Seasonal Pattern and Effects of Shocks on Outbound Tourism from the People's Republic of China: The Case of Thailand

Akarapong Untong, Vicente Ramos, Mingsarn Kaosa-ard, and Javier Rey-Maquieira

Abstract

This paper uses the case of Thailand, the first country to obtain approved destination status, to analyze two issues related to outbound tourism from the People's Republic of China (PRC). The first objective is to measure and understand the seasonal behavior of PRC tourist arrivals to Thailand during 1985–2009. The study applies the X12-ARIMA method and the Gini coefficient to the analysis of seasonality. The results show that the PRC market had a higher degree of seasonal concentration than the other main nationalities of Thailand's tourism. The second research issue is the measurement of the effects of major unexpected events that affected the tourism industry in Asia during 2000–2009. The results show that epidemic outbreaks had the greatest impact, followed by domestic turmoil and the 2005 tsunami.

Introduction

The World Tourism Organization (2010) ranking of international tourism spenders shows that the People's Republic of China (PRC) had by far the fastest growth in expenditure on international tourism during 2000–2009. Ranking only seventh in 2005, it overtook France in 2009 to achieve fourth position. In 2009, expenditure further increased by an impressive 21%. PRC outbound tourists increased from 4.5 million in 1995 to 47.8 million in 2009 (CNTA 2010a). The World Tourism Organization (2003) predicts that outbound travel from the PRC will grow to about 120 million tourists by 2020, while the Pacific Asia Travel Association predicts that this figure will be reached in 2026 (Kaosa-ard 2007). Thus, in the near future, the PRC is expected to become the largest tourism market in the world and a factor driving the growth of the world's tourism, especially in Asia and the Pacific.

In 1988, Thailand became the first country to achieve approved destination status (ADS)—a measure by the Government of the PRC that allows its residents to travel to selected

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countries for personal and leisure purposes, usually on all-inclusive package tours. Thailand consistently ranked among the top three destinations for PRC travelers in Asia and the Pacific during 1990–2009. However, new trends are challenging Thailand's position, in particular the current diversification of international destinations, the greater freedom of PRC outbound tourism, and the fact that due to its impressive outbound growth more countries are becoming increasingly aware of the importance of the PRC tourism market. Hence, many countries are aspiring to obtain a share of the PRC outbound tourism market and are beginning to develop marketing strategies oriented toward this market.

This paper analyzes outbound PRC tourism using the case of Thailand, the country with the longest history of welcoming PRC tourists. In particular, the paper focuses on two issues: (i) understanding the seasonal pattern of outbound PRC tourism and the effects on overall seasonality of an increase in the PRC market share, and (ii) measuring the effects of negative shocks on this market.

The results of these analyses will improve the understanding of PRC outbound tourism, and should help Thailand's tourism authorities adjust their tourism strategy for the PRC market. However, given the increasing interest from many countries in capturing part of the outbound PRC market, the results and the methodology proposed will be also useful to other destinations that wish to learn from Thailand's successful experience.

Literature Review

With a population of more than 1.3 billion and steady opening and reforms since 1978, the PRC economy has developed rapidly. Outbound tourism of PRC households has been increasing due to the rise in their disposable income (Kim, Guo, and Agrusa 2005). Thus, the number of PRC tourists has increased tremendously. In 2008, PRC tourism accounted for 1.87 billion trips, of which 94.5% were domestic, 2.4% were outbound, and 3.1% were inbound (CNTA 2009). Figure 1, presenting the evolution of PRC outbound tourism during 1991–2009, clearly shows the growing trend.

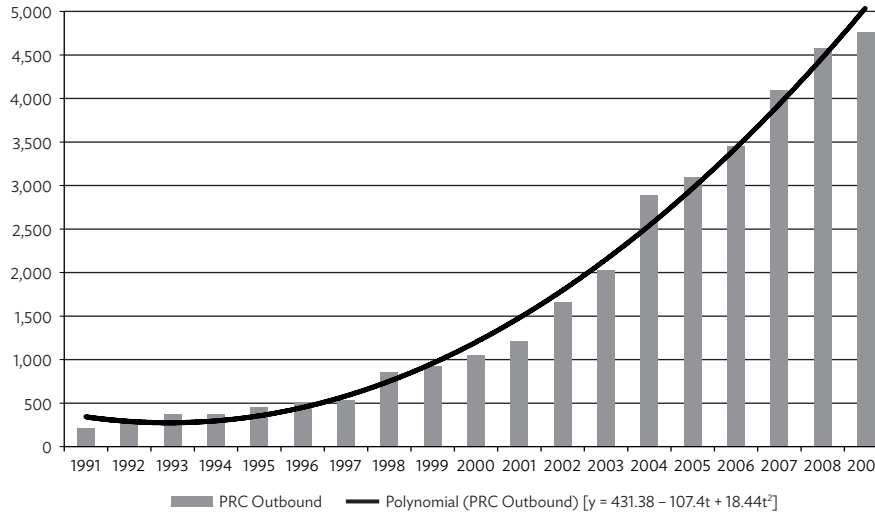
During 1991–2010, the PRC's tourism went through three main stages: (i) inbound tourism only; (ii) inbound and domestic tourism; and (iii) comprehensive tourism including domestic, inbound, and outbound tourism.

