Economics Division Working Papers

South Pacific

Tourism sector in Vanuatu, 1981–90: an empirical investigation

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Research School of Pacific Studies ANU

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Key to symbols used in tables

n.a.	**Not applicable**
..	**Not available**
-	**Zero**
.	**Insignificant**

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Islands/Australia Program
National Centre for Development Studies
This paper originates in the Islands/Australia Program at the National Centre for Development Studies. The size, geographic isolation and histories of the Pacific island states create special problems. Australia plays and important role in the region, both as an aid donor and trading partner. The National Centre for Development Studies has given priority to research on the islands since 1975. The Islands/Australia Program provides insights, primarily for Australia in its relations with its Pacific neighbours, but also for the island governments and international agencies. This stream of the Economics Division Working Papers widens the former Islands/Australia Working Paper series. Research on the area is undertaken by other scholars in the Division. The National Centre for Development Studies continues to disseminate analysis of the island economies through its *Pacific Policy Papers, Pacific Research Monographs* and the *Pacific Economic Bulletin*.

Abstract

The tourism industry is a major contributor to economic growth in the South Pacific. Recent initiatives introduced to promote tourism in Vanuatu have resulted in a dramatic increase in the number of travellers arriving in the country.

A model of the tourism sector in Vanuatu is developed in this paper as an aid to decision-makers in planning. Trends in the growth of tourist arrivals are also analysed. The results of this analysis and an application of the model to empirical data highlight the role of natural phenomena in fluctuations in tourist arrivals and the desirability of political stability and improved air access for sustained growth in the tourism industry.

tourism sector in Vanuatu, 1982-90: an empirical investigation

Unhindered by a small economy, the base of manufacturing activities, or by the size of the population, the tourism industry is increasingly recognized as a major contributor to economic development in the South Pacific. In addition to foreign exchange earnings from the tourism sector, there are valuable opportunities for other sectors (Dwyer 1986). These include linkages with

- local agriculture, which supplies tropical vegetables and fruits to meet tourist needs
- retail trade, which offers local handicrafts and duty free shopping
- domestic transportation, such as guided tours, travel to historic sites and beaches, as well as domestic air links
- general infrastructure, which includes provision of road networks, air terminal facilities, hotels/motels, and resort centres.

If fully exploited, these opportunities would give rise to substantial gains through employment, domestic value-added activities, and income creation.

Among the South Pacific countries, Fiji has been the leader in the tourism industry, mainly due to its head start, coupled with the advantage of its central location in the region and its relatively well developed infrastructure. In recent years, Vanuatu has taken notable initiatives to promote tourism, exploiting both its unique ancient cultural diversity as well as its English and French colonial heritage, which is attractive to European visitors. As a result of its intensive promotion efforts in the late 1980s, there has been a dramatic increase in tourist arrivals since 1988. Tourist arrivals are defined here as those visitors on holiday/vacation. Other visitors are categorized as business and conference travellers and those meeting friends and relatives. Two factors are behind this sudden spurt in travel to Vanuatu: expanded scheduling of the national air carrier and improvements in physical infrastructure.

Lately, Vanuatu has been widely promoted as a tourist destination, but more concerted efforts are necessary to attract increasing numbers of tourists. Such efforts should be based on intensive analyses of past patterns in tourism, infrastructure use, income changes in the countries of tourist origin, price factors and a host of variables that influence consumption of tourism as an economic good. Unfortunately, available data in Vanuatu do not permit such analysis and informed decision-making. This paper presents the results from an empirical investigation using available data and a model of tourism in Vanuatu. Trends in tourism and the sector's contribution to economic development are analysed in this paper. In addition, tests are run on the validity of the model.

Trends in tourism in Vanuatu

Growth in tourist arrivals

Political disturbances that accompanied Vanuatu's independence in 1980 resulted in economic contraction. In subsequent years, recovery came steadily, albeit slowly, thanks mainly to greater tourist arrivals. During the first three years of independence, tourist arrivals increased dramatically, by 48.1 per cent in 1982 alone. Over the next four years, however, this gain was reversed (Table 1). Disruption to air services, perceived political instability, and a tropical hurricane of severe intensity in early 1987 affected tourist arrivals. Together with decline in tourism, investors confidence in Vanuatu also suffered because of political uncertainties, which resulted in a modest growth rate of 0.4 per cent in gross domestic product (GDP) in 1987.

