692263	0.246486	0.771593	0.4460
$\Delta \mathrm{lnvis}_t$	0.184506^A	0.089513	0.279498	0.046635	3.956367	0.0004
ΔB_{1t}	-0.094483^A	-0.155974	-0.032991	0.030188	-3.129792	0.0037
ΔB_{2t}	-0.069063	-0.158810	0.020684	0.044060	-1.567472	0.1268
ΔB_{3t}	-0.106837^C	-0.215555	0.001881	0.053373	-2.001686	0.0539
ECT_{t-1}	-0.584082^A	-0.996621	-0.171543	0.202529	-2.883937	0.0070

Panel 2: Model statistics

$R^2 = 0.6064$, adjusted $R^2 = 0.5203$, $\hat{\sigma} = 0.029383$, n =40, $F(7, 34) = 7.0438^A$, DW = 1.8068

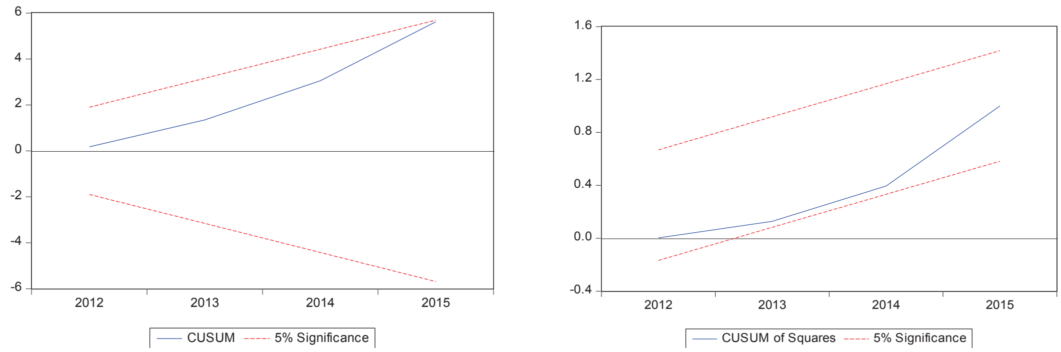
Source: authors' estimation in Eviews 9. Notes: A & C denotes statistical significance at the 1& 5 percent levels; LCL & UCL refer to lower and upper confidence interval at the 5% level.

4.5 Diagnostic tests

We use the Ramsey Reset test for detecting omitted variables and incorrect functional form, Breusch-Godfrey test for detecting residual autocorrelation, Breusch-Pagan-Godfrey test of heteroskedasticity, Skewness/Kurtosis test of residual normality based on the Jarque-Bera test, Durbin-Wu-Hausman test of regressor exogeneity and the Variance inflation factor (VIF) test for detecting multicollinearity. Finally, we check for parameter stability using the CUSUM and CUSUMQ (CUSUM squared) test (Table 8).

The initial OLS estimation with the inclusion of the break dummies did not solve the problem of autocorrelation. Other important diagnostics, specifically, regressor exogeneity for single equation techniques was met. The OLS-COIP estimator corrects for this shortcoming. The models do not appear to have any significant omitted variables or incorrect functional form and multicollinearity is not a severe problem in both panels.[25] The estimated parameters in the cointegrating and error correction models (break corrected) are stable according to the CUSUM and CUSUM of squares tests (Figure 3) at the 5%.

[25]Multicollinearity does not specifically violate any classical assumptions and hence the OLS estimators are still Blue and consistent. What is does do is decrease the precision of the estimates. A VIF less than 10 is acceptable by the literature.



Short-run

Cusum

Cusum squared

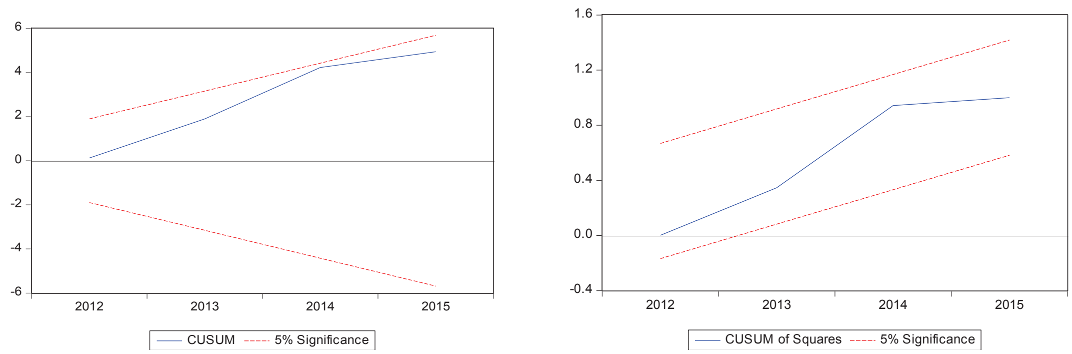


Fig.3 - Cusum stability test at 5%.