PRC outbound tourism had long been suppressed due to the political climate and the economic situation in the country. Before the 1980s, outbound tourism was strictly controlled and was permitted only for government business. In 1984, personal travel to visit relatives in Hong Kong, China and Macao, China was permitted, marking the beginning of PRC outbound tourism (Qu and Lam 1997).

In 1988, Thailand was granted ADS, and this status was also given to Malaysia and Singapore in 1990. However, at that time, the process of getting a private passport was difficult and took at least 6 months. Australia, the Republic of Korea, and New Zealand were granted ADS in 1998, and Japan in 2000. This was followed by the progressively rapid widening of ADS to most of the European Community in 2004, the United Kingdom (UK) in 2005, and the United States (US) in 2008 (CNTA 2009). Hence, PRC tourists' outbound travel destinations had expanded from 20 in 2002 to 135 by mid-March 2010 (CNTA 2010b).

The number of PRC outbound tourists traveling to Thailand increased at an annual average rate of 19.69% during 1985–2009 (Tourism Authority of Thailand, 2009), reaching a maximum of 1,033,305 in 2006, proving that Thailand is an attractive destination for PRC

Figure 1: Outbound Tourists from the People's Republic of China, 1991–2009 ('000)



Source: China National Tourism Administration (CNTA). 2009. [The People's Republic of] China Tourism Annual Report 2008. Beijing; 2010a. China National Tourism Administration Releases the 2009 Annual Report on Tourism Economy Operation. http://en.cnta.gov.cn/html/2010-1/2010-1-11-14-7-74560.html (accessed 14 March 2011).

tourists. Among destinations that had been granted ADS before 2007, Thailand is the first country visited by outbound PRC tourists as a first stop (CNTA 2009).

However, 2008 and 2009 saw a decrease in PRC arrivals due to several factors, including the international economic situation, the political crisis in Thailand, and a change in the behavior of PRC tourists as travelers became more sophisticated. Whereas the earlier concept was to visit as many places as possible in a limited time, the modern traveler tends to spend more time in one destination. Buffets are replaced by more special meals, and there is a need for new scenic spots on their itinerary (Verheslst 2003).

Data and Methodology

The empirical analysis presented in the results section uses secondary monthly data from January 1985 to December 2009 (a total of 300 observations). Tourist arrivals from the 11 main nationalities visiting Thailand were obtained from the Tourism Authority of Thailand (for 1985–2007) and the Ministry of Tourism and Sports (for 2008–2009).

Decomposition by X12-ARIMA Method

A time series can be decomposed into four components: trend (T), seasonal (S), cycle (C), and irregular (I). Three common methods are used for time series decomposition: the simple average method, the moving average method, and the Census II method. This study applies a Census II method called the X12-Autoregressive Integrated Moving Average (X12-ARIMA). As this method makes an adjustment for the fluctuation before the decomposition,

it is more adequate if the moving average parameter is not determined and the data fluctuate substantially. Typically, there are two underlying decomposition models:

Additive decomposition: $Y = T + S + C + I$ (1)

Multiplicative decomposition: $Y = T \times S \times C \times I,$ (2)

where Y is the time series, T is the trend component, S is the seasonal component, C is the cyclical component, and I is the irregular component.

X12-ARIMA is one of the most common methods used to adjust for seasonality in monthly and quarterly time series. This method was the successor to Census II X11. It combines two main methods: the regression model with the Seasonal Integrated Autoregressive and Moving Average (SARIMA), and the X11 seasonal adjustment method. The SARIMA was applied to adjust outliers of the series before the seasonal adjustment. There are three types of outliers: additive outliers, level shifts, and temporary changes. These were specified as regression variables in the model.

The SARIMA model developed by Box and Jenkins (1994) can be used with time series data with seasonality. It has the same form as the ARIMA model but with the additional assumption that the month of the same season must not have series correlation, and could have autocorrelation for intervals corresponding to the seasons. These assumptions are important constraints in the application of SARIMA, since time series data of a particular period as well as of different periods may have autocorrelation between them (Box, Jenkins, and Reinsel 1994). To overcome this problem, Box, Jenkins, and Reinsel (1994) introduced a seasonal multiplicative model that can be used with seasonal additive and multiplicative data. In general, there is no constant in the SARIMA model and the SARIMA$(p,d,q)(P,D,Q)_S$ is as follows (Box, Jenkins, and Reinsel 1994; Kim and Moosa 2005):

$$\phi_p(B)\Phi_P(B^S)\Delta^d\Delta_S^D Y_t = \theta_q(B)\Theta_Q(B^S)\varepsilon_t, \quad (3)$$

where

Y_t = data at time t with seasonality;

B and B^S = backward shift operation of regular and seasonal, when $B_m = \Delta Y_{t-m}$;

d and D = orders of the differentiation of regular and seasonal to be stationary;

p and P = regular and seasonal autoregressive order;

q and Q = regular and seasonal moving average order;

Δ^d and Δ^D = differenced orders at d and D of regular and seasonal;

$\phi_1,...,\phi_p$ and $\Phi_1,..., \Phi_P$ = the autoregressive parameters of regular and seasonal;

$\theta_1,...,\theta_q$ and $\Theta_1,...,\Theta_Q$ = moving average parameter of regular and seasonal;

ε_t = white noise process at time t [$\varepsilon_t \sim N(0,\sigma^2_{\varepsilon_t})$].