Table 1 Visitors to Vanuatu, 1981-91

	All visitors by air	Tourists by air[a]	Cruise ship passengers (CP)	All visitors (ann. % change)	Tourists (ann. % change)	CP (ann. % change)
1981	22092	17044	36434	..	..	..
1982	32180	25240	53538	45.66	48.09	46.95
1983	32374	27363	65318	0.60	8.41	22.00
1984	31615	26167	65490	-2.34	-4.37	0.26
1985	24521	18889	75742	-22.44	-27.81	15.65
1986	17515	13197	56091	-28.57	-30.13	-25.94
1987	14642	9201	49381	-16.40	-30.28	-11.96
1988	17544	12420	50932	19.82	34.99	3.14
1989	23865	17457	41311	36.03	40.56	-18.89
1990	35042	24283	41867	46.83	39.10	1.35
1991	39786	28578	37023	13.54	17.69	-11.57

Note: Defined as a person staying at least one night with purpose other than business.

Source: National Planning and Statistics Office, Port Vila.

New construction and rehabilitation of infrastructure damaged by cyclones was followed by the restoration of investor confidence in the economy. Tourism also expanded modestly in 1988, with arrivals increasing from about 9,200 in 1987 to 12,400. Recovery continued with spectacular increases in tourist arrivals in 1989 (17,500 an increase of 40.6 per cent) and in 1990 (24,300, up by 39.1 per cent) mainly as a result of the Government purchase of a Boeing 727 aircraft for its national carrier, Air Vanuatu, to bring tourists from Australia and New Zealand. These increases in tourist arrivals were experienced despite adverse publicity of the unfavourable domestic political climate. As a result, room-night capacity utilization also increased from 41 per cent in 1988 to 60 per cent in 1990 (Table 2). The major contributing factors to growth in tourism during these years are the following

- increased availability of direct flights to Vanuatu from Australia
- an intensive and sustained promotional campaign
- use of direct foreign aid for assistance to the government-owned Air Vanuatu and for funding the promotion of tourism activities
- improved political climate of Vanuatu and a peaceful outlook for New Caledonia, as the two countries are generally associated in the regional tourism industry.

Table 2 Hotel rooms in Vanuatu, 1981-90

	Hotel rooms	Room-night capacity ('000)	Room-night capacity utilization (%)	Bed-night capacity ('000)	Bed-night capacity utilization (%)
1981	430	156	50.0	349	38.0
1982	425	156	69.4	360	53.6
1983	438	161	66.7	383	52.2
1984	426	162	69.4	388	55.1
1985	414	154	54.0	336	45.3
1986	469	160	40.2	363	30.4
1987	449	120	45.3	263	33.2
1988	464	164	40.9	364	30.1
1989	517	173	51.6	379	40.4
1990	521	189	59.6	401	49.3

Source: National Planning and Statistics Office, Port Vila; National Tourism Office, Port Vila

Contribution to gross domestic product

The importance of tourism as a major service industry contributing to economic growth is seen in its share of GDP over the last ten years. Tourism earnings, which were 14.3 per cent of GDP in 1981, steadily grew in absolute terms as well as in percentage of GDP until 1983. But, after fluctuations from 1985-87 due to cyclones and political uncertainties, the ratio of tourism earnings to GDP increased to 25.1 per cent in 1990 (Table 3 and Figure 1). From 1981-90, the share of total export earnings provided by tourism grew from one-fifth to more than half (Figure 2). Imports financed by tourism also more than doubled (Table 3). Moreover, there is a close association between growth rates in GDP and tourism earnings (Table 4).

Table 3 Tourism earnings, GDP, exports and imports of Vanuatu in current prices, 1981-90

	GDP (vatu m)	Tourism revenue (vatu m)	Goods & services exports (vatu m)	Goods & services imports (vatu m)	Tourism revenue as % of GDP	Tourism revenue as % of exports	Tourism revenue as % of imports	As % GDP exports	As % GDP imports
1981	8791	1261	6000	8000	14.3	21.0	15.8	68.3	91.0
1982	9352	2050	6029	8750	21.9	34.0	23.4	64.5	93.6
1983	10150	2200	5934	7288	21.7	37.1	30.2	58.5	71.8
1984	12339	2361	7754	8424	19.1	30.4	28.0	62.8	68.3
1985	12534	2000	6391	9074	16.0	31.3	22.0	51.0	72.4
1986	12179	1520	4417	8254	12.5	34.4	18.4	36.3	67.8
1987	13404	1544	5142	9139	11.5	30.0	16.9	38.4	68.2
1988	15006	1853	5508	9213	12.3	33.6	20.1	36.7	61.4
1989	16351	2659	6099	10670	16.3	43.6	24.9	37.3	65.3
1990	17891	4499	8301	13714	25.1	54.2	32.8	46.4	76.7

