An Analysis of Inbound Tourism in China

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Major Paper Presented to
the Department of Economics
in Partial Fulfillment of the MA Degree in Economics

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August 2018

Abstract

The paper is an empirical study of China's inbound tourism industry during the period 1980-2016. The condition of the industry is discussed, and an interpretation of statistics on the development of the industry is offered. The linear regression models, which link foreign exchange revenue, the number of foreign tourists and per tourist revenue with determinants such as the infrastructure of the tourism industry and the characteristics of tourists, are specified and estimated with panel data. The results show that real GDP per capita and relative PPPs do have a significant impact on foreign exchange revenue and the number of foreign tourists. However, the coefficient of the relative PPP is negative, which is inconsistent with expectations. Some of the tourism infrastructure variables also have a significant impact on the dependent variables.

1. Introduction

The Chinese tourism industry has experienced rapid development in recent years. The total income from tourism in China was 3.2979 trillion Yuan in 2016, which accounted for 4.44% of GDP according to the National Bureau of Statistic of China. Thus the tourism industry has grown to become an important part of China's economy. The Chinese tourism industry has some definite advantages, like a lower price level and a friendly tourism policy compared to the tourism industries in other Asian countries, although some researchers believe that the tourism market of China is saturated. In reality, saturation only occurs in the domestic tourism sector and the growth of revenue from domestic tourism has slowed since 2010; in contract, the outbound and inbound sector of China's tourism industry is still far from being saturated.

The Chinese tourism industry has developed slowly since 1949 when the New China was born. However, the industry has experienced remarkable development since the 1970s. At the beginning of 1978, China entered an era of economic reform under the leadership of Deng Xiaoping.[1] Since then the country has continued to enjoy political stability and increasing economic prosperity due to its experimentation with the market economy, which was characterized by economic reforms (Lim and Pan 2005). According to the Chinese National Statistics Bureau, the average annual growth rate of China's economy was 10.8% from 1978 to 2006, which is 5.7% percentage points higher than that of other developing countries, and 7.7% percentage points higher than the world's average annual growth rate (Li, Ryan, and Cave 2016). A

[1] Deng Xiaoping was the president of China from 1972 to 1987.

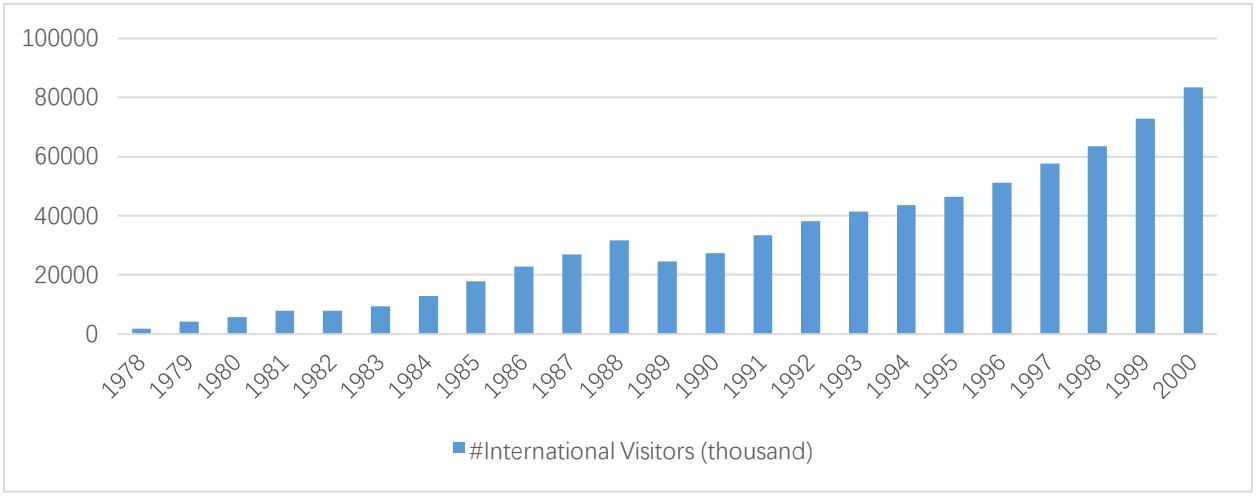
large number of Chinese industries, including the tourism industry, have benefited from the stable and rapid economic growth.

With the introduction of Deng's economic reforms in 1978, the Chinese government focused on the development of the tourism industry. However, during the first four years of the reform, the government paid attention mainly to political and educational visits to China. In 1982, the government recognized tourism as an economic activity, and a new government department – The China National Travel Administration (CNTA) – was founded in 1983. CNTA is the national administrative body responsible for the implementation of short-term and long-term tourism policies in China, and has played an important role in the Chinese tourism industry at the national level. Furthermore, the country reiterated the importance of the tourism industry and added the tourism industry to the "National Plan for Social and Economic Development" in 1990. In 1990, the Chinese government changed the policy that required international visitors to use Foreign Exchange Certificates (FECs) in China; this action is one of the factors that made the number of international tourist arrivals grow rapidly. From 1980 to 1990, there were two basic forms of currency in circulation in the Chinese tourism market, the RMB and FECs.[2] Both forms of currency officially had the same value, but FECs were overpriced for their low liquidity. Foreign visitors could use the RMB in the same manner as Chinese citizens effective in 1990, and this important reform helps to promote the Chinese inbound tourism industry.

[2] The RMB (Renminbi) is the official currency of China. A more common name for the RMB is the Yuan.

Relying on China's stable economic growth and tourism policy promotion, the tourism industry in China has achieved remarkable growth in terms of visitor arrivals and tourism receipts. The country's stable economic environment and its tourism promotion policy brought about a rapid growth in this industry from 1982 to 2000. According to the 2001 *China Statistical Year Book*, the Chinese inbound tourism market grew rapidly. In 2000, 83.44 million foreign tourists visited the country, which is nearly 11 times the number of the visitors in 1980 (Figure 1).