A SARIMA $(p,d,q)(P,D,Q)_S$ is identified by the autocorrelation function and partial autocorrelation function plot. Then, the diagnostic checking by the residual autocorrelation function plot and the Q-statistics by the Box–Pierce method are implemented (residuals must be a white noise series). Finally, an adequate model of SARIMA $(p,d,q)(P,D,Q)_S$ is obtained.

After the outliers are adjusted by using ARIMA, the time series is adjusted for seasonality using X11 under the assumption that seasonal variation can be measured from the observed series and can be extracted from the variation of the cyclical component (C), trend component (T), and irregular component (I). The seasonal component (S) is defined as the repetitive and predictable movement around the trend line in a year. The cyclical component refers to

fluctuation around the trend, such as a business cycle. The irregular component is the residual time series after the trend, cycle, and seasonal components such as terrorist attacks or disasters. In the multiplicative model, the original time series is expressed as

$$O_t = S_t \times C_t \times I_t \tag{4}$$

where O_t is the observed time series, S_t is the seasonal component, C_t is the cyclical component, and I_t is the irregular component.

After the seasonality is taken out of the time series, the next step is to evaluate the impacts of seasonal variation on the changes in the number of tourists in the high and the low season from those in the absence of seasonality. In this step, an impact measurement is applied, let S_t be the seasonal index in month t. Therefore, the impact of seasonality on the number of PRC outbound tourists to Thailand in month t (PS_t) can be examined using the following formula:

$$PS_t = \frac{(S_t - 100)}{100}. \tag{5}$$

The value calculated for PS_t indicates the change in the number of PRC outbound tourists not including the variation in time trend, cycle, and irregularity, compared to the usual time. Then, the remainder in the series is only the seasonal variation. If the calculated PS_t is positive, it implies that month t is in the high season. On the other hand, if the calculated PS_t is negative, it implies that in month t, the demand is less than usual, hence month t is in the low season.

Moreover, the method also allows the assessment of the duration of the effects of disasters on tourism arrivals. The duration of impact may vary and the impact may not be felt within the month of the crisis, especially if it occurs at the end of the month. The duration of each disaster's effects should therefore be studied individually. Thus, this research estimates the impact of an irregular event on the number of PRC outbound tourists to Thailand in month t (PD_t) using the following ratio:

$$PD_t = \frac{(100 - I_t)}{100}. \tag{6}$$

If PD_t has a value greater than 0, it means that the number of PRC outbound tourists in month t is less than the normal number when there is no time-related variation.

The impact is assumed to occur in the month of the disaster if the value of PD_t in that month is greater than 0. However, if it is less than 0, the impact is assumed to begin in the next month. The last month of impact is the month with a PD less than or equal to 0. The duration (DUR) of impact can be expressed as

$$DUR = j - i, \tag{7}$$

where i is the first month of impact and j is the last month of impact.

Analysis of Seasonal Concentration Using the Gini Coefficient

Corrado Gini, an Italian statistician, developed the Gini coefficient using the Lorenz curve for its calculation. Later, many economists developed and proposed various formulas to calculate the Gini coefficient in order to reduce errors in the calculation and to simplify the computation.

This study uses the formula suggested by Lundtorp (2001) because the formula is relatively easy to compute:

$$G_k = \frac{2}{n}\left(\sum_{i=1}^{n} if_{ik} - \frac{n+1}{2}\right), \quad (8)$$

where

G_k = Gini coefficient of tourists in group k,
i = the cumulative fractiles for month i,
f_{ik} = fractile for month i of tourists in group k,
n = the number of fractiles (12 for monthly data),
k = groups of tourists (in this case, PRC).

The Gini coefficient in equation 8 takes values from 1/12 to 1 (Rossello, Riera, and Sanso 2004). The value of 1/12 implies that the same number of tourists arrive every month; hence, there is no tourism seasonality. On the other hand, the coefficient would take the value of 1 if the entire demand is concentrated in a single month. Hence, the higher the index, the higher is the seasonality of tourist arrivals.

After equation 8 is used to calculate the Gini coefficient of group k, the method of Lerman and Yitzaki (1985) is applied to decompose the Gini coefficient of total tourists with the following formula:

$$G = \sum S_k R_k G_k, \quad (9)$$

where

G = Gini coefficient of total tourists,
S_k = market share of group k,
R_k = Gini correlation between tourists in group k and total tourists,
G_k = Gini coefficient of tourists in group k.

