



# Examination of Taiwan's travel and tourism market cycle through a two-period Markov regime-switching model



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## HIGHLIGHTS

- This study analyzed the business cycle of Taiwan travel and tourism (T&T) market.
- The two-period Markov regime-switching (MS-2) model was adopted.
- The effect of China visitor arrivals to Taiwan in the T&T market was verified.
- The MS-2 model had superior performance to the Markov regime-switching model.

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## ABSTRACT

This study analyzes the Taiwan travel and tourism (T&T) market cycle. According to data of the weighted Taiwan tourism stock index from January 1997 to August 2015, the two-period Markov regime-switching model identifies two distinct regimes of the T&T cycle and incorporates a specific set of mean and variance parameters for each period to control for the structural changes in Taiwan's T&T market. The effect of China visitor arrivals to Taiwan on the T&T market is also verified. The empirical findings offer essential information and policy implications for Taiwan's government tourism policymakers and business managers.

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## 1. Introduction

Demand for tourism and leisure increases as an economy grows. Therefore, the development of tourism is typically considered to be a positive contribution to economic growth (Khan, Phang, & Toh, 1995; Lee & Kwon, 1995; Lim, 1997; Oh, 2005). The travel and tourism (T&T) market is presently the largest and most diverse business sector worldwide. According to a 2015 report by the World Travel and Tourism Council (WTTC), the T&T market contributes up to 9.8% of global GDP and generates 2.84 million employment opportunities. Therefore, many countries have produced strategies to develop their T&T industries. For example, the basic plan for Japan includes policies on expanding the support base for tourism and improving the quality of vacations, and the National Department of

Tourism of South Africa provides strategic corporate and governance support including policy and information services, international tourism management, and domestic tourism management.<sup>1</sup>

Continuing analysis and research of the T&T industry are critical tasks to produce policies and strategies that contribute to the development of the T&T industry. All economic activity, including those involved in Taiwan's T&T market, undergoes periods of recession, depression, recovery, and prosperity, resulting in a cyclical phenomenon (Burns & Mitchell, 1946). A business-cycle analysis can elucidate future industrial trends, providing insight into policy marking and forecasting strategies for tourism-related business managers. For example, business-cycle analysis yields important information related to the growth rate, variation, and duration of different regimes and turning points of the T&T industry. The government can thereby adopt active policies when the

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<sup>1</sup> The details can refer pages 44–45 and pages 52–53 in *Governing National Tourism Policy* (2015) issued by the World Travel and Tourism Council.

T&T industry is undergoing a depression.

There are two approaches to analyzing business-cycle patterns: spectral analysis (in the frequency domain) and regime-switching analysis (in the time domain). [Choi, Olsen, Kwansa, and Tse \(1999\)](#) conducted a spectral analysis to examine the business-cycle pattern of the U.S. hotel industry. The hotel industry exhibited three cycles from 1966 to 1993. They provided useful information regarding economic cycles for managers and researchers involved in the hotel industry. Spectral analysis has also been employed to detect cycles within and between the time series of tourism flows ([Coshall, 2000](#)) and to show that international tourism income has a cycle of approximately 7 years ([Eeckels, Filis, & Leon, 2012](#)). [Guizzardi and Mazzocchi \(2010\)](#) developed Harvey's structural time series approach, in which the regularity and irregularity of asset prices are described in the time and frequency domains ([Harvey & Jaeger, 1993](#)), to model the effect of the business cycle on tourism demand in Italy.

[Hamilton \(1989\)](#) developed a Markov-switching (MS) model that characterizes nonlinearity according to individual economic variables. [Claveria and Datzira \(2010\)](#) forecasted tourism demand in Catalonia for the four main visitor markets by using the MS model. Other researchers who have applied the MS model in the context of industry development include [Moore and Whitehall \(2005\)](#), [Santana-Gallego, Ledesma-Rodriguez, and Perez-Rodriguez \(2010\)](#), [Chen \(2013\)](#), [Chang and Lee \(2015\)](#), and [Valadkhani and O'Mahony \(2015\)](#).