Figure 1. Number of International Visitors (thousands)

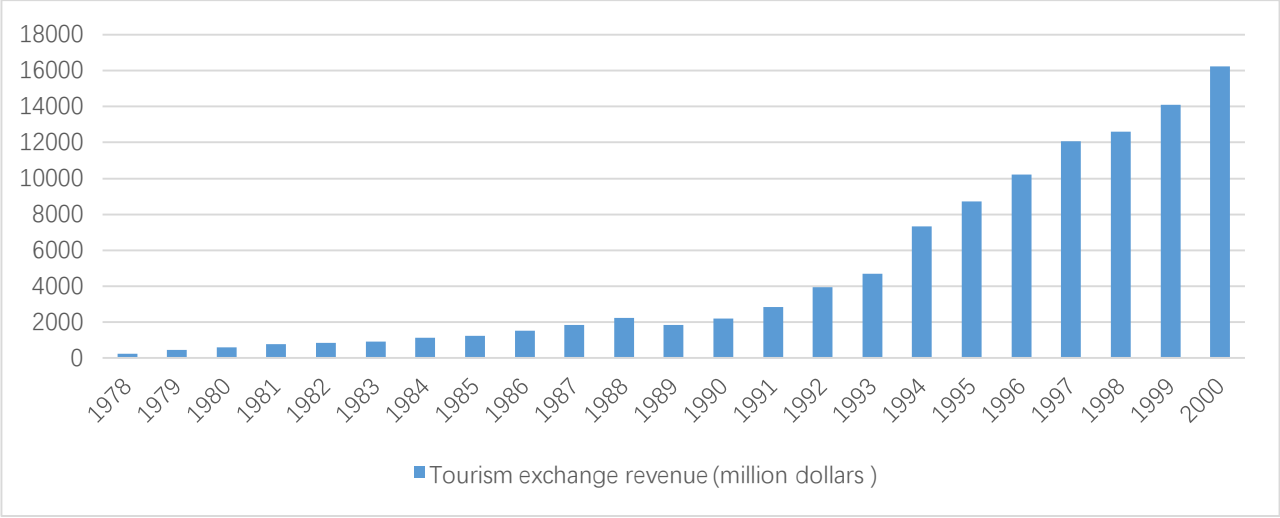


Source: China Statistical Year Book, 2001

Although there was a severe decline in global arrivals because of the negative effects of the 1989 Tiananmen Square incident, the number rebounded in the following year (Lou and Yan 2003). As Figure 2 illustrates, tourism exchange revenue also increased rapidly in accordance with the growth of the number of international tourists. Tourism exchange revenues increased from $263 million in 1978 to $16.224 billion in 2000. The share of tourism revenues in China's GDP also rose over time and the tourism industry became one of the decisive sectors of the Chinese economy (Gao,Huang, and Huang 2009).

In this paper, I attempt to seek the answers to the following questions: What is the tourism exchange revenue of China since 2000? What are the factors that influence the demand for tourism in China? Are these factors significant? To answer these questions, this paper tries to identify whether the variables like tourists' income, relative price and Chinese tourism infrastructure affect the tourism demand or not, using a fixed effects model. Three measures of demand are analyzed, including tourism exchange revenue, the number of foreign tourists and the per tourist revenue.

Figure 2. Tourism exchange revenue (millions of U.S dollars)



Source: China Statistical Year Book (2001).

According to the estimation results, real GDP per capita and relative prices (as measured by PPPs) do have a significant impact on foreign exchange revenue and the number of foreign tourists. Some of the tourism infrastructure variables also have a significant impact on Chinese inbound tourism. When considering country-specific effects, Australian and American tourists tend to spend more than Japanese tourists. However, Australian and American tourists are less willing to visit China than Japanese tourists.

The paper is organized as follows. In Section 2, the structure of China's tourism industry is described. The econometric model of the inbound tourism industry is presented in Section 3. Section 4 contains a discussion of the estimation results. Some concluding remarks are given in Section 5.

2. The Structure of China's Tourism Industry

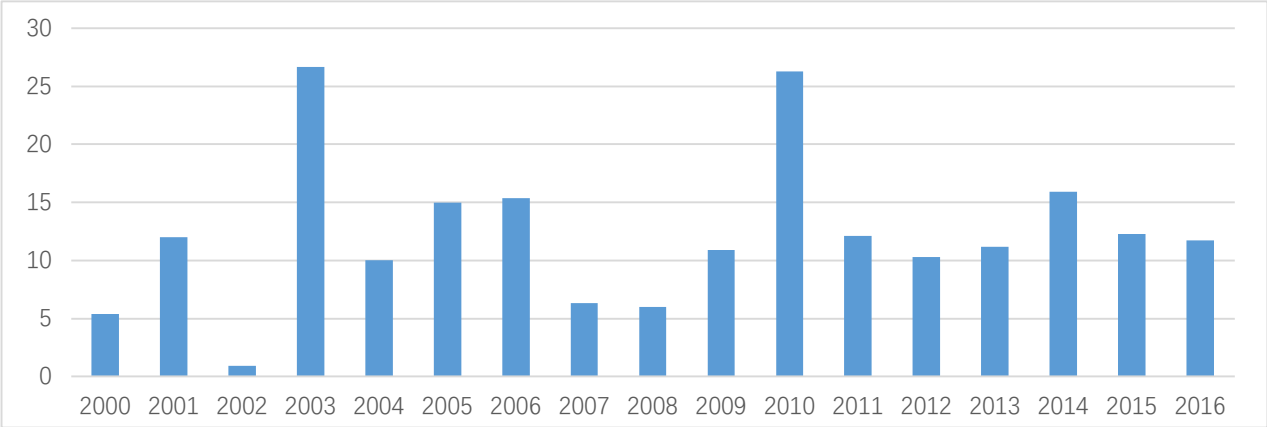
2.1. Domestic Tourism

Domestic tourism involves residents of one country traveling only within that country. In recent years, domestic tourism has played an essential role in the Chinese tourism industry. Gransow, Pál and Fong (2005) carried out research on what makes a particular place a destination for both (state affiliated) producers and consumers (citizens). They found that in China the sites and places visited by domestic tourists are quite different from those that European and North American tourists visit. The Chinese people prefer to visit "Ming Sheng," which refers to beautiful sightseeing and historic sites, such as Mao's mausoleum and historic towns in China. This is also the reason that more and more Chinese citizens travel at home.

According to the Chinese National Statistics Bureau, the number of domestic tourists grew swiftly after 2000. As can be seen from Figure 3, during the period 2000-2016 domestic tourism grew annually at an average rate of about 9.87%. The peak rate of growth is 26.67%, which was reached in 2003. The lowest growth rate occurred in 2002, when it fell to 0.91%. From 2007 to 2008, during the world financial crisis, the growth rate fell to 6%, but it recovered in 2009 to around 10%. The number of domestic tourists

increased at a very high and stable speed rate in 2010. From 2010 to 2016, the growth rate stayed at about 11%. Consumption expenditure per domestic tourist has also increased over time. In 2016, the average domestic tourist spent 1102 Yuan, which is three times higher than the average expenditure level in 2000.

Figure 3. The growth rate of the number of Chinese domestic tourists



Source: National Statistics Bureau, China.

