Modelling International Tourism Demand and Uncertainty in Maldives and Seychelles: A Portfolio Approach

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Abstract:

Maldives and Seychelles in the Indian Ocean are small island tourism economies (SITEs), both of which have relatively small populations, territorial sizes, land area and narrow productive bases. The two SITEs are surrounded by vast ocean and have an overwhelming reliance on international tourism for economic development. Variations in international tourist arrivals to these 2 SITEs have been affected by unanticipated oil shocks, natural disasters, crime and global terrorism, among others. An accurate assessment of the variations in international tourist arrivals, particularly the conditional volatility, is essential for policy and marketing purposes. The conditional mean and conditional variance of the weekly international tourist arrivals to Maldives and Seychelles from 1 January 1994 to 31 December 2003 for the 5 main tourist source countries are modelled. Multivariate models of uncertainty are estimated and tested. An assessment and interpretation of the estimates are made for policy makers and tour operators to reach optimal decisions on the basis of a portfolio approach to international tourism demand. The paper assesses 4 sets of country spillover effects between Maldives and Seychelles, namely: (i) the own country effects for Maldives and Seychelles; (ii) the country spillover effects from the remaining four countries within each of Maldives and Seychelles; (iii) the own country spillover effects between Maldives and Seychelles; and (iv) the cross-country spillover effects between Maldives and Seychelles. The empirical results for both Maldives and Seychelles are discussed in terms of each of these components.

Keywords: Small island tourism economies; Weekly international tourist arrivals; Uncertainty; Conditional volatility; Country spillover effects

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1. Introduction

The sovereign archipelagos of Maldives and Seychelles in the Indian Ocean are small island tourism economies (SITEs), both of which have small populations and are geographically isolated from the rest of the world. These two SITEs vary profoundly in their territorial size, total land area, prospects for self-reliance in economic development, and an overwhelming reliance on tourism as a source of exports. As a result of time-varying effects, such as oil shocks, natural disasters, ethnic conflicts, crime, and the threat of global terrorism, among others, there have been dramatic changes in the arrivals of international tourists to these two countries. An examination of these variations in international tourism demand, particularly the conditional volatility (or uncertainty) in international tourist arrivals to Maldives and Seychelles, is essential for policy analysis and tourism marketing purposes.

Since Maldives and Seychelles are both situated in the Indian Ocean and approximately on the same latitudinal level, they share similar geographical and environmental characteristics. In Maldives, there are relatively many and smaller coral-based islands, as compared with relatively few and bigger islands in Seychelles. These islands were formed millions of years ago when the earth's crust moved over a hot spot below it, causing submarine volcanoes to erupt. A large proportion of tourists visit Maldives on package tours and spend their entire vacation on one island and in one resort accommodation, engaging mainly in scuba diving and water sports. In Seychelles, there are relatively more free independent travellers, there is self-catering tourist accommodation, and tourists evenly distribute their vacation in diving, water sports and touring the country. Overall, there is some contrast between the types of tourism products offered in these 2 SITEs.

However, due to the many similarities in the tourism products offered by these 2 SITEs, it is important for policy makers in these 2 SITEs, and tour operators who sell holidays to these 2 SITEs, to make an accurate assessment of how the variations in international tourist arrivals from a particular source country to Maldives affect international tourist arrivals from the same source country to Seychelles. Such multivariate analysis in international tourism demand does not seem to have been undertaken to date.

This paper models the conditional mean and conditional variance of the weekly international tourist arrivals to Maldives and Seychelles from 1 January 1994 to 31 December 2003 from the 5 main tourist source countries. A common constant conditional correlation model, namely the symmetric vector autoregressive moving average-generalized autoregressive conditional heteroscedasticty (VARMA-GARCH) model of Ling and McAleer (2003), is estimated and tested. An assessment and interpretation of the estimates is made to enable policy makers and tour operators to reach optimal decisions on the basis of a portfolio approach to international tourism demand.

The paper also makes an assessment of the country spillover effects between Maldives and Seychelles. There are four sets of effects that need to be considered: (i) the own country effects for Maldives and Seychelles; (ii) the country spillover effects from the remaining four countries within each of Maldives and Seychelles; (iii) the own country spillover effects between Maldives and Seychelles; and (iv) the cross-country spillover effects between Maldives and Seychelles. The empirical results for both Maldives and Seychelles will be discussed in terms of each of these components.

The structure of the paper is as follows. In Section 2 an overview of the Maldivian and Seychellois economies are presented. A discussion of the VARMA-GARCH model is given in Section 3. This is followed by an assessment of the characteristics of weekly international tourist arrivals data for Maldives and Seychelles in Section 4. An empirical examination and the implications of the results for policy and marketing purposes are suggested in Section 5. Some concluding remarks are given in Section 6.

2. Overview of the Maldivian and Seychellois Economies

2.1. Maldives

The Republic of Maldives was a former British protectorate, which became independent in 1965. It is an archipelago in the Indian Ocean, comprising 1,192 islands, of which 199 are inhabited and 87 designated as tourist resort islands. The Exclusive Economic Zone of Maldives is 859,000 square kilometres, and the aggregated land area is roughly 290 square

kilometres. The total population of Maldives was 298,842 in the 2005 census, and is estimated to have grown at 1.69 percent per annum over the period 2000 to 2005.

