Foreword

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This monograph analyses the conditional volatility in two data series, specifically the monthly international tourist arrivals to seven Small Island Tourism Economies (SITEs), namely Barbados, Cyprus, Dominica, Fiji, Maldives, Malta and Seychelles, and the monthly risk returns for six separate SITEs, namely the Bahamas, Cyprus, Dominican Republic, Haiti, Jamaica, and Malta. These two series exhibit distinct seasonal patterns and positive trends. Moreover, the conditional volatilities have increased rapidly for extended periods, and stabilised thereafter. Most importantly, there have been increasing variations in monthly international tourist arrivals and country risk returns in SITEs for extended periods, with subsequently dampened variations. Such fluctuating variations over time are interpreted as the conditional volatility in tourist arrivals and risk returns, respectively, and can be modelled using modern financial econometric time series techniques.

The authors have identified several reasons why it is crucial to model and forecast the uncertainty or volatility in international tourist arrivals. First, governments as well as tour operators need to examine the underlying uncertainty that is intrinsic to the total numbers, as well as in the growth rate, of monthly international tourist arrivals, and country risk ratings and risk returns. Second, in the literature it is widely believed that the forecast confidence intervals are time varying. Therefore, more accurate confidence intervals can be obtained by modelling the conditional variance of the errors. Finally, if the heteroscedasticity in the errors is examined carefully and is dealt with accurately, more efficient estimators for the parameters in the conditional mean can be obtained.

Fluctuating variations, or conditional volatility, in international monthly tourist arrivals and country risk returns are typically associated with unanticipated events. There are time-varying effects related to SITEs, such as natural disasters, ethnic conflicts, crime, the threat of terrorism and business cycles in tourist source countries, among many others, which cause variations in monthly international tourist arrivals and country risk returns. Owing to the nature of these events, recovery from variations in monthly international tourist arrivals and risk returns from unanticipated events may take longer for

some countries than for others. These time-varying effects may not necessarily exist within SITEs, but may be intrinsic to the tourist source countries as well as other external factors, such as oil prices which affect risk returns.

This monograph shows how the generalised autoregressive conditional heteroskedasticity (GARCH) model can be used to measure the conditional volatility in monthly international tourist arrivals and country risk returns to seven SITEs. It is, for example, possible to measure the extent to which the 1991 Gulf War influenced variations in monthly international tourist arrivals and risk returns in Cyprus, and to what extent the *coups d'état* of 1987 and 2000 affected subsequent monthly international tourist arrivals to Fiji.

An awareness of the conditional volatility inherent in monthly international tourist arrivals, risk returns and techniques for modelling such volatility are vital for a critical analysis of SITEs, which depend heavily on earnings from tourism for their macroeconomic stability. The information that can be ascertained from these models about the volatility in monthly international tourist arrivals and risk returns is crucial for policy-makers, as such information would enable them to instigate policies regarding income, bilateral exchange rates, employment, government revenue, and so forth. Such information is also crucial for decision makers in the private sector, as it would enable them to alter their operations according to fluctuations in volatility.

Chapter 2 evaluates the common characteristics which impinge on SITEs and the implications of sustainable economic prosperity. These economies are relatively small in size and have small populations. They are all islands surrounded by very delicate ecosystems, and have an overwhelming reliance on international tourism for economic development. In analysing the common attributes of these economies, the main attributes which form the acronym SITE are examined in detail. Moreover, their geographical location, economic features, social indicators, political attributes, vulnerability and numerous other important characteristics are analysed in view of their implications for the economic well-being of these isolated locations.

In Chapter 4 the main economic activities and their prominence in the economic well-being of SITEs are examined. Based on the available data, the compositions of international tourists who visit six of these SITEs are analysed. The principal tourist source countries are from the G7 and the trends in tourism earnings in SITEs coincide with the economic cycles of these tourism source countries. Additionally, new and emerging source countries appear as globalisation and democratisation continue at current rates. The break-up of the former Soviet Union created new and relatively wealthy economies, which have also become new tourism sources to some SITEs.

