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# **ARE WORLD HERITAGE SITES ALWAYS A CATALYST FOR TOURISM DEVELOPMENT**

## **Abstract**

Whether World Heritage Sites (WHS) drive tourism demand is an ongoing debate. This study analyses tourist arrival data at a provincial level in China from 1999 to 2014, and employs linear and nonlinear models to re-examine the relationship between tourism demand and the numbers of WHS. The results show that there is a significantly positive linear effect of WHS on both international and domestic tourist arrivals, and the number of WHS drive international tourism demand more than domestic one. In addition, the effect of WHS on tourism exhibits an inverse U-shaped pattern where an optimal number of WHS exists. Finally, tourism specialization levels positively moderate the effect of WHS on tourism demand, and the relationship between WHS and tourism is not always positive. The number of WHS drive international tourism demand more than domestic one.

**Keywords:** World Heritage Sites; tourism demand; panel threshold model; nonlinear relationship; tourism specialization

# ARE WORLD HERITAGE SITES ALWAYS A CATALYST FOR TOURISM DEVELOPMENT

## Introduction

Tourism development can promote the positive image of a nation (Hampton, 2005; Li, Wu, & Cai, 2008) and accelerate local economic development (Balaguer & Cantavella-Jordá, 2002; Ha & Grunwell, 2011; Salifou & Haq, 2016). The goal of World Heritage Site (WHS) designation is to protect and conserve heritage sites with outstanding values (Cuccia, Guccio, & Rizzo, 2016; Kim, Wong, & Cho, 2007). It has also become an internationally recognized brand for tourism campaigns and promoting local tourism development (Poria, Reichel, & Cohen, 2011; Ryan & Silvanto, 2014).

However, no consensus exists on whether or not a WHS designation affects tourism demand (Arezki, Cherif, & Piotrowski, 2009; Cellini, 2011; Patuelli, Mussoni, & Candela, 2013; Yang & Lin, 2011). Su and Lin (2014) point out that the effect of WHS on tourism demand varies as the number of WHS increases. McKercher, Ho and du Cros (2005) describe a conceptual model of three-stage relationship between tourism and WHS. As an indicator of different stages of tourism development, tourism specialization can affect the relationship between WHS and tourism demand. Hence, a linear model of the influence of WHS on tourism development may not capture the real pattern, and a nonlinear model could be more valid. Although Su and Lin (2014) have studied the nonlinear effect of WHS globally, Ryan and Silvanto (2014) state that WHS has a different impact across different countries.

China now owns 52 WHSs, globally ranked the second only after Italy with 53. In addition, China also have 59 heritage sites on the UNESCO's tentative list, showing even greater cultural heritage. Using annual panel data on tourist arrivals of 30 provinces in China from 1999 to 2014, this study investigates the effect of WHS on tourist arrivals, and examines how the levels of tourism specialization moderate the relationship. This study differs from previous literature in two ways. First, since domestic tourism accounts for a major share of tourism market, the study investigates domestic tourism and international tourism separately. Therefore, this paper contributes to literature by considering the effect of WHS on both international and domestic tourism demand. Second, this study examines the nonlinear effect of WHS on tourism demand from two perspectives by considering the role of the number of WHS and the levels of tourism specialization, which explain the inconsistent research results between tourism and WHS.

## **Literature review**

### ***Impacts of WHS on tourism***

Since 1980s, WHSs have received increasing attention from scholars in the field of tourism. Most studies focus on the relationship between WHS and tourism demand (Hall & Piggin, 2001; Ribaud & Figini, 2017; Ryan, Chaozhi, Zeng, 2011). Although it is widely

believed that WHS status can bring prestige, more tourists and better tourism development, the empirical results are inconsistent (Cellini, 2011; Yang et al, 2010).

Some researchers validate the positive effect of WHS designation on domestic and inbound tourist arrivals (Buckley, 2004; VanBlarcom & Kayahan, 2011). Patuelli et al. (2013) investigate interregional tourism flows in Italy and discover a significantly positive effect of WHS on domestic tourists. Yang et al. (2010) and Yang and Lin (2014) employ provincial-level panel data in China and identify a positive link between WHS and international tourist arrivals. Su and Lin (2014) investigate the impact of WHS on international tourist numbers around the world and find a significant influence of WHS on tourism demand. Tisdell and Wilson (2002) examine the effect of a WHS listing on visitor numbers and find that the number of visitors is likely to increase with a WHS designation, but not as much as by previous estimation. Patuelli, Mussoni and Candela (2014) study the mediation role of distance on the tourism impact of WHS, and the results show that the number of WHS positively affects to long-distance tourist inflows but negatively impacts outflows. These findings suggest that the WHS designation contributes to an increase in tourist arrivals.

