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DETERMINANTS OF TOURISM DEMAND IN INDONESIA: A PANEL DATA ANALYSIS

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By 2014 Indonesia registered 11.6 million inbound foreign tourists, 135% higher than the year 2000. Since then, government policies to promote tourism flourished. This article investigates the determinants of inbound tourism from the top nine mayor tourist origin countries into Indonesia covering the period of 2000 to 2014. This research employs a dynamic panel dataset to estimate the impact of per capita real income, relative prices, accommodation capacity, distance, and public infrastructure investment on international tourism demand in Indonesia, capturing demand- and supply-side effects. The results show that per capita income of tourists, relative price, and available rooms have a positive effect on tourism expenditure in Indonesia, while distance has a negative effect. Dummy variables capture large negative shocks in tourism arising from two terrorist attacks in 2002 and 2005, as well as from the global financial crisis in 2008. Income plays a positive but low impact on tourism demand compared to other nations. The positive effect of prices suggests an advantage of Indonesia in competitive tourism prices. Nevertheless, low prices also denote low value in tourism services. The substantial impact of accommodation may indicate that significant effects of tourism are allocated in lodging, minimizing the impact on other sectors.

Key words: Tourism demand; Inbound tourism; Dynamic panel model; Indonesia

Introduction

In the last decades, tourism developed into one of the most dynamic and rapid growth sectors of the world. From 2000 to 2014, Indonesia also experienced vast expansion of foreign tourist arrivals from 5.06 million to nearly 9.43 million travelers. Besides, tourism revenues doubled to more than US$11 billion. The rapid growth of the tourism sector has reattracted the attention of Indonesian policymakers to launch tourism as a key sector to stimulate economic growth, create employment, increase foreign exchange income, encourage other supporting industries, and promote the natural beauty and culture of Indonesia, among others. The national government set an ambitious target of reaching 20 million international tourists by 2019, doubling the contribution of tourism to GDP to 8%,

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and multiplying foreign revenues to nearly US$16 billion.

However, by 2017, the share of tourism to Indonesia's GDP accounted for 5.8%, lower than the 9.1% share to GDP in the year 2000. By contrast, most Southeast Asian neighbors increased the share of tourism to total GDP. Although average receipts per traveler increased from US$1,059 in 2007 to US$1,226 in 2014, since 2010 the ratio fell year after year until US$1,005 in 2017. Inbound tourism expanded by 155% (2007–2017), but total tourism expenditure only increased by 98%. Although the share of the tourism sector to GDP is shrinking and receipts per traveler fell, in 2017 the sector stills account for an essential source of employment, estimated at 10% of total employment—direct and indirect jobs—and it contributes to the balance of payments with nearly US$20 billion on 2017.

Though previous empirical studies may support that the tourism sector could give a substantial contribution to the Indonesian economy (Mahadevan, Amir, & Nugroho, 2017), the challenge is to understand the drivers that influence tourism demand in the country to help policymakers design strategies in order to develop the tourism sector and to unleashed the potential of the archipelago. Several authors focus on demand aspects, leaving supply factors as secondary causes in determining tourism demand, opening a research gap. Besides, Indonesia is sensitive to terrorist attacks, to natural disasters, and global financial shocks, suggesting the need to capture how they affect tourism demand.

This article employs variables proxying both demand and supply factors that could trigger demand for tourism, offering insights of impacts that could help address policy efforts. This study includes an analysis of the influence of per capita income of the country of origin, accommodation capacity, relative price, and infrastructure development in Indonesia on transborder travelers' expenditure in Indonesia. The model incorporates five dummy variables to capture effects due to terrorism incidents (2002 and 2005), the 2004 tsunami (natural disaster), and the global financial shock (2008) that can help to measure the impact of events in tourism, constant threats to the country. Finally, the study tests a free entry visa scheme introduced in 2003 as a tourist promotion policy tool. An additional contribution of this article is that it employs a dynamic data panel applying a Generalized Method of Moments (GMM) system to a set that covers nine main origin countries during the period 2000–2014, five possible explanatory variables, capturing country-specific factors. The use of GMM allows testing effects of lagged influence from previous tourism arrivals, addressing the presence of endogeneity in the data.

Literature Review

The literature section deals with the demand function for tourism, and with factors that influence tourism demand. Understanding the dynamics of tourism demand help to design more effective policy tools and to build links towards evidence on tourism-led growth. Though the empirical evidence on the tourism-led growth is mixed (Brida, Cortes-Jimenez, & Pulina, 2016; De Vita & Kyaw, 2016), more often evidence suggests a positive contribution to the economy as tourism has the ability to increase employment, tax revenue, and national income, as well as provide wide and long linkages towards different sectors in the economy (Proenca & Soukiazis, 2005; Tang & Tan, 2015). In specific cases, tourism outstrips economic growth versus other sectors and plays a role of engine of economic recovery after periods of crisis (Dogru & Bulut, 2018). In Indonesia, evidence of tourism sector supports the presence of economic growth but not free of painful trade-offs as income inequality (Mahadevan et al., 2017), environmental degradation, and cultural and social distortion (Kinseng, Nasdian, Fatchiya, Mahmud, & Stanford, 2018).

