Tourism and economic growth: a panel data analysis for Pacific Island countries

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The contribution of tourism to the economic growth of Pacific Island countries (PICs) has achieved significance in the past decade. The shift in the economic policies of the PICs from the late 1980s has been decisively away from import substitution agriculture to urban-based manufacturing and services sectors. Tourism is the main component of the services sector in the PICs. The contribution of tourism to economic growth in Fiji, Tonga, the Solomon Islands and Papua New Guinea is expected to grow. The authors use panel data for the four PICs to test the long-run relationship between real GDP and real tourism exports. They find support for panel cointegration and the results suggest that a 1% increase in tourism exports increases GDP by 0.72% in the long run and by 0.24% in the short run.

Keywords: tourism and economic growth; panel data; real GDP; Pacific Islands

The shift in the economic policies of the Pacific Island countries (PICs) from the late 1980s has been decisively away from import-substitution agriculture to urban-based manufacturing and services sectors. In the past two decades, however, with the exception of Fiji, the urban manufacturing sector in Tonga, Papua New Guinea (PNG) and the Solomon Islands has not achieved
satisfactory growth (SPTO, 2006). Thus, tourism, which is a significant component of the services sector, has been seen as instrumental in driving economic growth in these PICs.

Tonga’s tourism industry employs about 4,000 workers and it accounted for almost 18% gross domestic product (GDP) in 2006 (WTTC, 2006). PNG’s tourism industry has not developed fully compared to Fiji; however, it seems to be growing and tourism earnings contributed around 9% towards GDP in 2006 (WTTC, 2006). In the Solomon Islands, tourism is still a small contributor to GDP and visitor arrivals have only been around 10,000 (WTTC, 2006). Despite tourism being a small contributor in the Solomon Islands, there has been a general increase in visitor arrivals and foreign exchange earnings. For Tonga and the Solomon Islands, while the contribution of tourism is less significant, it is expected that it will increase in the future. Given that PICs have not been able to raise productivity in the agricultural sector and prospects for manufacturing are very small, the tourism industry is likely to become the leading economic sector.

The majority of the PICs, including PNG, which is a relatively large country, are now decisively promoting the tourism industry as a key sector for growth. In this paper, we investigate the contribution of the tourism industry to GDP in these four PICs, as tourism is likely to be the focus of the economic policies of these countries. Briefly foreshadowing our main results, we find: (i) overwhelming support for panel cointegration among real GDP and real tourism exports for PICs; (ii) that the impact of tourism exports is positive and statistically significant for all the four PICs and is in the range of 0.55 to 0.92; and (iii) that panel results suggest that a 1% increase in tourism exports increases GDP by 0.72% in the long run and by 0.24% in the short run.

We organize the balance of the paper as follows. In the next section, we provide an overview of the literature followed by an overview of the tourism industries in Tonga, Fiji, PNG and the Solomon Islands. Then, we discuss the econometric methodology used to analyse panel data for the four countries. In the penultimate section, we discuss the results and, in the last section, we provide some concluding remarks and policy implications.

An overview of related literature

The time-series analysis of tourism has received increasing attention over the past couple of years. There have been studies on different branches of tourism economics: two of these areas, namely ‘shock persistence’ and ‘convergence of tourism markets’, have been popularized by Narayan (2005a,b,c, 2007). Recent studies (see, for example, Smyth et al, 2008, and Lean and Smyth, 2008) have tested these hypotheses for other countries.

There are several studies that examine the relationship between tourism and economic growth. There are cross-sectional studies, panel data-based studies and time-series studies. Among the main issues examined has been cointegration between tourism and economic growth and Granger causality in order to examine the direction of causation. In this section, we provide a brief overview of the selected studies related to our study.
Eugenio-Martin et al (2004) examine the relationship between tourism and economic growth for Latin American countries over the period 1985–1998. They use the Arellano and Bond panel data estimator and find that growth in tourist per capita contributes to economic growth in low- and medium-income countries, and not in the group of rich countries.