In contrast, some studies show no significant or negative effect of WHS on tourism. For example, Cellini (2011) argues that there is no significant positive tourism effect of WHS. He adopts either a dummy variable, capturing the presence or absence of a WHS, or the number of such sites in each region. The estimated results show that the dummy variable is negative but not

significant, but the coefficient for the number of WHS is negative and significant. Conducting interviews with tourists and practitioners in Israel, Poria, Reichel and Cohen (2013) investigate visitors' perceptions of the WHS designation and they find that visitors could express a negative opinion toward WHS resulting from the crowding and higher prices. Cuccia et al. (2016) evaluate the impact of WHS inscription on tourism destinations in Italy and find that the WHS status is negatively related to the technical efficiency of those destinations. In addition, a handful of empirical papers conclude that WHS designation exerts no significant impact on tourism (Hall & Piggin, 2001). Taking Macau as an example, Huang, Tsaor and Yang (2012) econometrically examine whether WHS status attracts more international tourists; their results support non-significant effect. Ribaudo and Figini (2017) examine the impact of WHS on the growth in tourism demand for destinations in Italy but find no statistical evidence. Arezki et al. (2009) conclude that not all tourists are aware of the WHS designation. These inconsistent results require more in-depth investigation on the actual impact of WHS.

### ***Factors moderating the impact of WHS on tourism demand***

The research results are inconsistent over the impact of WHS on tourism demand. Ribaudo and Figini (2017) consider this to be expected, since destinations endowed with WHS have idiosyncratic characteristics, which might affect the WHS's impact on tourism at these destinations. According to a small number of studies, these factors include the number of WHS and the features of the location.

According to the law of diminishing marginal utility, the marginal effect of WHS is expected to decrease with the increase in the numbers of WHS. Thus, the effect could be nonlinear. Su and Lin (2014) support this assumption. They divide the research samples into several groups based on the number of WHS and find that the numbers of WHS affects the marginal effect. Furthermore, Ribaudo and Figini (2017) propose that a subsequent WHS designation may have a different influence from the first. In contrast, Poria et al. (2011) imply that the more WHS a destination has, the more tourists it can attract. The current study therefore proposes that the marginal effect of WHS on tourist arrivals diminishes with the increase of WHS.

The location of the WHS also moderates the impact of WHS on tourism. According to Ryan and Silvanto (2014), WHS's impact varies from one country to another. In their opinion, WHS designation is coveted in developing countries that have a lack of established heritage brands; in countries that have well-established heritage brands, an extra WHS designation may not be as attractive. Therefore, the impact of WHS may depend on the presence of absence of a mature destination brand at the location.

In addition, different locations carry different cultures. Wuepper and Patry (2016) find WHS in Asian countries are better branded than those in the Middle East because Asian destinations are proud to be inscribed on the World Heritage List (WHL) and Asian tourists are eager to visit those destinations. In Middle East, heritage sites are deemed by visitors to be part

of national, Arabic or Muslim heritage, and managers of these sites are not impressed by the WHS designation and visitors do not understand the significance of a WHL inscription. Moreover, rural sites are likely to benefit more from the WHS branding than urban sites since reaching urban sites is easier, more affordable and less risky and hence, possess a large visitor base already. For a rural site, a WHS designation thus generates more publicity and is more an indicator of quality and popularity (Wuepper & Patry, 2016).

The tourism impact of WHS also depends on the attitude of local communities (Cuccia et al., 2016). Ribaud and Figini (2017) summarize the main benefits of the WHS designation for the local communities and the countries around those sites. Specifically, the designation of WHS offers access to funds for preservation and conservation. Besides, marketers can use the designation in tourism campaigns to increase the number of tourists and develop the tourism economy. However, the two benefits might be incompatible to each other, since too many visitors can cause pressure on preservation. Therefore, if the primary objective is to preserve the WHS, stakeholders, such as site managers, are unlikely to use the designation to increase public awareness and visitor numbers.

According to Rebanks (2009), 70%-80% of WHS management are not seeking economic gain. In such cases, the WHS designation has no marked influence upon the number of visitors. Tisdell and Wilson (2002) explain that some socio-economic factors, such as infrastructure, marketing efforts and other tourism attractions, affect the impact of WHS on tourism. Huang et



al. (2012) and Cuccia et al. (2016) add that a WHS can attract more international visitors but needs support from good management, facilities and infrastructures in the destination country.

Tourism specialization, as an indicator of tourism development in a destination, could moderate the relationship between WHS sites and tourism demand. As McKercher et al. (2005) suggest, the greater the tourism specialization, the more advanced the tourism development and the better the tourism infrastructure and service. Different relationships between WHS and tourism demand are found at different stages of tourism development. Advanced tourism development indicates that an area has a mature brand of tourism and a local community that is more likely to use the WHS as a brand to build its tourism industry. Therefore, tourism specialization, together with the number of WHS, is used to analyse and explain the contradictory impact of WHS.

In summary, past literature has offered contradictory conclusions. Where a few studies demonstrated the positive of WHS designation on tourism demand, others show the opposite effects. The complexity of the local destination's unique characteristics, such as different cultures and the levels of tourism development, may moderate the relationship between the number of WHS and tourism demand. However, no empirical evidence has supported this and the current study adopts tourism demand data in 30 provinces in China to validate the impact and the moderation factors.

## Data and Method

### *Data and variables*

This study adopts annual tourism arrival data from 30 provinces and municipalities in China (1999-2014). Tibet is excluded from the study due to incomplete data. The UNESCO World Heritage Centre website (<http://whc.unesco.org/>) reports the number and distribution of WHS in China. China Statistical Yearbook and Statistical Yearbook of each province provide the data on independent variables and other explanatory variables. To explain better the coefficient of each variable and to reduce the difference in magnitude between variables, every variable is converted into logarithmic format. Table1 shows the definitions and descriptive statistics of each variable.