Source: National Planning and Statistics Office (NPSO), Port Vila

Figure 1 Tourism earnings as a per cent of GDP, exports and imports, 1981-90

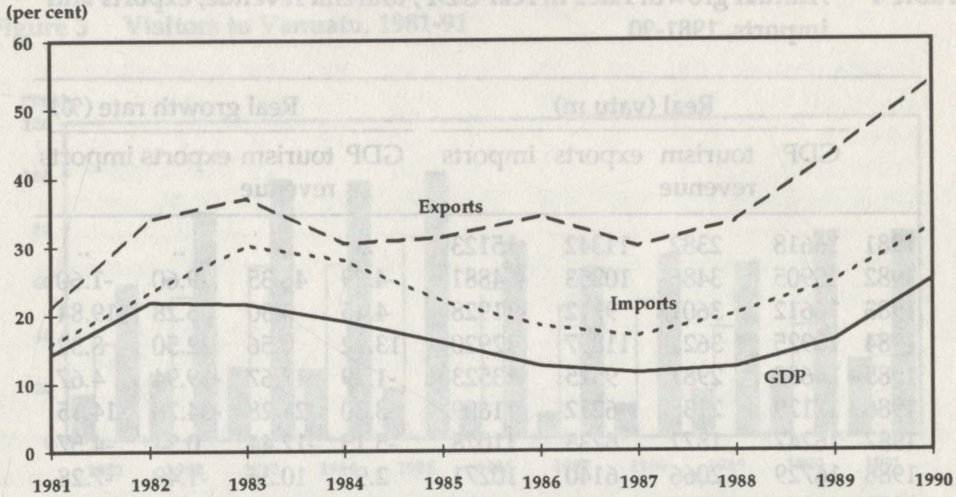


Figure 2 Annual growth rates of GDP, real exports and real tourism earnings, 1982-90

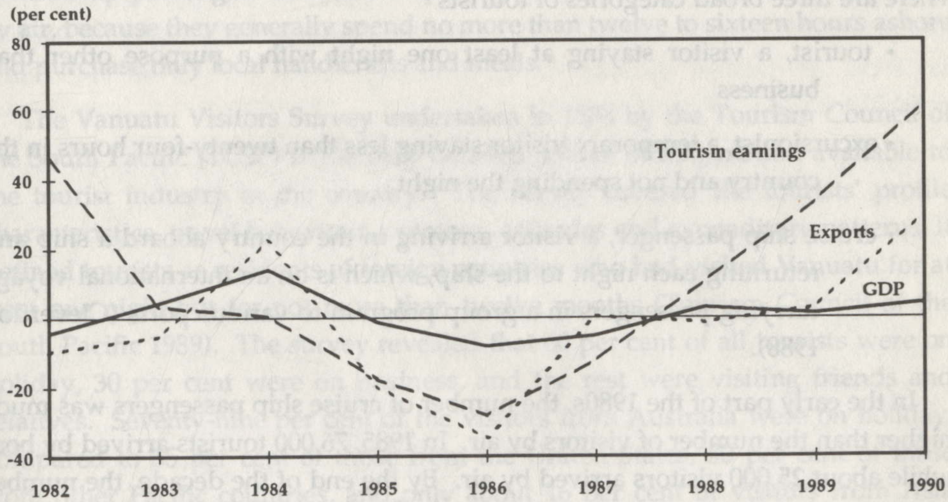


Table 4 Annual growth rates in real GDP, tourism revenue, exports and imports, 1981-90

	Real (vatu m)				Real growth rate (%)			
	GDP	tourism revenue	exports	imports	GDP	tourism revenue	exports	imports
1981	16618	2382	11342	15123	..	..	..	..
1982	15905	3486	10253	14881	-4.29	46.35	-9.60	-1.60
1983	16612	3601	9712	11928	4.45	3.30	-5.28	-19.84
1984	18925	3621	11897	12920	13.92	0.56	22.50	8.32
1985	18680	2981	9525	13523	-1.29	-17.67	-19.94	4.67
1986	17129	2138	6212	11609	-8.30	-28.28	-34.78	-14.15
1987	16247	1872	6233	11078	-5.15	-12.44	0.34	-4.57
1988	16729	2066	6140	10271	2.97	10.36	-1.49	-7.28
1989	16944	2755	6320	11057	1.29	33.35	2.93	7.65
1990	17669	4441	8194	13538	4.28	61.20	29.65	22.44