In spite of the small size, limited natural resource base, small population and remoteness, Maldives has shown an impressive economic growth record, averaging over 8% per annum during the 9 years preceding the December 2004 tsunami. This growth rate enabled Maldives to attain an estimated per capita GDP of US$2,401 in 2004, which is considerably above average for a small island developing country, which has an average per capita GDP of US$1,500. The engine of growth in Maldives has been the tourism industry, accounting for one-fifth of GDP, a third of fiscal revenue, and two-thirds of gross foreign exchange earnings in recent years.

The tourism industry of Maldives is unique because it is based on the *one-island, one-resort* concept. Owing to this particular feature, the country has become one of the most popular holiday destinations in the world. The first tourists to Maldives arrived from Italy in 1972, comprising writers, photographers and journalists. Since then Maldives' tourism has been growing rapidly, and in 2004 total international tourist arrivals reached 616,716. Nevertheless, due to the December 2004 tsunami the number of international tourist arrivals declined by 36% to 395,320. Despite this catastrophic incident, the tourism industry has recovered substantially by reaching the pre-tsunami capacity utilization rates without having to revise the price of the tourism product offered. Tourism in Maldives is seasonal and its peak tourist season coincides with the European winter months. Over 80% of tourists to Maldives are Europeans, and the biggest emerging tourism market is Russia. The main tourism source countries are Italy, Germany, UK, Japan, France, Switzerland, Austria, Netherlands, Spain, and Russia. While there are relatively few scheduled flights to Maldives, the majority of inbound air traffic is non–stop charter flights from major European cities.

The fisheries sector remains the largest sector in terms of employment, accounting for about one-quarter of the labour force. It is still an important source of foreign exchange earnings. Due to the high salinity content in the soil, agriculture continues to play a minor role. The government, which employs about 20 percent of the labour force, plays a

dominant role in the economy, both in the production process and through its regulation of the economy.

2.2. Seychelles

Since independence from the UK in 1976, per capita output in this Indian Ocean archipelago has expanded roughly seven times, from US$1,000 per capita in 1976 to US$7,600 today. GDP growth in 2001 was 3.3 per cent. Growth has been led by the tourism sector, which accounts for about 13 per cent of GDP, employs about 30 per cent of the labour force, and provides more than 70 per cent of foreign currency earnings. The vulnerability of the tourist sector was illustrated by the sharp drop in 1991-92, mainly due to the Gulf War. Although the industry has rebounded, the government recognizes the continuing need for upgrading the sector in the face of stiff international competition. Tourist arrivals, which are one of the main indicators of vitality in the sector, grew by 4.1 per cent in 2000.

A strong marketing effort by the Seychelles Tourism Marketing Authority and the introduction of several new five-star hotels seems to have spurred the growth. Officials hoped that the planned new hotels and expanded airline service to the island would help offset the possibility of reduced global travel following the events of 11 September 2001. In 2003, tourism earnings accounted for US$680 million and 122,000 visitors, comprising 82 per cent from UK, Italy, France, Germany and Switzerland. Any decline in tourism quickly translates into a fall in GDP, a decline in foreign exchange receipts, and budgetary difficulties. However, the country's economy is extremely vulnerable to external shocks.

Seychelles not only depends on tourism, but it imports more than 90 per cent of its total primary and secondary production inputs. The manufacturing and construction sectors, including industrial fishing, accounted for about 28.8 per cent of GDP. The public sector, comprising government and state-owned enterprises, dominates the economy in terms of employment (two-thirds of the labour force) and gross revenue. Public consumption absorbs over one-third of the gross GDP. Industrial fishing in Seychelles, notably tuna fishing, is an increasingly significant factor in the economy. Recent changes in the climate have greatly affected the tuna industry due to widespread mobility of tuna schools.

In 1995, Seychelles saw the privatization of the Seychelles Tuna Canning Factory, 60 per cent of which was purchased by the American food company, Heinz Inc. Other industrial activities are limited to small scale manufacturing, particularly agro-processing and import substitution. Despite attempts to improve its agricultural base and emphasize locally manufactured products and indigenous materials, Seychelles continues to import 90 per cent of consumption goods. The exceptions are some fruits and vegetables, fish, poultry, pork, beer, cigarettes, paint, and a few locally-made plastic items.

3. Models of Conditional Volatility

The empirical analysis presented in this paper is based on Engle's (1982) development of time-varying volatility (or uncertainty), using the autoregressive conditional heteroscedasticity (ARCH) model, and subsequent developments associated with the ARCH family of models (see, for example, the review by Li, Ling and McAleer (2002)). Numerous theoretical developments have been suggested by Wong and Li (1997), Hoti, Chan and McAleer (2002), and Ling and McAleer (2002a, 2002b, 2003). In McAleer (2005), an extensive comparison of univariate and multivariate conditional volatility models, including a discussion of the regularity conditions required for sensible empirical practice, is presented.

A common constant conditional correlation model is the symmetric VARMA-GARCH model of Ling and McAleer (2003). This model allows the analysis of volatility spillovers of international tourist arrivals from a common tourist source country across Maldives and Seychelles, and is estimated using weekly international tourist arrivals.