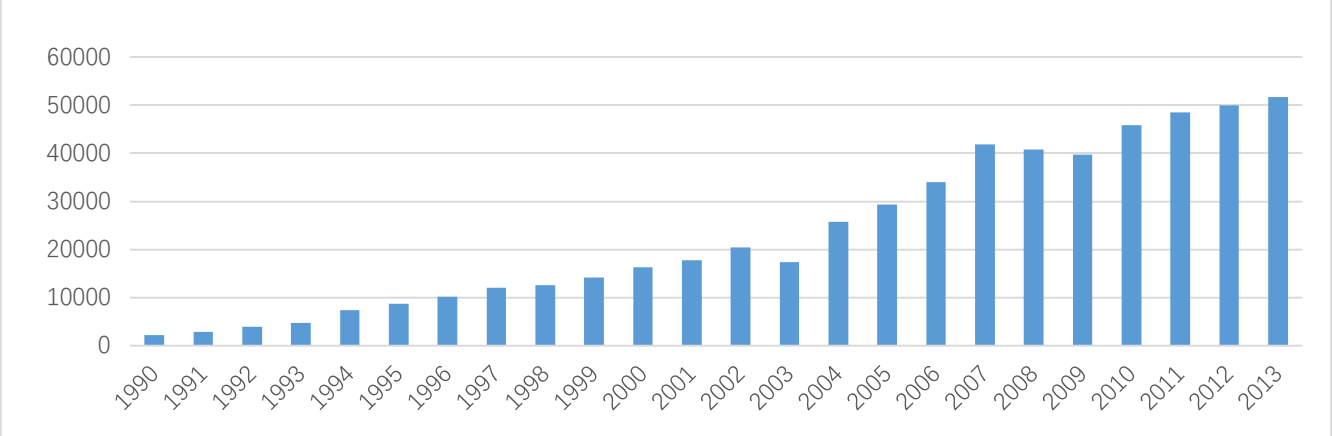
Another characteristic of domestic tourism is that urban residents, as compared to rural residents, constitute the major share of domestic tourists in both numbers and consumption expenditure per tourist. Before 2010, rural residents accounted for 70 percent of Chinese domestic tourism. After the year 2010, urban residents accounted for an increasing share of domestic tourism. Some researchers believe that the income gap between rural and urban residents is the basic cause of this phenomenon. According to Gunter and Netto (2016), travel can be classified as an either normal good or a luxury good by different groups of people. The income elasticity of luxury goods is larger than that of normal goods. When considering Chinese urban and rural tourists, urban residents are more likely to treat travel as a luxury good, since they have higher income and a higher level of education compared to rural residents. They will therefore be more likely to choose to travel in China.

Furthermore, other determinants of the demand for travel also encourage urban residents to travel more than rural residents. Urban residents face more pressure from their family obligations and they are more tired compared with rural residents. Therefore, they have a higher demand for travel (Liu 2004).

2.2. Inbound Tourism

According to the World Tourism Organization, inbound tourism is the activities of the visitor traveling to a place outside the visitor's usual environment for not more than one consecutive year and not less than 24 hours rather than traveling within their own country.[3] The tourism exchange revenues of a country are an important variable used to evaluate the development of a country's inbound tourism. In 2012, the tourism exchange revenues of China were about 50 billion US, which ranked 4th in the world, behind the US, Spain, and France. Figure 4 depicts the time path of China's tourism exchange revenue from 1990 to 2013.

Figure 4. Foreign exchange revenues from tourism (millions of U.S dollars)



Source: China National Tourism Administration

[3] Tourism exchange revenues include the consumption on traffic, accommodation, meals and so on.

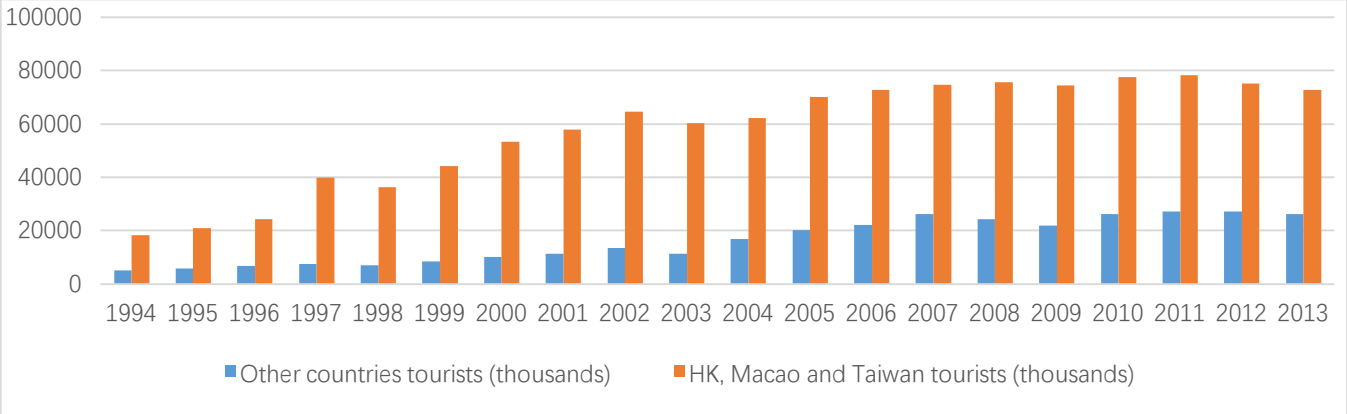
Foreign exchange revenues from tourism showed a rapid increase during the period 2003 to 2007. In the year 2008, likely as a result of the financial crisis, foreign exchange revenue decreased by about 2.4%. In the period from 2010 to 2015, foreign exchange revenues from tourism experienced a stable growth rate averaging around 5% annually. However, the average annual growth rates of foreign exchange from tourism of the US and Spanish tourism industries were even higher, at 10.2% and 7.1% respectively. According to the research of Lai et al (2006), the Chinese inbound tourism industry developed rapidly from 1997 to 2006, owing to the relatively low price level and friendly travel policy compared with other East Asian countries. However, problems like the deterioration of air quality and food security decreased the attraction to foreign tourists. Lai et al believe that the rate of increase will remain lower and the gap in tourism exchange revenue between the Chinese and American tourism industries will widen.

Why did the tourism exchange revenues increase rapidly from 1997 to 2010? The answer to this question can be found in the origins of foreign tourists. When considering China's inbound tourism, most researchers focused on foreign tourists and tourists from Hong Kong, Macau, and Taiwan who travel in mainland China. According to National Statistics Bureau data, the main feature of inbound tourism in China is that tourists from Hong Kong, Macao are the main sources of China's inbound tourism. Figure 5 shows the numbers of other overseas tourists and tourists from Hong Kong, Macao, and Taiwan from 1994 to 2016.