Source: National Planning and Statistics Office, Port Vila

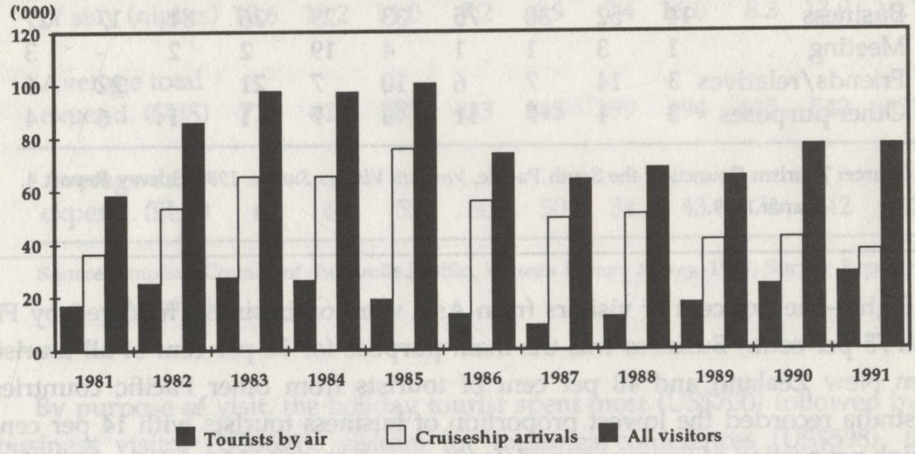
Analysis of tourism

There are three broad categories of tourists

- tourist, a visitor staying at least one night with a purpose other than business
- excursionist, a temporary visitor staying less than twenty-four hours in the country and not spending the night
- cruise ship passenger, a visitor arriving in the country aboard a ship and returning each night to the ship, which is on an international voyage carrying passengers in a group program to various ports (Cleverdon 1988).

In the early part of the 1980s, the number of cruise ship passengers was much higher than the number of visitors by air. In 1985, 76,000 tourists arrived by boat while about 25,000 visitors arrived by air. By the end of the decade, the number of cruise ship passengers had declined and was almost equal to the number of visitors by air. Yet, in any given year, cruise ship passengers were far more numerous than air arrivals (Figure 3).

Figure 3 Visitors to Vanuatu, 1981-91



While the annual growth in tourist arrivals by air has been consistently positive during the last four years, the rate of cruise ship arrivals has fluctuated. Cruise ship passengers have less impact on the economy than tourists arriving by air, because they generally spend no more than twelve to sixteen hours ashore and purchase only local handicrafts and meals.

The Vanuatu Visitors Survey undertaken in 1988 by the Tourism Council of the South Pacific (TCSP) is the only detailed source of information available to the tourist industry in the country. The survey covered the tourists' profile characteristics, travel behaviour, opinions, attitudes and expenditure patterns. It defined tourists as residents of foreign countries who had visited Vanuatu for at least one night but for not more than twelve months (Tourism Council of the South Pacific 1989). The survey revealed that 60 per cent of all tourists were on holiday, 30 per cent were on business, and the rest were visiting friends and relatives. Seventy-nine per cent of the visitors from Australia were on holiday, compared to 55 per cent of those from the United States, 50 per cent of those from other Pacific countries, and only about 16 per cent of visitors from Asia (Table 5).

Table 5 Purpose of visit to Vanuatu, 1988 (per cent)

	Aust.	NZ	USA	Fiji	New Cal.	Other Pac.	Europe	Asia	Other	All
Holiday/vacat.	79	29	55	6	46	38	50	16	56	60
Business	14	52	30	75	33	29	26	81	17	27
Meeting	1	3	1	1	4	19	2	2	-	3
Friends/relatives	3	14	7	6	10	7	21	-	22	6
Other purposes	3	1	7	11	8	7	1	1	6	4

Source: Tourism Council of the South Pacific, *Vanuatu Visitors Survey, 1988*, Survey Report 4, March 1989.

Eighty-one per cent of visitors from Asia were on business, followed by Fiji with 75 per cent. Business was the main purpose for 52 per cent of all tourists from New Zealand and 48 per cent of tourists from other Pacific countries. Australia recorded the lowest proportion of business tourists with 14 per cent. A high proportion of European tourists (21 per cent) visited friends and relatives in Vanuatu. About 48 per cent of all tourists in Vanuatu travelled on package tours while the remaining 52 per cent travelled on the basis of independent arrangements. Independent arrangements were used by more than 90 per cent of all tourists from Pacific countries, Europe and other countries (mainly Canada). The highest proportion of tourists on package tours was recorded by Australia with 74 per cent, followed by New Zealand with 37 per cent and USA and Asia each with 16 per cent. More than three-quarters of all holiday tourists came on the popular package tours, including 86 per cent of all Australian holiday tourists.

Tourists travelling on a package normally prepay all tour costs, including airfares, transfers, and accommodation. To a great extent, payment of airfares, either separately or as part of a package, does not benefit Vanuatu's economy. On the other hand, the part of the package tour that relates to accommodation and other services rendered in Vanuatu does benefit the country's economy. Similarly, other than prepaid airfares, most expenditures of tourists travelling on independent arrangements benefit the economy. On the basis of these assumptions it has been estimated that, on average, Vanuatu received in 1988 US$631 per tourist visiting the country. Australian tourists spent more than any others at US$715 per person, followed by tourists from Europe and Asia at US$694 and US$615 respectively (Table 6).