Consider the following specification for weekly international tourist arrivals, y_t, from a single tourist source country, for either Maldives or Seychelles:

$$\begin{aligned} y_t &= E\left(y_t \mid \Im_{t-1}\right) + \varepsilon_t, \qquad t = 1,\ldots,n \\ \varepsilon_t &= D_t \eta_t \end{aligned} \tag{1}$$

where $y_t = (y_{1t},...,y_{mt})'$ measures weekly international tourist arrivals to Maldives and Seychelles; $\eta_t = (\eta_{1t},...,\eta_{mt})'$ is a sequence of independently and identically distributed (*iid*) random vectors that is obtained from standardising the shocks to weekly international tourist arrivals, ε_t, using the standardisation $D_t = diag(h_{1t}^{1/2},...,h_{mt}^{1/2})$, where h_t is conditioned on (that is, determined by) historical data, as discussed below; $\Im_t$ is the historical information at time *t* that is available to tourists, tourist service providers and policy makers; $m\,(=10)$ is the number of weekly data series, namely weekly international tourist arrivals from 5 main tourist source countries common to Maldives and Seychelles, respectively; and $t = 1,...,522$ weekly observations during the period January 1994 to December 2003.

Bollerslev's (1990) constant conditional correlation (CCC) GARCH model assumes that the conditional variance of the shocks to the 10 data series i, $i = 1,...,m$, follows a univariate GARCH(*r,s*) process, that is,

$$h_{it} = \omega_i + \sum_{l=1}^{r} \alpha_{il} \varepsilon_{it-l}^2 + \sum_{l=1}^{s} \beta_{il} h_{it-l} \qquad (2)$$

where α_{il} represents the ARCH effects, or the short run persistence of shocks (namely, an indication of the strength of the shocks in the short run) to tourism growth, and β_{il} represents the GARCH effects, or the contribution of such shocks to long run persistence (namely, an indication of the strength of the shocks in the long run). This model assumes the independence of conditional variances, and hence no spillovers in volatility, across the 10 data series. It is important to note that Γ is the matrix of constant conditional correlations of standardized shocks to tourism growth, with the typical element of Γ being given by $\rho_{ij} = \rho_{ji}$ for $i, j = 1,...,m$. Therefore, multivariate effects across the 10 data series are determined solely through the constant conditional correlation matrix.

As an extension of (2) to incorporate the effects of shocks across the weekly international tourist arrivals from a common tourist source country to Maldives and Seychelles, and hence spillover effects in uncertainty across the 10 data series, it is necessary to define h_{it} on the basis of past information from ε_{it}, ε_{jt}, h_{it} and h_{jt} for $i, j = 1,...,m$, $i \neq j$. Thus, the multivariate asymmetric VARMA-GARCH model of Ling and McAleer (2003) is defined by (3) and (4). Equation (3) gives the multivariate conditional mean, while the multivariate conditional variance is given in (4):

$$\Phi(L)(Y_t - \mu) = \Psi(L)\varepsilon_t \tag{3}$$

$$\begin{aligned} \varepsilon_t &= D_t \eta_t \\ H_t &= W + \sum_{l=1}^{r} A_l \vec{\varepsilon}_t + \sum_{l=1}^{s} B_l H_{t-l} \end{aligned} \tag{4}$$

where $D_t = diag(h_{1t}^{1/2},...,h_{mt}^{1/2})$, $H_t = (h_{1t},.....,h_{mt})'$, $\vec{\varepsilon}_t = (\varepsilon_{1t}^2,...,\varepsilon_{mt}^2)'$, and A_l, and B_l are matrices with typical elements α_{ij} and β_{ij}, respectively. The conditional mean in (3) is expressed as an ARMA process. However, for purposes of this study, the conditional mean for a weekly international tourist arrivals series, *i*, is given as an AR(1) or AR(2) process. Therefore the conditional mean is estimated such that $y_{it} = \theta_{0i} + \theta_{1i} y_{it-1} + \theta_{2i} y_{it-2} + \varepsilon_{it}$, where θ_{0i} is the constant of the AR(1) process and θ_{1i} and θ_{2i} are the autoregressive coefficients. The order of autoregression is determined though the Akaike Information Criterion and the Schwarz Bayesian Information Criterion.

4. Data Characteristics

In this paper, weekly international tourist arrivals data, provided by the Ministry of Tourism of Maldives and National Statistical Bureau of Seychelles for the five main European tourist source countries during the period 1 January 1994 to 31 December 2003, are examined. As shown in Table 1, the five main European tourist source countries for Maldives in descending order are Italy, Germany, UK France and Switzerland, and

accounts for 65% of total international tourist arrivals during the sample period. For Seychelles in the same order the five main tourist source countries are France, Germany, Italy, UK and Switzerland, which constitute 66% of total international tourist arrivals during the same period.

An initial assessment of the respective series for unit root test for stationarity using the Phillips-Perron procedure, with truncated lags of order 5 for each of the ten series in levels, rejects the null hypothesis that there is a unit root in the series at the 1% level of significance. Visual examination of the ten data series reveals that there is strong seasonality presented in European tourist arrivals to Maldives and Seychelles, where the peak tourist season overlaps with the European winter. Furthermore, European tourist arrivals in Maldives show that there are strong positive trends, owing to the expansion of capacity in the tourism industry of Maldives. However, in the case of Seychelles, there are no strong trends present in the data.