Tourism Demand

The demand function is the fundamental theory that illustrates tourism as an economic activity where the output represents the aggregate set of services/goods demanded by a visitor during a specific frame of time on a foreign location. People at the destination offer products and services to incoming visitors. The willingness of visitors to acquire those goods determines the demand for services/goods. While demand function more often illustrates output as a function of income (purchasing power of the tourist) and prices (relative to one another; e.g., Akis, 1998), there are economic and non-economic

factors that interact in the demand of tourism services (Habibi, 2017). Other factors influencing demand in tourism include government regulations, transportation technology, real exchange rate, interstate economic relations, among other (Gallego, Rodríguez-Serrano, & Casanueva, 2019; Kim, Lee, & Mjelde, 2018; A. Liu, Sanshan Lin, & Song, 2018; Wray, 2015).

What is generally common in the literature of tourism demand is that tourism activities have the potential to drive demand, for both consumption and investment, eventually leading to the direct and indirect effects on other sectors. Spillover effects triggered by the tourism sector can raise demand for capital goods and raw materials (investment-derived demand) with the potential to foster economic growth across sectors (transportation, communication, hospitality, handicraft industry, consumer products, services, restaurants, among others).

Within a general demand function, the wider availability of resources can trigger the willingness of travelers to spend. Nevertheless, other factors, as the accessibility of the products and attractions and quality of services, could contribute to the demand for tourism attractions (Harb & Bassil, 2018). Transportation infrastructure can capture accessibility, as it is influential in connecting visitors to tourist destinations.

Analysis covering behavioral forces are also gaining weight in the literature of tourism demand as behavioral factors can lead to significant variations depending on a full set of circumstances. Empirical studies covering destination image (Cohen, Prayag, & Moital, 2014; Isaac & Eid, 2019), expenditure behavior among tourists (Hung, Shang, & Wang, 2013), perception in destinations (Yang & Wall, 2009), market structures (Y. Liu, Li, & Parkpian, 2018), sentiment analysis (Önder, Gunter, & Scharl, 2019), among others, are an example.

The empirical study of Proenca and Soukiazis (2005) pointed out that the theory of demand and the theory of consumer behavior are the basis in determining tourism activities. Different approaches to tourism demand include tourist arrivals, length of the visit, and visitor expenditure (De Mello, Pack, & Sinclair, 2002; Proenca & Soukiazis, 2005). Nevertheless, the demand for tourism services is determined by a set of observable and nonobservable factors, not always the same as demand functions for tradable goods.

Factors Affecting Tourism Demand

Per capita income of the country of origin, rooms, relative prices, and infrastructure development are often important drivers of tourism demand, both in developing and developed countries. However, the degree and direction often differ. Kim et al. (2018) found a significant effect of per capita GDP, relative prices, and exchange rates towards Japanese inbound tourism from Korea (the largest inbound market for Japan). In the Portugal case, Proenca and Soukiazis (2005) found that income per capita accounts for the largest effect driving demand, while accommodation capacity represents the largest supply variable in attracting more tourists. Habibi (2017) pointed out that income, hotel rooms, and political stability play a determinant role in larger tourism inflows in Malaysia. As for Thailand, distance appears as a driver of regional tourism; however, GDP per capita and population size is not conclusive as a driver of ASEAN tourist (Y. Liu, Li, & Parkpian, 2018).

In the case of the US, Yazdi and Khanalizadeh (2017) found that GDP, prices, real exchange rate, certain events, and transportation play a role in determining tourism demand.

Other factors often employed in tourism demand studies include distance and accessibility (A. Liu et al., 2018; Y. Liu, Li, & Parkpian, 2018), the role of location factors (Assaf, Josiassen, & Agbola, 2015), tourism cycles (Kožić, 2014), transportation infrastructure (Barman & Nath, 2019; Khadaroo & Seetanah, 2008; Tóth, Dávid, & Vasa, 2014), security (Ghaderi, Saboori, & Khoshkam, 2017), among others. Studies such as that of Khadaroo and Seetanah (2008) highlighted the positive role of transportation and infrastructure in tourism inflows in a large number of countries (28), with more significant coefficients for countries within Africa and Asia. The Indian case also supports the notion that transportation and communications play a crucial role in attracting tourist (Barman & Nath, 2019).

Effects of terrorism in tourism is attracting attention in the tourism literature, as in Indonesia (Pambudi, McCaughey, & Smyth, 2009; Smyth, Nielsen, & Mishra, 2009) where evidence suggests

that a bomb in 2002 caused a decrease in real GDP, employment, export prices, and consumer price index of Bali. The World Bank/UNDP also reported a fall in tourism arrivals of nearly 50% after the bombing attacks of 2002.