Table 6 Visitors' average length of stay and average expenditures, 1988

	Aust.	NZ	USA	Fiji	New Cal.	Other Pac.	Europe	Asia	Other	All
Average length of stay (nights)	10.6	10.2	11.0	7.2	6.9	7.4	16.0	8.3	13.0	10.1
Average total expend. ($US)	715	610	585	433	345	399	694	615	543	631
Average daily expend. ($US)	67	60	53	60	50	54	43	74	42	62

Source: Tourism Council of the South Pacific, *Vanuatu Visitors Survey*, 1988, Survey Report 4, March 1989.

By purpose of visit, the holiday tourist spent most (US$700) followed by the business visitor (US$641), visitors for meetings/conferences (US$598), those visiting friends and relatives (US$554), and visitors for other purposes (US$483). The average daily expenditure is US$64 for the holiday tourist, US$70 for the business visitor and US$30 for those visiting friends/relatives (Tourism Council of the South Pacific 1989).

Investment in infrastructure

Impressive growth in tourism in recent years and the sectors emergence as a major contributor to economic development can be attributed to critical investment in infrastructure. Currently, tourism in Vanuatu is restricted to the islands of Efate, where the capital of Port Vila is situated, Santo, and Tanna. The tourism-related infrastructure (airport terminals, roads from the airport to hotels and resorts, and hotel accommodation and resort facilities) is limited to these islands. Tourist centres have received greater investment under the Second Five Year Development Plan (1987-91), and the Third Five Year Development Plan (1992-96). The major investment during 1989-90 has been the extension and upgrading of the Port Vila runway, which was completed in 1990, and the construction of the new terminal facilities in 1991. In addition to adding a Boeing 727 to its fleet, Air Vanuatu also successfully negotiated seat-sharing arrangements with two foreign airlines for the Noumea-Vila-Nadi-Vila and Auckland-Vila routes.

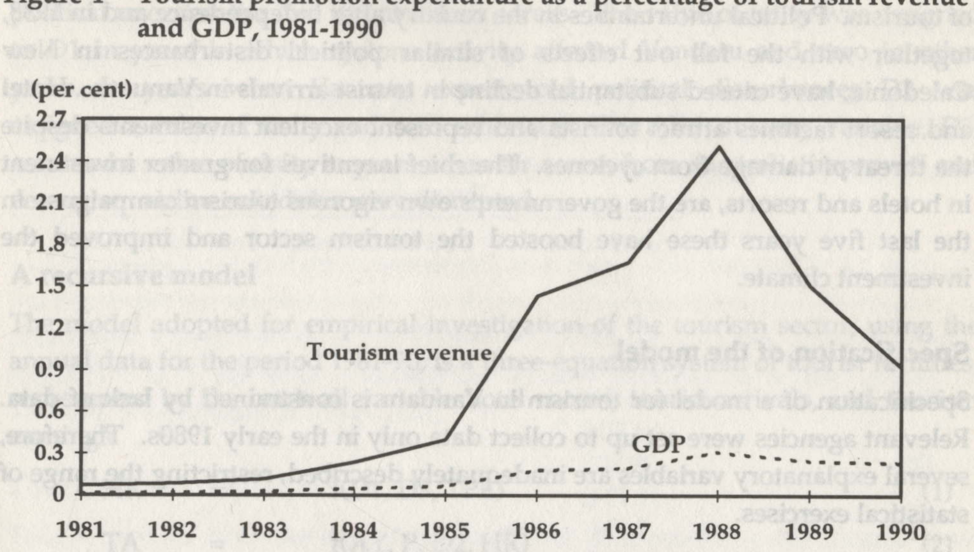
In addition to these infrastructure investments, the government continued to support the institutional framework for tourism. This consists of the National Tourism Office (NTO) established under an Act of Parliament (1982) to promote tourism through planning, development, marketing, and provision of information and assistance to visitors on arrival. The NTO is provided with funds for recurring costs and development costs for undertaking promotional activities, such as special campaigns in major European capitals. Tourism promotion expenditure in real terms has been increasing, although it is well below one per cent of GDP (Table 7). The highest peak was reached in 1988, however, in the last two years, investment as a per cent of GDP has declined along with the ratio of expenditure to earning (Figure 4).