5. Empirical Analysis

The univariate VARMA(p,q)-GARCH(1,1) model is used to estimate the spillover effects of weekly international tourist arrivals over the period 1994-2003, for the five main European tourist source countries from and within Maldives and Seychelles. Tables 2 and 3 present the empirical results for the different conditional means, and also displays the spillover effects for the respective time series.

All the estimates in this paper are obtained using the EViews 4.1 econometric software package. The Berndt, Hall, Hall and Hausman (BHHH) (1974) algorithm has been used in most cases, but the Marquardt algorithm is used when the BHHH algorithm does not converge. Several different sets of initial values have been used in each case, but do not lead to substantial differences in the estimates. The asymptotic and robust t-ratios (see Bollerslev and Wooldridge (1992) for the derivation of the robust standard errors) for the Quasi-Maximum Likelihood Estimates (QMLE) are reported in Tables 2 and 3. There are 3 entries for each estimate, namely the coefficient (in bold), the Bollerslev-Wooldridge (1992) robust t-ratio, and the asymptotic t-ratio. In general, the robust t-ratios are smaller in absolute value than their asymptotic counterparts.

In examining the country spillover effects between Maldives and Seychelles, there are four sets of effects that need to be considered: (i) the own country effects for Maldives and Seychelles; (ii) the country spillover effects from the remaining four countries within each of Maldives and Seychelles; (iii) the own country spillover effects between Maldives and Seychelles; and (iv) the cross-country spillover effects between Maldives and Seychelles.

The empirical results for both Maldives and Seychelles will be discussed in terms of each of these components.

5.1. Maldives

(i) Own-country effects

The magnitudes of the long run own-country effects are greater than the short run country effects. The short run and long run own country effects of the 5 main European tourist source countries to Maldives are generally very reasonable and are statistically significant, except for the long run own country effect of Italy.

(ii) Country spillover effects from four countries

There is little evidence to suggest that there are country spillover effects from the remaining four countries within Maldives. However, the estimates are generally reasonable.

(iii) Own-country spillover effects

The own-country spillover effects of weekly tourist arrivals from the same 5 source countries in Seychelles that affect tourist arrivals in Maldives are mixed, and there are some unreasonable estimates. However, the short run own country spillover effect of German tourist arrivals in Seychelles is twice that of the own effect of German tourist arrivals to Maldives. Conversely, the short run cross country spillover effect of French tourist arrivals in Seychelles is half that of the own country effect of French tourist arrivals

to Maldives. These results are indicative of the strong influence of German and French tourist arrivals to these two SITEs in the short term.

(iv) Cross-country spillover effects

There is evidence to suggest that there are cross country spillover effects from Seychelles to Maldives, and vice-versa. Overall, the spillover effects from Seychelles to Maldives are greater than the spillover effects from Maldives to Seychelles.

5.2. Seychelles

(i) Own-country effects

In the case of Seychelles, the absolute values of the long run own country effects are greater than the short run own country effects. Moreover, the short run and long run own country effects of the 5 main European tourist source countries to Seychelles are also satisfactory and statistically significant.

(ii) Country spillover effects from four countries

In Seychelles there are not many country spillover effects from the remaining four countries. Nevertheless, the estimates are of a reasonable order of magnitude.

(iii) Own-country spillover effects

The own country spillover effects of weekly tourist arrivals from the same 5 source countries in Maldives that affect tourist arrivals in the Seychelles are mixed, and the orders of magnitude of some of the estimates are unsatisfactory. However, the short run and long run own country spillover effect of German and British tourist arrivals in Seychelles is statistically significant. Furthermore, the long run own country spillover effect of Switzerland is also statistically significant. These results are indicative of the strong influence of German and French tourist arrivals, both in the short and long run, and British tourist arrivals in the long run, to these two SITEs.

(iv) Cross-country spillover effects

The estimates for the cross-country spillover effects are mixed, and it is reasonable to suggest that there is little or no spillover effect from Maldives to Seychelles. In general, the spillover effects from Maldives to Seychelles are greater than the own country spillover effects of Seychelles.

6. Conclusion

Maldives and Seychelles are SITEs in the Indian Ocean with very similar climatic characteristics. Tourism is the principal economic activity as a proportion of their exports, and hence is the key foreign exchange earner in these two economies. There are many similarities in the tourism products offered by these 2 SITEs. Variations in international tourist arrivals due to exogenous shocks that are beyond the control of these two economies have serious ramifications for every sector in these two SITEs.

An examination of the variations in international tourism demand, particularly the conditional volatility (or uncertainty) in international tourist arrivals to Maldives and Seychelles, is essential for policy analysis and tourism marketing purposes. It is important for policy makers in these 2 SITEs and tour operators who sell holidays to these 2 SITEs to make an accurate assessment about how the variations in international tourist arrivals from a particular source country to Maldives affect international tourist arrivals from the same source country to Seychelles. Such a multivariate analysis in international tourism demand does not seem to have been undertaken to date.

The paper assessed the country spillover effects of weekly international tourist arrivals between Maldives and Seychelles in terms of the own country effects, the country spillover effects from the remaining four countries, the own country spillover effects, and the cross-country spillover effects.

