Modelling and forecasting tourism from East Asia to Thailand under temporal and spatial aggregation

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Abstract

Tourism is one of the key service industries in Thailand, with a 5.27% share of Gross Domestic Product in 2003. Since 2000, international tourist arrivals, particularly those from East Asia, to Thailand have been on a continuous upward trend. Tourism forecasts can be made based on previous observations, so that historical analysis of tourist arrivals can provide a useful understanding of inbound trips and the behaviour of trends in foreign tourist arrivals to Thailand. As tourism is seasonal, a good forecast is required for stakeholders in the industry to manage risk. Previous research on tourism forecasts has typically been based on annual and monthly data analysis, while few past empirical tourism studies using the Box–Jenkins approach have taken account of pre-testing for seasonal unit roots based on Franses [P.H. Franses, Seasonality, nonstationarity and the forecasting of monthly time series, International Journal of Forecasting 7 (1991) 199–208] and Beaulieu and Miron [J.J. Beaulieu, J.A. Miron, Seasonal unit roots in aggregate U.S. data, Journal of Econometrics 55 (1993) 305–328] framework. An analysis of the time series of tourism demand, specifically monthly tourist arrivals from six major countries in East Asia to Thailand, from January 1971 to December 2005 is examined. This paper analyses stationary and non-stationary tourist arrivals series by formally testing for the presence of unit roots and seasonal unit roots prior to estimation, model selection and forecasting. Various Box–Jenkins autoregressive integrated moving average (ARIMA) models and seasonal ARIMA models are estimated, with the tourist arrivals series showing seasonal patterns. The fitted ARIMA and seasonal ARIMA models forecast tourist arrivals from East Asia very well for the period 2006(1)–2008(1). Total monthly and annual forecasts can be obtained through temporal and spatial aggregation.
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1. Introduction

Thailand is one of Asia's most popular tourist destinations [7] provide an extensive discussion of the various studies that have been undertaken to assess international tourist perceptions of Thailand as a tourist destination. Lower real exchange rates (due to the lower inflation rate in Thailand, as compared with the origin, and/or the weaker Thai baht in terms of the origin currency) have made Thailand a very affordable destination. Additionally, Thailand is well known for its beautiful beaches, especially in the southern region, diverse cultural, historical and culinary attractions,

excellent shopping places, especially in Bangkok, and many world-class hotels and resorts, especially in Bangkok, Pattaya, Phuket and Chiang Mai.

East Asia, including the ASEAN countries of Brunei, Indonesia, Laos, Malaysia, the Philippines, Singapore and Vietnam, China, Hong Kong, Japan, Korea and Taiwan, are Thailand's major tourist markets, with a market share of 63.97% of the overall international tourist arrivals to Thailand in 2005. Indonesia, Japan, Korea, Malaysia, the Philippines and Singapore were the six major tourism source markets in East Asia to Thailand, with shares of 1.6%, 10.35%, 7.06%, 11.88%, 1.61% and 5.62% of total international tourist arrivals to Thailand in 2005, respectively [15,16]. The average annual growth rates during the period 1971–2005 were 10.6%, 10.7%, 27.2%, 8.3%, 10.2% and 13.0%, respectively.

In spite of the phenomenal growth in inbound tourism from these source markets, little research on these markets has been undertaken to evaluate their significant contributions to Thailand's inbound tourism industry. Most empirical research on tourism in Thailand has focused on domestic tourism. The primary aim of this paper is to undertake and incorporate an historical analysis of monthly seasonal variations of international tourist arrivals from East Asia to Thailand using time series from 1971 to 2005, and to forecast temporal and spatial tourist numbers to Thailand from 2006 to 2008.

This paper analyses the empirical results for evaluating changes in tourism trends. The Box–Jenkins univariate time series analysis is also applied to understand how the tourism time series from East Asia are generated. The remainder of the paper is structured as follows. Trends of tourists from East Asia to Thailand are explained in Section 2. Some theoretical and methodological issues are considered in Section 3. In Section 4, seasonal unit root tests and ARIMA time series models are estimated to analyze the alternative trending behaviour of tourism from East Asia. Forecasts of tourist arrivals from East Asia are given in Section 5, and some concluding remarks are provided in Section 6.

2. Trends in tourism from East Asia to Thailand

This section explains the trends in tourist arrivals to Thailand from East Asia, specifically Indonesia, Japan, Korea, Malaysia, the Philippines and Singapore, over the period 1971–2005. East Asia is the single biggest tourists source market of Thailand, which accounted for two-thirds of international tourist arrivals to Thailand in 2005. Figs. 1 and 2 give an overview of the number of tourist arrivals and annual growth rates of tourist arrivals from East Asia over the same period. Tourists from these six major tourism markets showed an increase in the numbers of arrivals from 222,386 tourists, or 34.82% of the total international tourist arrivals in 1971, to 4,410,354 tourists, or 38.13% of the
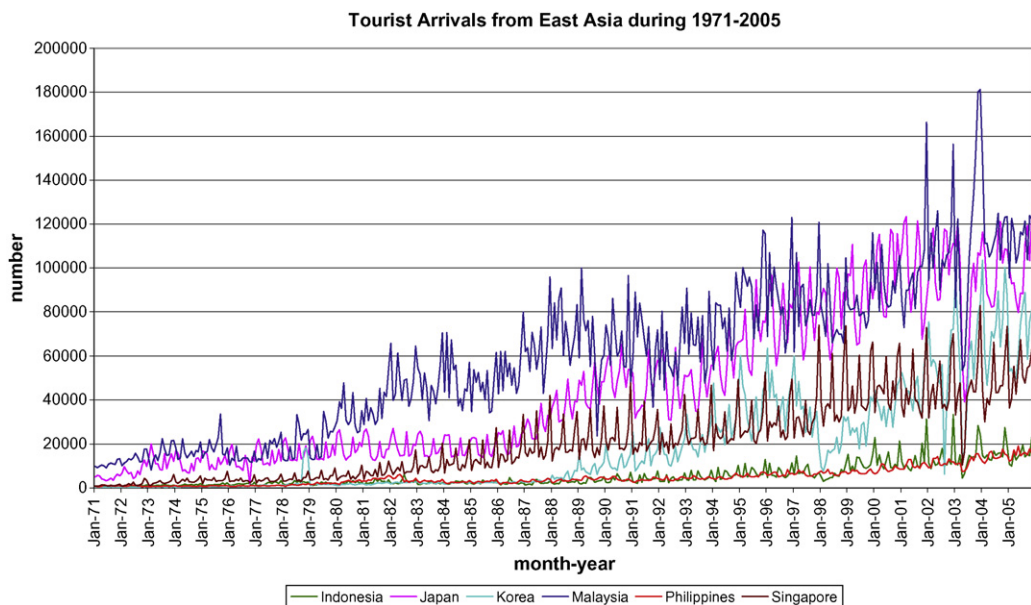

Fig. 1. Tourist arrivals from East Asia to Thailand during 1971–2005.