[Insert table 1 about here]

Following previous studies (Su & Lin, 2014; Yang et al., 2010), variable *WHS* is measured by the number of World Heritage Sites and is used to measure the impact of the designation of World Heritage Sites on tourism demand. International tourism demand (*INT*) and domestic tourism demand (*DOM*) are represented by international and domestic tourist arrivals respectively. What do these mean? How did they estimate the numbers? Hotel records? Please explain...Please add a little explanation about international and domestic tourist arrivals sources and add a citation. The levels of tourism specialization (*TS*) is defined as the ratio of total

tourism income to GDP (Chang, Khamkaew, & McAleer, 2012; Deng, Ma, & Shao, 2014), representing the stages of tourism development.

Other control variables include the following. For inbound tourism model, *RGDP* (real GDP, deflated by GDP deflator in 1999) captures the effect of economic development on tourism (Kim, Lee, & Mjelde, 2016). *FDI* (foreign direct investment) is a measure of the openness of economy (Deng et al., 2014). *HOTEL* represents the number of star hotels, measuring the level of accommodation facilities (Yang et al., 2010). *ROAD* is the total length of highway, capturing the effect of transportation accessibility (Lin et al., 2016). *EXCH* represents the exchange rate and measures relative price (Song, Li, Witt, & Fei, 2010; Wang, 2009). *EXCH* is included in domestic tourism demand model due to a possible replacement effect since an increase the values of Chinese currency may increase the outbound Chinese travel and thus, replace domestic travel in different years (Athanasopoulos, Deng, Li, & Song, 2014; Eugenio-Martin & Campos-Soria, 2011). Variable *CPI* is Consumer Price Index, capturing the local products' pricing (Naude & Saayman, 2005). Variables *SARS* and *CRISIS* are dummy variables, representing the events of Severe Acute Respiratory Syndromes in 2003 and the economic crisis in 2008 (Page, Song, & Wu, 2012). The same set of control variables are included in the domestic tourism demand model except for the variable *FDI*. In addition, *CAR* is the number of cars in possession and included in the domestic tourism demand model; this number affects

domestic demand for self-driving tourism (Lin et al., 2016), since most tourist arrivals in a province is within-province travel.

### ***Linear and nonlinear models***

This paper uses the traditional panel model as a baseline model to investigate the linear effect of WHS on tourist arrivals and to compare with nonlinear model. The linear panel models are specified as follows:

$$\begin{aligned} \ln INT_{it} = & \beta_0 + \delta_1 WHS_{it} + \beta_1 \ln RGDP_{it} + \beta_2 \ln FDI_{it} + \beta_3 \ln HOTEL_{it} \\ & + \beta_4 \ln ROAD_{it} + \beta_5 EXCH_{it} + \beta_6 CPI_{it} \\ & + \beta_7 SARS_{it} + \beta_8 CRISIS_{it} + \eta_i + \varepsilon_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} \ln DOM_{it} = & \beta_0 + \delta_1 WHS_{it} + \beta_1 \ln RGDP_{it} + \beta_2 \ln HOTEL_{it} + \beta_3 \ln ROAD_{it} \\ & + \beta_4 \ln CAR_{it} + \beta_5 EXCH_{it} + \beta_6 CPI_{it} \\ & + \beta_7 SARS_{it} + \beta_8 CRISIS_{it} + \eta_i + \varepsilon_{it} \end{aligned} \quad (2)$$

The subscripts  $i$  and  $t$  denote the provinces of China and the time period,  $\varepsilon_{it}$  is a normally distributed error term, and  $\eta_i$  is the unobserved province-specific heterogeneity.

To test the nonlinear effect of WHS on tourism demand, a first term and a quadratic term are introduced in regression model (models 3 - 4). According to the law of diminishing marginal utility, the marginal effect of WHS is expected to decrease with the number of WHS. If the

coefficient  $\delta_2$  of the quadratic term is significantly negative, an inverse U-shaped relationship can be inferred between WHS and tourism, which indicates a decreasing marginal effect of WHS.

$$\begin{aligned} \ln INT_{it} = & \beta_0 + \delta_1 WHS_{it} + \delta_2 WHS_{it}^2 + \beta_1 \ln RGDP_{it} + \beta_2 \ln FDI_{it} \\ & + \beta_3 \ln HOTEL_{it} + \beta_4 \ln ROAD_{it} + \beta_5 EXCH_{it} + \beta_6 CPI_{it} \\ & + \beta_7 SARS_{it} + \beta_8 CRISIS_{it} + \eta_i + \varepsilon_{it} \end{aligned} \quad (3)$$

$$\begin{aligned} \ln DOM_{it} = & \beta_0 + \delta_1 WHS_{it} + \delta_2 WHS_{it}^2 + \beta_1 \ln RGDP_{it} + \beta_2 \ln HOTEL_{it} \\ & + \beta_3 \ln ROAD_{it} + \beta_4 \ln CAR_{it} + \beta_5 EXCH_{it} + \beta_6 CPI_{it} \\ & + \beta_7 SARS_{it} + \beta_8 CRISIS_{it} + \eta_i + \varepsilon_{it} \end{aligned} \quad (4)$$