Of the four country spillover effects, the most important results for policy and marketing purposes are the own-country and cross-country spillover effects. The empirical results indicated that there was strong influence of German and French weekly tourist arrivals,

both in the short and long run, and particularly weekly British tourist arrivals in the long run, to these two SITEs.

The estimates for the cross-country spillover effects were mixed and were reasonable, which suggest that there were few or no spillover effects from Maldives to Seychelles. Overall, the spillover effects from Seychelles to Maldives were greater than the spillover effects from Maldives to Seychelles. This suggests that variations in weekly international tourist arrivals from Italy, Germany, UK, Japan, France, and Switzerland to Seychelles affect variations in international tourist arrivals to Maldives. However, the results do not indicate the directions in which the variations of weekly international tourist arrivals occur. For such an assessment, this research will be extended in future to incorporate the multivariate asymmetric VARMA-AGARCH model of Hoti, Chan and McAleer (2002).

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Figure 1: Weekly European Tourist Arrivals to Maldives and Seychelles, 1994-2003

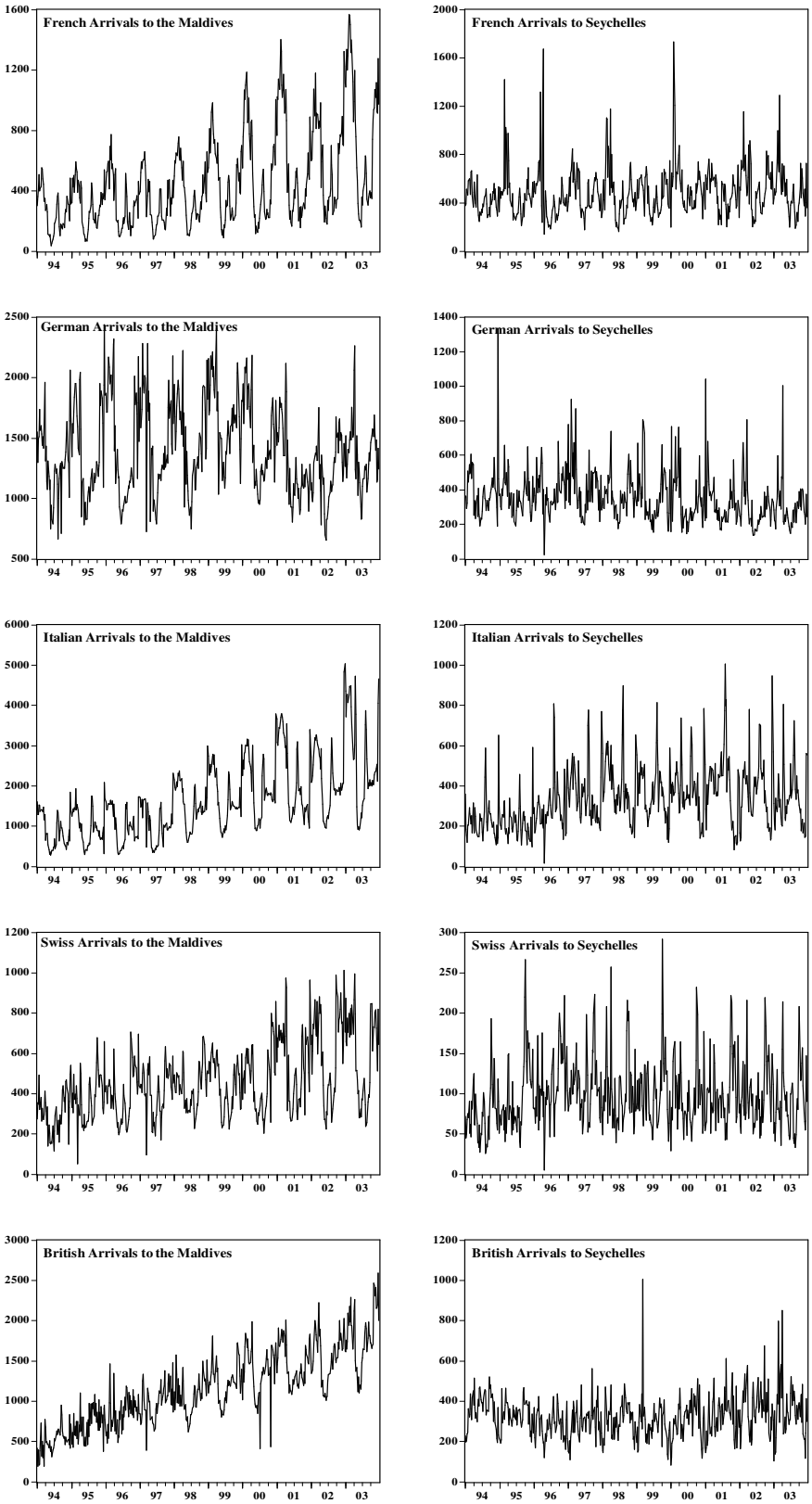

Table 1: Composition of Tourists to Maldives and Seychelles, 1994-2003

	MALDIVES			SEYCHELLES		
	Tourist Source	**Head Count**	**Proportion**	**Tourist Source**	**Head Count**	**Proportion**
1	**Italy**	983,433	**20.85**	**France**	255,379	**20.29**
2	**Germany**	803,420	**17.03**	**Germany**	185,286	**14.72**
3	**UK**	717,492	**15.21**	**Italy**	177,795	**14.12**
4	Japan	428,313	9.08	**UK**	172,757	**13.72**
5	**France**	284,794	**6.04**	**Switzerland**	51,075	**4.06**
6	**Switzerland**	266,497	**5.65**	South Africa	48,302	3.84
7	Austria	131,383	2.78	Spain	36,460	2.90