Note that the number of tourists from Hong Kong, Macao, and Taiwan has been much higher than that from overseas countries during the past twenty years. During the period from 2002 to 2006, this number has experienced rapid growth, from 70 million person-visits to 100 million annually. In 2011, the number

peaked at 103 million people. In contrast, the growth rate of the number of overseas tourists remained at a relative low level during the period 2009-2016. In 2008, after the global financial crisis, the number of overseas tourists fell. Although the total number of oversea tourists has changed slightly from 2006 to 2016, the distribution of these tourists across countries of origin has changed. Table 1 gives the number of foreign tourists according to countries of origin.

Figure 5. Number of tourists from Hong Kong, Macao, Taiwan and all other countries



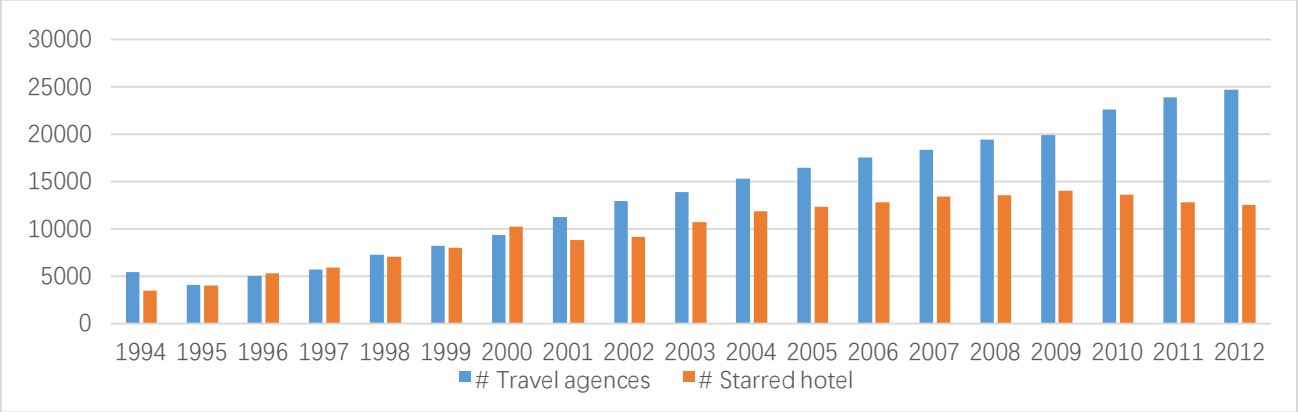
Source: Chinese National Statistics Bureau.

As can be seen from Table 1, the number of tourists from Southeast Asian countries such as Mongolia and the Philippines increased rapidly after 2008. However, the number of tourists from Japan and Russia, which constitute a large share of China's inbound tourism, decreased in recent years. In 2009, the number of tourists from Russia decreased quite a bit, perhaps because Russia's economy deteriorated. In the year 2009, Russia's national GDP decreased about 12 percent.

Another factor that may contribute to the growth of inbound tourism is the "tourism infrastructure" This term refers to the scale and condition of operation of travel agencies and hotels, among other things. The development of this infrastructure is important to the tourism industry because it can affect the quantity

of tourists and the expenditure flow for both domestic and foreign tourists. The infrastructure and capacity of the tourism industry is symbolic of the level of development level of the national economy in a country. The scale and the state of operation of travel agencies have increased in recent years. However, the number of starred hotels have been experienced negative growth for several years. More and more travel agencies, which serve tourists, have been established in China, and these agencies play an important role in inbound tourism. According to the Chinese National Statistics Bureau, in 2013, the number of foreign tourists travelling inbound through travel agencies is 33.51 million, which accounted for about 42% of the total foreign tourists who traveled to China. It is likely that the number of tourists who travel through agencies that will continue to rise rapidly. Figure 9 depicts the evolution of the number of China's travel agencies and starred hotels from 1994 to 2012.

Figure 6. The number of Chinese travel agencies and starred hotels



As can be seen from Figure 6, the number of travel agencies has increased rapidly. The number of agencies is always higher than the number of starred hotels, except for the year 2000. In 2013, there were 2004 travel agencies, which was about 4.5% higher compared with the number of the preceding year, and

the total assets of all travel agencies were 103.98 billion Yuan. The in total revenue was 359.95 billion Yuan, which represents a 4.7% increase compared with the previous year. The number of starred hotels is not as stable; in 2001 and 2010 it decreased considerably. However, the number of starred hotels has been increasing in recent years.

3. Model

3.1 Previous literature on tourism demand

The tourism exchange revenue of a country is a statistic that measures the country's status of development in inbound tourism. Tourism exchange revenue is the revenue earned from foreign tourists and includes all expenditures on transportation, hotels, catering, shopping, and entertainment. What are the factors that may affect tourism exchange revenue? According to Yazdi and Khanalizaden (2017), the international travel demand of tourists is strongly related to their income. Yazdi and Khanalizaden estimate the coefficients of the determinants of the international tourism demand of American using a gravity framework for the period 1995-2014 using U.S data. Their analysis is based on a panel dataset of the tourist arrivals from 14 countries. They estimate an autoregressive distributed lag model. They find that real GDP per capita, the consumer price index and the real exchange rate have a significant impact on the international tourism demand.

Choyakh (2008) estimates a model of tourism demand for Tunisia using annual time series data for the period 1962- 2005. He chooses the income of the country of origin, relative prices, prices of substitutes and various dummy variables as the independent variables, and uses the log of hotel nights spent by

nationals of the origin country as the dependent variable. After carrying out tests for cointegration, Choyakh finds that in his log-linear model income of the country of origin of tourists is the most significant factor in determining the dependent variable. Relative prices and tourism supply do not have a significant effect on the demand of European tourists for visits to Tunisia.

According to Onafowora and Owoye (2012), who provide models of international tourism demand for destination countries in the Caribbean region, several variables influence tourism demand. The authors use the autoregressive distributed lag (ARDL) bonds test - to test for the cointegration in their tourism demand equations (Onafowora and Owoye 2012). The authors use annual data for the period 1970- 2004, and choose per capital tourist arrivals in destination country as the dependent variable. The independent variables are per capital real income, tourism prices and transport costs. The estimation results indicate that changes in tourism prices, travel costs and tourists' income significantly affect tourists' travel decisions.

Another study of tourism demand that uses the number of visitors, disaggregated by type of visit (holidays, visits to family and friends, and business visits) was carried out by Turner and Witt (2001): The authors focus on inbound tourism to New Zealand from Australia, Japan, the UK and the USA using annual time series data for the period 1978-1997. They use structural equation modelling to examine the determinants of the three types of visits simultaneously. As independent variables the authors include prices (destination living costs), airfare, retail sales, new private car registrations and domestic loans. Their linear models lead to the conclusion that international trade is an important determinant of business tourism demand, while retail sales are the most important determinant of business tourism demand.