Other studies suggest that tourism is sensitive to economic and financial shocks (Khalid, Okafor, & Shafiullah, 2019). Song and Lin (2010) uncovered negative impacts on tourism in Asia as a result of the 2008 financial crisis, although with an expected rebound a year after the shock (2010). Purwomarwanto and Ramachandran (2015) found that Indonesia experienced a decrease on tourism arrivals on the aftershock of the 2008 financial crisis, with a slow down on arrivals on 2009 and a recovery in the following year. Smeral (2010) predicted a nearly 10% decrease in world total tourism expenditure as a consequence of the global financial crisis, although the recovery process was a rather short-term effect.

Some policy interventions can support tourism flows due to tools as free tourist visas. A free tourist visa in Turkey (Balli, Balli, & Cebeci, 2013) and in South Korea (Lee, Song, & Bendle, 2010) suggested a positive effect in arrivals.

Three points support the need for an analysis of factors influencing tourism within this article. First, the unachieved national goal of Indonesia related to tourism activities. Second, the potential that the tourism sector offers to support economic growth, still at a low level (Mahadevan et al., 2017). Third, the still unconcluded results on tourism determinant factors for Indonesia (Pujiharini & Ichihashi, 2016; Tan, McCahon, & Miller, 2002). A possible reason why Indonesia is below its targets level is related to tourism offerings, the so-called Triple-A (Damanik & Weber, 2006): attractions, accessibility, and amenity. Indonesia may have superior resources (natural beauty) but it may need to support its advantages with more qualified human resources, infrastructure, institutions, and security, among others.

Tourism led-growth hypothesis (TLGH) suggests that nations with a well-developed tourism sector could achieve higher economic growth, as concluded by Brida et al. (2016) in an exhaustive review on TLGH literature. The works on Indonesia TLGH support that tourism could help in reducing poverty, although not free of a trade-off of income inequality (Mahadevan et al., 2017) and some negative social impacts (Kinseng et al., 2018; Mahendradhata, 2019) beyond the scope of this article. This work contributes to the literature of tourism demand, first addressing a gap due to unconcluded results in the Indonesian case. In addition, this article contributes by combining supply and demand factors to a model, supported by other studies but not yet incorporated into Indonesia.

Data and Methods

The purpose of this study is to analyze the factors that influence the demand of transborder tourists in Indonesia, including the nine major countries of origin that account for about 80% of the total inflows of tourism in Indonesia. Versus a large number of papers employing time series, this study employs a dynamic panel data to estimate the demand function of tourism in Indonesia for 15 years (2000–2014). A combination of time series and cross-sectional data enables higher degrees of freedom in the estimation process, providing the advantage of incorporating specific effects in the country, providing more data information, reducing multicollinearity effects, and enabling dynamic specification (Proenca & Soukiazis, 2005).

As a dependent variable, this study employs the total expenditure of travelers from each of the nine origin countries in Indonesia:

$$\omega_{i,t} = \text{average tourist expenditure of per country} * \text{total arrivals per country} \quad (1)$$

where i is 1, . . . , 9 (i nine main inbound countries), and t corresponds to the year of research (2000–2014).

The model includes a lagged variable of tourism arrivals proxied through the expenditure variable. The lagged variable captures the effect of previous tourist arrivals on current arrivals as tourist are likely to spread news about the destination. Besides, the effect of growing numbers of tourist from particular destinations may influence government and investors to increase the availability of services.

As independent variables, the proposed model includes the country of origin per capita real income, calculated as real gross domestic product (GDP) per capita. The income per capita is expected

to play a positive role with tourism demand as the income rises.

$$Y_{i,t} = \frac{\text{GDP}}{\text{CPI.POPULATION}} \quad (2)$$

The relative price between Indonesia and each of the nine origin countries of tourists reflects the level of prices consumed by foreign tourists in Indonesia against prices in the tourists' countries of origin. Goods/services consumed by international tourists are hotels, food, transportation, entertainment, and souvenirs, among others. Considering that the prices of goods consumed by foreign visitors are not available, this study uses consumer price index (CPI) data as a proxy. The weakness of employing CPI as a proxy is the possibility of finding differences in the group of goods use to compute the CPI and the group of goods consumed by transborder tourists. This study follows Dogru and Bulut (2018), who demonstrated the superiority of using relative price adjusted by exchange rates over other possible proxies (exchange rate or relative prices alone). The CPI captures the relative prices adjusted to the exchange rate:

$$P_{i,t} = \text{CPI}_{\text{Indonesia}}/(\text{CPI}_{\text{origin}} * \text{ER}_{\text{Indonesia/origin}}) \quad (3)$$

Accommodation capacity uses the number of hotel rooms available in Indonesia every year, considering that the readiness of accommodation is important for travelers. The hotel rooms include both star and nonstar hotels.