8	Nether.	66,650	1.41	Scandinavia	31,815	2.53
9	Spain	57,051	1.21	Reunion	28,715	2.28
10	Russia	67,071	1.42	Mauritius	26,070	2.07
	Total	**4,717,744**	**80.68**	**Total**	**1,258,857**	**80.52**

Table 2: Spillover Effects within Maldives and from Seychelles

Tourist Source	Conditional Mean		CONDITIONAL VARIANCE																		
			Own Effects			Spillovers within Maldives								Spillovers from Seychelles							
France	**AR(1)**	**AR(2)**	ω	α_{FR}	β_{FR}	α_{GR_M}	β_{GR_M}	α_{IT_M}	β_{IT_M}	α_{SW_M}	β_{SW_M}	α_{UK_M}	β_{UK_M}	α_{FR_S}	β_{FR_S}	α_{GR_S}	β_{GR_S}	α_{IT_S}	β_{IT_S}	α_{SW_S}	β_{SW_S}	α_{UK_S}	β_{UK_S}
	0.71	**0.21**	**-2,105.63**	**0.08**	**0.83**	**-4.7E-03**	**-0.01**	**-4.7E-03**	**-4.7E-03**	**0.02**	**0.23**	**0.01**	**-0.02**	**0.01**	**-0.02**	**-0.02**	**0.01**	**0.21**	**-0.17**	**0.26**	**2.44**	**0.01**	**-0.01**
	13.51	4.12	-0.46	3.20	27.12	-1.98	-1.78	-0.38	-0.09	0.42	2.03	1.02	-4.25	8.53	-7.22	-8.18	0.75	4.27	-4.03	1.32	0.56	0.45	-0.51
	8.66	2.37	-0.54	1.58	8.44	-1.06	-11.05	-0.32	-0.08	0.30	0.78	0.70	-0.44	2.27	-21.30	-0.38	0.15	2.73	-2.84	1.00	0.60	0.40	-0.39
Germany	**AR(1)**	**AR(2)**	ω	α_{GR}	β_{GR}	α_{FR_M}	β_{FR_M}	α_{IT_M}	β_{IT_M}	α_{SW_M}	β_{SW_M}	α_{UK_M}	β_{UK_M}	α_{FR_S}	β_{FR_S}	α_{GR_S}	β_{GR_S}	α_{IT_S}	β_{IT_S}	α_{SW_S}	β_{SW_S}	α_{UK_S}	β_{UK_S}
	0.50	**0.07**	**-28,368.38**	**0.12**	**0.68**	**0.18**	**-0.43**	**-0.01**	**-4.7E-03**	**0.11**	**0.09**	**-0.01**	**-0.37**	**0.10**	**-0.05**	**0.25**	**0.06**	**0.50**	**-0.41**	**-1.05**	**47.73**	**0.12**	**0.32**
	7.99	1.12	-3.44	2.56	7.92	0.86	-1.63	-0.92	-0.15	0.39	0.18	-0.20	-1.69	1.37	-0.62	0.99	0.25	2.02	-2.25	-0.68	45.70	0.43	0.55
	8.40	1.08	-1.30	2.09	8.77	1.82	-3.25	-1.64	-0.11	0.56	0.23	-0.80	-5.68	1.59	-1.29	1.88	0.40	2.43	-2.03	-0.98	2.26	1.06	0.83
Italy	**AR(1)**	**AR(2)**	ω	α_{IT}	β_{IT}	α_{FR_M}	β_{FR_M}	α_{GR_M}	β_{GR_M}	α_{SW_M}	β_{SW_M}	α_{UK_M}	β_{UK_M}	α_{FR_S}	β_{FR_S}	α_{GR_S}	β_{GR_S}	α_{IT_S}	β_{IT_S}	α_{SW_S}	β_{SW_S}	α_{UK_S}	β_{UK_S}