Table 7 Tourism promotion expenditure, 1981-90

	Tourism promotion expenditure		GDP in current prices	Tourism revenue	Tourism expend. as % of	
	current (vatu m)	real (vatu m)	(vatu m)	(vatu m)	GDP	tourism revenue
1981	0.85	1.61	8791	1260	0.01	0.07
1982	1.71	2.90	9352	2050	0.02	0.08
1983	2.56	4.19	10150	2200	0.03	0.12
1984	5.51	8.45	12339	2361	0.04	0.23
1985	7.91	11.78	12534	2000	0.06	0.40
1986	21.76	30.61	12179	1520	0.18	1.43
1987	25.81	31.29	13404	1544	0.19	1.67
1988	46.42	51.75	15006	1853	0.31	2.51
1989	40.02	41.47	16351	2659	0.24	1.50
1990	41.52	40.99	17899	4499	0.23	0.92

Source: National Tourism Office, Port Vila

Figure 4 Tourism promotion expenditure as a percentage of tourism revenue and GDP, 1981-1990



In the private sector, a large part of investment has been in hotel accommodation. There are an estimated 666 hotel rooms in the country, of which 83 per cent are in Port Vila, the remainder are in rural Efate and on the islands of Santo and Tanna, with a very limited number of guest-house rooms on the three other islands. In 1990-91, the construction of a casino and refurbishment of one of the main resort hotels has been the main object of private sector investment. While the restaurants in Port Vila are all expatriate-owned and operated, tour transportation is reserved for ni-Vanuatu and the Government owns 51 per cent of a major tour-operating company.

Tourism model for Vanuatu

A theoretical framework

Demand for tourism, just as for any consumption good, is influenced by many factors, including price and consumer income. Accordingly, tourist arrivals depend on the real income of potential tourists and the price of travel relative to other consumption goods. Since nearly 55-60 per cent of the tourists are from Australia, the GDP of Australia and cost of travel from Australia to Vanuatu, relative to prices of other consumption goods, are major determinants of tourism to Vanuatu. The political climate in Vanuatu and the region also influence rates of tourism. Political uncertainties in the country after independence and in 1988, together with the fall out effects of similar political disturbances in New Caledonia, have caused substantial decline in tourist arrivals in Vanuatu. Hotel and resort facilities attract tourists and represent excellent investments despite the threat of damage from cyclones. The chief incentives for greater investment in hotels and resorts, are the government's own vigorous tourism campaigns. In the last five years these have boosted the tourism sector and improved the investment climate.

Specification of the model

Specification of a model for tourism in Vanuatu is constrained by lack of data. Relevant agencies were set up to collect data only in the early 1980s. Therefore, several explanatory variables are inadequately described, restricting the range of statistical exercises.

Nonetheless, the construction of a model of the tourism sector for Vanuatu has been attempted. For figures on tourism earnings, data on balance of payments were used to help construct a consistent time series for 1981-90, as the survey data of tourists' expenditure in Vanuatu were available only for 1988 (Tourism Council of the South Pacific 1989). The tourist arrival figures were drawn from the published data of the National Tourism Office and National Planning and Statistics Office. Resorts and other attractions were not used consistently over the period, and data covering these facilities do not form a reliable time series; so the number of hotel rooms was employed as a catch-all variable.

The annual tourist promotion expenditures include the operating expenditures of the government-owned National Tourism Office and expenditures relating to promotional campaigns and activities, including those funded exclusively by aid money. Tourism earnings and tourist promotion expenditures have been deflated by the consumer price index of Vanuatu (1990 QI = 100) so as to arrive at their real values. The income variable employed in the model is the real GNP of Australia and the price is based on the round trip excursion fare from Sydney to Port Vila, deflated by the consumer price index of Australia. Although there are different types of excursion fares, including promotion fares and package tours, insufficient data make it impossible to form a consistent time series over a ten-year period (1981-90). As the normal round trip excursion fare was the only information available, it has been employed in the model.

Three dummy variables were employed in the model, representing cyclones, political uncertainties and improved air access. The value of unity was assigned to D1 in years in which cyclone activity affected Vanuatu and zero in other years. In years when Vanuatu experienced political disturbances D2 was assigned a value of unity and zero otherwise. The third dummy variable, D3, assumed a value of unity in years when air access from Australia improved and zero when airline schedules were disrupted.

A recursive model

The model adopted for empirical investigation of the tourism sector, using the annual data for the period 1981-90, is a three-equation system of tourist facilities, represented by the catch-all variable hotel rooms, tourist arrivals, and tourism earnings.

$$HR = f(D1, D3, TPE) \quad (1)$$

$$TA = f(AY, P, D2, HR) \quad (2)$$

$$TE = f(TA) \quad (3)$$

where

HR = number of hotel rooms

TPE = real tourism promotion expenditure

TA = tourist arrivals

TE = tourism expenditure

AY = Australia's real income

P = real price of tourist access

D1 = dummy variable for cyclones

D2 = dummy variable for political uncertainty

D3 = dummy variable for improved air access to Vila

The first equation consists of exogenous variables on the right hand side. The next two equations, which complete the model, have the previously estimated endogenous variables (HR and TA) as explanatory variables. The system of equations is recursive: HR affects TA and TA affects TE. The relationship is only unilateral and is not simultaneous. Hence, the error terms in each of these three equations are assumed to be independent. Accordingly, each equation has been estimated by the method of ordinary least squares. The results are presented in Table 8.