The variable of public investment is used as a proxy for connectivity and infrastructure, expected to be positively related to tourism expenditures. In a number of empirical studies (Magerman, Studnicka, & Van Hove, 2016) there is a negative impact between distance and tourism, commonly associated with transportation costs. Distance is not only associated with trade cost but also to sensitivity to policy modifications, or *weaker cultural affinity* (Baier, Yotov, & Zylkin, 2019). Distance represents the distance (kilometers) between the capital cities of the origin country and Indonesia (touristic destination).

The model incorporates a set of four dummy variables (years). Two dummies consider the effects of terrorist attacks expected to affect tourism inbounds negatively after the 2002 and 2005 bombings in Bali (Pambudi et al., 2009; Smyth, Nielsen, & Mishra, 2009). The effects are likely to be short term (1 year) as suggested in Smyth et al. (2009). A dummy for year 2004 captures the impact from a free tourist visa launched in 2003 for selected Asian countries. A dummy for 2005 is expected to capture adverse effects from the devastating tsunami of 2004 (Kelman, Spence, Palmer, Petal, & Saito, 2008). An additional dummy (2009) covers the effect of the global economic slowdown of the year 2008, with impacts on 2009 as suggested in Smeral (2010).

Model Specification

Based on tourism supply and demand theory, this study assumes that the tourism inflows received by Indonesia are equivalent to the "export receipts" and the "import costs" for the sending countries. Export revenues (tourism inflows) will depend positively on the purchasing power of the tourist sending countries (importers) and negatively to the relative price between the recipient country (exporter) and the tourist sending countries (importers). It is likely that the higher the purchasing power of the sending countries, the higher the demand for tourism. The higher the price of the recipient country, the lower the tourism demand for the recipient country. Other current factors may also influence demand (resistance factors), besides the possible effect of prior periods (word-of-mouth or persistent habits). Consequently, the tourism demand model is formulated as follows (see Table 1):

$$\begin{aligned}\ln W_{i,t} = {} & \alpha + \beta_1 W_{i,t-1} + \beta_2 \ln Y_{i,t} + \beta_3 \ln P_{i,t} + \beta_4 \ln A_t \\ & + \beta_5 \ln IP_t + \beta_6 \text{Dis}_i + \beta_7 \text{Dummy}_{2003} \\ & + \beta_8 \text{Dummy}_{2004} + \beta_9 \text{Dummy}_{2006} \\ & + \beta_{10} \text{Dummy}_{2009} + \mu_{i,t} \end{aligned} \quad (4)$$

The data panel includes the top nine tourist origin countries: Singapore, Malaysia, Australia, Japan, US, UK, Italy, Germany, and the Netherlands (see Table 2).

Gallego et al. (2019) suggested applying a GMM to deal with endogeneity problem, common in the sector, as well as to capture dynamic effects from previous years (e.g., word-of-mouth effect). The GMM is a model proposed by Arellano and

Table 1
Variable Description and Sources

Variable	Description	Source
$W_{i,t}$	Ratio of the total tourism expenditure of origin countries from total tourism expenditure in Indonesia	National Bureau of Statistics in Indonesia (BPS)
$W_{i,t-1}$	Lagged variable on tourism expenditure of origin country	National Bureau of Statistics in Indonesia (BPS)
$Y_{i,t}$	Per capita GDP of the foreign's tourists country of origin	IMF, Economic Outlook
$P_{i,t}$	Relative price between destination country and country of origin (CPI adjusted by exchange rate)	IMF, Economic Outlook
A_t	Accommodation capacity (number of available hotel rooms)	Ministry of Culture and Tourism of Indonesia
IP_t	Public investment yearly	National Bureau of Statistics in Indonesia (BPS)
Dis_i	Distance between Indonesia and partner country	indonesia.distanceworld.com
$Dummy_{2003}$	Dummy variable equal to one if the observation covers year 2003, zero elsewise (Bali Bombing 2002)	
$Dummy_{2004}$	Dummy variable equal to one if the observation covers year 2004, zero elsewise (Free Entry Visa for selected Asian countries launched in 2003)	
$Dummy_{2006}$	Dummy variable equal to one if the observation covers year 2006, zero elsewise (Bali Bombing 2005)	
$Dummy_{2009}$	Dummy variable equal to one if the observation covers year 2009, zero elsewise (Global Financial Shock 2008)	

Bond (1991), which converts the original regression model by differencing the variables, securing the stationarity of the different variables that carry fixed effects (Lam & Shiu, 2010). Applying the Sargan diagnosis test is necessary to validate for possible overidentification of restrictions. The Arrellano–Bond test AR(1) also helps to validate for no autocorrelation in the model using the z-statistically distribution for autocorrelation test, both for first-order autocorrelation and second order of autocorrelation. Both the AR(1) and AR(2) test are above the significant level, indicated by the probability > χ^2, meaning no autocorrelation in the model. The model fulfills the null hypothesis of the system (GMM) regarding no second-order autocorrelation and effective instrumental variables.