	0.95		**-72,747.83**	**0.25**	**-4.7E-03**	**0.30**	**-0.32**	**0.04**	**-0.22**	**0.27**	**2.92**	**0.03**	**3.28**	**-0.06**	**-0.17**	**0.23**	**-0.24**	**4.13**	**3.08**	**-2.76**	**-23.41**	**-0.18**	**1.61**
	12.60		-1.86	2.78	0.03	0.57	-0.46	0.33	-1.48	0.59	1.76	0.27	3.12	-2.29	-2.30	0.93	-0.68	11.36	2.95	-1.00	-1.07	-2.27	0.86
	17.28		-2.69	2.58	0.04	1.07	-0.41	0.75	-3.11	1.13	2.40	0.63	3.52	-21.01	-9.69	0.83	-3.20	4.20	2.71	-4.00	-2.36	-2.47	1.58
Switz.	**AR(1)**	**AR(2)**	ω	α_{SW}	β_{SW}	α_{FR_M}	β_{FR_M}	α_{GR_M}	β_{GR_M}	α_{IT_M}	β_{IT_M}	α_{UK_M}	β_{UK_M}	α_{FR_S}	β_{FR_S}	α_{GR_S}	β_{GR_S}	α_{IT_S}	β_{IT_S}	α_{SW_S}	β_{SW_S}	α_{UK_S}	β_{UK_S}
	0.60	**0.22**	**4,147.21**	**0.09**	**0.81**	**-0.06**	**0.12**	**0.01**	**-0.03**	**0.01**	**-0.01**	**0.01**	**-0.07**	**0.02**	**-0.02**	**-0.01**	**0.01**	**0.08**	**-0.06**	**-0.07**	**-0.19**	**-4.7E-03**	**-4.7E-03**
	8.52	3.06	0.55	1.80	10.46	-1.71	2.28	1.21	-1.84	0.64	-1.09	1.51	-55.38	1.46	-1.97	-0.81	0.94	1.05	-0.87	-0.19	-0.03	-0.08	0.01
	11.84	5.00	1.57	3.46	15.90	-2.65	3.01	1.85	-2.64	2.73	-3.46	1.43	-4.33	1.37	-1.53	-1.81	2.01	2.16	-1.86	-0.35	-0.07	-0.36	0.02
UK	**AR(1)**	**AR(2)**	ω	α_{UK}	β_{UK}	α_{FR_M}	β_{FR_M}	α_{GR_M}	β_{GR_M}	α_{IT_M}	β_{IT_M}	α_{SW_M}	β_{SW_M}	α_{FR_S}	β_{FR_S}	α_{GR_S}	β_{GR_S}	α_{IT_S}	β_{IT_S}	α_{SW_S}	β_{SW_S}	α_{UK_S}	β_{UK_S}
	0.53	**0.41**	**22,127.04**	**0.11**	**0.75**	**0.15**	**0.15**	**-0.01**	**-0.03**	**-0.02**	**-4.7E-03**	**0.17**	**-0.42**	**0.05**	**-0.06**	**0.22**	**-0.09**	**0.13**	**-0.16**	**1.56**	**-13.33**	**-0.08**	**-0.04**
	11.23	8.93	1.58	2.90	11.03	1.64	1.02	-0.72	-1.09	-2.29	0.82	1.28	-1.46	1.00	-2.08	1.41	-0.77	1.46	-1.95	1.79	-0.97	-0.88	-0.35
	11.12	8.63	10.19	3.28	11.16	1.00	0.80	-0.60	-1.45	-1.97	0.82	0.76	-1.10	1.06	-1.74	1.94	-1.08	1.60	-2.07	1.28	-46.13	-1.29	-0.34