In addition to the increasing number of travel agencies and starred hotels, the volume of international airline routes that connect China to the rest of the world has increased over time. According to Williams (2016), the increasing number of international airlines and routes is necessary for the development of the tourism industry, because airplanes are the most used and fastest transportation mode for oversea tourists. At the beginning of the 21st century, China had 316 international airlines, with 2090 thousand kilometers air routes in use. Most of the airlines connect with important countries like the United States, Russia, and the UK. Tourists from other developed countries like Canada, France, and Norway, would not travel to China during that time because of the time wasted in transfers and expensive airline tickets. With the development of the airline industry, China opened itself to more international airlines, especially those connecting to medium-sized countries like Turkey, Spain, and New Zealand. According to the China Statistical Yearbook, in 2016 China had 1,079 international airlines and 28,280 thousand kilometers of air routes in use.

The number of sightseeing buses and hospitals, which provide services to foreign tourists may also affect the tourism exchange revenue. According to the research of Lam et al. (2011), Chinese traditional medicine has received more publicity, which led to more foreign tourists to China for a medical tourism. Lam et al. (2011) collect data on the number of tourists who traveled Macau from 2000 to 2007 and the purpose of their visits. The author uses linear regression model and finds that the demand of Chinese medical tourism is a significant factor that will affect the total number of foreign tourists in Macau. In the model I will use indicators of Chinese tourism infrastructure like the number of sightseeing buses and

hospitals as independent variables, and test whether these factors affect Chinese tourism exchange revenue or not.

In another study of the demand for international tourism in China, Chen and Haynes (2015) examine the impact of the Chinese high-speed rail (HSR). They estimate a dynamic panel data model using a panel data set that includes 21 countries over the period 1997 to 2012. The dependent variable is the number of international tourist arrivals, while the independent variables include income of the origin country (measured by real GDP per capital), transportation cost, relative prices and the length of Chinese high-speed rail. The empirical results confirm the overall impact of HSR is positive, indicating that improvements of Chinese tourism infrastructure lead to growth of the Chinese tourism industry.

In conclusion, most researchers use tourists' income and the relative price as the independent variables when examining the demand for international tourism, and the coefficients of these two variables are significant in most studies. Furthermore, some authors use tourism infrastructure as independent variables when considering the demand for international tourism in China. The literature review provides reasonable guidance to me when creating the model for Chinese inbound tourism by myself.

3.2 A model of Chinese inbound tourism industry

The goal of this paper is to estimates the effect of variables like income, prices and tourism infrastructure on Chinese inbound tourism demand. In building a model of tourism demand, one must first specify the dependent variable. In this paper, I will consider three alternative dependent variables: tourism foreign exchange revenue (or simply "tourism revenue"), the number of tourists and per tourist revenue.

According to Song and Li (2008), although the number of tourists is the most commonly-used dependent variable in models of tourism demand, tourism revenue is also used by some studies.

As the literature review in section 3.2 highlighted, as explanatory variables previous researchers have used a variety of factors that may affect international tourism demand. Following the literature, I will select the variables that are most suitable for Chinese inbound tourism industry and the most readily available. The same explanatory variables will be used in the equations for each of the dependent variables. Since panel data will be used to estimate the methods, in the equations below *i* indicates the country of origin of the tourists and *t* indicates the year.

The following specifications of the econometric equations are adopted for the three models to be estimated:

$$tourismex_{it} = \alpha + \beta_1 rgdp_{it} + \beta_2 reppp_{it} + \beta_3 nhotels_{it} + \beta_4 nagences_{it} + \beta_5 lengair_{it} + \beta_6 ntb_{it} + \beta_7 nhos_{it} + \sum_{j=1}^{J} \gamma_j D_{it}^{j} + \varepsilon_{it}, \quad (1)$$

$$nutotalt_{it} = \alpha + \beta_1 rgdp_{it} + \beta_2 reppp_{it} + \beta_3 nhotels_{it} + \beta_4 nagences_{it} + \beta_5 lenghair_{it} + \beta_6 ntb_{it} + \beta_7 nhos_{it} + \sum_{j=1}^{J} \gamma_j D_{it}^{j} + \theta_{it}, \quad (2)$$

$$pertourev_{it} = \alpha + \beta_1 rgdp_{it} + \beta_2 reppp_{it} + \beta_3 nhotels_{it} + \beta_4 nagences_{it} + \beta_5 lenghair_{it} + \beta_6 ntb_{it} + \beta_7 nhos_{it} + \sum_{j=1}^{J} \gamma_j D_{it}^{j} + \mu_{it}. \quad (3)$$

In equation (1), $tourismex_{it}$ represents the annual tourism foreign exchange revenue (in hundreds of millions of US dollars) that China earned from tourists from country i in year *t*. In equation (2), $nutotalt_{it}$ is number of foreign tourists from country i who travelled to China in year *t*. In the equation (3), $pertorevenue_{it}$ represents per tourist revenue, which is calculated by dividing the tourism foreign exchange revenue by the number of foreign tourists.

Many papers include a measure of tourists' income as an explanatory variable that may affect the demand for international tourism. As is commonly done, I chose real GDP per capita in the country *i* in year *t* ($rgdp_{it}$) as a proxy for tourists' income. I also include a measure of prices (again a common control). As my relative price measure I use the purchasing power parity of country *i* relative to that of China in year *t*, $reppp_{it}$

Equations (1), (2) and (3) also include a number of variables that vary only across time, not countries. These variables reflect the common categories of tourism infrastructure that were mentioned above. $lengair_{it}$ is the total length of the international airline routes (thousands of kilometers) that served China in year t; $nagences_{it}$ is the number of Chinese travel agencies in year *t*; $\mathrm{nhotels}_{it}$ is the number of Chinese starred hotels in year *t*; ntb_{it} is the number of sightseeing buses in China in year *t*; and nhos_{it} is the number of Chinese hospitals in year *t*. Because these variables do not vary with country, year dummies cannot be included in the model. Finally, ε_{it} , θ_{it} and μ_{it} are the error terms.

In addition, the D_{it}^{j}, *j= 1,…, J* are the country-specific dummy variables for nine of the ten countries included in the data set. These variables capture the fixed effects of unmeasured factors like distance and

relations between countries that do not change over time. Japan is selected as the reference country, and hence no dummy variable is included for it.

In this paper, I will use the method of ordinary least squares to estimate equation (1), (2) and (3) with panel data. The reason why I choose panel data is that the values of the determinants of tourism differ by countries of origin. The differences cannot be adequately captured using time-series data,

3.3 Data description

For this paper I have collected panel data for the period from 2000 to 2016. Because the determinants of tourism vary with the country of origin of the tourists, tourists are therefore divided by country of origin into nine groups, including the United States, Russia, Japan, Korea, Australia, the Philippines, Hong Kong, Macau and Taiwan. The reason why I chose these countries is because they represent a high proportion of tourists to China- more than 70% of the total tourists in 2016.