Results

From 2000 to 2014 foreign tourist arrivals increased by nearly 90%. Nine countries account for 80% of total foreign tourists; three are Asian countries (Singapore, Malaysia, and Japan), four are European countries (Italy, England, Germany, and the Netherlands), as well as Australia and the US. Although the largest number of visitors arrive from nearby countries (Singapore, Malaysia, Australia, and Japan), the presence of far-away nations on the sample suggests the need to look at a distance together with other factors.

High-income countries dominate tourist arrivals to Indonesia. Average real GDP per capita in 2014 is US$48,654 per year, excluding Malaysia

Table 2
Descriptive Statistics

Variable	Mean	SD	Min	Max	Observation
ln_Tourism expenditure	1.952058	0.8257468	17.51299	21.32763	135
ln_GDP per capita	1.033459	0.6237943	8.2726	11.12142	135
ln_Relative price	7.774938	2.479.538	1.596968	10.56051	135
ln_Accomodation	1.267255	0.1962059	12.44108	13.05895	135
ln_Public investment	1.107107	0.6636373	9.553575	12.1055	135
ln_Distance	8.653372	0.918601	7.045777	9.613737	135

(US$10,398) and Italy that contracted its GDP per capita by −7% during the 2000–2014 period. The GDP per capita of Indonesia increased from US$780 in the year 2000 to US$3,500 in 2014 (Table 3).

On the 2017 travel & tourism competitiveness report (World Economic Forum, 2017), Indonesia ranked fifth on price competitiveness, highly suggesting that price is an essential driver for tourism. Although competitive in prices the CPI of Indonesia increased from 44 to 124.39 (2010 = 100 value), suggesting a negative impact on tourism, or at least a diminished role of prices in tourism demand. The real foreign exchange rate between Indonesian Rupiah (IDR) versus the currencies of a foreign tourist mainly favored tourists' purchasing power versus the Rupiah during the period. Nevertheless, in three particular periods, most currencies experienced fluctuations (drop in value versus Indonesian Rupiah), namely in 2002, 2008–2010, and 2013–2014. The British pound and the Euro were the most volatile currencies.

Although Indonesia is competitive in prices, tourism service infrastructure in Indonesia ranks poorly in the 96th place, and 69th in ground and port infrastructure. The government made outstanding efforts; however, more initiatives and commitment to execution are needed (Ollivaud & Haxton, 2019). Indonesia moved fast in prioritizing tourism and travel (12th in the ranking in 2017), suggesting that although still underdeveloped, investments and improvement within tourism may benefit the sector by attracting more visitors and improving the quality of the trips. Policy efforts to promote tourism reflect certain anxiety of the nation to further benefit from the cultural and natural collection of attractions distinguished by the World Heritage Cultural/Natural Sites by the UNESCO.

From the supply variables included in the study, the number of available rooms (accommodation capacity) increased from 252,984 in 2000 to 469,288 in 2014. Tourism experienced a drop in demand in 2002–2003, and 2005–2006, probably associated with terrorist attacks on 2002 and 2005, as well as the devastating tsunami at the end of the year 2004. External factors associated with the economic crisis on 2008 could also impact tourism demand (choices and behavior) as evident in Lu, Chen, and Kuo (2018) for several Asian countries, and, for instance, causing adjustments in the supply side.

Public investment in Indonesia experienced a substantial increase between 2000 and 2014, suggesting a positive impact on the infrastructure supporting tourism in the country. Total investment to GDP increased from 25% in 2000 to 34.6% in 2014, with a year-on-year average growth rate of 7.66%. However, most massive expansion of infrastructure investment targeting tourism started in 2015.

Results Analysis

This section presents the estimates for tourism demand in Indonesia shown in equation (4). The results indicate that all independent variables [except for public investment and the dummy for year 2005 (tsunami)] are significant (Table 4).

The elasticity of lagged variable introduced to capture the word-of-mouth (persistence of tourists) is positive and significant, signaling that either tourists tend to return or that references given to new travelers influence larger tourist inbounds and

Table 3
International Tourism Statistics (Largest ASEAN Countries 2000–2017)

	IDN	MYS	PHL	THA	VNM
Growth expenditures % (2000–2017)	242%	321%	595%	260%	460%
Growth umber of arrivals % (2000–2017)	177%	154%	232%	272%	504%
Expenditures (current Billion US$) 2017	10.94	−10.69	12.78	11.57	5.04
International tourism, number of arrivals 2017 (million)	14.04	25.94	6.62	35.59	12.92
International tourism, receipts (current US$ billion)	14.11	18.35	8.34	62.15	8.89
Expenditures per tourist (current US$) 2017	780	412	1.931	325	390
Receipts per tourist (current US$) 2017	1,005.5	707.3	1,261.0	1,746.4	688.0

Note. IDN, Indonesia; MYS, Malaysia; PHL, Philippines; THA, Thailand; VNM, Vietnam (VNM reference 2005–2017). Data from https://data.worldbank.org.