Note: The three entries corresponding to each parameter are their estimates (in bold), their asymptotic t-ratios, and the Bollerslev and Wooldridge (1992) robust t-ratios, respectively.

Table 3: Spillover Effects within Seychelles and from Maldives

Tourist Source	Conditional Mean		CONDITIONAL VARIANCE																			
			Own Effects			Spillovers within Seychelles								Spillovers from Maldivess									
France	**AR(1)**	**AR(2)**	ω	α_{FR}	β_{FR}	α_{GR_S}	β_{GR_S}	α_{IT_S}	β_{IT_S}	α_{SW_S}	β_{SW_S}	α_{UK_S}	β_{UK_S}	α_{FR_M}	β_{FR_M}	α_{GR_M}	β_{GR_M}	α_{IT_M}	β_{IT_M}	α_{SW_M}	β_{SW_M}	α_{UK_M}	β_{UK_M}
	0.27		**4,810.69**	**0.21**	**0.54**	**-0.02**	**0.16**	**0.05**	**-0.05**	**0.05**	**-3.17**	**0.03**	**-0.01**	**-0.01**	**0.18**	**-0.01**	**-0.04**	**-0.01**	**-4.7E-03**	**0.07**	**0.07**	**0.11**	**-0.03**
	4.44		2.68	3.29	5.59	-2.74	2.75	1.30	-1.39	0.08	-0.97	0.39	-0.03	-0.11	1.65	-0.46	-1.83	-1.20	-0.11	0.69	0.33	2.80	-0.25
	5.06		0.71	3.67	9.51	-2.10	2.26	2.59	-12.35	0.18	-0.50	0.58	-0.05	-0.16	1.77	-2.00	-3.57	-2.12	-0.19	1.17	0.55	4.13	-0.34
Germany	**AR(1)**	**AR(2)**	ω	α_{GR}	β_{GR}	α_{FR_S}	β_{FR_S}	α_{IT_S}	β_{IT_S}	α_{SW_S}	β_{SW_S}	α_{UK_S}	β_{UK_S}	α_{FR_M}	β_{FR_M}	α_{GR_M}	β_{GR_M}	α_{IT_M}	β_{IT_M}	α_{SW_M}	β_{SW_M}	α_{UK_M}	β_{UK_M}
	0.17	**0.13**	**-3,496.44**	**0.08**	**0.64**	**0.03**	**-0.01**	**0.07**	**-0.06**	**-0.53**	**13.21**	**0.05**	**-0.17**	**0.04**	**-0.11**	**0.05**	**-0.07**	**-0.01**	**-4.7E-03**	**0.09**	**0.06**	**-0.01**	**-0.09**
	2.26	1.67	-0.74	1.19	4.34	1.50	-1.46	1.01	-0.92	-1.14	3.92	1.07	-1.84	0.73	-1.41	3.71	-4.34	-2.98	2.07	0.84	0.22	-0.67	-0.76
	3.41	2.67	-0.54	2.21	5.52	1.55	-1.02	1.74	-1.40	-1.55	2.46	0.54	-2.49	1.10	-1.76	2.43	-4.06	-5.72	4.06	2.27	0.38	-1.66	-1.42
Italy	**AR(1)**	**AR(2)**	ω	α_{IT}	β_{IT}	α_{FR_S}	β_{FR_S}	α_{GR_S}	β_{GR_S}	α_{SW_S}	β_{SW_S}	α_{UK_S}	β_{UK_S}	α_{FR_M}	β_{FR_M}	α_{GR_M}	β_{GR_M}	α_{IT_M}	β_{IT_M}	α_{SW_M}	β_{SW_M}	α_{UK_M}	β_{UK_M}
	0.56	**-0.11**	**56.81**	**0.27**	**0.31**	**-4.7E-03**	**0.01**	**0.04**	**-0.05**	**-0.77**	**10.30**	**-0.04**	**0.07**	**0.08**	**-0.10**	**0.01**	**-4.7E-03**	**-4.7E-03**	**-4.7E-03**	**-0.04**	**0.17**	**-4.7E-03**	**0.02**
	6.14	-1.31	0.00	1.66	1.00	-0.11	0.27	0.67	-0.72	-0.95	0.84	-0.64	0.21	0.69	-0.45	0.30	-0.03	0.04	-0.71	-0.45	0.49	0.08	0.28
	10.26	-2.07	0.01	3.40	2.81	-0.29	0.39	0.77	-1.88	-2.57	1.65	-3.34	1.02	1.26	-1.12	0.58	-0.08	0.11	-5.99	-1.18	1.26	0.17	0.11
Switz.	**AR(1)**	**AR(2)**	ω	α_{SW}	β_{SW}	α_{FR_S}	β_{FR_S}	α_{GR_S}	β_{GR_S}	α_{IT_S}	β_{IT_S}	α_{UK_S}	β_{UK_S}	α_{FR_M}	β_{FR_M}	α_{GR_M}	β_{GR_M}	α_{IT_M}	β_{IT_M}	α_{SW_M}	β_{SW_M}	α_{UK_M}	β_{UK_M}
	0.26	**-0.14**	**697.29**	**0.05**	**0.58**	**-4.7E-03**	**-4.7E-03**	**-4.7E-03**	**-4.7E-03**	**-0.01**	**-4.7E-03**	**0.01**	**-0.01**	**-4.7E-03**	**-0.01**	**-4.7E-03**	**-4.7E-03**	**-4.7E-03**	**-4.7E-03**	**-4.7E-03**	**-0.01**	**-4.7E-03**	**-4.7E-03**
	4.94	-2.80	2.65	1.12	4.05	2.42	-1.34	-0.34	0.22	-3.72	0.10	1.87	-1.56	0.02	-0.93	1.02	-2.83	1.05	-0.11	0.52	-1.28	-0.41	0.31
	5.30	-3.10	9.35	1.37	77.34	2.18	-2.08	-2.62	0.98	-18.66	0.18	2.59	-3.06	0.04	-1.73	1.96	-4.24	3.89	-0.19	1.33	-8.15	-0.81	1.30
UK	**AR(1)**	**AR(2)**	ω	α_{UK}	β_{UK}	α_{FR_S}	β_{FR_S}	α_{GR_S}	β_{GR_S}	α_{IT_S}	β_{IT_S}	α_{UK_S}	β_{UK_S}	α_{FR_M}	β_{FR_M}	α_{GR_M}	β_{GR_M}	α_{IT_M}	β_{IT_M}	α_{SW_M}	β_{SW_M}	α_{UK_M}	β_{UK_M}
	0.29	**0.10**	**847.16**	**0.12**	**0.74**	**0.02**	**-0.02**	**-0.01**	**0.01**	**0.01**	**-4.7E-03**	**-0.13**	**1.48**	**-0.01**	**0.13**	**-4.7E-03**	**0.01**	**-4.7E-03**	**-4.7E-03**	**-0.05**	**0.02**	**0.02**	**-0.08**
	4.33	1.47	0.18	1.76	7.43	1.32	-2.42	-0.96	0.98	0.36	0.10	-0.75	0.33	-0.29	1.91	-0.65	0.73	0.60	-1.04	-1.63	0.29	1.63	-1.82
	5.33	1.84	0.44	2.69	14.87	4.86	-14.06	-4.96	1.16	0.50	0.16	-0.82	0.80	-0.52	3.05	-1.78	1.28	1.55	-4.24	-4.05	0.63	2.70	-2.48

Note: The three entries corresponding to each parameter are their estimates (in bold), their asymptotic t-ratios, and the Bollerslev and Wooldridge (1992) robust t-ratios, respectively.