Lee and Chang (2008) used panel unit root and panel cointegration approaches to examine the long-run relationship between tourism development and economic growth for OECD and non-OECD countries, including those countries in Asia, Latin America and sub-Saharan Africa. Their empirical analysis is based over the period 1990–2002. They find that tourism has a greater impact on GDP in non-OECD countries than in OECD countries.


Brau et al (2007) examine the role of tourism in economic growth for 143 countries over the period 1980–2003 using standard ordinary least squares cross-country regressions and find that countries where emphasis is on tourism grow significantly faster than other groups of countries, such as the OECD and less developed countries, among others. They also find that small states are fast growing only when they are highly specialized.

Parrilla et al (2007) examine the relationship between tourism and economic growth for Spain, using the Balearics and Canary Islands as case studies. They use an accounting model and their empirical analysis is based on data for the period 1965–2002. They find that tourism has been instrumental in income growth in these two Spanish regions.

Kim et al (2006) use both quarterly data (over the period 1971–2003) and annual data (1956–2002) to examine the relationship between tourism and economic growth for Taiwan. They find a long-run relationship between tourism and economic growth and that tourism growth causes economic growth and economic growth causes tourism growth.

Lee and Chien (2008) use annual data for the period 1959–2003 to examine the relationship between tourism and economic growth for Taiwan. They use the cointegration test and find that in the long run tourism has a positive effect on Taiwan’s economic growth.

Po and Huang (2008) use cross-sectional data for the period 1995–2005 for 88 countries to investigate the non-linear relationship between tourism development and economic growth. They find some evidence of a positive relationship between tourism and economic growth.1
In conclusion, it seems that there is a clear empirical consensus in the literature that tourism promotes economic growth. More specifically, it seems that the role of tourism in economic growth is larger for smaller developing countries than for the developed countries.

An overview of the tourism sector in Fiji, PNG, Solomon Islands and Tonga

Fiji Islands tourism industry

Tourism represents the fastest growing industry in the world, and the Pacific is no exception. In the South Pacific region, Fiji attracts the most number of visitors annually. With its roots in the trans-Pacific shipping trade era, the tourism industry has contributed significantly to the Fijian economy, providing employment to over 40,000 people either directly or indirectly (Narayan, 2005a,b) and contributing significantly towards Fiji’s foreign reserves. According to Milne (2005), each US$1 million creates around 63 jobs in Fiji. The Reserve Bank of Fiji’s (RBF, 2006a) report shows that in 2006 aggregate receipts from the tourism industry were estimated at around US$500 million, representing an annual growth of more than 10% over 2005 (Figure 1). It also provides positive flow-on effects to other sectors of the Fijian economy, as revealed in Narayan’s (2005a) computable general equilibrium analysis of Fiji’s tourism industry. Moreover, total visitor arrivals were estimated to be 562,000 (RBF, 2006b) in 2006 (Figure 2).

The 2005 visitor influx to Fiji was approximated provisionally at 549,911 by the Reserve Bank of Fiji (RBF, 2006b). According to the World Travel and Tourism Council (WTTC, 2006), this industry was estimated to have accounted for around 33% of overall output in Fiji in 2006. Furthermore, it indicated that the sector generated over US$1 billion worth of economic activity or total demand in 2006.

Data on the purpose of tourist visits indicate that most visitors to Fiji come for holiday purposes: on average, about 79% of visitors come for holidays at resorts and hotels; around 7% come to visit relatives and friends; 6% are transit visitors; 4% are business guests, while the remaining visitors fall in the category of official conferences and recreational activities (FIBOS, various reports).

Furthermore, Australia holds the largest share of Fiji’s tourism export market. On average, 32% of tourists originally come from Australia, followed by New Zealand, which captures around 17% of the market share, and the USA, with 16% of the market share. Around 14% of tourists come from Japan and Continental Europe, while 6% of visitors originate from the UK and around 5% from Canada. The remaining visitors come from Asia, the Pacific Islands and other countries in the world (see Narayan, 2007).

