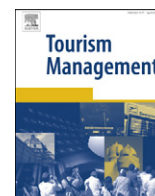




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# Does world heritage list really induce more tourists? Evidence from Macau

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## ARTICLE INFO

### Article history:

Received 7 September 2010

Accepted 17 January 2012

### JEL classification:

L83

Q26

### Keywords:

World heritage list

Tourism

## ABSTRACT

It is commonly believed that being listed on the World Heritage List (WHL) results in attracting more tourists. However, this assumption has not been generally subject to rigorous econometric approach in the existing literature. To fill this gap, we assess the impact of the accreditation World Heritage status on the “Historic Centre of Macau” in 2005 on visitor numbers to the territory to identify the real effect of WHL on fostering tourism. In doing so, because of the policy restrictions on the mainland Chinese tourists, such tourists have been excluded from the analysis. The empirical results indicate that there is no significant effect of WHL on promoting tourism other than possibly a short-run tourism-enhancing impact. Notably, this effect is particularly relevant to Asian tourists. This paper discusses these results in the wider context of econometric analyses of tourism.

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## 1. Introduction

International tourism is a fast-growing industry that helps promote economic growth and development by creating jobs, earning foreign exchange, stimulating infrastructure provision, and generating tax revenues (Eilat & Einav, 2004). In addition, the pollution produced by the tourism industry is recognized to be lower when compared to the production of the manufacturing sector. As a result, numerous countries have adopted a tourism-oriented growth strategy while devoting greater efforts to developing the tourism industry.

Given this background, a growing amount of research has attempted to identify the determinants of international tourism, for example, Dhariwala (2005), Dritsakis (2004), Naude and Saayman (2005), and Saayman and Saayman (2008). While various factors have been clearly identified as significant in attracting international tourists, the degree of influence from being inscribed on the list of World Heritage Sites (WHs) by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) on international tourism demand remains subject to debate. Although the accreditation of the World Heritage List (WHL) was meant to identify, recognize, and protect scenic spots of global value, the WHL is now widely used as a marketing tool for national tourism campaigns. This strategy is rooted in the belief that the WHL is a powerful boost for attracting tourism. Surprisingly, the impact of the WHL on

fostering tourism has been little explored by rigorous econometric approaches. Moreover, existing findings are far from being clear and robust.

Specifically, Arezki, Cherif, and Piotrowski (2009) adopted a cross-section of up to 127 countries to examine the impact of tourism specialization on economic growth.<sup>1</sup> In particular, they used various versions of the WHL as an instrument for tourism specialization. The *F*-test showed that the number of WHs does not weaken the instrument for tourism specialization in cross-sectional regressions. However, the first-difference results imply that instruments based on the WHL appear to be weak when exploiting the within variation. Therefore, the effect of spots inscribed in the WHL on attracting tourists is not robust.

Importantly, Yang, Lin, and Han (2010) econometrically and systematically evaluated the influence of the WHL on international tourist arrivals. Using China as a case study, Yang et al. (2010) claimed that WHs (especially cultural sites) had a significant tourist-enhancing effect on the pooling estimates. However, the positive impact of WHs becomes insignificant in the fixed-effect models. Inspired by Yang et al. (2010), Cellini (2011) utilized data from Italy from 1996 to 2007 to show that UNESCO recognition is not an effective in attracting tourists. In response to Cellini (2011), Yang and Lin (2011) stated that the impact of being included among

<sup>1</sup> For robustness, Arezki et al. (2009) used two measures for tourism specialization: (1) the average of tourism receipts as a share of exports of goods and services for the period 1980 to 1990; and (2) the average of tourism receipts as a share of GDP for the period 1980 to 1990. Taking the average of tourism receipts over the whole period (1980–2002) generates similar results.

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sites on the WHL could be examined from both cross-sectional and time-series dimensions. However, due to the time-invariant feature of the WHL variables in the short-run, the time-dimensional effect of the WHL based on a fixed-effects model may not be reliable and robust. As a result, whether or not the UNESCO recognition is a panacea for promoting tourism deserves further study.

The contribution of examining the effects the WHL has on tourism is at least twofold. First, examining such effects helps evaluate the viability of tourism-led growth policies; and, more importantly, helps achieve the original purpose of the WHL—to protect and maintain these assets that belong to mankind. After all, we must understand the extent to which WHL attracts tourists to provide appropriate protection that prevents potential damage caused by overloading tourists.

However, Yang and Lin (2011) indicated that one difficulty associated with investigating the tourism demand impacts of being inscribed on the WHL is that these famous cultural and/or natural sites were established or created in the past. What has changed is merely the label given by UNESCO. Therefore, the number of WHSs is fixed in the short-run for a country after the famous scenic spots have been included on the WHL. This nearly time-invariant feature might explain why fixed-effects estimates of the WHL variables in Yang et al. (2010) and Cellini (2011) are insignificant.

Fortunately, being included on the WHL as the “Historic Centre of Macau” in 2005 allows Macau an excellent case for examining this issue. Moreover, Macau is a small region and has only one WHS, further facilitating study. Disregarding the recent UNESCO recognition, Macau’s tourism attractions concentrate on casinos and Portuguese-style architecture. Controlling other factors, the case of Macau enables us to explore the pure impact of UNESCO recognition on international tourist flows into Macau. As a result, this study employs various and sound econometric strategies to examine the effect of UNESCO recognition. The empirical results lend new insights and provide robust evidence to this crucial and debatable issue.