To examine the moderating effect of tourism specialization on the tourism impact of WHS, a panel threshold model introduced by Hansen (1999) is employed to study the effect of WHS. A panel threshold model can search for multiple regimes and be used to test the threshold effect in the WHS and tourism demand relationship (Chang et al., 2012). That is, in different ranges of values of tourism development, the relationships between the number of WHS and tourism demand may be significantly different. Although selecting a threshold arbitrarily is traditional in nonlinear relationship investigation, this approach has been criticized as too subjective (Deng et al., 2014). An interaction term can also be introduced to investigate the interactive effect of other factors on the core variable, but the interaction term can only examine

a monotonic moderating effect (positive or negative), which is not always the case in reality. In comparison, the number and location of thresholds are endogenously decided by the data in the threshold model (Deng et al., 2014), which is preferred in this paper.

The single threshold model takes the form:

$$y_{it} = \mu_i + \beta_1 x_{it} I(q_{it} \leq \gamma) + \beta_2 x_{it} I(q_{it} > \gamma) + \varepsilon_{it} \quad (5)$$

In model 5,  $i$  and  $t$  represent individuals and time,  $q_{it}$  is threshold variable,  $\gamma$  is the assumed specific threshold value,  $\mu_i$  denotes the fixed effect that captures the unobservable heterogeneity of each province;  $\varepsilon_{it}$  denotes the error term with expected value of zero and the variance following the identically independent distribution.  $I(\cdot)$  is an indicator function. There are two problems to be addressed: 1) to test the significance of threshold effect; and 2) to

estimate the value of unknown parameters  $\gamma$  and  $\beta$ . The first step of regression is to eliminate

the individual effect  $\mu_i$ ,  $y_{it}^* = y_{it} - \frac{1}{T} \sum_{t=1}^T y_{it}$ . The same manipulation needs to be done to other variables and to replace the variable in equation 5 to get equation 6:

$$y_{it}^* = \beta_1 x_{it}^* I(q_{it} \leq \gamma) + \beta_2 x_{it}^* I(q_{it} > \gamma) + \varepsilon_{it}^* \quad (6)$$

Finally, regression equation 6 is re-written as:

$$Y^* = X^*(\gamma)\beta + \varepsilon^* \quad (7)$$

Given the presumed threshold value  $\gamma$ , OLS regression can be used to yield  $\hat{\beta}$ :

$$\hat{\beta}(\gamma) = (X^*(\gamma)' X^*(\gamma))^{-1} X^*(\gamma)' Y^* \quad (8)$$

The sum of squared errors (SSE) is calculated as follow:

$$S_1 = (\hat{\varepsilon}^*(\gamma)' \hat{\varepsilon}^*(\gamma))^{-1} = Y^{*'} (I - X^*(\gamma)' X^*(\gamma))^{-1} X^*(\gamma) \quad (9)$$

Finally, a threshold value  $\hat{\beta}$  is determined for this model using the corresponding  $\gamma$  based on the smallest SSE:

$$\hat{\gamma} = \min_{\gamma} SSE_1(\gamma) \quad (10)$$

After calculation, the threshold value is  $\hat{\beta} = \hat{\beta}(\hat{\gamma})$  and the residual-vector estimator is

$$\hat{\varepsilon}^* = \hat{\varepsilon}^*(\hat{\gamma})$$

Although a threshold effect on the influence of WHS is assumed here, the statistical significance of the threshold effect and the threshold value are still needed to be tested. Hansen (1999) suggests that a bootstrap method should be employed for an approximation of the

asymptotic distribution. Thus, the bootstrap method and the likelihood statistic LR are used to test the threshold effect. The estimation and test described above are for a single threshold. For more thresholds, these steps can be repeated.

## **Empirical results**

### ***Linear effect of WHS on tourism demand***

Table 2 shows the estimated results of linear and nonlinear models. Before conducting the regression models, Hausman test and F-test are used to determine the appropriate model, and the selected models are shown in table 2. The null hypothesis of Hausman test is that there is no correlation between individual effects and regressors. If the null hypothesis is accepted, then the random effects (RE) model should be chosen. The null hypothesis of F-test is that all individual effects equal zero. The rejection of the null hypothesis indicates that the fixed effects (FE) model is better than the pooled OLS regression (PO) model, and thus the FE model should be selected. As the test results show, F-tests are all statistically significant at 1% level, suggesting that FE models are superior to PO models. The Hausman tests for regressions I - IV indicate that FE model is more appropriate (Magazzini & Calzolari, 2010; Schreiber, 2008).

[Insert table 2 about here]

Linear regression I shows that the effect of GDP on tourist arrivals is significantly positive, indicating a positive relationship between international tourism and economic development. The coefficient for *FDI* is also significantly positive, suggesting that the openness



of economy positively influences the development of international tourism. The effect of *HOTEL* on international arrivals is not significant, indicating that accommodation facilities at the destination do not affect the number of international tourist arrivals. The coefficients for *ROAD* is 0.182 and statistically significant at the 5% level, suggesting a positive relationship between tourism demand and transportation infrastructure. The results also show a positive relationship between *EXCH* and international arrivals. The coefficient for *EXCH* is 0.165 and is statistically significant at the 5% level. An unexpected finding is that the pricing effect of *CPI* on arrivals is significantly positive, suggesting that international tourists are more interested in big cities and popular destinations where consumer prices are higher. The effects of *SARS* and *CRISIS* on tourist arrivals are both negative, but is significant only for *SARS*.