The 2004 International Visitor Survey Report for Fiji (Ministry of Tourism, 2004) suggests visitors from long-haul markets are normally backpacker tourists. These tourists spend relatively less in Fiji and they generally stay at dormitory-type resorts. Tourists from Japan are found to be the largest spenders and contribute significantly towards overall visitor expenditure in Fiji; as a
Figure 1. Fiji tourism earnings (US$ million).
Source: Reserve Bank of Fiji.

Figure 2. Visitor arrivals in Fiji (thousands).
Source: Reserve Bank of Fiji.
result, most hotels and other tourism affiliates in Fiji invest heavily in marketing themselves to Japanese tourists. Overall, most visitor expenditure is geared towards accommodation, followed by shopping and other activities.

Tonga’s tourism industry

Unlike the tourism industry in the Fiji Islands, Tonga’s tourism sector is not as significant in its contribution towards growth and employment. Milne (2005) estimates that Tonga’s tourism industry employs roughly around 4,000 workers. According to the WTTC (2006), inbound tourists injected over US$25 million in the Tongan economy in 2006, representing a growth in tourism earnings of almost 10% on an annual basis (see Figure 3).

Due to data constraints, visitor arrivals data for 2006 are unavailable. Nonetheless, the WTTC (2006) estimates suggest that tourism activity would have grown by around 5% in 2006. Furthermore, travel and tourism activities in Tonga in 2006 were expected to have generated US$51.6 million of economic activity. In addition, the WTTC (2006) estimated that Tonga’s tourism industry accounted for almost 18% of total output in 2006. Tonga’s tourist source market follows characteristics similar to the Fijian industry, with the bulk of tourists coming from Australia and New Zealand.

Papua New Guinea’s tourism industry

The performance of PNG’s tourism industry is similar to that of Tonga.
Although it has the potential to contribute significantly to the country’s economic growth, to date the tourism industry’s growth remains subdued. Sharing similar characteristics to other Pacific economies, PNG’s tourism industry depends largely on its tropical climate. However, it has not been able to keep pace with the growth of other PICs, particularly Fiji and the Cook Islands. Nonetheless, it is estimated that the industry has contributed over 5% of PNG’s national income in recent years.

The inbound tourism sector contributes towards PNG’s foreign reserves accumulation. Recent data suggested that total tourism earning was around US$244 million, representing an annual growth of around 14% in 2005 (WTTC, 2006).

A cursory inspection of visitor arrivals data suggests that total arrivals of non-residents in the country approximates to more than 64,000 in 2006 (PNGTPA, 2006) – see Figure 4. The industry contributed around 9% towards overall GDP in 2006 and was estimated to have created US$1 billion worth of economic activity in 2006 alone (WTTC, 2006). As for employment creation, it is assumed that the industry employs around 104,000 workers (Milne, 2005).

PNG’s market share is slightly different from Tonga and Fiji. Although a large proportion of visitors come from Australia, a significant proportion also comes from Asia. The remaining visitors come from New Zealand and the rest of the world.

**Solomon Island’s tourism industry**

The Solomon Island economy is one of the weakest economies in the Pacific, owing mainly to years of civil and economic unrest in the nation. As a result,
most of the domestic sectors, including tourism, have not fared well in recent times. The WTTC (2006) Solomon Island country report suggests that the tourism industry contributes rather sluggishly towards GDP. Relative to its size, the industry represented only 9% of overall growth in 2006.

Consequently, foreign earnings have also remained subdued relative to those of other Pacific Island economies. In 2006, the industry was believed to have posted around US$13.1 million in the country’s income accounts, representing an annual growth of nearly 16%. Furthermore, total international visitors to the Solomon Islands have remained fairly low over the years. Data from the South Pacific Tourism Organization (SPTO, 2006) suggest that arrivals in 2006 were around 10,000 (Figure 5).