According to equation 9, the contribution of the Gini coefficient of tourist arrivals in group k to the Gini coefficient of total tourist arrivals can be computed by using the following formula:

$$C_k = \frac{S_k \times R_k \times G_k}{G}. \quad (10)$$

According to equation 10, the contribution of the Gini coefficient of tourist arrivals in group k depends on three factors: the market share of that group (S_k), the Gini correlation between tourists in group k and total tourists (R_k), and the Gini coefficient of tourists in group k (G_k). Among these factors, it can be argued that the market share is a controllable and changeable factor by means of marketing promotion and planning (Fernandez-Morales and Mayorga-Toledano 2008). The change in the market shares of tourists in each segment affects the seasonal concentration of total tourist arrivals. For that reason, Fernandez-Morales and Mayorga-Toledano (2008) suggested using relative marginal effects (RMEs) to measure the effect of a change in the market share of each segment on total seasonal concentration of tourist arrivals using the following formula:

$$RME_k = S_k \times \left(\frac{R_k G_k}{G} - 1\right). \quad (11)$$

The estimated RME can then be used to identify for which segment an increase in the market share would affect the overall seasonal concentration. The rationale for this proposal is that the market share is easier to change than the Gini correlation (R_k) and the Gini coefficient (G_k), which have a more structural character. However, an increase in market share can be achieved through successful marketing campaigns (Fernandez-Morales and Mayorga-Toledano 2008).

Results of the Study

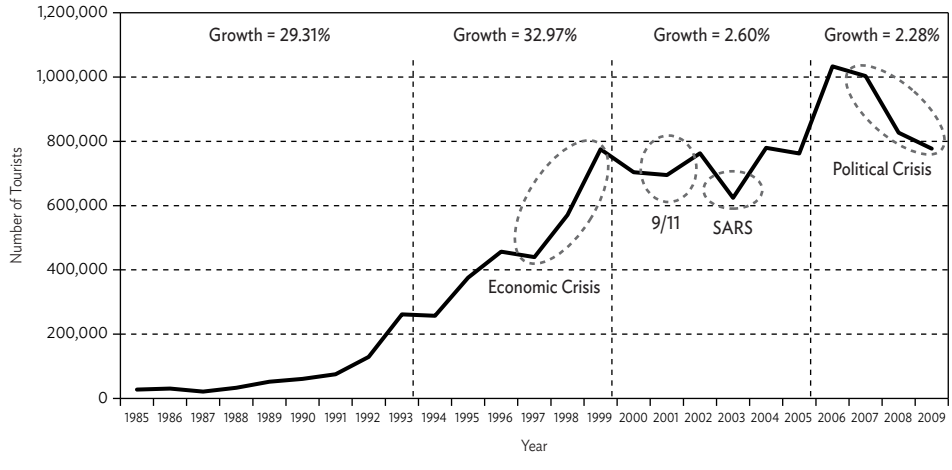
The results of this study are divided into two major parts: (i) the results of the analysis of the PRC's outbound tourism to Thailand, and (ii) the results of the seasonality and uncertainty analysis.

Tourist Arrivals from the People's Republic of China to Thailand

Figure 2 shows the rapid growth of PRC tourist arrivals to Thailand during 1991–2009 and the stages of its evolution. Using the growth rate, we can divide the trend of PRC tourist arrivals to Thailand into four periods: 1985–1992, 1993–1999, 2000–2005, and 2006–2009.

During 1985–1992, PRC tourist arrivals to Thailand grew by 29% per year. The Government of the PRC adopted an opening-up policy and Thailand was the first ADS for PRC outbound tourism. During 1993–1999, PRC tourism grew rapidly at a 33% per year. The 1997 Asian economic crisis led to a depreciation of Thailand's currency, which made Thailand a cheaper destination and resulted in a surge of PRC tourists to the country. During 1999–2005, tourism was affected by different shocks, including the 9/11 terrorist attack in the US and the outbreak of severe acute respiratory syndrome (SARS). These extraordinary events caused a deceleration in the growth rate of PRC tourist arrivals to Thailand. The unsatisfied willingness to visit the country during these years led to a boom in PRC tourists to Thailand during 2005–2006.

Figure 2: Number of Tourist Arrivals from the People's Republic of China to Thailand, 1985–2009



SARS = severe acute respiratory syndrome.
Source: Tourism Authority of Thailand. 2009. Annual Statistic 2008. Bangkok; and MOTS.

However, several negative events occurred again during 2007–2008 (notably the Thai political crisis, which closed Thailand's main airports at the end of 2008), explaining the sudden decline in 2009.