The data on national real GDP per capita is drawn from the World Bank's *World Development Indicators* database for the years 2000 to 2016. The unit of account is the American dollar. The relative PPPs were constructed by first dividing PPP conversion factors for GDP for each country in the sample and China by the country's exchange rate with the US dollar, and then dividing the resulting ratio for each country by the Chinese ratio. The PPP conversion factors, which are developed by the world Bank's International Comparison Program, were obtained from the World Bank's *World Development Indicators* database for all countries except Taiwan; for Taiwan, the conversion factor was obtained from IMF's

International Financial Statistics.[4] Annual average market exchange rate were also obtained from the *International Financial Statistics*. Data on the number of foreign tourists from each country, the number of travel agencies and the number of starred hotels are from the National Statistics Bureau of China's annual report on the tourism industry. Data on the number of sightseeing buses and the number of hospitals are from the National Statistics Bureau of China's annual report on urban construction. Finally, data on the length of international airline routes serving China are drawn from the annual report on the public transportation. Data on the tourism foreign exchange revenue is drawn from the Ministry of Culture and Tourism of the People's Republic of China. The data on all categories of Chinese infrastructure are annual data for period 2000 to 2016. Per tourist revenue was computed by dividing tourism foreign exchange revenue for each country of origin by the number of tourists from that country. Further details on the data sources can be found in the appendix.

Table 2 provides summary statistics of my data. According to table 2, for the sample as a whole, the mean of real GPD per capita is $29,733.51 US. The mean of the relative PPP is 1. When considering the factors of the Chinese infrastructure, the means of the data about the number of hotels and travel agencies are 12,102.18 and 34,887.12. The mean number of sightseeing buses is 903,438.7. When considering the dependent variables, the mean of tourism foreign exchange revenue is $3.42 billion US. The mean and standard deviation of the number of tourists from different countries are 3,003,080 and 2,028,212. The mean of per tourist revenue is $1,229.852. In total there are 153 observations.

[4] IMF data were used for Taiwan because the World Bank does not include Taiwan in their database. PPP conversion factors for GDP were used rather than PPP conversion factors for the private consumption because the IMF provides conversion factors only for GDP.

It is also interesting to consider descriptive statistics by country, the Australia has the highest mean real GDP per capita over the sample period- $50,527.92 US. In contrast, mean real GDP per capita in the Philippines is only $2,051.825 US. The mean of relative PPP is also highest in Australia at 2.586378 with a standard deviation equal to 0.363252. Hong Kong has the highest mean value of tourism foreign exchange revenue and the highest mean number of tourists per year, equal to $6.55 million of US and 6,477,976 respectively. Australian tourists have the highest mean per tourist revenue at $2,366.969 US, which means that Australian tourists on average spent the most while travelling to China.

Of the explanatory variables, only real GDP per capita and relative PPP change with both country and time period. The factors related to Chinese tourism infrastructure change only with time. The condition of tourism infrastructure is unrelated to the foreign tourists' nationality, which means that the data for these variables will be same in each year for the different countries of origin. All the dependent variables vary over both time period and country of origin.

4. Estimation Results

As discussed in section 3, equation (1), (2) and (3) of this paper are fixed effects models. The equations are estimated using the ordinary least squares method, with Japan as the reference country of origin.

Table 3 shows the OLS results for all three equations. For equation (1), the joint test of the null hypothesis that all the coefficients are zero is rejected with an F-value of 45.37, and a p-value of 0.0000. The R-squared and adjusted R-squared are 0.8324 and 0.8141, which are reasonably high for this type of model. Thus the function fits fairly well and has good explanatory power.

The effect of the foreign tourists' real GDP per capita is significant at the 1% level with a p-value equal to 0.002, which implies that real GDP per capita is a statistically significant factor affecting the tourism foreign exchange revenue that China earns. The coefficient of the factor is 74993.13, which suggests that China's tourism foreign exchange revenue will increase by $74,993,130 if the foreign real GDP per capita increases by $1000. This result is consistent with my expectations. The relative PPPs variable has a coefficient that is significant at the 5% level (p-value equal to 0.018), which implies that the relative PPPs also has impact on China's tourism foreign exchange revenue. However, because the estimated the coefficient is negative, a higher relative PPP will not increase tourism foreign exchange revenue. The result implies that a lower price level in China will decrease the tourism exchange revenue, which is the opposite of what was expected.

Now considering the effect of Chinese infrastructure on tourism foreign exchange revenue. The coefficients of the number of travel agencies, hospitals, starred hotels and the length of international air routes are insignificant at the 10% level with p-values much greater than 0.1, which implies that more starred hotels, travel agencies and hospitals and more international air routes will not effectively influence China's tourism exchange revenue. However, the effect of the number of sightseeing buses is significant at the 5% level with a p-value equal to 0.019. The coefficient of the variable is -2,009.911, which implies that increases in the number of sightseeing buses will not increase tourism revenue as expected. The number of the sightseeing buses increased from 791,652 to 1,102,563 during the 2000 to 2016 period, a large increase; it is possible that the existing buses are sufficient to serve the foreign tourists.

When considering the effect of tourists' nationality on the tourism revenue, I set Japan to be the reference group. The results shows in table 3, indicate that the country-specific effects of Russia, Macau, Taiwan and the Philippines are insignificant at the 10% level, with the p-values much greater than 0.1. This means that there exist no differences between these countries and Japan, holding other variables constant. The country-specific effects of Australia and the United States are significant at the 1% level, with negative coefficients, which implies that compared with Japanese tourists, Australian and American tourists' willingness to visit China is relatively low when holding all else constant. These country-specific effects account for several factors that are unmeasured, like the the distance to China. The distances between Australia and China and the US and China are much larger than the distance from Japan to China, which means that Australian and American tourists must spend much more time on an airplane during the journey. The long and boring air travel may decrease their willingness to visit China.

The effect of the country dummy variable for Hong Kong is significant at the 1% level (p-value equal to zero). The coefficient of this dummy variable is positive, which implies that tourists from Hong Kong have a higher willingness to visit China compared with Japanese tourists. Tourists from Hong Kong can enter China visa-free, which is more convenient compared with Japanese tourists. Similarly, the coefficient for Korea is significant at the 1% level, with a p-value smaller than 0.01. The coefficient of this country dummy variable is positive, which means that tourists from Korea also have a higher willingness to travel to China compared with Japanese tourists.

Now we can turn to equation (2), which examines the effects of the variables on the number of foreign tourists from country *i*. For this equation the null hypothesis that all the coefficients are jointly zero is

rejected the 1% level of significance. The R-squared and adjusted R-squared of this equation are 0.9443 and 0.9382. They are even higher than those for equation (1), which suggest that the model fits the data very well.