The GARCH model is well established in the financial economics and econometrics literature. After the initial development by Engle (1982), extensive theoretical developments regarding the structural and statistical properties of the model have evolved (for derivations of the regularity conditions and asymptotic properties of a wide variety of univariate and multivariate GARCH models see, for example, Ling and McAleer (2002a, b; 2003a, b) and McAleer (2005)). Wide-ranging applications of GARCH models include economic and financial time series data, such as share prices and returns, stock market indexes and returns, and intellectual property (especially patents), among others. Such widespread analysis has led to the GARCH model being at the forefront of estimating volatility in economic and financial time series.

This monograph introduces the concept of conditional volatility and uses the GARCH model to analyse monthly international tourist arrivals and country risk returns in SITEs. Moreover, GARCH is applied to model monthly international tourist arrivals and risk returns in SITEs, which rely overwhelmingly on tourism as a primary source of export revenue. Such research would be expected to make a significant contribution to the existing tourism research literature, as tourism research on the volatility of monthly international tourist arrivals would appear to be very limited.

Chapter 3 reviews 53 published empirical studies on tourism demand analysis between 1989 and 2003. The purpose of this survey is to analyse the empirical literature on tourism demand pertaining to small island tourism economies, of which there have only been ten such published papers. As a result, the aim of the chapter is also to introduce recent developments in the empirical literature on international tourism demand and to evaluate the significance of the modelling process in leading journals in tourism, applied economics and forecasting, since 1995. There is evidence from this review that there is a dearth of applications of conditional volatility models in tourism research.

The GARCH model is appealing because both the conditional mean, which is used to capture the trends and growth rates in international tourism arrivals, and the conditional variance, which is used to capture deviations from the mean monthly international tourist arrivals, can be estimated simultaneously. Consequently, the parameter estimates of both the conditional mean and the conditional variance can be obtained jointly for purposes of statistical inference.

In Chapter 5, an extensive review of the theoretical developments and structural properties in the GARCH literature, and the implications of constant conditional correlations of the standardised shocks of the conditional variance for tourism planning and promotion, are addressed.

In Chapter 6 the uncertainty in monthly international tourist arrivals from

the eight major tourist source countries to the Maldives is modelled. Maldives is probably the only SITE which relies entirely on tourism for the economic well-being of the nation. Tourism accounts for a substantial proportion of foreign exchange earnings, which enables importation of consumer as well as capital goods for economic development. Moreover, tourism provides a significant share of government revenue, and therefore is a key determinant of development expenditure. Tourism also provides employment for a considerable proportion of the workforce in SITEs where there is abundant low-skilled labour. Risk ratings and risk returns of six SITEs, namely the Bahamas, Cyprus, Dominican Republic, Haiti, Jamaica and Malta, are considered in Chapter 7, these being the only SITEs for which monthly International Country Risk Guide (ICRG) risk ratings and risk returns are available.

The main contributions of this monograph are as follows. First, the importance of conditional volatility in monthly international tourist arrivals and country risk returns is examined and modelled, and the macroeconomic implications for SITEs are appraised. The main reason for this examination is because, if heteroscedasticity exists in the data generating process, there are numerous ramifications for tourism and country risk analysis. If heteroscedasticity exists, then it should be explicitly accommodated in order to address a variety of issues, such as uncertainty surrounding tourist arrivals and country risk ratings. Second, the conditional volatilities are estimated, and an economic interpretation from the estimated results is provided. In achieving these two objectives, the monograph presents an extensive assessment of the important characteristics and the impact of tourism in small island economies in relation to their gross domestic product, balance of payments, employment, and foreign direct investment, among other factors. The monograph also critically examines the literature on empirical tourism demand and country risk analysis, and introduces and applies conditional volatility models to tourism demand and country risk.

An important aspect to be examined empirically is the effects of positive and negative shocks in monthly international tourism arrivals and risk returns, which may have different effects on the volatility in these two data generating processes. For this reason, two popular univariate models of conditional volatility, namely the Generalised Autoregressive Conditional Heteroscedasticity (GARCH) model of Engle (1982) and Bollerslev (1986), and the asymmetric GJR model of Glosten, Jagannathan and Runkle (1992), are estimated and compared.

In Chapter 8, the important issues that are addressed in this monograph and the major findings of this research are summarised. The monograph concludes with a discussion of some issues that are likely to be useful for further research.

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