The Seasonality and Uncertainly Analysis

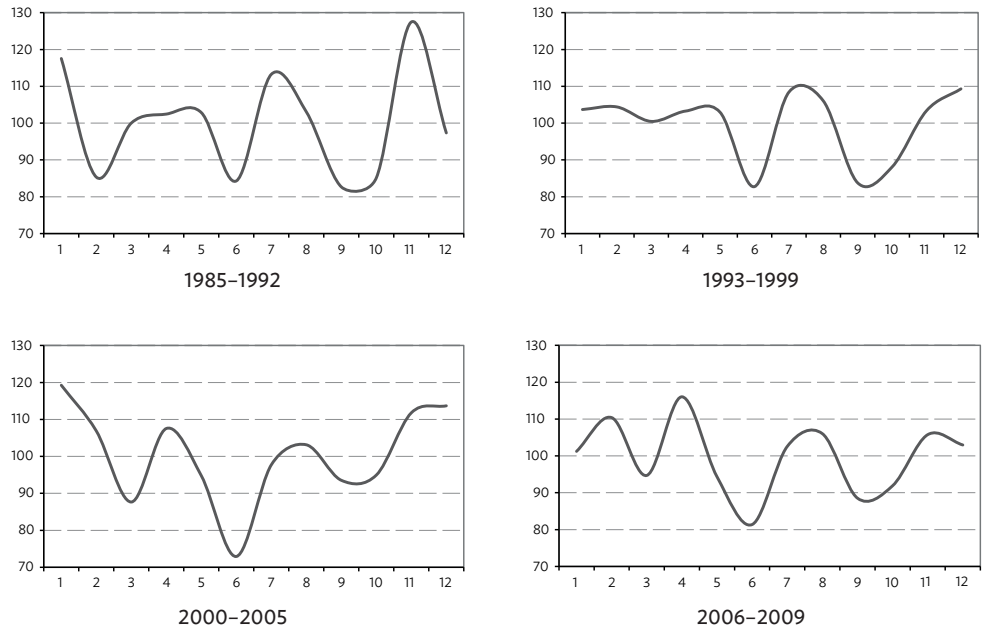
Figure 3 presents the monthly distribution of PRC arrivals to Thailand during the four periods proposed in Figure 2. Comparing the profiles of the four graphs, it can be concluded that there has been a change in the pattern of seasonal variation. However, there are still two main reasons that explain the seasonal pattern: public holidays, such as the PRC's traditional New Year holiday in January or February; and Thailand's Songkran festival in April.

Table 1 displays the monthly impact of seasonality (PS_t) described in equation 4 using the seasonal index estimated by X12-ARIMA.

The percentages in the table show the monthly and peak season and low season differences in tourist arrivals compared to the profile without seasonal variation. For example, in 1985–1992, there was an increase in peak season tourist arrivals of 9.52% compared to the situation in the absence of seasonality.

Table 1 proves that the peak seasons for PRC tourism in Thailand are January and February (due to the PRC's New Year holiday) and April (due to the Thai Songkran festival). In contrast, during the rainy season from July to October, there are fewer PRC visitors to Thailand. The table is also useful to understand the evolution of the seasonal impacts on the number of PRC outbound tourists to Thailand. The seasonal pattern has changed over the 25-year period

Figure 3: Seasonal Pattern of Arrivals from the People's Republic of China to Thailand, 1985–2009 (%)



Source: Authors' calculation.

Table 1: Monthly Impact of Seasonality on Arrivals from the People's Republic of China to Thailand (%)

Month	1985–1992	1993–1999	2000–2005	2006–2009
January	17.54	3.68	19.24	1.23
February	(14.67)	4.40	6.87	10.39
March	0.01	0.46	(12.35)	(5.31)
April	2.45	3.27	7.54	16.03
May	2.86	2.94	(5.23)	(5.67)
June	(15.71)	(17.26)	(27.08)	(18.64)
July	13.25	8.41	(2.29)	2.56
August	3.06	6.03	3.13	6.03
September	(17.33)	(16.25)	(6.47)	(11.48)
October	(14.89)	(11.91)	(5.06)	(8.11)
November	27.46	3.37	11.78	5.76
December	(2.67)	9.30	13.68	2.96
Peak season	9.52	4.65	10.37	6.42
Low season	(13.06)	(15.14)	(9.75)	(9.84)

( ) = negative.
Source: Authors' calculation.

from an initial situation of high seasonal variation to a more stable profile in the last subperiod (2006–2009). In particular, there has been a reduction of about 5 percentage points in the decrease associated with the low season. Finally, as the high and low seasons have a similar magnitude in absolute terms after 1999, it can be concluded that the seasonal variation during 2000–2009 had little effect on the overall number of tourists.

To compare the profile of the PRC market with that of tourists of other nationalities, Table 2 presents the X12-ARIMA estimation of the impact of seasonality on the arrivals from Thailand's top 10 origin markets: the nine other countries are Australia, Germany, India, Japan, the Republic of Korea, Malaysia, Singapore, the UK, and the US (the main destinations from Oceania, South Asia, Europe, Northeast Asia, Southeast Asia, and the Americas).