The rest of this paper is organized as follows. Section 2 briefly introduces the WHSs recognized by UNESCO and discusses their potential impacts on international tourism. In addition, we discuss the trend of tourist flows in Macau over the past decade. In Section 3, we construct the empirical specifications of the tourist demand by borrowing the commodity version of the gravity model. We also introduce estimating techniques and the utilized dataset. Section 4 reports the empirical results obtained from various econometric strategies. The final section summarizes concluding remarks.

## 2. World heritage list, tourism, and Macau’s international tourist arrivals

### 2.1. World heritage sites and tourists

A World Heritage Site is a place listed by UNESCO as culturally and/or naturally significant. In the process of economic development, many cultural and natural heritage sites were increasingly threatened by the traditional causes of decay and by industrialization. Yet the protection of these heritages often remains incomplete at the national level, especially in developing and less-developed countries. In noting this formidable phenomenon of damage as well as inadequate conservation, the World Heritage Convention (hereafter, referred to as the Convention) of UNESCO launched an initiative in 1972 to preserve heritage sites considered to be of great value to humanity. The Convention enacted an international treaty called “the Protection of the World Cultural and Natural Heritage” and began to ratify sites on the WHL in 1978.<sup>2</sup>

Over the past three decades, under the coordinated effort of the World Heritage Center, an increasing number of famous and important sites have been recognized by and then protected by strict regulations. As of June 2010, 911 sites, comprising 704 cultural, 180 natural, and 27 mixed properties, have been recognized in 151 enlisted countries or regions.<sup>3</sup>

Although the purpose of inscribing the WHL is to identify and protect sites of outstanding value, the UNESCO recognition has been widely used as an advertisement to attract tourists. Indeed, being on the WHL seems to be effective for increasing global visibility and tourist arrivals. For example, Thorsell and Sigaty (1998) documented that recorded annual visits to 116 of the WHSs was roughly 63 million in 1998, accounting for nearly one-tenth of international tourist arrivals. In addition, a wave of heritage tourism was caused by the *Traveler* magazine October 1999 issue, showcasing 50 superlative places that every curious traveler should visit in a lifetime (Yang et al., 2010).

The tourist-enhancing effect of the WHL causes a dilemma. In one sense, heritage sites are thought to induce prosperous tourism that create jobs and earn foreign exchange, thus serving as a major driving force for further growth in many countries (Herbert, 2001; McIntosh & Prentice, 1999; Wager, 1995). Specifically, once sites are inscribed on the list of WHSs, UNESCO provides financial as well as technological aid to repair and maintain those heritage sites (of particular importance for low-income countries that depend heavily on the tourism industry for economic growth). Conversely, visitation increases the threat of damage or destruction of the environmental and cultural integrity of the WHSs due to excess number of tourists. In light of this conflict, an emerging line of research has focused on discussing how to achieve a balance between strict protection of WHSs and tourism development, for example, Wager (1995), Garrod and Fyall (2000), Maikhuri, Nautiyal, Rao, and Saxena (2001), and Leask and Fyall (2006).<sup>4</sup>

### 2.2. Macau’s tourism development

Macau, also known as Macao, is a small region (29.5 square kilometers) on China’s south coast. Macau lies on the western side of the Pearl River Delta, bordering Guangdong province to the north and facing the South China Sea to the east and south. Macau was settled by Portuguese traders in the 16th century and became a Portuguese colony during 1887–1999. On 20 December 1999, the sovereignty was transferred to China and Macau became one of the two special administrative regions of China.<sup>5</sup> Although China is responsible for Macau’s defense and foreign affairs, Macau maintains its existing systems (such as legal system, police force, monetary system, and immigration policy) established by the Portuguese.<sup>6</sup>

The economy of Macau is highly dependent on tourism and the gambling sector.<sup>7</sup> The gambling industry had been operated under

<sup>3</sup> The World Heritage Committee inscribed a total of 21 new sites on the UNESCO WHL at the latest meeting in Brasilia from July 25 to August 2, 2010. The 21 new sites consist of 15 cultural, five natural and one mixed property. In addition, three countries, Kiribati, the Marshall Islands, and Tajikistan, had sites added for the first time.

<sup>4</sup> UNESCO also publishes a series of studies (called the IMPACT publication) to explore the relationship between sustainable tourism and heritage sites management.

<sup>5</sup> The other is Hong Kong.

<sup>6</sup> It is the so-called “one country, two systems” policy implemented by the China government.

<sup>7</sup> According to the *Macau 2007 Yearbook*, gaming, tourism, and the hospitality industry are estimated to contribute to more than 50% of Macau’s GDP.

<sup>2</sup> This treaty contains eight chapters and 38 articles.