Regarding the effect of the numbers of WHS, the estimation results indicate a positive relationship between WHS and arrivals. The coefficient for WHS is 0.097 and statistically significant at the 1% level, suggesting that a one-unit increase in WHS would lead to a 9.7% increase of visitation.

In the linear model on domestic tourism demand (regression II), most of the control variables exhibit the expected sign and are significant at the 1% statistical level, except for the variable *CPI*. This result means that there is no significant relationship between domestic tourism demand and local price level. It is worth noting that there is a significant effect of *EXCH* on domestic tourism demand, indicating a negative relationship between domestic tourism

demand and the relative value of China's Yuan (RMB). The coefficient for *CAR* is 0.130 and significant at the 1% level, indicating a positive effect of car ownerships of local residents in that province/city on domestic tourism.

In comparison, the magnitude of the effect of *WHS* on domestic tourism is less than that on international tourism. The coefficient for *WHS* is 0.075 and significant at the 1% level, suggesting that a one-unit increase in *WHS* would contribute to a 7.5% increase in domestic tourism visitation.

### ***Nonlinear effect of WHS on tourism demand***

This section examines the diminishing marginal effect of *WHS* on both international tourism and domestic tourism (regressions III and IV in table 2). The estimation results of regressions III and IV support a U-shaped pattern of the relationship between *WHS* and tourism demand. As regression III shows, the coefficients for *WHS* and *WHS*<sup>2</sup> are statistically significant at 1% and 5% levels respectively. The coefficients for *WHS*<sup>2</sup> is -0.023, indicating an inverse U-shaped influence of *WHS* on international tourist arrivals. Furthermore, the optimal number of *WHS* is obtained by calculating the first-order condition. After calculation, the optimal number of *WHS* for international tourism demand is 4.09. When there are fewer than five *WHS*, the total effect of *WHS* on international tourism demand increases with the number of *WHS*; however, the total impact of *WHS* on tourism begins to decrease with the fifth. This finding suggests that the effect of *WHS* on international tourism demand presents an inverse U-shaped pattern.

The U-shaped effect of WHS on tourism is also valid for domestic tourism demand. The estimation results of regression IV show that the coefficients for  $WHS$  and  $WHS^2$  are 0.132 and -0.014 respectively, and are both statistically significant at the 5% level. The optimal number of WHS for domestic tourism demand is 4.58, slightly larger than for international tourism demand. The law of diminishing marginal effect therefore seems to work for the influence of WHS on both international and domestic tourism demand. Figure 1 shows the impact of the number of WHS designation on the percentage of international and domestic tourism demand.

[Insert figure 1 about here]

### ***Threshold effect of tourism specialization***

Threshold models can examine the threshold effect of tourism specialization on the relationship between WHS and tourism demand. Before conducting regression models, a threshold test is conducted to check for a selected threshold variable and to examine the number of thresholds. For international tourist arrivals, the test of a single threshold is insignificant with a bootstrap p-value of 0.103 (table 3), suggesting no threshold effect of tourism specialization on international arrivals and WHS.

For domestic tourism demand, the test of a single threshold is significant with a bootstrap p-value of 0.007, and the test of a double threshold is significant with a bootstrap p-value of 0.013 (table 3). However, the test for a triple threshold is not significant with a bootstrap p-value of 0.68. . The F statistics for single and double threshold tests are both significant, indicating that

both single and double threshold models are supported. We adopt double threshold model because it can capture more details over the change of the WHS and tourism demand relationship. Figure 2 shows the two threshold estimates from the concentrated likelihood ratio function plots separately. The point estimates of threshold value are the value of  $\gamma$  where LR statistic hits the zero axis. The 95% confidence intervals for the threshold  $\gamma$  can be found where LR statistic lies beneath the dotted line. The value of 0.110 is only marginally significant.

[Insert table 3 about here]

[Insert figure 2 about here]

The regression results of the double threshold models are shown in regression V (table 2). As Table 3 and Figure 2 show, there are two thresholds on WHS and tourism, which are 0.078 and 0.125 respectively. The estimated coefficients for WHS between each threshold are -0.047, 0.039, and 0.111 respectively, and are all statistically significant at the 5% level, suggesting an increasing effect of WHS on domestic arrivals moderated by *TS*. The higher the tourism specialization is, the stronger the effect of WHS on tourism demand will be. However, the results do not necessarily support a positive relationship between WHS and tourism demand. When tourism specialization is lower than 0.078, the effect of WHS on tourist arrivals is negative.

To conclude, the results significantly support the nonlinear effect of WHS on both international and domestic tourism. In addition, the fitness of nonlinear model is better than that

of the linear model. For international tourism, the R-square for linear and U-shaped models are 0.791, 0.793, and the AIC value are 232.717 and 229.842, which means the fitness of nonlinear model is better. Similarly, regarding domestic tourism, the R-square for linear, U-shaped and threshold models are 0.950, 0.951 and 0.957, and the AIC value is -369.653, -373.721 and -437.249 respectively, suggesting that nonlinear models are more accurate in capturing the effect of WHS.

