An Econometric Analysis of Inbound Tourism for China

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Abstract

The People's Republic of China is one of the world's most popular tourist destinations. This paper reviews the development of the Chinese inbound tourism industry after the cultural revolution and analyses tourist flows from Japan, which is the most important short-haul inbound market for China. Box-Jenkins univariate time series analysis facilitates an understanding of tourist arrival patterns in inbound tourism for China from Japan for the period 1986-2000. Tests for stationarity of tourist arrivals time series are also conducted.

***Keywords**:* China inbound tourism; tourism reforms; seasonality; ARIMA models; tests of unit roots.

1. INTRODUCTION

China has become one of the world's most popular tourist destinations. Table 1 presents the world's top 10 destinations in terms of tourist arrivals. China was the fastest growing destination in 1999 and 2000. According to the World Tourism Organisation (2001), China was ranked fifth in international tourist arrivals in 2000, and seventh in international tourism receipts, earning US$16,231 million. Furthermore, China had 4.5% of the world's market share of tourist arrivals in 2000. Within East Asia and the Pacific region, China was ranked first in international tourist arrivals and international tourism receipts in recent years. This information highlights the important role which China is playing as an integral part of the international tourism industry.

2. INBOUND TOURISM EVELOPMENT IN CHINA

Under Mao Zedong's regime, China was liberated by the Communist Party from Chiang Kai Chek in 1949. Subsequently, a near total ban on inbound travel for any purpose was enforced between 1949 and 1976. According to Zhang and Heung (2001a), the development of China's international tourism has been through several stages. It started with political visits, but ten years of cultural revolution (1966-1976) had entirely suspended the development of China's inbound tourism. This enforced isolation had fostered widespread interest in China among foreigners. With the introduction of Deng Xiaoping's economic reforms in 1978, this radical change in policy brought about the rapid development of inbound tourism in China. However, during the first four years from 1978-1982, the government focused mainly on educational and political visits to China. In 1982 the Government recognized tourism as an economic activity, and in 1986 China reiterated the importance of tourism nationwide by including the tourism industry in the national plan for social and economic development. The China National Travel Administration (CNTA), which is the national administrative body responsible for implementing short-term and long-term tourism policies in China, has played an important role in the development of the Chinese tourism industry at the national level (Choy and Can 1988; Yu 1992). These factors have contributed to an increased amount of tourism activities in China, namely the growth of inbound tourism by overseas visitors, domestic tourism, and outbound tourism by Chinese residents (Dou and Dou 1999).

The tourism industry in China has achieved remarkable growth since 1978 in terms of visitor arrivals and tourism receipts (see Figures 1 and 2). Although there was a severe decline in international arrivals because of the negative effects of the 1989 Tiananmen Square Incident, it rebounded in the following year. International visitor arrivals in

China increased from 1.8 million in 1978 to about 73 million in 1999, and international tourism receipts increased from US$263 million in 1978 to US$ 14.1 billion in 1999 (CNTA 2000).

The Chinese government categorizes inbound tourists as (China Statistical Year Book 2000):

- Compatriots from Hong Kong and Macau – ethnic Chinese residents of Hong Kong and Macau.
- Compatriots from Taiwan – ethnic Chinese residents of Taiwan.
- Overseas Chinese – Chinese who reside in other countries (except in Hong Kong, Macau and Taiwan).
- Foreigners – foreign travellers with other countries' passports.

The number of inbound tourists to China from 1978 to 2000 is given in Table 2. Overseas Chinese accounted for slightly over 0.07% of total arrivals in 2000. The Chinese government considers Hong Kong, Macau and Taiwan as part of China. Hong Kong and Macau have become China Special Administration Regions, with "one country, two policies" being conducted, but Taiwan is still not part of China. Compatriots accounted for 87.7% of total arrivals in 2000.

The Chinese inbound tourism market has grown rapidly, with over 8 million foreign tourists visiting the country in 1999, which is almost five times the number in 1990 (China Statistical Year Book, 2000). Most of the major tourist-generating countries are in Asia due to the geographical proximity of China to these markets. Japan, which is China's largest tourist-source market, benefits from the short haul convenience (an average flight of 2 hours to China), and comparatively lower costs of travel to China than to other destinations. With its historic relics and oriental culture, China has always appealed to travellers from the rest of the world. Recent developments in China, such as easier access, the availability of facilities and international-chain commercial tourist accommodation, has also attracted tourists from all over the world.