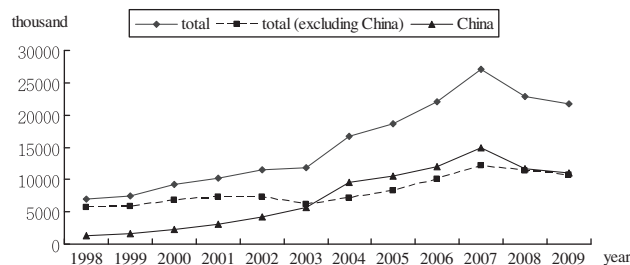


Fig. 1. International tourist arrivals of Macau, 1998–2009 (by place of residence). Source: Statistics and Census service of Macau (DSEC).

a government-issued monopoly license beginning in 1962. Since the end of the monopoly in 2002, several casino owners from Las Vegas have subsequently entered the market, for example, Sands Macau in 2004, Wynn Macau in 2006, and MGM Grand Macau as well as Venetian Macau in 2007. While gambling revenues from casinos were greatly prosperous, the Macau government tried to change the image of Macau tourism from gambling to diversified tourism; for example, hosting the Grand Prix and International Fireworks Festival. Moreover, the Macau government also promotes tourism aggressively through the MICE (meetings, incentives, conventions, and exhibitions) policy. Importantly, re-molding Macau into a cultural city is a key strategy toward promoting tourism. As described on the UNESCO website: “With its historic street, residential, religious and public Portuguese and Chinese buildings, the historic centre of Macao provides a unique testimony to the meeting of esthetic, cultural, architectural and technological influences from East and West.” The Macau government has aggressively conserved these features and promoted the unique culture of the international tourism market. On 15 July 2005, “The Historic Centre of Macao” was formally inscribed on the prestigious WHL.<sup>8</sup>

Does the inscription of “The Historic Centre of Macao” on the WHL induce more tourists that are international? We can first take a glance at the trend of tourist flows over the past decade. Fig. 1 displays the trend of tourist arrivals by place of residence over the period of 1998–2009.

According to the Statistics and Census Service of Macau (DSEC), the number of total tourist arrivals (including Chinese residents) had more than tripled during the period of 1998–2009. Specifically, 6.95 million visitors arrived in 1998 and 21.75 million in 2009. From 1998 to 2003, the number of tourists had increased steadily from 6.95 million to 11.89 million with an average growth rate of 11.54%. Notably, a surge of 16.67 million visitors occurred in 2004, causing an annual growth rate of 40.25%. The number of visitor arrivals achieved the peak of 27 million in 2007, and then decreased in 2008 and 2009 due to the global financial crisis.

As mentioned, a sizable rise in tourist arrivals occurred in 2004. In fact, this increase is mainly attributed to China’s “Individual Visit Scheme” policy enacted in July 2003, to boost the economy of Macau. Under the Individual Visit Scheme, mainland Chinese can travel to Macau as individuals and avoid strict requirements on tour groups.<sup>9</sup> In 2003, mainland Chinese visitors accounted for 48.3% of

total tourist arrivals. This ratio reached the peak of 57.16% in 2004 and then maintained at over 50%.

The number of total tourists excluding travelers from the mainland China may more accurately reflect the international tourism market of Macau, which is represented by the dash-line in Fig. 1. We excluded visitors from mainland China because they are subject to policy constraints. In other words, government regulations play an important role in determining whether or not a mainland Chinese citizen may visit Macau. As a result, we focused on travelers from other regions to examine the effect on tourism through market mechanisms.

The number of tourist arrivals increased slightly from 5.631 million in 1998 to 7.290 million in 2002. Affected by the SARS outbreak in 2003, this figure decreased slightly to 6.146 million. The figure then moderately and steadily increased from 7.143 million in 2004 to 12.134 million in 2007. Again, the global finance crisis influenced the international tourism market, inducing the decrease of tourist arrivals in Macau in 2008 and 2009. Along with the application process of “The Historic Centre of Macau”, an increasing number of travelers visited Macau from 2004 to 2007. However, this increasing trend of international tourist arrival is probably not caused by the attraction of “The Historic Centre of Macau”. Other explanations are economic recovery from the dot-com bubble and the newly established luxury and multi-recreational casinos. Therefore, a rigorous econometric approach is required to examine the real effect of the WHL on attracting tourists.

### 3. Empirical specification and data

To investigate the determinants of international tourist arrivals in Macau, especially for the effect of UNESCO recognition in 2005, we apply the commodity version of the gravity model by treating tourist arrivals as one type of traded good. This specification has been adopted by Yang et al. (2010) to estimate determinants of tourism demand. The gravity model is specified as:

$$Q = \frac{m_i m_j}{d^2}$$

where  $Q$  is the number of tourist arrivals, and  $m_i$  and  $m_j$  denote the characteristics of country  $i$  and  $j$ , respectively. The term  $d$  denotes the geographic distance between country  $i$  and  $j$ , meaning that the number of tourist arrivals depends on the transportation cost (distance) and both countries’ characteristics that may foster or retard tourism. Needless to say, being included on the WHL is the key variable of concern in this study.