## Discussion

In consistent with previous research (Su & Lin, 2014; Yang et al., 2010; Yang & Lin, 2014), the findings support a significant impact of WHS on international tourist arrivals, and also show that the linear effect of WHS on international tourist arrivals is larger than that on domestic tourist arrivals. One possible explanation is that, domestic tourists have easier access to information about historic sites than international tourists do, disregarding WHS designation. China also has its own policy for rating scenic spots, which provides sufficient information about valuable tourist attractions (Liu, Huang, & Fu, 2017). Hence, domestic tourists might have known the tourism value of the World Heritage Site before the WHS designation and have more choices about where to visit. Another possible reason is that international tourists have to travel longer distances and have less time, and thus they prefer more significant spots to maximize their utilities, such as WHS. Thus, the effect of the nomination for domestic tourists is weaker than that for international tourists.

This study adds to previous studies by finding an inverse U-shaped relationship between WHS and tourist arrivals, including international tourism and domestic tourism. There are two reasons for this finding. For a particular destination, the marginal utility that a single WHS offers to tourists could be diminishing, especially for those WHS located in the same area, since they share the same natural and cultural background. Thus, the marginal effect of WHS is expected to decline as the number of WHS rises and total effect of WHS on tourism could increase. In addition, the increasing number of WHS contributes to the growth in tourist visits, which results in the crowding at destinations and higher prices of tourism products, both of which can have a negative impact on tourist experience and tourist arrivals (Poria, Reichel, & Cohen 2013; Zehrer & Raich, 2018), leading to the decline of the total effect of WHS.

Furthermore, this study contributes to the literature by identifying a moderating variable, i.e., tourism specialization. As the estimated results show, the threshold effect of tourism specialization on WHS and tourist arrivals is valid only for domestic tourism. This finding suggests that domestic tourists are more concerned with the tourism development at the destination than international tourists. This finding is supported by the estimated results for variables *HOTEL* and *ROAD*. The coefficients of *HOTEL* and *ROAD* are larger or more significant for domestic tourist arrivals than those for international tourist arrivals, indicating that local tourism facilities and infrastructure are critical in affecting domestic demand for tourism. For international tourism, the threshold effect of tourism specialization is not supported,

indicating that international tourists focus more on WHS itself. Just as Kim (2007) points out, a significantly different pull factor of international travel from domestic travel is “attraction”. Moreover, international tourists tend to have lower expectations of China’s tourism infrastructure since China is a developing country. In a study conducted by Cheng, Wong and Liu (2013) in Hue’s world heritage sites, they find that tourism facilitation scores higher among international tourists than among domestic tourists. Therefore, the attraction of WHS on international tourists would not be affected by tourism specialization. Hence, the label of WHS could be used to attract international tourists, but it is important to establish enough local infrastructure to realize the branding effect for domestic tourism (Kimbu & Albert, 2011; Sun, Lin, Gao and Lin, 2018).

The threshold model also finds a negative effect between WHS and domestic tourist arrivals when tourism specialization is low. One possible explanation is that there are insufficient supportive facilities and services in the destination at the low level of tourism specialization, such as offering poor accommodation and transportation. As a result, an unpleasant tourism experience would lead to negative word of mouth, weakening the relationship between WHS and tourism demand. In addition, McKercher et al. (2005) suggest that the relationship between heritage and tourism includes the Denial and Conflict phase. In this phrase, the designation of WHS could deteriorate the conflict relationship between tourism

operator and local communities, especially for the development and protection issues, implying that the initial effect of WHS on tourism could be negative (Yang, Xue, & Jones, 2019).

## Conclusions

Using annual data from 30 provinces in China from 1999 to 2014, this study investigates the linear and nonlinear relationships between the number of WHS and domestic/international tourist arrivals. The study results support the positive impact of WHS on both international and domestic tourist arrivals, at least in China. However, the nonlinear model indicates an inverse U-shaped relationship between WHS and tourism. The threshold model suggests that the effect of WHS on domestic tourism is positively moderated by tourism specialization, but not for international tourism. Finally, the study results show that the relationship between WHS and tourism is not always positive. Specifically, when the number of WHS exceeds 4, each additional one could have an adverse impact on demand for both domestic and international tourism. In addition, when tourism specialization is low, the effect of WHS on domestic tourist arrivals could be negative. Since the linear coefficients of WHS on tourist arrivals are quite different from nonlinear models, additional investigation about the impact of WHS on tourism in a nonlinear model is suggested.

This study has the following implications. The WHS nomination could be used as a tourism brand to promote domestic and especially international tourism. However, it should be careful to take WHS as a silver bullet for tourism and believe that more World Heritage sites are



better. In China, the total effect of WHS on tourism decreases after the number of WHS exceeds four. As a result, it is not advisable to promote tourism by applying for as many WHS as possible. Although this paper only verifies the role of tourism specialization in the relationship between tourism and WHS, this finding does offer important implications. The WHS nomination is only a start; the destination has more work to do before reaping the benefits of a WHS designation, such as enhancing its local infrastructure.