The results show that the gap between the high and low seasons for the PRC market is among the highest, similar only to that of the Republic of Korea and the UK. Hence, PRC tourist arrivals to Thailand show a stronger seasonal behavior than some of Thailand's other main origin markets, such as Japan, Malaysia, and Singapore.

The seasonality analysis using the Gini coefficient is shown in Figure 4. The graph displays the estimate of this index for each year, showing that there is a lot of variation, with estimated values ranging from 0.16 to 0.37. However, it can be concluded that the pattern of seasonal concentration tended to stabilize after 1997, except for the unexpected shocks of the SARS outbreak in 2003 and the Thai political crisis in 2008–2009.

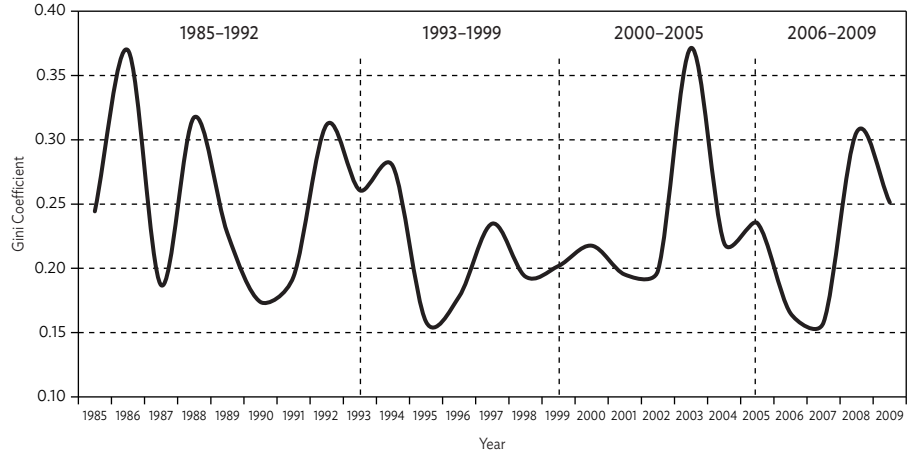
Continuing the comparative analysis, Table 3 presents the results of the Gini coefficient for the main tourism origin markets of Thailand. As was explained in the description of the methodology, the higher the Gini coefficient, the higher is the measure of inequality—in this case, the difference in the distribution of arrivals though the year. Hence, the conclusion from this table is that the PRC market has a higher seasonal concentration than all of the other nationalities except Germany.

Table 2: Comparison of Monthly Impact of Seasonality between the People's Republic of China and Other Countries, 2006–2009

Month	PRC	Australia	Germany	India	Japan	Rep. of Korea	Malaysia	Singa-pore	UK	US
January	1.23	10.02	3.25	(1.26)	9.92	33.88	(1.43)	(1.84)	12.91	22.28
February	10.39	(15.14)	3.18	(2.08)	7.87	0.00	0.48	(1.68)	10.97	4.96
March	(5.31)	(9.22)	3.30	(0.88)	8.33	(1.44)	0.01	(0.06)	15.10	8.53
April	16.03	3.32	0.04	(0.05)	(10.86)	(15.65)	(0.24)	(1.87)	5.98	(8.37)
May	(5.67)	(12.58)	(2.96)	3.35	(20.16)	(10.19)	(0.65)	(0.64)	(21.07)	(13.08)
June	(18.64)	(3.19)	(4.87)	2.08	(12.58)	(7.64)	(0.23)	1.90	(18.97)	(3.70)
July	2.56	2.02	(3.20)	(0.13)	(7.11)	7.03	(0.39)	(0.04)	(5.38)	0.91
August	6.03	(6.03)	(2.45)	(0.01)	15.48	16.06	0.65	(0.28)	(7.18)	(14.43)
September	(11.48)	5.80	(1.68)	(0.25)	12.44	(24.62)	(0.96)	(0.80)	(22.24)	(25.73)
October	(8.11)	14.60	0.18	(0.02)	(8.32)	(11.67)	0.14	(0.18)	(4.82)	0.98
November	5.76	(4.22)	2.88	(0.93)	3.94	3.07	0.11	1.75	6.36	10.09
December	2.96	13.79	2.30	(0.11)	(0.97)	7.93	2.40	3.74	27.06	15.97
Peak season	6.42	0.54	0.86	5.43	2.61	7.47	0.23	7.39	7.25	4.49
Low season	(9.84)	(0.92)	(1.21)	(5.72)	(4.06)	(11.11)	(0.34)	(7.39)	(10.40)	(6.60)

( ) = negative, PRC = People's Republic of China, Rep. = Republic, UK = United Kingdom, US = United States.
Source: Authors' calculation.

Figure 4: Gini Coefficients of Arrivals from the People's Republic of China to Thailand, 1991–2008



Source: Authors' calculation.