By indexing Macau as the only destination to examine determinants of tourism demand, we specify the empirical model as the following:

$$\ln TOUR_{jt} = \beta_0 + \beta_1 \ln PGDP_{jt} + \beta_2 \ln POP_{jt} + \beta_3 \ln DIS_{ijt} + \beta_4 EXC_{jt} + \beta_5 \ln HOTEL_{it} + \beta_6 \ln PO_{it} + \beta_7 \ln CASINO_{it} + \beta_8 SARS + \beta_9 WHL + \varepsilon_{jt} \quad (1)$$

The dependent variable  $TOUR$  is the logarithm of tourist arrivals by place of residence. Let subscripts  $i$ ,  $j$ , and  $t$  denote Macau, the country of origin, and the time period, respectively. Last, let  $\varepsilon$  represent the error term, which is assumed to be normally distributed.

Following existing literature, our explanatory variables include per capita GDP ( $PGDP$ ) and population ( $POP$ ) of country  $j$  to capture income and market size of the countries of origin. In addition, the geographical distance between Macau and country  $j$  ( $DIS$ ) is included to reflect transport costs. The change of exchange rates

<sup>8</sup> For detailed information regarding “The Historic Centre of Macao”, please refer to its official website: <http://www.macaupatrimony.net/wh/indexC.asp>.

<sup>9</sup> Prior to the Scheme, China residents could travel to Macau on business visas or in group tours. As the “Individual Visit Scheme” introduced in 2003, China approved only residents living in 8 cities to visit Macau. The scheme was then applied to more cities gradually. However, until now, only residents lived in 49 cities are allowed to visit Macau individually.



also plays a critical role in tourism determination. As a result, the average yearly change of exchange rate between the Macau dollar and the currency of country  $j$  ( $EXC$ ) is included.

Moreover, three local characteristics that might promote or decrease the number of tourists are taken into account. In particular,  $HOTEL$  represents the number of rooms provided by hotels. Although there is a possibility of endogenous causality between visitor arrivals and hotels, this problem would be minor even if we adopt the number of hotel beds from the current period, because constructing a new hotel normally requires a few years. In addition, this variable can also capture also the tourism policy of MICE, because these activities are normally held in hotels.  $PO$  denotes the public order that is measured by the number of crimes against persons per year. Finally yet importantly, because Macau is famous for its gambling sector, the number of casinos ( $CASINO$ ) is also included. Furthermore,  $SARS$  is a dummy variable, which equals one for the year of 2003 when the Severe Acute Respiratory Syndrome (SARS) was spread from the Guangdong province of China to 37 countries around the world (Wang & Jolly, 2004).

To estimate Equation (1) with a panel dataset, we allow for the existence of individual effects, which are potentially correlated with the right-hand side regressors:

$$\varepsilon_{jt} = u_j + v_{jt} \quad (2)$$

where  $\varepsilon$  is composed of an individual effect ( $u_j$ ) and the pure white noise ( $v_{jt}$ ). Let  $u_j$  be an individual country effect corresponding to permanent, unobserved heterogeneity across countries of origin but not within a country over time. In addition, let  $v_{jt}$  be a “white noise” error term, which is assumed to be independent across countries and over time. The standard approach is to employ a fixed-effects (FE) or a random-effects (RE) technique to eliminate the individual effect and get the “within” panel estimator. In the following, we report both FE and RE estimates along with the Hausman test to evaluate whether the FE or RE is more appropriate to use.

As the objective of this study is to examine the impact of WHL on tourist arrivals, we should create a variable for the WHL. Aforementioned, Macau has only one spot listed on the WHL—the 2005 recognition—suggesting that it is similar to an exogenous shock. Thus, the WHL is captured by a dummy variable ( $WHL$ ) which equals one for years since 2005 and onward. Estimates on  $WHL$  can be used to measure the direct effect of WHL inclusion on tourist arrivals.

To obtain robust estimates of the WHL effect, we employ two alternative estimating strategies to examine the effect of policy reform. The first involves replacing the WHL dummy in Equation (1) with a series of year dummies (1998–2009). In this manner, Equation (1) becomes

$$\begin{aligned} \ln TOUR_{jt} = & \beta_0 + \beta_1 \ln PGDP_{jt} + \beta_2 \ln POP_{jt} + \beta_3 \ln DIS_{ijt} + \beta_4 EXC_{jt} \\ & + \beta_5 \ln HOTEL_{it} + \beta_6 \ln PO_{it} + \beta_7 \ln CASINO_{it} + \beta_8 SARS \\ & + \gamma YEAR + \varepsilon_{jt} \end{aligned} \quad (3)$$

The estimates of these dummies can be used to indicate whether a change in tourist arrivals has taken place or not during the period after the UNESCO recognition in 2005. Furthermore, the common shift in a time trend might be attributed to a number of other macro shocks that are contemporaneous with the WHL recognition, which also have an impact on tourism. However, the change of tourist arrivals can be ascribed to many factors with no effect on the average.<sup>10</sup> In this setting, we can interpret the

estimated coefficient of these time dummies as international tourist arrivals’ responses to the inclusion of “The Historic Centre of Macau” on the WHL.<sup>11</sup>

The second econometric strategy employed is the difference-in-difference approach. Equation (1) is rewritten by adding a series of interaction term between WHL and the countries of origin.

$$\begin{aligned} \ln TOUR_{jt} = & \beta_0 + \beta_1 \ln PGDP_{jt} + \beta_2 \ln POP_{jt} + \beta_3 \ln DIS_{ijt} + \beta_4 EXC_{jt} \\ & + \beta_5 \ln HOTEL_{it} + \beta_6 \ln PO_{it} + \beta_7 \ln CASINO_{it} + \beta_8 SARS \\ & + \gamma WHLS * REGION + \varepsilon_{jt} \end{aligned} \quad (4)$$

The series of estimated coefficients on the interaction terms can be used to judge the effect of inclusion of world heritage sites on attracting international tourists for various regions, compared with the reference country.