Tab.8 - Diagnostic tests

Test	Null hypothesis	OLS		OLS-COIP: AR(1)	
		Test statistic	P value	Test statistic	P value
Panel a: Long run					
Ramsey RESET	H_0: No omitted variables	$F(1,33) = 1.71$	0.2000	$F(1,32) = 1.71^A$	0.1012
Breusch-Godfrey	H_0: No residual autocorrelation	$\chi^2(1) = 10.81$	0.0015	$\chi^2(1) = 0.53^A$	0.4669
Breusch-Pagan-Godfrey	H_0: Homoskedasticity	$\chi^2(6) = 10.17$	0.1175	$\chi^2(6) = 3.89^A$	0.6916
Jarque-Bera skewness/kurtosis	H_0: Residual normality	$\chi^2(1) = 1.41$	0.4949	$\chi^2(1) = 0.41^A$	0.8246
Durbin-Wu-Hausman	H_0: Regressor exogeneity	$\chi^2(2) = 0.91$	0.6355	-	-
Variance inflation factor	H_0: No severe multicollinearity	$\overline{VIF} = 7.95$	-	$\overline{VIF} = 3.61$	-
Panel b: Short run		ECT_{t-1}: OLS		ECT_{t-1}: OLS − COIP	
Ramsey RESET	H_0: No omitted variables	$F(1,31) = 0.68$	0.4165	$F(1,31) = 1.38^A$	0.2496
Breusch-Godfrey	H_0: No residual autocorrelation	$\chi^2(1) = 0.19$	0.6550	$\chi^2(1) = 3.60^B$	0.0579
Breusch-Pagan-Godfrey	H_0: Homoskedasticity	$\chi^2(6) = 5.55$	0.5933	$\chi^2(7) = 5.72^A$	0.5731
Jarque-Bera skewness/kurtosis	H_0: Residual normality	$\chi^2(1) = 0.31$	0.8600	$\chi^2(1) = 0.41^A$	0.8146
Durbin-Wu-Hausman	H_0: Regressor exogeneity	$\chi^2(3) = 0.64$	0.8877	-	-
Variance inflation factor	H_0: No severe multicollinearity	$\overline{VIF} = 2.12$	-	$\overline{VIF} = 2.07$	-

Source: Authors' estimation in Eviews 9, "-" refers to not applicable. A, B refers to non-rejection of the null hypothesis at the 1 and 5 percent level.

4.6 Robustness tests

In addition, we use the ARDL model with sample specific bounds (Pesaran et al, 2001) to examine whether our results are reliable. The method has the advantage that (1) cointegration can be examined irrespective of whether the data is $I(0)$ or $I(1)$ or some combination of them, (2) it avoids the small sample bias because the long and short run models are estimated in a single step, (3) it avoids the endogeneity, simultaneity and omitted variables bias through its dynamic structure and (4) it avoids problems arising with measurement problems in the data. For these reasons, it provides super-consistent estimates even in small samples. Cointegration is confirmed when the calculated F statistic in the bounds test falls above the critical upper bound. The long and short run results from the ARDL model are presented in Table 9.

We note that the results are comparable to the earlier results, both in the long-run and the short-run. Specifically, the coefficient of $\mathrm{lnk}_t$is 0.33, lnvis_t is 0.21, the adjusted goodness of fit criterion is 0.95 and the error correction terms effect is -0.3. Hence, the results from the OLS based COIP provides fairly robust and consistent results.

A comparison of the results of Kumar & Kumar (2012) examining the effect of tourism on growth in Fiji over 1980-2008, we note that the effect of tourism remains roughly the same in the two studies irrespective of the indicator variable, tourism receipts in the study of Kumar & Kumar (2012) and visitor arrivals in the current study and the length of the sample. We do differ in terms of the capital elasticity; the current study reports the capital elasticity at 0.33 which is equal to its stylized value. Plausible reasons for this include (1) a more developed Fijian economy relative to the last study whereby the capital elasticity shows signs of convergence to its stylized value, (2) use of structural breaks and (3) country specific analysis.

4.7 Causality

Causality results based on χ^2 test is presented in Table 10. We note a unidirectional causality from lny_t to lnvis_t, a bidirectional causality in between lnk_t and lnvis_t and a unidirectional causality from lny_t to lnk_t. Interestingly, support feedback hypothesis is noted through tourism-investment channel of tourism, whereas economic growth causes tourism growth. On one hand, growth in tourism drives the need for improved infrastructure including roads, transportation, etc., on the hand, developments in tourism infrastructure improves tourism numbers. The overall economic progress also causes tourism demand. This finding has important implications for tourism policy.