Although China has become one of the world's most popular destinations, not much research has been undertaken on China's inbound tourism industry. Studies by Cai, Hu and Feng (2001) and Zhang (1997) focused on Chinese domestic tourism. Research on Chinese outbound tourism has only been conducted recently (see, for instance, Pan and Laws 2001; Ryan and Mo 2001; Zhang and Heung 2001b; Zhang and Lam 1999). With regard to Chinese inbound tourism, only Jeffrey and Xie (1995) have examined the UK tourism market to China. Tourist arrivals from Japan represent the most important short-haul inbound market to China. The purpose of this paper is to use Box-Jenkins univariate time series analysis to facilitate an understanding of tourist arrival patterns in inbound tourism for China from Japan. Tourism encompasses a set of economic activities with tremendous potential for future domestic and export earning. This paper will contribute to an expansion of the existing literature on China inbound tourism. The research findings will provide knowledge to policy-makers in the private and public sectors in China to formulate sensible tourism investment and marketing strategies.

3. AUTOREGRESSIVE-MOVING AVERAGE MODELS

Data on tourist arrivals from Japan are published by China National Tourism Administration. Figures 3 and 4 show the time plots of tourist arrivals to China from Japan in logarithms and first differences over the period 1986-2000. Tourist arrivals in Figure 3 appear to be non-stationary and to follow an upward trend. The large reduction in tourist arrivals from Japan in 1989 is related to the Tiananmen Square Incident on 4 June. The first difference of the logarithms of tourist arrivals in Figure 4 appears to be stationary and fluctuating around a zero mean.

The Box-Jenkins (1970) approach to modelling a single time series variable based on the information of its past values, and current and past values of random errors, is known as univariate time series analysis. In time series analysis, the two most important time series models include the autoregressive (AR) and moving average (MA) processes. An autoregressive process of order p, AR(p), is given by:

$$X_t = \alpha_1 X_{t-1} + \alpha_2 X_{t-2} + ... + \alpha_p X_{t-p} + \varepsilon_t$$

where X_t is the number of tourist arrivals from a particular origin country to a destination at time t, α_i (i = 1, …, p) are the autoregressive parameters, and ε_t is the normally and independently distributed error term. A moving average process of order q, MA(q), can be used to represent a time series process which is a linear combination of current and past random errors, and is defined as follows:

$$X_t = \varepsilon_t + \beta_1 \varepsilon_{t-1} + ... + \beta_q \varepsilon_{t-q}$$

where β_j (j = 1, …, q) are the moving average parameters. A time series model that contains both

AR and MA components, ARMA(p,q), is represented by:

$$X_t = C + \alpha_1 X_{t-1} + ... + \alpha_p X_{t-p} + \varepsilon_t + \beta_1 \varepsilon_{t-1} + ... + \beta_q \varepsilon_{t-q}$$

where C is the intercept or constant term.

The theory behind the autoregressive moving average (ARMA) model is based on stationary time series processes. A tourist arrival series is said to be stationary if the mean, variance and covariance of the series remain constant over time. The unit root test is a formal method of testing the stationarity of a series. Quarterly tourist arrivals (in logarithms) from Japan to China are tested for unit roots using the Augmented Dickey- Fuller (ADF) test procedure based on the following regression equation:

$$\Delta y_t = \alpha + \beta t + \delta y_{t-1} + \sum_{j=1}^{p} \psi_j \Delta y_{t-j} + \varepsilon_t$$

where y_t is the logarithm of tourist arrivals to China from Japan at time t, t is a deterministic trend, ε_t is a disturbance term of the regression which is independent and normally distributed with zero mean and constant variance. In order to test for unit roots, the hypothesis of interest is:

$$H_0: \quad \delta = 0$$

$$H_1: \quad \delta < 0.$$

The null hypothesis of a unit root is based on the t-statistic (which has non-standard distribution) using simulated critical values. The trend term (t) is retained ($\beta \neq 0$) in the test regression because the ADF t-statistics with and without a trend are substantially different. As quarterly data are used, an initial lag length of 4 is used in the ADF regression to accommodate possible serial correlation. If the fourth lag is insignificant at the 5% level, the lag length is sequentially reduced until a significant lag length is obtained. Using the EViews 3 (1997) software package, the fourth lag is significant from Japan to China (with t-statistic = 2.42).