Table 4
Estimation Result of Determinants of Demand of Tourists in Indonesia

Variable	Coefficient	$p>\|t\|$
ln_$W_{i,t-1}$ (1 year lagged tourism arrivals)	0.636	0.000***
ln_$Y_{i,t}$ (per capita GDP)	0.144	0.001***
ln_$P_{i,t}$ (relative prices)	0.049	0.000***
ln_A_t [Accommodation (beds)]	0.605	0.000***
ln_IP (public investment/GDP)	−0.015	0.571
ln_Dist (distance)	−0.261	0.000***
Dummy year 2003 (Bomb Bali 2002)	−0.161	0.018**
Dummy year 2004 (Free-entry Visa)	0.113	0.065*
Dummy year 2005 (Tsunami 2004)	−0.065	0.277
Dummy year 2006 (Bomb Bali 2005)	−0.236	0.000***
Dummy year 2009 (Financial Crisis 2008)	−0.118	0.076**
AR(1)	0.000	
AR(2)	0.793	
Sargan test	0.589	
Hansen test (GMM)	0.482	
Hansen test (Diff GMM)	0.667	
Hansen (IV)	0.489	
Hansen (Diff IV)	0.783	
Prob > *F*	0.000	

Note. Regression estimates.
***, **, * indicate significant level at 1%, 5%, 10%.

expenditure as suggested in Gallego et al., (2019). As for the demand-side variables, per capita real income of the country of origin ($Y_{i,t}$) it is significant at the 1% level, proposing a decisive role in demand (as expected). The results suggest that an increase in per capita income of inbound countries has a statistically significant influence on the expenditure of transborder travelers visiting Indonesia. The income level is one of the main factors driving the consumption of tourism goods/services in Indonesia. However, tourism demand is income inelastic as the demand grows at a lower speed than the change in income. It is worth to note that average tourism expenditure per visitor in Indonesia is rather low (nearly $1,000 per arrival) versus other countries. Still, it is noticeable that among the nine countries included in this study, the allocation of income (and time) to tourism abroad is large. The estimator for income per capita is smaller than other studies (Habibi, 2017; A. Liu et al., 2018) but within the same direction (positive) and inelastic.

Pujiharini and Ichihashi (2016) reported inbound tourist in Indonesia as income elastic as the magnitude of the effect of income in expenditure in tourism in Indonesia is larger than 1. This study reports an inelastic relation as 1% increase in GDP in foreign partners leads to less than 1% in tourism expenditure in Indonesia. Nevertheless, Pujiharini and Ichihashi (2016) applied a fix-effect model where the presence of endogeneity may cause an overestimation of coefficients. Nearly 30% of tourists in Indonesia are below 35 years old, often associated with lower income per capita and, for instance, lower allocation for tourism expenditure.

The relative price is expected to have a negative sign. However, the results indicate that the weakening relative price in Indonesia has a statistically positive (although small) effect on tourist expenditure. An increase of 1% in relative prices (ratio of Indonesia to partner country adjusted by exchange rate) is associated with an increase of 0.049% in tourism expenditure. A positive value indicates that tourist is inelastic as an increase in prices leads to a lower increase in expenditure. Prices of Indonesia were indeed low in relation to other countries, also reflected in the Travel and Competitiveness Index, where Indonesia ranks fifth (World Economic Forum, 2017). The positive sign may indicate that the adjustment in prices affects total expenditure, not necessarily because of a higher volume of services delivered but due to higher prices. As all eight countries have higher standards of living than

Indonesia, prices do not necessarily discourage tourist arrivals. Tourism demand might not follow the negative price–volume relationship in demand, either because there is an adjustment of prices (still low relative to foreign countries) or because tourism could be considered a luxury good. The estimator of relative prices is small (below 0.05) to suggest that tourism in Indonesia is not a luxurious good, as noted in the literature (Proenca & Soukiazis, 2005). More detail of expenditure allocation could help to explain the role of prices better as tourism is not related to the activities taking place at a destination alone, or only associated with the prices offered during the stay. Travel, transportation, and sometimes accommodation costs from the native country to the destination may play a more significant role than the cost during the stay in the country.

The results of this study contrast with findings of tourism determinants in the US where income elasticity, prices, and real exchange rate hurt tourist arrivals (Yazdi & Khanalizadeh, 2017). Similar adverse effects of prices to tourism are present in most cases, as in Malaysia (Habibi, 2017) or China (Y. Liu, Li, & Li, 2018).

The next variable is the accommodation capacity. This variable has a strong influence on driving larger foreign tourist demand, in line with Mahadevan et al. (2017) who estimated that accommodation services receive nearly half of foreign expenditure. The availability of rooms then suggests paying more attention to the developments of the sector. The number of available rooms increased, suggesting a change in the services offered in the country, in both number and perhaps in quality of services. The length of time spend in Indonesia is rather low (3.1 days in 2014 vs. 2.84 in 2017), and accommodation capacity fluctuates around 60%. Findings on the role played by accommodation capacity (rooms) are similar in sign and magnitude to those of the Malaysian case (Habibi, 2017).