This study adds some insights to the debate over the relationship between WHS and tourism. The effect of WHS on tourism is nonlinear, influenced by the scale of WHS and moderated by tourism specialization. Since the number of WHS and the level of tourism specialization differ across regions and countries, inconsistent findings among studies are perhaps to be expected.

This study has the following limitations. Researchers of this study examine only the role of the number of WHS and tourism specialization in the relationship between tourism demand and WHS. Other factors should also be explored to obtain a better understanding of the relationship between WHS and tourism, such as data on the city level and tourists' countries of origins.

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Table 1. Descriptive statistics of each variables, 1999-2014 (30 provinces/cities)

Variable	Definition	Mean	SD	Min	Max
<i>lnINT</i>	International tourist arrivals in logarithm form	6.3	1.2	0.8	9.0
<i>lnDOP</i>	Domestic tourist arrivals in logarithm form	8.8	1.2	5.1	11.0
<i>WHS</i>	Number of World Heritage Sites	1.3	1.5	0.0	7.0
<i>lnRGDP</i>	Real Gross Domestic Product in logarithm form	6.4	1.1	3.2	8.8
<i>lnFDI</i>	Foreign direct investment in logarithm form	7.1	1.9	-2.3	10.5
<i>lnHOTEL</i>	Number of star hotels in logarithm form	5.6	0.8	2.1	7.1
<i>lnROAD</i>	Operation length of highway in logarithm form	11.2	0.9	8.4	12.6
<i>lnCAR</i>	Quantity of car ownership in logarithm form	6.4	1.3	3.0	9.4
<i>EXCH</i>	Exchanges rates	7.4	0.9	6.1	8.3
<i>CPI</i>	Consumer price index	102.2	2.3	96.7	110.1
<i>SARS</i>	Dummy variable for year 2003	0.1	0.2	0.0	1.0

<i>CRISIS</i>	Dummy variable for year 2008	0.1	0.2	0.0	1.0
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Table 2. Effect of World Heritage sites on tourist arrivals

Regression ns	LinearDomestic		U-shaped		Threshold
	International	Domesti	International	Domestic	Domestic
	FE I	FE II	FE III	FE IV	FE V
<i>lnRGDP</i>	0.989*** (0.139)	0.349*** (0.086)	1.012*** (0.138)	0.374*** (0.086)	0.350*** (0.081)
<i>lnFDI</i>	0.089** (0.027)		0.095*** (0.027)		
<i>lnHOTEL</i>	-0.099 (0.069)	0.130*** (0.037)	-0.107 (0.069)	0.126*** (0.037)	0.149*** (0.035)
<i>lnROAD</i>	0.182** (0.081)	0.222*** (0.043)	0.161** (0.081)	0.211*** (0.043)	0.209*** (0.041)
<i>EXCH</i>	0.165** (0.067)	-0.282*** (0.038)	0.172** (0.067)	-0.280*** (0.037)	-0.275*** (0.035)
<i>CPI</i>	0.019** (0.009)	0.004 (0.005)	0.018** (0.009)	0.003 (0.005)	0.008* (0.004)
<i>SARS</i>	-0.495*** (0.063)	-0.122*** (0.034)	-0.490*** (0.063)	-0.120*** (0.033)	-0.123*** (0.031)
<i>CRISIS</i>	-0.016 (0.074)	-0.238*** (0.040)	-0.006 (0.074)	-0.233*** (0.040)	-0.236*** (0.038)
<i>lnCAR</i>		0.130*** (0.036)		0.125*** (0.036)	0.106*** (0.034)
<i>WHS</i>	0.097*** (0.030)	0.075*** (0.016)	0.185*** (0.052)	0.132*** (0.028)	
<i>WHS<sup>2</sup></i>			-0.023** (0.011)	-0.014** (0.006)	
<i>WHS_1</i>					-0.047** (0.022)
<i>WHS_2</i>					0.039** (0.017)
<i>WHS_3</i>					0.111*** (0.016)
<i>Constant</i>	-5.127*** (1.388)	4.255*** (0.746)	-4.974*** (1.384)	4.331*** (0.742)	3.978*** (0.694)
F test	67.480***	71.042***	64.756***	70.133***	78.158***
Hausman	23.866***	20.577***	31.156***	46.930***	
R-square	0.791	0.950	0.793	0.951	0.957
AIC	232.717	-369.653	229.842	-373.721	-437.249
F	185.445***	934.338*	168.671***	852.095***	891.760***
# of Observati	30 480	30 480	30 480	30 480	30 480



Notes: Figures in parentheses are standard deviations. \*, \*\* and \*\*\* represent significance at the 10%, 5%, 1% statistical levels, respectively.

Table 3. Threshold effect tests

	International		Domestic	
	Single	Single threshold	Double	Triple threshold
	threshold		threshold	
Threshold $-value$	0.076	0.110**	0.125**	0.125**
			0.078**	0.078**
				0.035
$F$ statistics	27.920	42.990	30.010	16.330
Bootstrap $p$ -value	0.103	0.007	0.013	0.680

Notes:  $F$  statistics and  $p$ -values result from repeating the bootstrap procedure 300 times for each of the three bootstrap tests. \*\*Significant at the 5% level. In Domestic Double threshold and triple threshold models, the value 0.110 is only marginally significant but so we deleted it.