Employment creation is another positive spin-off from the industry. According to Milne (2005), the tourism sector employs around 3,000 people, either directly or indirectly. Furthermore, with each millionth dollar of tourist expenditure, around 146 jobs are created. As for the source market share, the industry shares similar characteristics with other Pacific nations: Australia and New Zealand feature prominently as the main source of inbound tourists to the Solomon Islands.

Methodology

Pedroni’s panel cointegration test

Following Pedroni (1999), to test for a cointegration relationship among variables for a panel of countries, we specify the following panel cointegration regression:
Tourism and economic growth

\[ \ln Y_{it} = \alpha_i + \beta_i \ln TE_{it} + \epsilon_{it} \]  

(1)

for \( t = 1,...,T; \ i = 1,...,N; \) where \( T \) refers to the number of observations over time and \( N \) refers to the number of individual members in the panel. \( \ln Y \) is the natural logarithm of real GDP and \( \ln TE \) is the natural logarithm of real tourism exports. Seven test statistics, as recommended by Pedroni (1999), are used to test for panel cointegration. These tests are the panel \( v \)-statistic, panel \( p \)-statistic, panel \( t \)-statistic (non-parametric), panel \( t \)-statistic (parametric), group \( p \)-statistic, group \( t \)-statistic (non-parametric) and the group \( t \)-statistic (parametric).

Granger causality

We follow the work of Engle and Granger (1987), who show that if two non-stationary variables are cointegrated, a vector autoregression (VAR) in first differences will be misspecified. To remedy this, we need a model with a dynamic error correction representation assuming that real income and tourism exports are cointegrated. This means that the traditional VAR model is augmented with a one-period lagged error correction term, which is obtained from the cointegrated model. We extend this to a panel data case, thus specifying the following equations for the Granger causality test:

\[ \Delta \ln Y_{it} = \pi_{1Y} + \sum_p \pi_{11p} \Delta \ln Y_{it-p} + \sum_p \pi_{12p} \Delta \ln TE_{it-p} + \psi_1 \text{ECT}_{i,t-1} \]  

(2)

\[ \Delta \ln TE_{it} = \pi_{1TE} + \sum_p \pi_{21p} \Delta \ln TE_{it-p} + \sum_p \pi_{22p} \Delta \ln Y_{it-p} + \psi_2 \text{ECT}_{i,t-1} \]  

(3)

Here, all variables are as previously defined, \( \lambda \) denotes the first difference of the variable and \( p \) denotes the lag length. The significance of the first-differenced variables provides evidence on the direction of the short-run causation, while the \( t \)-statistics on the one-period lagged error correction term denotes long-run causation.

Empirical results

Data

The empirical analysis is based on four PICs, namely the Fiji Islands, the Solomon Islands, PNG and Tonga. The choice of these four PICs was based purely on data availability. It should be noted that while GDP data are available for most PICs, data on tourism exports are available for these four countries only. We use annual time-series data for the period 1988–2004.\(^2\) We obtained the GDP data from the International Financial Statistics published by the International Monetary Fund, while the tourism exports data were obtained from the World Travel and Tourism Council Database. All data were converted into natural logarithmic form before the empirical analysis.

Panel unit root test

The goal of this section is to establish the panel unit root properties of real GDP and real tourism exports. To achieve this, we use four panel unit root tests,
Table 1. Panel unit root tests.

<table>
<thead>
<tr>
<th>Variables</th>
<th>LLC test</th>
<th>Breitung test</th>
<th>IPS test</th>
<th>ADF Fisher test</th>
</tr>
</thead>
<tbody>
<tr>
<td>lnY</td>
<td>0.0395</td>
<td>0.5745</td>
<td>1.2249</td>
<td>2.7609</td>
</tr>
<tr>
<td></td>
<td>(0.5157)</td>
<td>(0.7172)</td>
<td>(0.8897)</td>
<td>(0.9485)</td>
</tr>
<tr>
<td>ΔlnY</td>
<td>−4.0665</td>
<td>−3.9322</td>
<td>−3.4159</td>
<td>25.8402</td>
</tr>
<tr>
<td></td>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td>(0.0003)</td>
<td>(0.0011)</td>
</tr>
<tr>
<td>lnTE</td>
<td>−0.0770</td>
<td>0.1628</td>
<td>0.4252</td>
<td>5.7242</td>
</tr>
<tr>
<td></td>
<td>(0.4693)</td>
<td>(0.5647)</td>
<td>(0.6646)</td>
<td>(0.6781)</td>
</tr>
<tr>
<td>ΔlnTE</td>
<td>−5.4664</td>
<td>−2.0515</td>
<td>−5.3085</td>
<td>38.6878</td>
</tr>
<tr>
<td></td>
<td>(0.0000)</td>
<td>(0.0201)</td>
<td>(0.0000)</td>
<td>(0.0000)</td>
</tr>
</tbody>
</table>