Table 3: Comparison of Gini Coefficients of the People's Republic of China and Other Major Tourism Countries

Period	PRC	Australia	Germany	India	Japan	Rep. of Korea	Malaysia	Singapore	UK	US
1985–1992	0.253	0.168	0.302	0.174	0.185	0.217	0.197	0.254	0.204	0.178
1993–1999	0.215	0.150	0.280	0.160	0.178	0.238	0.179	0.219	0.163	0.162
2000–2005	0.240	0.163	0.279	0.186	0.179	0.211	0.178	0.210	0.172	0.177
2006–2009	0.220	0.152	0.241	0.185	0.167	0.207	0.167	0.200	0.173	0.168

PRC = People's Republic of China, Rep. = Republic, UK = United Kingdom, US = United States.
Source: Authors' calculation.

Table 4 uses the methodology described in equation 8 to decompose the total Gini coefficient (first column) into three factors: the PRC Gini coefficient (second column), market share (S), and Gini correlation (R). The contribution to total seasonal concentration of PRC tourists, calculated from equation 9, is presented in column C; and the last column of the table displays the RME described in equation 10.

In Table 4, the RME value of 1.87 for 2009 indicates that a 1% increase in the PRC market share in Thailand would lead to a 1.87% increase in overall seasonality. Hence, the results of the seasonal decomposition show that during 1995–2009, the increase in PRC market share has caused an increase of Thailand's tourism seasonality.

Table 5 presents the value of the RME for Thailand's main tourism origin markets.

As a general conclusion, an increase in the market share of any nationality will not reduce the overall seasonality of Thailand's tourism. However, there are some exceptions, such as the negative figures for Australia in some years, for example 1985, 2007, or 2009.

Table 4: Decomposition of the Seasonal Concentration of Outbound Tourists from the People's Republic of China to Thailand

Year	Gini Coefficient (G)		Market Share (S)	Gini Correlation (R)	Contribution to Total Concentration (C)	Relative Marginal Effect (RME)
	Total	PRC				
1985	0.15	0.24	1.13	0.93	1.66	0.53
1992	0.17	0.31	2.51	0.88	4.00	1.49
1993	0.14	0.26	4.54	0.97	8.05	3.50
1999	0.14	0.20	8.97	0.87	11.10	2.13
2000	0.14	0.22	7.35	0.96	11.35	4.00
2005	0.15	0.24	6.58	0.92	9.40	2.81
2006	0.14	0.17	7.47	0.91	7.81	0.34
2007	0.15	0.16	6.94	0.99	7.14	0.20
2008	0.16	0.31	5.67	0.94	10.43	4.76
2009	0.17	0.25	5.49	0.91	7.37	1.87

PRC = People's Republic of China.
Source: Authors' calculation.

Table 5: Comparison of the Relative Marginal Effect between the People's Republic of China and Other Major Tourism Countries

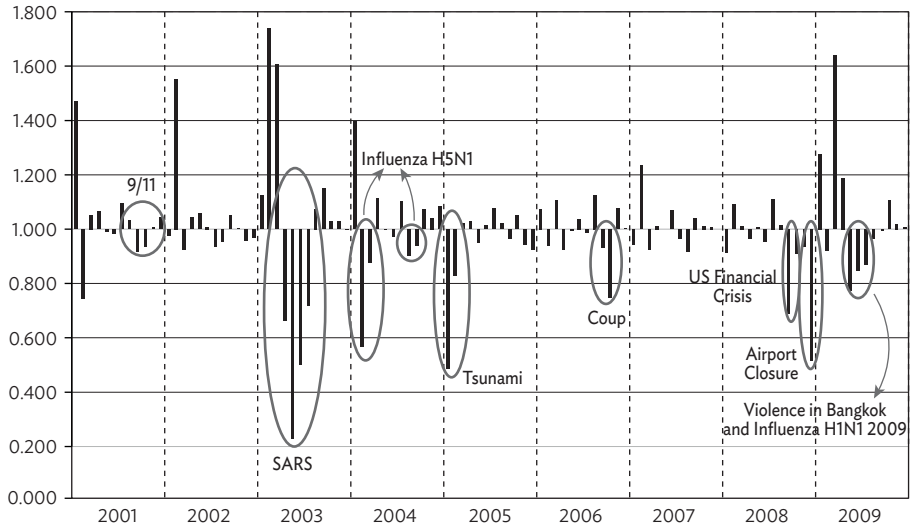
Year	PRC	Australia	Germany	India	Japan	Rep. of Korea	Malaysia	Singapore	UK	US
1985	0.53	(0.28)	3.69	0.66	1.69	(0.13)	3.81	5.03	0.14	1.16
1992	1.49	(0.19)	3.25	(0.30)	2.59	1.60	1.52	1.19	(0.04)	(0.57)
1993	3.50	0.17	4.80	0.16	2.35	2.42	4.24	1.10	0.18	0.44
1999	2.13	0.37	4.27	0.42	2.84	1.49	(1.62)	1.94	0.72	0.77
2000	4.00	0.31	3.53	0.70	1.83	1.53	0.15	2.56	1.04	1.19
2005	2.81	0.60	2.03	0.74	0.30	1.71	(2.89)	1.32	0.52	0.18
2006	0.34	0.41	1.77	0.42	(0.17)	1.69	(0.72)	1.45	0.56	0.31
2007	0.20	(0.29)	1.94	0.42	(0.42)	0.81	1.42	0.91	1.17	0.38
2008	4.76	(1.06)	1.75	0.30	1.46	3.22	0.19	0.54	0.45	0.11
2009	1.87	(0.17)	1.19	0.43	(0.53)	1.20	0.78	1.59	(0.55)	(0.03)

( ) = negative, PRC = People's Republic of China, Rep. = Republic, UK = United Kingdom, US = United States.
Source: Authors' calculation.