The data utilized in this study comprises the Macau’s statistics on international tourist arrivals originating from the largest nineteen countries and regions between the years 1998 and 2009. As Macau received the UNESCO recognition in 2005, the time span of 1998–2009 enables us to have balanced data for pre- and post-WHL periods.<sup>12</sup> Note that we exclude the largest sourcing region, the mainland China. As discussed, this is because Chinese visitors are policy-directed rather than market-oriented. The nineteen countries and regions include Korea, Japan, Taiwan, Hong Kong, India, the Philippines, Indonesia, Malaysia, Singapore, Thailand, Canada, the US, Germany, France, Italy, Portugal, the UK, Australia, and New Zealand.<sup>13</sup> Table 1 summarizes the definition and basic statistics of variables.

## 4. Empirical result

### 4.1. The empirical result

Table 2 shows two sets of linear panel data estimates for Equation (1). Due to the high correlation between  $HOTEL$  and  $CASINO$ , each of these two variables was separately included in the estimation. Both random-effects (RE) and fixed-effects (FE) estimates are reported in Table 2. Note that the distance variable,  $DIS$ , is time-invariant, and is dropped from the fixed-effects model. However, all the Hausman test figures reject the null hypothesis at the 1% statistical level, suggesting that the FE model is more appropriate.

The estimated coefficients on the core variables of the gravity model,  $PGDP$ ,  $POP$ , and  $DIS$ , are significant and have an expected sign, indicating that a country with a higher per capita GDP and greater population has more tourists visiting Macau, *ceteris paribus*. This finding reflects the fact that the large and rich countries, for example, Canada, France, Germany, Japan, the UK, and the US, are the main outbound tourism countries in the international tourism market.

As transportation costs account for a large share of travel expenditure, the coefficient of geographical distance is negative and significant at the 1% statistical level. Transportation costs are

<sup>11</sup> This approach is widely adopted in evaluating the impact of patent reform on patenting, such as Sakakibara and Branstetter (2001) and Yang (2008).

<sup>12</sup> As Macau is a special case with the sovereignty transferred from Portugal to China in 1999, a referee suggested us to extend to several years prior to 1999 to consider the impact of transfer on Macau tourism. However, tourism statistics is only available after 1998.

<sup>13</sup> Countries other than the 19 countries are integrated as a regional sum; it prevents us to include more countries. For detailed numbers of visitor arrivals by country/region, please refer to the Statistics section of DSEC website: <http://www.dsec.gov.mo/Statistic.aspx>. It is also shown in Appendix Table.

<sup>10</sup> For example, Macau’s two famous tourism-promoting activities, the Grand Prix and the International Fireworks Festival, were firstly introduced before 1998. It implies that the overall effect will be similar in each year.

**Table 1**  
Definition of variables and basic Statistics.

Variables	Definition	Mean	S.D.
TOUR	Overnight stays from tourist arrivals	444999	1356117
PGDP	The relative per capita of country <i>j</i>	21181.6	14236.76
POP	The population of the countries of origin	122447.8	243668.8
DIS	The geographical distance between Macau and country <i>j</i>	5754.421	4132.669
EXC	Exchange rate	1.025	8.6677
HOTEL	The number of hotel rooms	11966.64	3704.112
PO	The number of crime per year	2275.455	388.504
CASINO	The number of casino	18.455	8.456
SARS	A dummy variable which equals one for the year 2003.	0.091	0.288
WHL (TIME)	The dummy variable of WHL equals one for years since 2005 and onward.	0.455	0.499
EUROWHL	EURO = Germany, France, Italy, UK	0.088	0.284
USCWHL	USC = Canada, US	0.044	0.205
ANZWHL	ANZ = Australia, New Zealand	0.044	0.205
ASIAENWHL	ASIAEN = Korea, Taiwan, Japan	0.066	0.248
ASIAESWHL	ASIAES = India, Philippine, Indonesia, Malaysia, Singapore, Thailand	0.132	0.338
TREAT	Macau and HK = 0 Other countries = 1	0.895	0.308
TT	TREAT*TIMR	0.407	0.492

particularly relevant to the international tourism market when the price of petroleum increases. Alternatively, the negative effect of *DIS* can be interpreted by the fact that many travelers cannot bear long-distance flights and prefer to spend vacations in surrounding countries.

The variable of change in exchange rates was found to associate with a significantly negative coefficient in all estimates. This indicates that *all other things being equal*, an appreciation in the Macau dollar will reduce international tourist arrivals, arising from the important role of exchange rates in determining international spending.