The ADF test result indicates that the ADF statistic (of -2.73) for the tourist arrival series is greater (or less negative) than the critical value of -3.49 at the 5% significance level. Therefore the null hypothesis of a unit root cannot be rejected, which implies that tourist arrivals from Japan to China are nonstationary. Taking the first differences of the logarithm of the tourist arrivals and applying the ADF test procedure to the transformed series, a more negative test statistic (of -8.75) than the critical value of –2.91 is obtained at a significant lag length of 1. This suggests that the first differenced series is stationary. Individual ADF tests show that the logarithm of tourist arrivals is integrated of order one, I(1), whereas the first difference of the logarithm of the series follows an I(0) process, or is integrated of order zero. Hence, the first difference of the logarithm of tourist arrivals from Japan is used to estimate the appropriate Box-Jenkins time series models for tourist arrivals from Japan to China.

Various autoregressive (AR), moving average (MA), and autoregressive integrated moving average models (ARIMA) have been estimated using ordinary least squares to determine whether the tourist arrivals data for 1986(1)-2000(4) can be described by an AR, MA or ARIMA process. The models selected yield significant t-statistics at the 5% level of significance for the AR and MA coefficients, with no serial correlation at the 5% level, using the Lagrange multiplier test for serial correlation. Table 3 presents the various fitted models for inbound tourists from Japan. These models include ARIMA(0,1,3), ARIMA(1,1,2) and ARIMA(1,1,3) for tourist arrivals from Japan. The Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC) are commonly used in model selection, whereby the smaller values are preferred. Thus, ARIMA(0,1,3) is the best fitting model to describe tourist arrival patterns from Japan. The estimated model is given as follows (with absolute t-ratios in parentheses):

$$\Delta X_t = \underset{(4.59)}{0.041} + \hat{\varepsilon}_t - \underset{(7.47)}{0.70}\hat{\varepsilon}_{t-2} - \underset{(5.98)}{0.59}\hat{\varepsilon}_{t-3}$$

Diagnostic tests are used to determine whether the estimated models deviate from the assumptions of the standard linear regression model. In particular, the estimated models are tested for serial correlation. If serial correlation is present, the estimates are biased and the selected model is not valid. A correlogram, which displays a set of autocorrelations and partial autocorrelations, is an important tool in time series modelling. Diagnostic checkings of the residuals based on the correlogram of the estimated residuals of ARIMA(0,1,3) for Japan lend further support to the result of the Lagrange multiplier test for serial correlation, namely that there is no serial correlation in the residuals.

4. CONCLUSION

It is estimated that China will attract 130 million tourists annually by the year 2020, making it the world's top tourist destination (World Tourism

Organisation, 2000). China has one of the oldest continuous civilizations in the world, vast territory, charming scenery and tremendous social transformation, and will always be an attractive destination for many foreign tourists. This paper has reviewed the rapid development of tourism in China since 1978, and the Box-Jenkins autoregressive integrated moving average model that best describes tourist arrival patterns from Japan has been estimated. An integrated moving average process is the best fitting model to explain tourist arrivals from Japan to China for the period 1986 to 2000.

Since the economic reforms which started in the late 1970s, China has gradually moved from a low-income to a middle-income country with large income inequality. Like many developing countries, China has experienced high rates of unemployment. With tourism fast becoming its major export industry, partly in view of China's successful bid to host the 2008 Olympic Games, many people will find employment in the tourism-related retail trade, accommodation, cafes and restaurants, and manufacturing and entertainment services. Analysing the arrival patterns in international tourism demand by Japan (as well as other important tourist markets) is important for forecasting, marketing promotion, and planning the supply of accommodation, transport and other services. This will be beneficial in ameliorating unemployment in China, particularly in cities and towns due to the dismantling of State-Owned Enterprises and massive urban migration.

5. ACKNOWLEDGEMENT

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Table 1. World's top 10 tourism destinations

Rank	Country	International Tourist Arrivals (million)		% Change 2000/1999	Market share (%) 2000
		1999	2000		
1	France	76.0	75.5	3.4	10.8
2	United States	48.5	50.9	4.9	7.3
3	Spain	46.8	48.2	3.0	6.9
4	Italy	36.5	41.2	12.8	5.9
5	China	27.0	31.2	15.5	4.5
6	United Kingdom	25.4	25.2	-0.8	3.6
7	Russian Federation	18.5	21.2	14.5	3.0
8	Mexico	19.0	20.6	8.4	3.0
9	Canada	19.5	20.4	4.9	2.9
10	Germany	17.1	19.0	10.9	2.7

Source: World Tourism Organization (2001)

Table 2. International Tourists Arrivals in China, 1978-1999 (10,000 persons)