Note: Figures in parenthesis are the probability value.


We generate test statistics for the natural log levels of real GDP and real tourism exports, as well as for the first difference of these two variables. The test statistics together with the probability values are reported in Table 1. The results are organized as follows. In column 2, we present the LLC test, in column 3 we present the Breitung test, in column 4 we present the IPS test and in the final column we present the ADF Fisher test.

Beginning with the results for real GDP, the test statistics reveal that it is panel non-stationary. For instance, the LLC, Breitung, IPS and ADF Fisher statistics for the log levels of GDP are 0.04, 0.57, 1.22 and 2.76, respectively. The associated probability values are all greater than 0.10, suggesting that the null hypothesis of non-stationarity cannot be rejected at the 10% level of significance. Meanwhile, when we subject the first difference of the panel real GDP data to the four panel unit root tests, we obtain probability values of less than 0.01, suggesting that we can reject the panel non-stationarity null hypothesis.

We now turn to the results from the panel tourism export series, reported in the last two rows of Table 1. Our result can be summarized as follows. For the log levels of the tourism exports variable, the LLC, Breitung, IPS and ADF Fisher test statistics obtained are −0.08, 0.16, 0.43 and 5.72, respectively. The associated probability values are greater than 0.10, suggesting that we cannot reject the null of panel non-stationarity. However, when we consider the first difference of the tourism exports series, the probability values obtained from the four panel unit root tests are less than 0.01, suggesting that we can reject the null hypothesis. Taken together, all four tests suggest that tourism exports is panel non-stationary.

Cointegration

In the previous section, we confirmed that both real GDP and real tourism exports were integrated of order one for the panel of four PICs. This paves the way to testing for any possible long-run relationship between real GDP and real tourism exports for the panel of four countries. We achieve this goal through using the suite of panel cointegration test statistics suggested by
Table 2. Pedroni’s panel cointegration test.

<table>
<thead>
<tr>
<th>Tests</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel $v$-statistics</td>
<td>1.1010</td>
</tr>
<tr>
<td></td>
<td>(0.2709)</td>
</tr>
<tr>
<td>Panel $rho$-statistics</td>
<td>$-1.8868^{**}$</td>
</tr>
<tr>
<td></td>
<td>(0.0592)</td>
</tr>
<tr>
<td>Panel $pp$-statistics</td>
<td>$-2.4534^{**}$</td>
</tr>
<tr>
<td></td>
<td>(0.0142)</td>
</tr>
<tr>
<td>Panel $adf$-statistics</td>
<td>$-2.1734^{**}$</td>
</tr>
<tr>
<td>Group $rho$-statistics</td>
<td>$-0.9493^{***}$</td>
</tr>
<tr>
<td></td>
<td>(0.3425)</td>
</tr>
<tr>
<td>Group $pp$-statistics</td>
<td>$-2.8656^{***}$</td>
</tr>
<tr>
<td></td>
<td>(0.0042)</td>
</tr>
<tr>
<td>Group $adf$-statistics</td>
<td>$-2.5445^{**}$</td>
</tr>
<tr>
<td></td>
<td>(0.0109)</td>
</tr>
</tbody>
</table>

Note: Probability values are in parentheses; **, *** denote statistical significance at the 5% and 1% levels, respectively.