The impacts of local characteristics, *HOTEL*, *PO*, and *CASINO*, are summarized below. The estimated coefficients for *HOTEL* (Model 1) are all significantly positive at the 1% statistical level, suggesting that sufficient accommodation facilities are a prerequisite for providing tourism service. Likewise, the estimates of *CASINO*

(Model 2) are also positive and significant. As discussed previously, the gambling industry is the long-standing famous attraction that lures international tourists to visit Macau. Moreover, along with the deregulation on the license of casinos, more luxurious and multi-recreational functions casinos were established to attract tourists of various age levels. As expected, the crime variable (*PO*) has a significantly negative impact on tourist arrivals in all FE estimates, supporting the findings in existing literature, for example, *Eilat and Einav (2004)* and *Naude and Saayman (2005)*. Furthermore, as expected, the unanticipated outbreak of the SARS epidemic in 2003 had a significantly negative effect on tourist arrivals.

More importantly, do the empirical results support the tourism-enhancing effect of the WHL? Various estimates show that, while the estimated coefficients on the WHL variable are positive, not all of them are statistically significant. This finding is consistent with *Cellini (2011)* and within the estimates in *Yang et al. (2010)*. That is, contrary to common belief, being included on the WHL is not a primary driver of international tourism. One point worth mentioning is that the coefficient of the WHL dummy can only be explained as the average treatment effect between pre- and post-WHL inclusion periods for all sample countries. In other words, the coefficient of the WHL dummy cannot provide more insightful implications such as year effects or country-specific effects.

#### 4.2. Further investigations

*Table 3* reports the results of estimating Equation (2), where the WHL variable is replaced by a series of year dummies.

As the SARS variable is the same as the 2003 dummy, it is excluded from the estimation. In this manner, the impact of the epidemic of SARS on tourist arrivals will be captured by the 2003 dummy. In addition, because local characteristics are yearly variant, they cannot be determined within estimates when we include the series of year dummies. Macau features casinos; therefore, we retain the important variable of a casino and drop a year dummy in Model 4.

The estimated coefficients on *PGDP*, *POP*, *DIS*, and *EXC* are qualitatively the same as in *Table 2*. To be specific, countries with a higher per capita GDP and greater population are associated with more outbound tourists to Macau, *ceteris paribus*. Conversely, distance and depreciation of a sourcing country's currency have a negative effect on the number of outbound visitors to Macau, after controlling for other variables.

**Table 2**  
Determinants of tourist arrivals in Macau.

	Model 1		Model 2	
	RE	FE	RE	FE
lnPGDP	1.144*** (0.127)	1.404*** (0.176)	1.131*** (0.131)	1.425*** (0.188)
lnPOP	0.723*** (0.146)	5.926*** (0.847)	0.717*** (0.147)	6.065*** (0.854)
lnDIS	−1.517*** (0.156)		−1.512*** (0.157)	
EXC	−0.003 (0.003)	−0.006** (0.003)	−0.004 (0.003)	−0.006** (0.003)
lnHOTEL	0.757*** (0.184)	0.478*** (0.169)		
lnPO	0.095 (0.188)	−0.554*** (0.186)	−0.060 (0.209)	−0.632*** (0.199)
lnCASINO			0.550*** (0.166)	0.276* (0.157)
SARS	−0.369*** (0.098)	−0.312*** (0.087)	−0.281*** (0.105)	−0.270*** (0.093)
WHL	0.067 (0.106)	0.026 (0.095)	0.067 (0.117)	0.055 (0.104)
CON	−2.912 (2.422)	−65.815*** (8.120)	3.943* (2.372)	−63.220*** (8.297)
Hausman test		70.66(7)***		71.26(7)***
R <sup>2</sup>	0.786	0.8261	0.779	0.822
Obs	228	228	228	228

Note: Figures in the parentheses are standard deviations. \*\*\*, \*\*, and \* denote coefficients are significant at 1%, 5%, and 10% statistical level, respectively.

**Table 3**

WHL and tourist arrivals in Macau: Year effect.

	Model 3		Model 4	
	RE	FE	RE	FE
lnPGDP	1.172*** (0.133)	1.515*** (0.192)	1.172*** (0.133)	1.515*** (0.192)
lnPOP	0.740*** (0.149)	6.030*** (0.856)	0.740*** (0.149)	6.030*** (0.856)
lnDIS	−1.528*** (0.159)		−1.529*** (0.159)	
EXC	−0.004 (0.003)	−0.008*** (0.003)	−0.004 (0.003)	−0.008*** (0.003)
lnCASINO			0.550*** (0.129)	−0.166 (0.145)
D99	0.014 (0.115)	−0.071 (0.101)	0.014 (0.115)	−0.071 (0.101)
D00	0.037 (0.112)	−0.128 (0.100)	0.037 (0.112)	−0.128 (0.100)
D01	0.082 (0.111)	−0.126 (0.102)	0.082 (0.111)	−0.126 (0.102)
D02	0.088 (0.117)	−0.157 (0.108)	0.088 (0.117)	−0.157 (0.108)
D03	−0.294** (0.124)	−0.606*** (0.115)	−0.294** (0.124)	−0.606*** (0.115)
D04	0.005 (0.125)	−0.408*** (0.121)	−0.166 (0.109)	−0.356*** (0.098)
D05	0.225* (0.127)	−0.275** (0.127)	−0.015 (0.104)	−0.203** (0.093)
D06	0.397*** (0.132)	−0.181 (0.137)	−0.033 (0.104)	−0.052 (0.091)
D07	0.610*** (0.144)	−0.047 (0.153)	0.095 (0.116)	0.108 (0.102)
D08	0.690*** (0.147)	−0.055 (0.162)	0.120 (0.114)	0.117 (0.100)
D09	0.605*** (0.142)	−0.182 (0.160)	Drop	Drop
CON	4.321** (2.239)	−67.599*** (8.776)	3.001 (2.120)	−67.201*** (8.604)
Hausman test		76.96 (14)***		76.96 (14)***
R2	0.791	0.834	0.791	0.834
Obs	228	228	228	228