Facilities and hospitality in Indonesia are satisfactory both in terms of the number of available rooms and quality. Facilities in addition to the rooms are restaurants, sports facilities, and business centers. Various hotel classifications, ranging from inns and low-priced hotels to star hotels, exist in almost all tourist destinations in Indonesia. From the supply side, Indonesia is not experiencing shortages in terms of the number of rooms; instead, it is possible that Indonesia has an oversupply of rooms and facilities, calling for more supporting government programs for the sector. Additional rooms are accompanied by larger and more qualified human capital. In the year 2000, only 8.79% of workers within tourism had a vocational, technical, or tertiary level of education. By 2014 the share increased to 18.7%, suggesting an improvement in the quality of services as well.

Another supply factor considered in this study is public investment. The results indicate that public investment in Indonesia has a negative relationship on tourism demand; however, it is not statistically significant. The results are opposed to the expected positive association in a country where infrastructure ranks low, and in the case where the government is actively improving public infrastructure (World Economic Forum, 2017). Results on the effect of public infrastructure in tourism literature is instead mixed, as in the case of Portugal by Proenca and Soukiazis (2005), where public investment has no effect on tourism demand in Portugal, while tourism transport infrastructure in the US plays a decisive role in tourist arrivals (Yazdi & Khanalizadeh, 2017). The literature on Indonesia tourism sector within the period of the analysis suggests a deficient level in infrastructure (Ollivaud & Haxton, 2019), meaning that low levels of public investment may not play a significant role in demand. Since 2015 the new administration launched ambitious public infrastructure projects, expected to support the tourism sector through.

The distance factor indicates a negative relation to demand. Distance plays a vital role, perhaps explaining why the largest number of inbound tourists is from within Asia. Literature in gravity models suggests considering distance, together with factors capturing attractiveness, accessibility, and other sets of factors to avoid unbiased estimators (Harb & Bassil, 2018; Tóth et al., 2014). Although distance alone lacks conclusive results on other empirical evidence (Harb & Bassil, 2018; Tóth et al., 2014), the coefficient in this study suggests the importance of accessibility and connectivity to attract tourist from far-away regions.

This study also includes dummy variables to capture possible effects arising from terrorism in Bali, the largest tourist destination of Indonesia.

An additional dummy captures natural disasters (the tsunami in 2004), and the global financial crisis of 2008. The study also includes a variable to capture the effects of a free entry visa launched in 2003. The results for the Bali bombings of 2002 and 2005 suggest a significant decline in tourism as demand dropped by nearly 16% in 2003 (a year after the 2002 Bali bombing) and 23.6% in 2006 (after the 2005 attack). Other studies onn the effects of terrorism in Indonesia captured significant adverse effects as well, suggesting the vulnerability of the sector to terrorism (Pambudi et al., 2009; Smyth et al., 2009). The global financial crisis of the year 2008 also suggests a negative impact on tourism demand in Indonesia, causing a drop of more than 11% in demand. Studies such as that of Song and Lin (2010) signaled a drop in both tourism inbound and outbound for Asia during 2009, in line with this finding.

Finally, the study also incorporates a dummy variable to capture a free entry visa policy implemented in 2003, mainly for Asian countries (e.g. Singapore, Malaysia, Thailand, Philippines, and Hong Kong). The results indicate a positive effect on tourism demand on the year of implementation in line with other studies capturing the effects of the free entry visa policy in Indonesia on 2003 (Pujiharini & Ichihashi, 2016). In other regions, the findings are also in line (Balli et al., 2013; Lee et al., 2010). While more details may be needed to analyze the precise effects, the sign suggests that tourism policy tools could be implemented to create a friendlier environment for tourism and a more competitive sector. A more recent scheme of on-arrival visa for a large number of countries (169) is undergoing, together with the addition of more countries to the free-entry visa plan. The evidence supports the expansion of free entry visas as it can help driving more tourist.

This study is limited to analyze certain factors promoting tourism demand in Indonesia. For instance, it is not possible to conclude evidence of tourism-led growth model (available in Mahadevan et al., 2017), as it is beyond the scope of this article. Nevertheless, the large growth of tourism expenditure in the country, together with larger number of inbound tourists and an increase in prices (possibly indicating higher value-added services), may propose that the sector is driving economic growth. Comparing with other countries in the region like Singapore (Zhu, Lim, Xie, & Wu, 2018), Thailand (Y. Liu, Li, & Parkpian, 2018), and Malaysia (Habibi, 2017), the growth of tourism in Indonesia seem to be slow, pointing out the need for more effective policy efforts to promote the sector.

As previous literature has noted, countries can increase their tourism revenues by improving the tourism offer (Sokhanvar, Çiftçioğlu, & Javid, 2018), often requiring stronger policy efforts to increase the quality of services, the infrastructure, and security, among other factors that appear to be critical for tourism development.