Pedroni (1999). The results from a total of seven different panel test statistics suggested by Pedroni (1999) are reported in Table 2. The statistical significance of these test statistics is provided in parenthesis in the form of $p$-values.

We find overwhelming support for panel cointegration between real GDP and real tourism exports. Five of the seven test statistics suggest evidence for panel cointegration either at the 5% level or the 1% level. For instance, the panel $rho$, panel $pp$ and panel $adf$ test statistics are $-1.89$, $-2.45$ and $-2.17$, respectively. The group $rho$ and group $pp$ test statistics are $-2.86$ and $-2.54$, respectively. All these five test statistics have a probability value of around 0.05 or less, suggesting panel cointegration at a high level of significance.

Panel long-run elasticities

In the previous section, we established empirical support for panel cointegration, implying that real GDP and real tourism exports shared a long-run relationship. In this section, we take a step further and investigate the long-run impact of tourism exports on real GDP. We report the long-run elasticities of the impact of tourism exports for each of the four PICs and for the panel of PICs based on the fully modified ordinary least squares (FMOLS) estimator, suggested by Pedroni (2000), in Table 3.

We initially discuss the country-specific results and observe the following interesting results. First, the elasticity on tourism exports is in the range of 0.55 to 0.92. Second, the impact of tourism exports is positive and statistically significant for all the four PICs. In the case of Fiji, a 1% increase in tourism exports leads to a 0.79% increase in real GDP. In the case of the Solomon Islands, a 1% increase in tourism exports leads to a 0.55% increase in real GDP. In the case of PNG, a 1% increase in tourism exports leads to a 0.92% increase in real GDP, while in the case of Tonga, a 1% increase in tourism exports leads to a 0.63% increase in real GDP.
Table 3. FMOLS elasticities.

<table>
<thead>
<tr>
<th></th>
<th>ln(TE)</th>
<th>(t)-Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiji Islands</td>
<td>0.79***</td>
<td>8.49</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>0.55***</td>
<td>4.24</td>
</tr>
<tr>
<td>PNG</td>
<td>0.92***</td>
<td>13.07</td>
</tr>
<tr>
<td>Tonga</td>
<td>0.63***</td>
<td>4.77</td>
</tr>
<tr>
<td>PANEL long run</td>
<td>0.72***</td>
<td>15.29</td>
</tr>
<tr>
<td>PANEL short run</td>
<td>0.24***</td>
<td>3.84</td>
</tr>
</tbody>
</table>

Note: *** denotes statistical significance at the 1% level.

Third, despite tourism being a key sector for most PICs, elasticity is less than one. The results suggest that tourism contributes most to PNG’s GDP and that it has the smallest impact on the GDP of the Solomon Island.

Finally, the panel long-run elasticities reported in the last row of the table suggest that tourism exports have a positive and statistically significant effect on real GDP for the PICs. For instance, a 1% increase in tourism exports increases GDP by 0.72%. The short-run panel elasticity turns out to be 0.24, suggesting that a 1% increase in tourism exports increases GDP by 0.24%. We observe that the impact of tourism exports on GDP for the panel of PICs is smaller in the short-run compared with the long-run.

**Panel Granger causality**

Panel Granger causality results are reported in Table 4. We find that in the short run, real GDP Granger causes tourism exports and in the long run, tourism exports through the lagged error correction term Granger cause real GDP.

We do not find any evidence of short-run Granger causality running from tourism exports to GDP. Similarly, we do not find any evidence of long-run causation from real GDP to tourism exports, since the lagged error correction term when GDP is endogenous is statistically insignificant.

Table 4. Panel Granger causality test results.