The last part of this section is devoted to the uncertainty analysis, focusing on the irregular component of PRC tourist arrivals to Thailand during 2001–2009 (Figure 5). The figure shows nine important negative situations.

Once the irregular component is estimated through the X12-ARIMA method, it can be used to construct a dummy variable that reflects the impact of the nine negative situations. These

Figure 5: Irregularities in the Number of Tourists from the People's Republic of China Visiting Thailand, 2001–2009



SARS = severe acute respiratory syndrome, US = United States.
Note: Values > 1.00 indicate positive shock; values < 1.00 indicate negative shock.
Source: Authors' calculation.

variables are used in a SARIMA intervention model to estimate the number of PRC tourists lost due to each event. The results of the estimated effect on the number of PRC tourists visiting Thailand show that SARS caused the greatest fall of approximately 18% per month, while avian influenza caused a monthly fall of 7%, and the H1N1 influenza outbreak in 2009 caused a decline of 3% (Table 6). In total, the three epidemic outbreaks resulted in the greatest losses in tourism from the PRC market—a decline of 285,237 visitors. The losses from the 2005 tsunami account for a monthly fall of almost 24%, or the 131,331 PRC tourists.

Table 6 also shows that the epidemic outbreaks and natural disasters are of longer duration than the other crises. Their average impact length was about 4 months, while the impact duration of the 9/11 terrorist attack, the military coup, the closure of airports, and the 2005 tsunami was approximately 2 months. Finally, the duration of the Bangkok violence at the beginning of 2009 was only 1 month, the same duration as the impact of the US financial crisis.

Table 6: Impact of Major Crises on Arrivals from the People's Republic of China to Thailand

Year of Impact	Crisis Event	Duration (months)	Loss in Number (persons)	% Loss per Month (%)
2001	Terrorist attack on the World Trade Center (9/11)	2	18,185	7.87
2003	Outbreak of SARS	4	178,688	18.00
2004	Outbreak of avian influenza (H5N1)	4	81,973	7.04
2005	Indian Ocean earthquake and tsunami	2	68,200	23.86
2006	Military coup in Thailand	2	45,558	13.41
2008	Financial crisis in the United States	1	32,174	48.51
2008	Closure of Suvarnabhumi and Don Mueang airports	2	53,817	22.09
2009	Violence in Bangkok	1	31,956	46.73
2009	Outbreak of influenza (H1N1)	4	24,576	2.60

SARS = severe acute respiratory syndrome.
Source: Authors' calculation.

Conclusions

This paper studied both the seasonal behavior of PRC tourist arrivals to Thailand during 1985–2009 and the effect of some negative shocks that affected tourism during 2001–2009. The X12-ARIMA method, SARIMA with intervention, and the Gini coefficient were applied to analyze seasonality and estimate the impact of nine crises during 2001–2009.

The empirical analysis proves the adaptability of the methodologies proposed to perform a complete seasonality analysis. The monthly seasonal index of equation 4 is more informative than the Gini coefficient, as the Gini coefficient measure is affected by shocks that are not due to seasonality. With this methodology, the results show that PRC tourist arrivals to Thailand have a relatively higher degree of seasonal concentration compared with Thailand's other main tourism origin markets. The decomposition of the Gini coefficient proved useful for understanding the contribution of each individual market to overall destination seasonality. In particular, the analysis shows that an increase in the PRC market share would not improve the overall seasonality of tourism in Thailand.

The study also quantified the effects of the main negative shocks that occurred during 2001–2009 on the number of PRC tourists visiting Thailand. The epidemic outbreaks had the greatest impact, but the losses tend to decline if a similar event occurs again. The domestic political crisis and the 2005 tsunami had the second-greatest impact, while the 9/11 terrorism attack on the World Trade Center in the US had the smallest impact on PRC tourism to Thailand.

This paper combined several methodologies to characterize and quantify the seasonal pattern of a given tourism origin market. Understanding the evolution of seasonality is crucial for many destinations that face this problem. It can be particularly relevant to assessing the effectiveness of counter-seasonal policies, which have been proposed in some destinations. The empirical research should be beneficial to the Government of Thailand in the design of strategies to deal with seasonality and negative tourism shocks. However, given that Thailand was the first outbound tourist destination of the PRC, beginning in 1988, this study should also be helpful to other destinations that wish to increase their share of the PRC outbound tourism market.

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