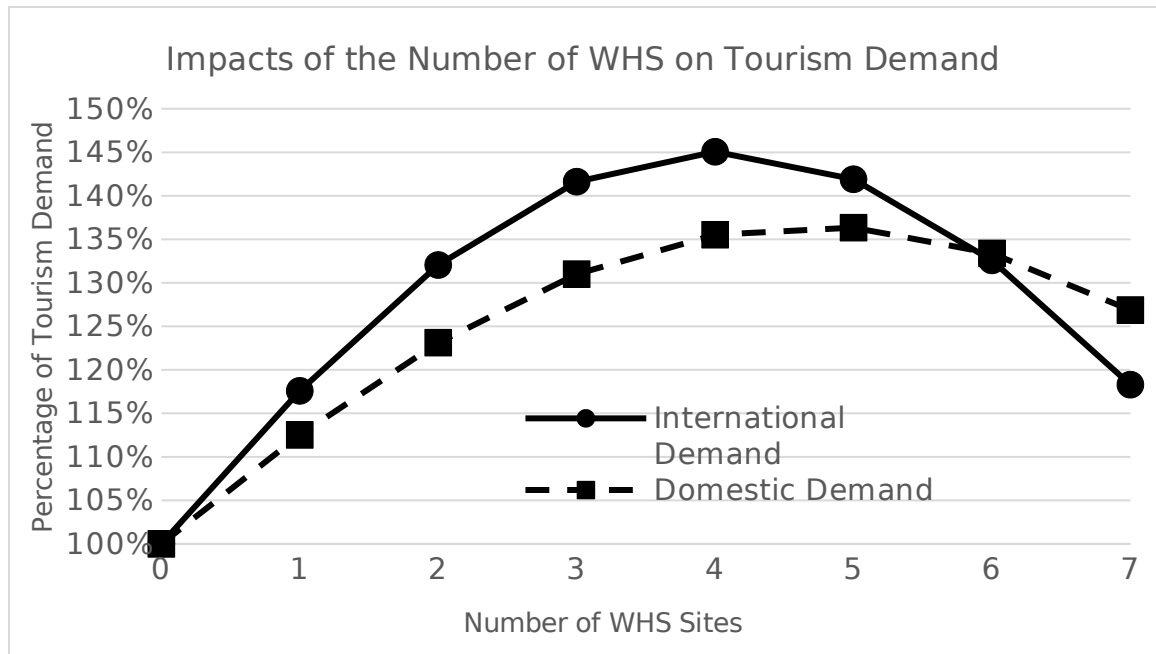
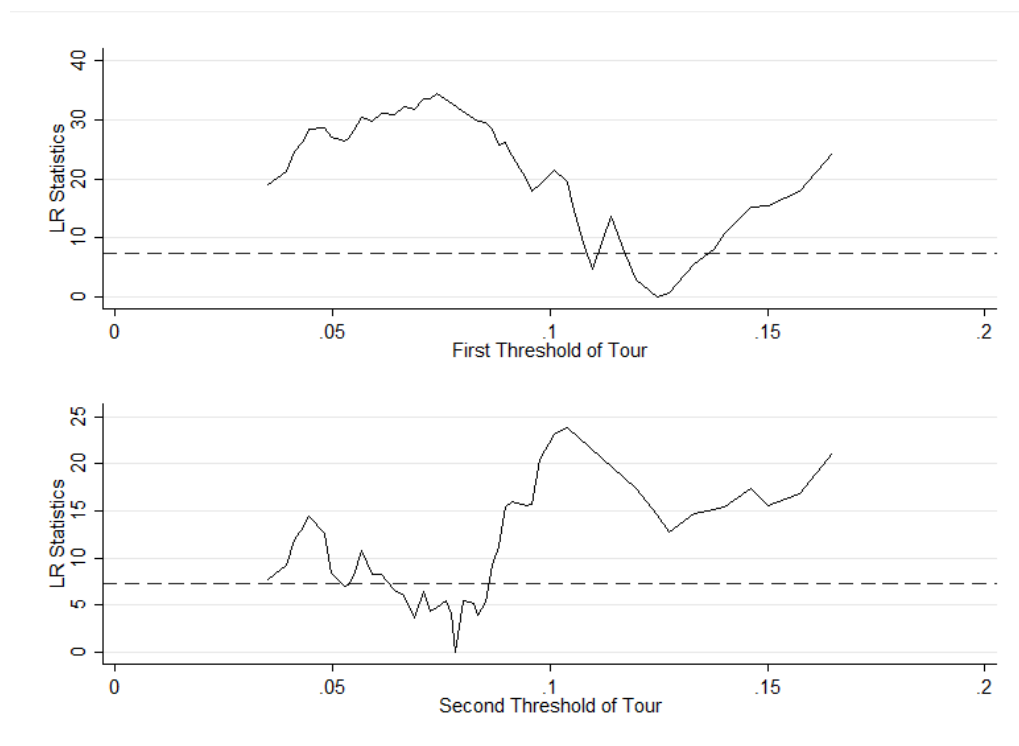


Figure 1. The impact of the number of WHS on tourism demand



**Figure 2.** Confidence interval construction in double threshold model