Note: Figures in the parentheses are standard deviations. \*\*\*, \*\*, and \* denote coefficients are significant at 1%, 5%, and 10% statistical level, respectively.

Our main focus is to explain the estimates of year dummies in terms of the impact of the UNESCO recognition. The two sets of FE estimates (Model 3 and Model 4) suggest that, compared with the base year 1999, there was a significant decrease in tourist arrivals in 2003–2005, *ceteris paribus*. In addition, the FE estimates in model 4 indicate that tourist arrivals increased in 2007 and 2008, after controlling for other variables.

To learn more insights from this estimation, we exclude the impact of SARS (the SARS coefficient in Table 2) and then plot the two sets of FE estimates on the year dummies in Fig. 2. As mentioned, the WHL inscription was announced in July 2005. Therefore, we expect to observe a spike in 2005 or immediately thereafter, if the WHL does induce more visitors. Fig. 2 clearly indicates that starting from 1999, there has been a slight decrease in tourist arrivals in Macau. This downturn may result from the macroeconomic or international economic conditions. In particular, 2004 had the most negative impact on tourism. Importantly, Fig. 2 shows a noteworthy positive year effect on tourist arrivals between 2005 and 2007. The time trend decreased again in 2008 and 2009.

To summarize, compared with the pre-WHL period, there has been a substantial difference in tourism growth during the post-WHL period. Given this observation, it seems to suggest that there is a strong tourism-enhancing effect caused by the WHL inscription. However, this positive impact lasts only for a short-run. In addition to the UNESCO recognition, aggressive promotions made by the Macau government and higher quality global economic conditions are also possible explanations for the increase in tourist arrivals during 2005–2007.<sup>14</sup>

The above analyses neglect the possibility that the “Historic Centre of Macau” may exhibit different degrees of attractiveness to tourists from diverse regions. Specifically, the Portuguese-style buildings and the Portugal-China mix of aesthetics, culture, and architecture are perhaps more attractive to Asian tourists than those from European countries. To differentiate the potential tourism-enhancing effect of the WHL across tourists of various

regions, we adopt visitors from Hong Kong and Portugal as the reference group. Next, we classify the other sample countries into five regions and introduce five interaction terms between regions and the WHL variable into Equation (3). The five regions include EURO (European countries), AMER (the US and Canada), ANZ (Australia and New Zealand), EASIA (Japan, Korea, and Taiwan), and SEASIA (Southeast Asian countries: India, the Philippines, Indonesia, Malaysia, Singapore, and Thailand). Table 4 reports the empirical results.

Compared with estimates shown in Table 2, the influences of sourcing countries' characteristics and Macau's specific characteristics stay the same. Despite the overall impact of the WHL not being significant, there are several important points worth noting. First, the estimated coefficients on EURO\*WHL, AMER\*WHL, and ANZ\*WHL are all not statistically significant, suggesting that being listed on the WHL does not attract more tourists from European countries, North America, Australia, or New Zealand to visit Macau. One interpretation is that the cultural distance between Portugal and the above countries is shorter in terms of religion belonging to the Judeo-Christian faith. From this point of view, the Catholic churches and Portuguese buildings are less attractive for tourists from the aforementioned countries.

Second and more importantly, the brand of heritage travel seems to be attractive for Asian tourists. In the RE estimates of Model 5, the estimated coefficient of SEASIA\*WHL is positive and significant at the 1% statistical level, indicating that there is a considerable increase in tourist arrivals from Southeast Asian

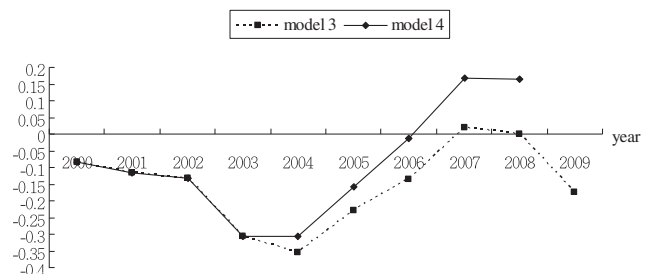


Fig. 2. Year effect of WHL on tourist arrivals in Macau. Source: Statistics and Census service of Macau (DSEC).

<sup>14</sup> According to the statistics of World Tourism Organization, international tourism arrivals expanded by 5.5% in 2005, 6.6% in 2006, and 6% in 2007, and then appeared a slowdown on growth of international tourism arrivals that reached only 1.9% in 2008.

**Table 4**

WHL and tourist arrivals in Macau: Regional effect.