In this equation the coefficient of real GDP per capita is significant at the 1% level with a p-value equal to zero. The value of the coefficient is 55.37837, which implies that if real GDP per capita increases by $100 US, the number of tourists traveling to China will increase by about 5,538. This result is consistent with expectations. However, the coefficient of the relative PPP is not significant at the 10% level (p-value equal to 0.147), which implies that changes in relative PPP do not significantly influence the number of tourists, which is inconsistent with my expectation.

The effect of the number of starred hotels on the number of tourists is significant at the 1% level, with a p-value equal to 0.004. The coefficient of the variable is 95.40522, which indicates that one more starred hotel in China can attract 95 more foreign tourists in one year. The result is consistent with my expectation that the development of infrastructure which provides services and convenience to foreign tourists is important to the Chinese inbound tourism industry. However, the effects of other infrastructure variables such as the number of travel agencies, sightseeing buses and hospitals are not statistically significant at the 10% level, suggesting that they do not play an important role in attracting more tourists from nine countries included in the sample. This condition may be caused by multicollinearity between the variables of tourism infrastructures, which will be discussed in the conclusion.

In this equation as well, I set Japan to be the reference country of origin. The results in column (2) of table 3, shows that the country-specific effects for the Philippines and Russia are insignificant at the 10%

level, with p-values much greater than 0.1, which means that there exist no differences between these countries and Japan. The county effects of the US and Australia tourists are significant at the 1% level (the p-values for both countries are equal to zero). The coefficients of these country dummy variables are negative, which implies that compared with Japanese tourists, Australian and American tourists' willingness to visit China is relatively low, holding all else constant. This may be due to factors like distance from China, as discussed earlier. In contrast, the country-specific effects of Hong Kong, Macau, Taiwan and Korea are significant at the 1% level, with p-values smaller than 0.01. The coefficients of these country dummy variable are positive, which implies that tourists from Hong Kong, Macau, Taiwan and Korea have a higher willingness to visit China than Japanese tourists. Again, distance with China maybe one of the factors underlying the result. Furthermore, the territorial dispute about "Diaoyu" Island has worsened the relations between Japan and China in recent years, which may have changed the relations between Korea, Japan and China.

Next, table 3 includes estimation results for equation (3). As with the other two equations, I can reject the null hypothesis that all the coefficients are jointly zero. The R-squared and adjusted R-squared of the equation are 0.8854 and 0.8729, which are reasonably high for this type of model.

Surprisingly, in this equation, the effect of real GDP per capita is insignificant at the 10% level, with a p-value equal to 0.116. This result implies that a higher real GDP per capita in one of the countries of origin of tourists to China does not influence the per tourist revenue, even through real GDP per capita has a positive coefficient in equation (1) and (2). Since per tourist revenue is calculated by dividing tourism revenue by the number of foreign tourists and real GDP per capita has a significant positive effect on both

the denominator and numerator, the effect on per tourist revenue is uncertain. The coefficient of the relative PPP is also insignificant at the 10% level (p-value equal to 0.118). Thus changes relative PPP also do not effectively influence the per tourist revenue.

More of the infrastructure variables seem to have a significant effect on per tourist revenue than on total tourism revenue and the number of tourists. The effect of the number of travel agencies is significant at the 1% level with a p-value equal to 0.009. The coefficient of the variable is 0.023675 and the positive coefficient means that more travel agencies can increase the per tourist revenue as expected. The effect of the number of hospitals is significant at the 1% level with a p-value equal to 0.005. The positive coefficient of 0.930738 implies that increases in the number of hospitals will increase per tourist revenue. The result is consistent with prediction that more foreign tourists will visit China for the medical tourism. The effect of the number of sightseeing buses is significant at the 1% level with a p-value close to zero, but the coefficient is -0.0007964, which implies that the increases in the number of sightseeing buses will decrease, the per tourist revenue.

In this equation, the coefficients of all nine country dummy variables are significant at least the 5 % level. The coefficients of the country variables for Australia and the US are positive, which means that holding other things constant, that American and Australian tourists on average spend more money than Japanese tourists. The coefficients of the other country dummy variables are negative. These results may be due to different airfare and consumption habits. The average airfare between New York and Beijing is six times higher than the airfare between Tokyo and Beijing.

5. Conclusion

This paper presents an analysis of China's inbound tourism Industry. An account of the evolution of two sectors – domestic tourism and inbound tourism– was given. The main objective of the paper is to examine which factors that affect tourism revenue, the number of foreign tourists and per tourist revenue. Using panel data obtained mostly from the World Bank and the Chinese National Statistics Bureau, the paper estimates three econometric equations that link the independent variables – tourists' income (real GDP per capita), the relative PPP, and measures of China's tourism infrastructure such as the number of starred hotels, travel agencies, sightseeing buses, hospitals and the length of the international airline route to the three dependent variables. In the models, I set the Japan as the reference country of origin, and the nine specific country-specific dummy variables are included for the United States, Russia, Australia, Korea, the Philippines, Hong Kong, Macau and Taiwan. These variables capture the effects of unmeasured factors like distance and relations between countries. The results show that real GDP per capital and relative PPP do have a significant impact on foreign exchange revenue and the number of foreign tourists. However, the coefficient of the relative PPP is negative, which is inconsistent with my expectations. Some of the tourism infrastructure variables also have a significant impact on the dependent variables. When considering the country specific effects, Australian and American tourists are less wiling to visit China than Japanese tourists. However, Australian and American tourists will spend more compared to Japanese tourists.

The model has several limitations that make some results inconsistent with my expectations. One of the limitations is that the performance of the relative PPP is not as good as expected. One possible explanation

for this result is that the foreign tourists will focus on the price level differences between China and other Asian countries like Japan and Korean if they are interested in travelling to Asia, rather than the price level difference between their own country and China. In the future research, I will change the price variable to the relative PPP between China and other Asian countries. Another problem is that PPP measure used is for gross domestic product and may be too broad for the tourism industry. The model may be better if a PPP measure for consumption or some specific goods that provide a better proxy for the price of tourism is used as an independent variable.

Another problem is that the measures of China's tourism infrastructure suffer from multicollinearity. In fact, the VIFs of the length of airline routes and number of hospitals variables are 37.33 and 28.57 and the condition number for the five infrastructure variables is 84.1405, which implies that there exists multicollinearity involving these variables. It is notable that China experienced a period of rapid economic growth from 2000 to 2016, and the tourism infrastructure measures all grew rapidly at the same time, which may explain why there is multicollinearity between them, and thus why some of their coefficients are not statistically significant or have the unexpected signs.

Another limitation is that the effects of many of the independent variables in equation (3) are insignificant. This may be because per tourist revenue is calculated by dividing tourism exchange revenue by the number of tourists, meaning that per tourist revenue is the ratio of equations (1) and (2). The independent variables may perform better when equations (1) and (2) are estimated separately. In future work, I will try rewrite equation (3) with the aim of making it more realistic.