<table>
<thead>
<tr>
<th>(\Delta \ln Y)</th>
<th>(\Delta \ln TE)</th>
<th>(ECM_{t-1})</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\Delta \ln Y)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>–</td>
<td>0.6262</td>
<td>(-0.0476^{***})</td>
</tr>
<tr>
<td></td>
<td>(0.4320)</td>
<td>([-2.5758])</td>
</tr>
<tr>
<td>6.1784***</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.0576)</td>
</tr>
<tr>
<td>(\Delta \ln TE)</td>
<td>0.0158</td>
<td>([-1.4825])</td>
</tr>
</tbody>
</table>

Note: *** denotes statistical significance at the 1% level. The \(t\)-statistics are shown in parentheses and square brackets.
Conclusions and policy implications

Secondary data on the tourism industry show that it is already a significant contributor to the economic growth in Fiji, PNG, the Solomon Islands and Tonga. The majority of the PICs, including the relatively large country of PNG, are now decisively promoting the tourism industry as a key sector for growth. In this paper, we investigate the contribution of the tourism industry to GDP in these four countries, as tourism is likely to be the focus of the economic policies of these countries, particularly given the failure in the export growth of the manufacturing sector.

We used Pedroni’s panel cointegration test and found overwhelming support for panel cointegration among real GDP and real tourism exports for PICs. We then estimated for each country the long-run impact of tourism exports on GDP and found that the impact of tourism exports was positive and statistically significant for all the four PICs. Our findings revealed that tourism exports had the biggest impact in PNG, followed by Fiji. In the case of Fiji, a 1% increase in tourism exports led to a 0.79% increase in real GDP, while in the case of PNG, a 1% increase in tourism exports led to a 0.92% increase in real GDP. In the Solomon Islands and Tonga, the impact was 0.55 and 0.63%, respectively. Our panel results suggested that a 1% increase in tourism exports increased GDP by 0.72% in the long run and by 0.24% in the short run.

There are a number of policy implications in the PICs as a result of this study. While our results confirm the importance of tourism to the PICs, one of the problems for their tourism industry is their heavy dependence on imported food. This is a bigger issue for Fiji, as it has not been able to raise its agricultural production to service the tourism industry and this explains the smaller than expected impact on its GDP. Fiji can improve the contribution of the tourism industry to its GDP if it raises agricultural production, such as that of fruit and vegetables, as the bulk of these are currently imported. For this to happen, it has to resolve urgently the issue of land leases, which currently pose a significant barrier to investment in both agriculture and tourism development (Prasad and Tisdell, 1996a,b, 2006; Prasad, 2006).

For the tourism industry to realize its full potential in the PICs, it has to overcome a number of other constraints. Tourism is very vulnerable to natural disasters and political instability. Unfortunately for the PICs, both these factors are already affecting the tourism industry negatively. Natural disasters such as cyclones, floods and droughts have affected the tourism industry recently in all the four PICs. They have also all been affected by political instability and this has affected the growth of the tourism industry. Fiji has had four coups in 20 years and each time tourism arrivals fell drastically and it took the industry several years to recover (see Narayan, 2004a, 2005a,b). The Solomon Islands continues to suffer from political instability as a result of civil war. Tonga suffered a major riot recently and had most of its central business district burnt in the capital, Nuku'alofa. This had a negative impact of visitor arrivals. PNG continues to suffer from violent crime and a prolonged period of political instability due to frequent changes in government. In addition to putting in place mitigation and adaptation measures for natural disasters and resolving political instability, these countries will also have to invest heavily in the tourism infrastructure. Tonga, the Solomon Islands and PNG have an underdeveloped
tourism infrastructure and this needs to be addressed by policymakers in order
to maximize the potential of their tourism industries. These issues thus remain
the key policy challenges for PICs in their bid to draw on the tourism industry
for their economic growth.

Endnotes

1. There are several studies that use computable general equilibrium models and find that tourism
contributes to economic growth. Sugiyarto et al (2003) use a computable general equilibrium
model of the Indonesian economy and find that tourism growth leads to greater positive effects

2. At the request of one referee of this journal, we also examined the impact of tourism exports
on per capita GDP. We found that results, regardless of whether we used GDP or per capita
GDP, were only marginally different. Hence, in order to save space, we reported results
using just the GDP data. Results based on per capita GDP are available from the authors on
request.

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