Table 8 Summary of the estimates of the model

	Dependent variable			
	Hotel rooms (HR)	Tourist arrivals[a] (TA)		Tourism earnings (TE)
Constant	429.147	-19.189	31.988	-0.312
	(50.732)	(-11.290)	(-1.041)	(-0.781)
D1	-46.399			
	(-4.706)			
D3	29.903			
	(1.714)			
TPE	1.254			
	(2.530)			
AY		0.750		
		(0.386)		
P		-0.493		
		(-0.252)		
D2		-8.851	-7.468	
		(-1.631)	(2.396)	
HR		0.140	0.161	
		(1.240)	(2.090)	
T		-7.823	-3.639	0.110
		(-0.608)	(-3.246)	(3.339)
TA				0.141
				(9.861)
Number of observations	9	9	9	9
Degrees of freedom	5	3	5	6
R^2	0.928	0.751	0.739	0.943
Adjusted R^2	0.885	0.336	0.581	0.924
F statistic	21.463	1.809	4.705	49.887
DW statistic	2.404	2.307	2.270	2.214

a The second column of figures are estimated without income or price variables

Note: The figures in parenthesis are t statistics

Infrastructure equation

The availability of infrastructure required for attracting tourists is proxied by hotel rooms and determined by various incentives, the most important being tourist promotion expenditure by the Government and improved air links to Vanuatu from the rest of the world. On the other hand, adverse natural factors, represented by the dummy variable for cyclones, have a negative influence, as in the past, cyclones have severely damaged infrastructure.

The estimated equation has emerged as a reasonably acceptable fit, with all the explanatory variables having the theoretically expected signs. Both tourism promotion expenditure and the dummy variable for cyclones are statistically significant at 5 per cent, whereas the dummy variable for airline access to Vanuatu is significant at 10 per cent.

Tourist arrival equation

Tourist arrivals from the rest of the world are determined by the income level abroad and the price of access. In this equation, the influence of income and price are calculated from the real income in Australia, from where the majority of tourists to Vanuatu came during 1981-90, and by the round trip airfare from Australia to Port Vila. Besides these two explanatory variables, the availability of infrastructure, represented by hotel rooms as a variable, should have a positive influence on tourist arrivals. Domestic political uncertainties are likely to have a negative impact on tourist arrivals.

While estimating the equation, a time trend was added to isolate the influence of time on the endogenous variables. The fitted equation, with real income lagged by one year, was not satisfactory. Both income and price variables, despite having the theoretically expected signs, were not significant. This indicates that income changes in Australia and changes in price of tourist access to Vanuatu, contrary to expectations, did not have any significant impact on tourist arrivals. However, the dummy variable for political climate did emerge as a significant variable at 10 per cent, implying that political disturbances caused the decline in tourism. Infrastructure also emerged as a significant variable, with the expected positive sign at 15 per cent.

The two non-significant variables, income and price, were dropped and another regression was estimated. All three retained explanatory variables were found significant at the 5 per cent level. The combined explanatory power of the variables (dummy for greater air access to Vanuatu, hotel rooms and the time trend) also improved in terms of the adjusted R^2.

Tourism earnings equation

A simple relationship was postulated for tourism earnings (TE), which are affected by the number of tourist arrivals (TA). A time trend was added to separate the effect on the dependent variable. The estimated equation emerged with the expected sign of TA at a high level of significance. Similarly, the time trend was also found significant.

Assessment of the estimated equations in the model reveals that changes in income in the tourists' originating countries and the recent recession in Australia have not had an adverse impact on tourism in Vanuatu. Similarly, the price factor is of no statistical significance. However, empirical evidence shows that better infrastructure and greater access to the country have had a positive affect on earnings from tourism. National and regional events beyond control, such as natural disasters, cyclones, and political disturbances have a negative influence on tourism earnings.

Reduced forms of equations

Using the estimated values of the parametric coefficients, one can obtain the reduced forms of equations for both tourist arrivals and tourism earnings. Although real income and price variables were not found to be highly significant, they were included in the reduced forms of equations, which are

$$TA = 40.89 + 0.75AY - 0.49P - 6.50D1 - 8.85D2 + 4.19D3 + 0.18TPE - 7.82T$$

$$TE = 5.58 + 0.11AY - 0.07P - 0.93D1 + 1.24D2 + 0.60D3 + 0.03TPE - 0.97T$$

Using these two equations, the estimated values of tourist arrivals and real tourism earnings for 1982-89 were obtained and compared with the respective actual values (Table 9 and Figures 5 and 6).