	Model 5		Model 6	
	RE	FE	RE	FE
lnPGDP	0.947*** (0.115)	1.188*** (0.166)	0.960*** (0.119)	1.259*** (0.180)
lnPOP	0.517*** (0.135)	3.489*** (0.895)	0.525*** (0.136)	3.733*** (0.905)
lnDIS	−1.377*** (0.143)		−1.383*** (0.144)	
EXC	−0.005** (0.002)	−0.006*** (0.002)	−0.006*** (0.002)	−0.007*** (0.002)
lnPO	0.071 (0.144)	−0.326* (0.173)	−0.39E − 03 (0.164)	−0.373** (0.182)
lnHOTEL	0.539*** (0.132)	0.380*** (0.138)		
lnCASINO			0.336*** (0.117)	0.169 (0.125)
SARS	−0.295*** (0.074)	−0.270*** (0.072)	−0.248*** (0.081)	−0.251*** (0.079)
EURO*WHL	−0.091 (0.099)	−0.037 (0.099)	−0.073 (0.103)	−0.004 (0.102)
AMER*WHL	0.186 (0.125)	0.126 (0.122)	0.206 (0.129)	0.155 (0.126)
ANZ*WHL	0.112 (0.128)	−0.068 (0.133)	0.128 (0.132)	−0.061 (0.136)
EASIA*WHL	0.228** (0.108)	0.327*** (0.108)	0.250** (0.113)	0.375*** (0.114)
SEASIA*WHL	0.915*** (0.092)	0.716*** (0.103)	0.935*** (0.095)	0.726*** (0.105)
CON	2.097 (1.937)	−38.676*** (8.758)	6.569*** (2.083)	−38.523*** (9.138)
Hausman test	14.85 (11)			17.34 (11)*
R2	0.869	0.877	0.864	0.874
Obs	228	228	228	228

Note: Figures in the parentheses are standard deviations. \*\*\*, \*\*, and \* denote coefficients are significant at 1%, 5%, and 10% statistical level, respectively.

countries after Macau was inscribed on the WHL, *ceteris paribus*. In the FE estimates of Model 6, both coefficients of *EASIA\*WHL* and *SEASIA\*WHL* are significantly positive, suggesting that the tourism-enhancing effect of the WHL works for both Southeast Asian tourists and East Asian countries. One possible explanation is that Asian people are attracted by the foreign atmosphere of Portuguese culture and architecture. Moreover, Asian tourists have a preference for “Heritage Tourism,” because most travel agents and guidebooks preach and promote the value of visiting WHSs.

## 5. Concluding remarks

Although the authentication of the WHL aims to protect historical and natural assets belonging to human beings, many countries have adopted the UNESCO recognition as a marketing tool to attract foreign tourists. The idea that having WHSs can promote tourism seems to be a common belief. Yet, only a few studies have systematically examined the real effect of WHL on fostering tourism and reached divergent results. The continuous debate in the research line of demand for international tourism suggests the need for more rigorous empirical investigation.

Provided that Macau is a small region famous for the gambling industry, the inscription of “Historic Centre of Macau” on the WHL in 2005 makes Macau an excellent case to examine the tourism-enhancing effect of WHL. Using panel data for the tourist flows from nineteen countries and regions to Macau from 1999 to 2009, this study examined the impact of WHL inscription on international tourist arrivals in Macau. The empirical estimates can lend new evidence and implications to the worldwide debate on the conflict between promoting tourism and sustainable preservation.

Employing various econometric techniques to implement empirical estimations, our findings lend support to previous studies that per capita income and population of countries of origin, geographical distance, and change of exchange rate are important determinants of international tourism. In addition, Macau’s characteristics such as crime rate and tourism infrastructures (hotels and casinos) are relevant to tourism demand.

Overall, we found no significant impact of WHL inscription on inducing more tourist arrivals in Macau, supporting the argument in Cellini (2011) that the effect of the presence of spots in WHL on attracting more tourists is minor. Importantly, we find some appealing results through further examinations on the year effect and region-effect of tourism caused by the WHL. First,

announcement of inscribing a site on the WHL seems to be an effective advertisement and promotion strategy stimulating more tourist arrivals in the short-run. Second, the tourism-enhancing effect of the WHL is different among countries and regions. In particular, the inscription of the “Historic Centre of Macau” exhibits a significant impact on fostering more Asian tourists to Macau, especially for visitors from Southeast Asia, because the Portuguese-style architecture and culture appeal more to Asian travelers than to Western tourists. Finally, Macau is a special case with only one WHS. As a result, our empirical findings cannot apply to all sites of WHL. Indeed, whether a spot listed on WHL can attract more international visitors needs supporting infrastructures and facilities within the enlisted country. However, Macau acts as an excellent case for us to avoid problems associated with the time-invariant property of WHL variables in fixed-effects models. In this manner, our results are reliable and can lend insights on the impact of UNESCO recognition on tourism.

## Acknowledgments

The authors would like to thank two anonymous referees and the Editor Chris Ryan for their helpful comments and suggestions on an earlier version of this paper. The usual disclaimer applies.

## Appendix. Supplementary data

Supplementary data related to this article can be found online at doi:10.1016/j.tourman.2012.01.014.

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