Tab.9 - ARDL(1,1,1) results

Panel 1: Cointegrating Form				
Variable	Coefficient	Standard Error	T-Statistic	P Value
Δlnk_t	-0.324762	0.435617	-0.745522	0.4618
$\Delta lnvis_t$	0.220982^A	0.052346	4.221572	0.0002
ΔB_{1t}	-0.103140^A	0.034434	-2.995276	0.0055
ΔB_{2t}	-0.055986^C	0.031352	-1.785727	0.0843
ΔB_{3t}	-0.079142	0.048438	-1.633864	0.1127
ECT_{t-1}	-0.532561^A	0.151341	-3.518942	0.0014
Panel 2: Long Run Coefficients				
Variable	Coefficient	Standard Error	T-Statistic	P Value
lnk_t	0.330528^C	0.166644	1.983440	0.0565
$lnvis_t$	0.207193^C	0.106877	1.938614	0.0620
Constant	-0.193668^A	0.065755	-2.945301	0.0062
B_{1t}	-0.105127^C	0.061550	-1.708002	0.0980
B_{2t}	-0.148606	0.092682	-1.603396	0.1193
B_{3t}	0.016795	0.046167	0.363787	0.7186

Panel 3: ARDL Model Statistics

R^2 = 0.9646, adjusted R^2 = 0.9539, $\hat{\sigma}$ = 0.0306, n = 40, F(9, 30) = 90.7513***, DW = 1.8339, h =1.8142; Root MSE = 0.03064

Panel 4: Bounds test

Computed F statistic	4.2526^C
Upper critical bound	4.1400
Lower critical bound	3.1700

Panel 5: ARDL Model Diagnostics

$\chi^2_{sc}(1) = 0.12[0.7286]$; $\chi^2_{hc}(8) = 5.88[0.7521]$; $\chi^2_{n}(1) = 1.26[0.5335]$; $F_{RR}(1, 30) = 0.44[0.5127]$; Cusum: Stable; Cusum squared: Stable

Source: Authors' estimation in Eviews 9. A, B and C indicate significance at 1, 5 and 10 percent, SC refers to serial correlation, HC refers to heteroskedasticity, N refers to normality, RR refers to Ramsey RESET test. Model selection based on Akaike information criteria

Tab.10 - Causality test

Excluded	χ^2	P Value
Dependent variable: lny_t		
lnvis_t	$\chi^2(2)$ =1.036153	0.5957
lnk_t	$\chi^2(2)$ = 1.645982	0.4391
All	$\chi^2(4)$ = 4.679770	0.3218
Dependent variable: lnvis_t		
lny_t	$\chi^2(2)$ = 5.181144^C	0.0750
lnk_t	$\chi^2(2)$ = 5.576003^C	0.0615
All	$\chi^2(4)$ =11.33341^B	0.0231
Dependent variable: lnk_t		
lny_t	$\chi^2(2)$ =6.336692^B	0.0421
lnvis_t	$\chi^2(2)$ = 6.254460^B	0.0438
All	$\chi^2(4)$ = 12.67862^B	0.0130

Source: Authors' estimation in Eviews 9. B and C indicate significance at 5 and 10 percent, respectively.

5 CONCLUSIONS & POLICY RECOMMENDATIONS

This study has examined the tourism led growth hypothesis in Fiji over the period 1975-2015. We noted the presence of a long run association between real GDP, visitor arrivals and capital stock (in per capita terms) by using the Engle and Granger (1987) two-step procedure. The error correction effect was noted at -0.51. The capital stock elasticity was noted at 0.33% and the tourism was around 0.22%. Importantly, the magnitude of capital stock is in line with economic theory and the magnitude of tourism measured as visitor arrivals is not significantly different from the results of Kumar and Kumar (2012). The study finds a unidirectional causality from real GDP to tourism, which was also noted for Fiji and other selected Pacific Island Countries by Narayan et al. (2010). However, our finding deviates from the earlier study in that we control for structural breaks at multiple points in the sample. Also, by including capital per worker in the estimation model, we noted bidirectional causality between investment and tourism. A unidirectional causality from growth to tourism is underscored. The results highlight that tourism is important for the economic growth via the investment channel, and that higher economic growth propels visitor arrivals to Fiji.

Subsequently, to account for and magnify the impact of tourism on the economy of Fiji, greater tourism related investment is necessary. Hard investments such development of roads, transportation, telecommunications, financial services, beaches and parks, among other thing, are vital. Equally important is the need for soft investments such as marketing Fiji as a tourist destination, creating greater awareness of the importance of tourism in the rural and remote highlands of Fiji through workshops and trainings, so that local residents are better prepared to host visitors.

It must the noted that Fiji has a rich history and diverse culture given its multicultural composition. Additionally, there are some natural attractions such as forests, sand dunes, sandy beaches among other thing things. The tourism department should continue to proactively sell this product to the tourists, especially to countries which are major and emerging markets. The role of Fijian embassies in overseas countries will be decisive in promoting and boosting tourism in Fiji.

Greater impact of tourism on the Fijian economy is plausible if equal focus is given to the demand side factors. Hence, focusing on tourist preferences and their willingness to pay for critical, common and new products and services will provide valuable inputs to package and sell tourism. Additionally, destination re-marketing via new products and standards, underscoring the unique Fijian experience, investing in eco-friendly or green-tourism, establishing new direct routes emerging markets and visa relaxations, and establishing supportive regulations to facilitate investment in the entire tourism value chain are important policy considerations. Finally, it is important to ensure that price and exchange rates, and political environment are stable; and hence the role of government and central banks become critical. To ensure continuity in product development, innovation and investment in tourism, having a reliable projections of visitor arrivals (tourism demand) from the major source countries will be an important consideration. However, this will require developing a tourism demand model for Fiji and the neighbouring Pacific Island counties based on microeconomic foundations, something which future research related to small island economies in the Pacific must consider.

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