Table 9 Actual and estimated tourism arrivals and real tourism earnings

	Actual tourist arrivals ('000)	Estimated tourist arrivals ('000)	Actual real tourism earnings (vatu b)	Estimated real tourism earnings (vatu b)
1982	25.24	27.41	3.49	4.08
1983	27.36	23.93	3.60	3.73
1984	26.17	26.45	3.62	4.23
1985	18.89	25.63	2.98	4.29
1986	13.20	10.81	2.14	2.44
1987	9.20	11.67	1.87	2.72
1988	12.42	12.06	2.07	3.02
1989	17.46	21.82	2.76	4.51
1990	24.28	18.52	4.45	4.19

Figure 5 Estimated and actual values of tourist arrivals, 1982-90

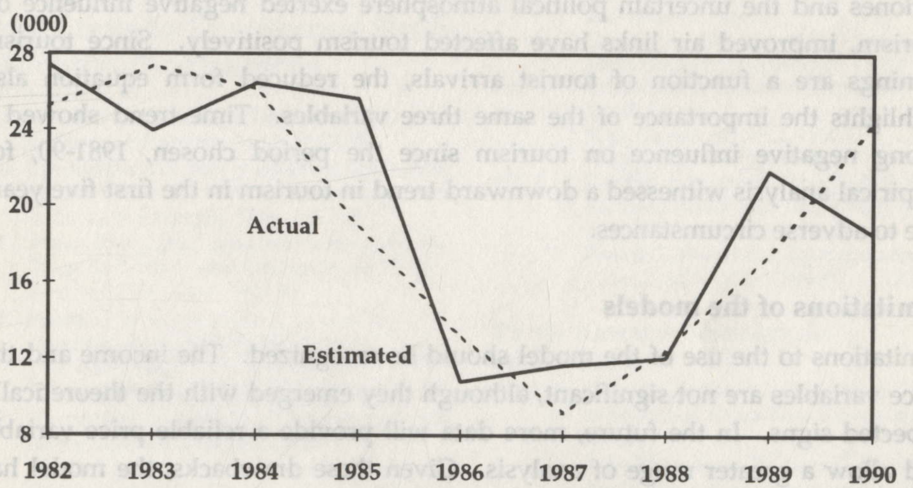
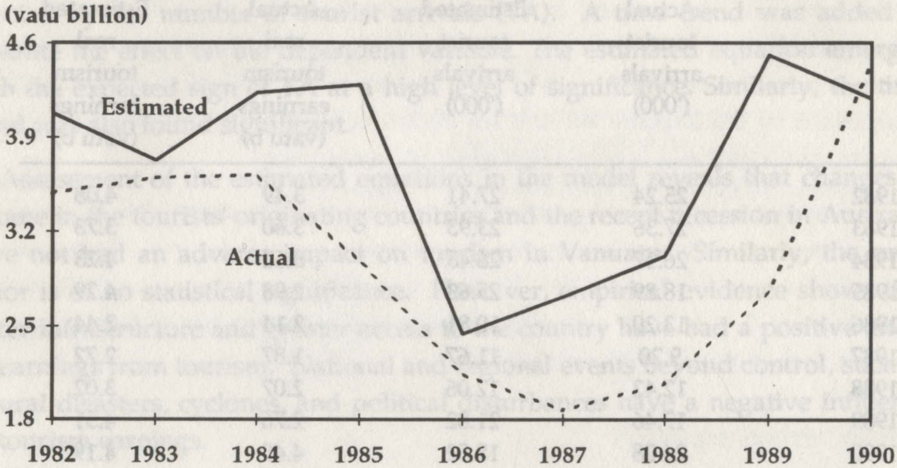


Figure 6 Estimated and actual values of real tourism, 1982-90



Determinants of tourism

The important determinants of tourist arrivals, as estimated in the model, are cyclones, political environment, and improved air access to Vanuatu. While cyclones and the uncertain political atmosphere exerted negative influence on tourism, improved air links have affected tourism positively. Since tourism earnings are a function of tourist arrivals, the reduced form equation also highlights the importance of the same three variables. Time trend showed a strong negative influence on tourism since the period chosen, 1981-90, for empirical analysis witnessed a downward trend in tourism in the first five years due to adverse circumstances.

Limitations of the models

Limitations to the use of the model should be recognized. The income and the price variables are not significant, although they emerged with the theoretically expected signs. In the future, more data will provide a reliable price variable and allow a greater range of analysis. Given these drawbacks, the model has emerged with an approximation of variables interacting in the tourism sector. With greater resources spent on data collection and processing supplemented by annual visitor surveys over the next five years, a more comprehensive model for planning and projection can be developed.

Conclusions

The following conclusions emerge from this empirical investigation.

- Investment in infrastructure needs to be stepped up, primarily in hotel/resort facilities which have a positive influence on tourism.
- Air access to Vanuatu is critical and must be improved.
- Natural disasters are beyond human control, but a peaceful socio-political environment will help nurture continued growth in the tourism industry.

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