Tourism development and economic growth are known to have a positive relationship. [Lee and Chien \(2008\)](#) examined the issue of whether regime changes have broken down the stability of the long-run relationships between tourism development and real GDP in Taiwan for the 1959–2003 period, and they investigated the comovements and causal relationships between real GDP, tourism development, and the real exchange rate in a multivariate model. Economies in the Asia Pacific region are growing rapidly—as, notably, are household incomes in China in particular. This has led to growth among T&T industries in the Asia Pacific region, including that in Taiwan. The Taiwan government has exploited this opportunity to promote a series of tourism actions. Since 2000, tourism revenue and visitor arrivals to Taiwan have exhibited continuous growth. This has been attributed to Taiwan's tourism policy opening Taiwan to Chinese tourists to promote the Taiwan tourism market and thereby enhance further growth. Since 2002, the Taiwan government has implemented numerous tourism strategies aimed at promoting international tourism. Specifically, Taiwan opened its tourism market to tourists from China in 2008 and began operating daily flights between Taiwan and China. From June 2011, the Taiwanese government has maintained a policy of openness concerning China's travel independence. Chinese visitors have gradually replaced tourists from Japan, Hong Kong, and Macao, and now dominate Taiwan's tourism market. According to reports from the Taiwan Tourism Bureau and the WTTC, tourism-related industries are estimated to comprise 2.2%–4.9% of Taiwan's economy and account for 2.8%–5.6% of employment. In the next 10 years, this sector is expected to exhibit mean annual growth average rates of 2% for its economic contribution to GDP and 0.9% for employment, thus indicating sustainable growth.

Many Chinese tourists travel to China's neighboring countries such as Taiwan and Thailand ([Appendix A](#)). Although Chinese visitors have affected tourism developments in these two countries, the structures of their T&T industries differ markedly. For example, Chinese tourists account for more than half of all foreign visitors to

Taiwan since April 2009. However, Chinese tourists account for less than half of all foreign visitors to Thailand. According a WTTC report, Taiwan has ranked higher than Thailand since 2011. Moreover, competitiveness indices for Taiwan have increased annually.<sup>2</sup> This indicates the importance of Taiwan's tourism policy regarding China and that these tourism policies have produced a structural shift in Taiwan's tourism industry.

On the basis of [Table B \(Appendix B\)](#), various observations can be made regarding the T&T industry. A structural change occurred in the T&T market in 2008. [Krolzig \(2001\)](#) demonstrated that the two regime MS models failed to depict the business cycles for the United States and Japan because of the two countries' substantial changes in the stochastic process of economic growth. His results indicated that a structural shift occurred in these two economies' business cycle. Thus, the conventional two-regime MS models may fail to depict regime switches and identify the recession and boom stages of the economies. [Li, Lin, and Rau \(2005\)](#) applied the MS model to various economic business cycles to analyze three groups, namely industrialized, newly industrialized (NI), and developing economies. They found that the model is ineffective for two NI economies that underwent structural economic shifts and that two-period MS models more effectively measure NI economies.

Notably, the implementation of industrial and monetary policies is usually accompanied by structural shifts and transitory shocks ([Baddeley, Martin, & Tyler, 1998](#)), including in the T&T industry. In addition, economic development ultimately causes structural shifts in industries, and such changes are important factors in economic development. Therefore, adequate understanding and estimations of structural shifts are essential for forming policies on industrial growth and development ([Bhattacharya, 2011](#); [Castillo, Garone, Maffioli, & Salazar, 2015](#); [Lee & Chien, 2008](#)). [Rau, Lin, and Li \(2001\)](#) applied a two-period MS model to examine the annual growth of Taiwan's industrial product index and GDP from 1970 to 1998. They found that Taiwan's business cycle patterns changed significantly after 1987, with real investment being the primary factor in post-1987 economic growth. Their results indicated the direction of future economic developments in Taiwan. Similarly, in the present study, we used a two-period MS model to analyze Taiwan's T&T market and determine its future developments. Few contemporary studies that have explored business cycles using MS models (e.g., [Chen, 2013](#); [Chen, Wu, & Su, 2014](#); [Mérida & Golpe, 2016](#)) and few other studies of Taiwan's T&T industry (e.g., [Chen & Chiou-Wei, 2009](#); [Chen, 2010](#)) have addressed the diminishing business cycle patterns caused by structural changes in the T&T market.

The present study used the weighted tourism stock index of Taiwan (TTSI) to capture the cyclical pattern of the T&T market because the TTSI includes the stock prices of flight, hotel, and catering services. [Su and Tsaor \(2003\)](#) established a set of tourism business indicators based on changes in the status of visitor arrivals. The number of visitor arrivals to Taiwan is a critical indicator; however, focusing on this variable may lead to the contributions of domestic tourists being overlooked. [Tang and Kulendran \(2011\)](#) constructed composite leading indicators to predict changes in the growth cycle of hotel occupancy in Hong Kong. [Chen \(2013\)](#) used the Taiwanese tourist hotel industry to describe the activities of the T&T industry. [Chen et al. \(2014\)](#) applied a Markov regime-switching model to study the business cycle of Taiwan's hotel industry. These studies have provided valuable information for hotel business owners and managers in Taiwan. Nevertheless, the T&T industry includes tourism, transportation, and hotels, as well as catering and leisure. [Chen \(2007\)](#) examined the interactions between the business conditions and financial performance of a tourism firm in Taiwan, identifying a significant linkage between business conditions such as the T&T industry structure and its

<sup>2</sup> The T&T industries of Taiwan and Thailand are representative of newly developed T&T economies.

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