Year	Total	Foreigners	Overseas Chinese	Compatriots
1978	180.92	22.9	1.81	156.1
1985	1783.31	137	8.5	1637.8
1991	3334.98	271	13.3	3050.6
1994	4368.45	518.2	11.5	3838.7
1995	4638.65	588.7	11.6	4038.4
1996	5112.75	674.4	15.5	4422.8
1997	5758.79	742.8	9.9	5006.1
1998	6347.84	710.77	12.1	5625
1999	7279.56	843.23	10.81	6425.52
2000	8344.39	1016.04	6.0	7320.8

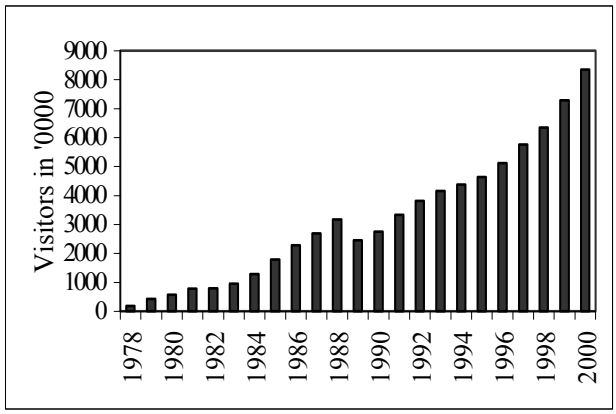
Source: China Statistical Year Book, 2001.

Table 3. Estimates of Selected ARIMA Processes for Inbound Tourists from Japan to China

Variable	Coefficient	t-statistic	AIC/SBC	LM(SC)
Constant	0.041	4.59	AIC = -0.67	F = 0.83
MA(2)	-0.701	-7.47	SBC = -0.56	p = 0.44
MA(3)	-0.594	-5.98		
Constant	0.032	5.85	AIC = -0.51	F = 0.40
AR(1)	0.493	3.10	SBC = -0.37	p = 0.68
MA(1)	-0.559	-3.43		
MA(2)	-0.412	-2.63		
Constant	0.028	2.11	AIC = -0.50	F = 0.47
AR(1)	-0.806	-5.47	SBC = -0.32	p = 0.63
MA(1)	0.761	4.69		
MA(2)	-0.400	-2.64		
MA(3)	-0.376	-3.48		

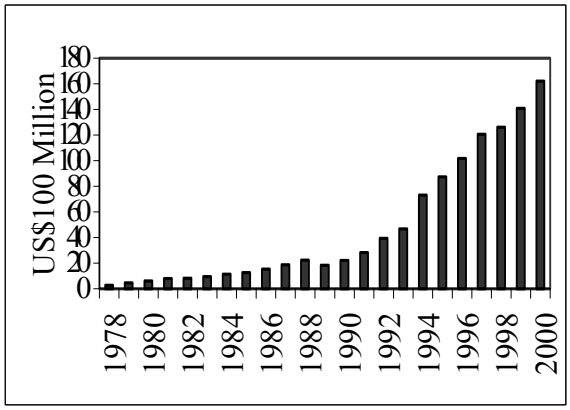
Note: p denotes the probability-value of the calculated F statistic.

Figure 1. International visitor arrivals in China, 1978-2000



Source: China Statistical Year Book (2001).

Figure 2. Chinese international tourism receipts, 1978-2000



Source: China Statistical Year Book (2001).

Figure 3: Logarithm of Tourist Arrivals in China from Japan, 1986-2000

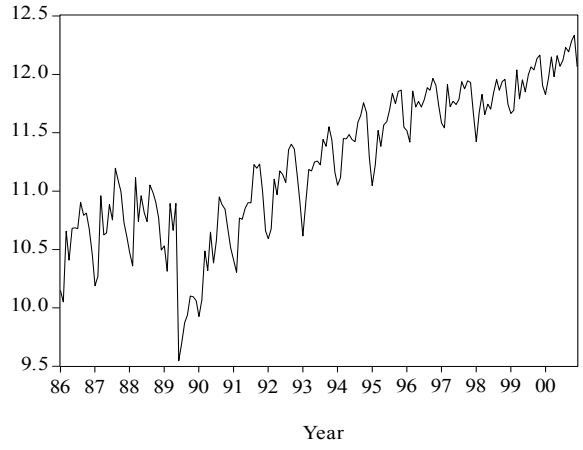


Figure 4: Log First Difference of Tourist Arrivals inChina from Japan, 1986-2000