Yet another potential limitation of the model is the possibility that some of the explanatory variables may be correlated with the error term. For example, omitted variables could perhaps be correlated with independent variables like China's infrastructure variables. The country dummies control for some such variables, but perhaps not all of them, as the country dummies control only for omitted variables that do not change over time.

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Table 1. Foreign tourists by country of origin (thousands)

	Country								
Year	Korea	Japan	Russia	USA	Thailand	Malaysia	Mongolia	Philippines	Singapore
2006	3924.0	3745.9	2405.1	1710.3	532.3	893.4	631.2	712.0	886.1
2007	4777.1	3977.5	3003.9	1901.2	547.2	910.7	643.6	733.0	894.2
2008	3960.4	3446.1	3123.4	1786.4	611.6	1062.0	705.3	795.3	910.0
2009	3197.5	3317.5	1743.0	1709.8	554.3	1040.6	576.4	748.9	953.1
2010	4076.4	3731.2	2370.3	2009.6	541.8	1059.0	794.4	828.3	984.2
2011	4185.4	3658.2	2536.3	2116.1	635.5	1245.2	984.2	894.3	1002.0
2012	4069.9	3518.2	2426.1	2118.1	608.0	1245.1	1000.5	862.0	1027.7
2013	3969.0	2878.0	2186.0	2085.0	647.6	1235.5	1040.0	997.0	967.0
2014	4182.0	2718.0	2046.0	2093.0	613.0	1130.0	1083.0	968.0	971.0
2015	4444.4	2497.7	1582.3	2085.0	641.5	1075.0	1014.1	1004.0	905.3
2016	4775.0	2590.0	1977.0	2250.0	753.0	1165.0	1581.0	1135.0	925.0

Source: National Statistics Bureau, China.

Table 2. Summary statistics for full sample

	Mean	Standard deviation
tourismex	$3.420,000,000	3.04e+09
pertoureve	$1229.852	795.9236
nutotalt	3003080	2028212
rgdp	$29733.51	18122.38
reppp	1.767555	.8111279
nhotels	12102.18	1898.004
nagences	34887.12	63817.88
lenghair	1183995	638394.3
ntb	903438.7	216301.6
nhos	20956.82	3831.31
N	153	

Table 3. OLS results

	(1) tourismex	(2) nutotalt	(3) pertourev
rgdp	74993.1***	55.38***	-0.00812
	(3.16)	(6.07)	(-1.58)
reppp	-743877511.6**	-174450.7	-106.1
	(-2.39)	(-1.46)	(-1.57)
nhotels	24463.6	95.41***	-0.00101
	(0.29)	(2.90)	(-0.05)
nagences	7938.7	-2.035	0.00237***
	(1.92)	(-1.28)	(2.64)
lenghair	1037.5	0.571	0.000112
	(0.90)	(1.29)	(0.45)
ntb	-2009.9**	0.474	-0.000796***
	(-2.38)	(1.46)	(-4.35)
nhos	156217.4	-22.25	0.0931***
	(1.03)	(-0.38)	(2.83)
us	-1.41036e+09***	-1664734.3***	360.3***
	(-2.97)	(-9.11)	(3.50)
australia	-3.30824e+09***	-2948183.9***	1093.1***
	(-6.89)	(-15.98)	(10.52)
hongkong	2.94745e+09***	4014794.2***	-575.8***
	(4.91)	(17.39)	(-4.43)
korean	1.76473e+09***	1526764.5***	-378.9**
	(2.37)	(5.34)	(-2.35)
macau	-861327540.9	1187561.7***	-596.6***
	(-1.32)	(4.73)	(-4.22)

philippines	-1.35662e+09	-254054.4	-1131.1***
	(-1.22)	(-0.59)	(-4.70)
russia	-622177546.3	488606.8	-638.0***
	(-0.60)	(1.23)	(-2.85)
taiwan	1.01188e+09	2634670.1***	-830.5***
	(1.21)	(8.21)	(-4.60)
constrant	-553555417.9	-610573.5	524.3
	(-0.23)	(-0.67)	(1.03)
N	153	153	153
R^2	0.832	0.944	0.885
F	45.37	154.9	70.57

Notes: Values in parentheses are t statistics. *means the coefficient is significant at the 10% level, **means significance at the 5% level, and ***means significance at the 1% level.

Data Appendix

Variable	Definition and Source
PPP conversion factor, GDP (LCU per international $)	Number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as U.S. dollar would buy in the United States All countries except Taiwan: PA.NUS.PPP World Bank, World Development Indicators database (all countries except Taiwan) http://databank.worldbank.org/data/source/world-development-indicators Taiwan: PPPEX, from file WEOApril2018all.xls, retrieved from the World Economic Outlook Database of the International Monetary Fund https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/index.aspx
Exchange Rate	Exchange Rate, Domestic Currency per U.S. Dollar, Period Average International Financial Statistics, International Monetary Fund http://data.imf.org/?sk=4C514D48-B6BA-49ED-8AB9-52B0C1A0179B&sId=1390030341854
Real GDP per capita	The ratio between the real gross domestic product and the number of people in the country. Units in US dollar. World Bank, World Development Indicators database http://databank.worldbank.org/data/source/world-development-indicators
Number of Starred hotels in China	The number of starred hotels constructed in China over the 2000 to 2016 period. Chinese national statistic Bureau http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0201&sj=2016
Number of travel agencies	The number of travel agencies who get approved from the government in China National Bureau of Statistics of China http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0201&sj=2016
Number of sightseeing buses and hotels	The number of sightseeing buses and hospital that get work permit in China. National Bureau of Statistics of China http://data.stats.gov.cn/english/easyquery.htm?cn=C01
The length of International routes	The total length of international routes serving China National Bureau of Statistics of China http://data.stats.gov.cn/english/easyquery.htm?cn=C01

The number of tourists from different country	Number of Overseas Visitor Arrivals refers to the number of tourists of foreigners, Chinese compatriots from Hong Kong, Macao and Taiwan who come to China (mainland) within the reference period for sight-seeing, vacation, visiting relatives, medical treatment, shopping, attending conference, or to engage in economic, cultural, sports and religious activities. National Bureau of Statistics of China http://data.stats.gov.cn/english/easyquery.htm?cn=C01
The tourism exchange revenue	Foreign Exchange Earnings from International Tourism refer to the total expenditure on transportation, sighting, accommodation, food, shopping and entertainment of foreigners and overseas Chinese during their stay in the mainland of China. Units in hundreds of millions of US dollars. Ministry of Culture and Tourism of the People's Republic of China http://zwgk.mct.gov.cn/?classInfoId=12