Policy Implications: Major Initiatives for Tourism Development in Indonesia

The most recent policies to promote tourism in Indonesia are expected to support inbound tourism in the nearby time. It is only more recently that the national budget for tourism promotion has increased by nearly four times (still less than 1% of GDP). The most recent national plan to develop tourism covering 2015 to 2019 includes support policies within five main blocks: infrastructure to enhance connectivity, skill development, tourism promotion, development of an integrated destination master plan, and a stricter system to implement the programs. The government aims to double arrivals, revenues, contribution to national GDP, and competitiveness in tourism. Although this study does not capture such new policies, it opens space for further empirical studies where the new infrastructure projects and non-economic aspects are taking into account. As an example, nearly 30% of national tourism budget after 2014 aims to increase tourism promotion efforts. While the international tourism brand "Wonderful Indonesia" substantially improved, the campaigned is not attracting the expected number of tourist.

New efforts in infrastructure and connectivity may support the development of tourism, although investment during 2000–2014 in Indonesia were low with no evidence of positive impact on the sector. Tourism infrastructure in Indonesia needs further development as connectivity remains underdeveloped (Ollivaud & Haxton, 2019). It is just until recently (2015–2019 program) that the government launched national infrastructure projects

including the construction of 24 new seaports, 15 new airports, upgrading of 27 airports, 2,650 km of new roads, and 3,258 km of railways, among many other efforts in urban transportation (bus and mass rapid transit), energy, water, and an extensive national coverage of 4G signal. In 2016 a new policy allowed cruise liners to disembark in Indonesia, opening new tourism lines.

Enhancing the skills for tourism-related populations could also help to create a more diverse touristic destination (Ollivaud & Haxton, 2019). In the year 2015 nearly 60% of workers in the tourism-related sector have primary education or less. The government is launching a national effort to increase the share of vocational and technical students to improve human resources in tourism and tourism-related skills, a possible driver of demand.

As commonly proposed in the literature, tourism in Indonesia is underdeveloped considering the large potential of the archipelago. Indonesia ranks 14th in the World Economic Forum (2017) regarding natural resources. However, the country ranks poorly in sustainability (below 130th), suggesting that a number of efforts are needed to turn the rich natural landscapes into a more attractive place for holidays (Ollivaud & Haxton, 2019).

Conclusion

The overall purpose of this study was to estimate factors affecting the demand for tourism expenditure in Indonesia, including variables capturing effects from the demand side (income and relative prices), as well as two variables from the supply side (accommodation capacity and public investment). The model includes distance within the gravity equation as well as five dummy variables to capture effects of terrorist attacks on years 2002 and 2005, the tsunami of 2004, the financial crisis of 2008, and the effect of a free-entry visa implemented in 2003. The dataset covers the years 2000–2014 and employs a dynamic panel data including the nine top countries of tourists entering Indonesia (nearly 80% of travelers). Tourism arrivals increased by nearly 90% during the period of study. The demand function including per capita income of country of origin, relative price, and accommodation capacity indicates a positive effect in demand for tourism goods/services in Indonesia. The persistence of travelers captured through a lagged expenditure variable indicates a strong word-of-mouth effect. As expected income plays an important role; nevertheless, the empirical case of Indonesia finds a lower role in tourist incomes than in other countries. Income elasticity is positive, although below 1, signaling that tourism grows with income but at a lower speed. Prices play a positive determinant role in demand, contrary to what is expected; nevertheless, it is in line with the strength that Indonesia displays in global tourism ranking as a country with price advantage. Prices may be adjusting (increasing) leading to higher expenditures without signals of detriment in demand for goods/services. Available rooms play a sizeable decisive role, proxying the expansion of tourism facilities. The broad effect of accommodation suggests that most of the impact of tourism may be allocated in lodging, possibly minimizing effects on other sectors.

The country remains vulnerable to terrorism, as the events of 2002 and 2005 significantly affected tourism arrivals. Tourism in Indonesia also declined due to the global financial shocks. However, the shocks on the aftermath of the events seem to be short term (1 year). The dummy for free-entry visa suggests a positive effect in tourism arrivals, signaling space for government promotion tools to increase tourist arrivals.

Contrary to expectations, public infrastructure investments are not significant in the proposed tourism demand model, either due to low investment (more efforts by the government are required) or the effects were not captured by the model. Nevertheless, the results (prices, accommodation, and infrastructure) are in line with the achievements of the country in tourism competitiveness reflected in the ranking (World Economic Forum, 2017).

A further look to variables nonstrictly economic (related to quality, experience, appreciation of culture, nature, safety, and human resources) may allow finding more determinants on tourism demand. The large diversity of tourism options and motivations in Indonesia imposes essential challenges in further studies. The most recent support policy programs for tourism (2015–2019) open a field for further research. The ambitious infrastructure program, the branding of ”Wonderful Indonesia,” upgrading in human skills and vocational education, and the promotion of 10 new top destinations “New Bali”

in Indonesia are some examples. Recent government policies under implementation could be new drivers of tourism in the country, leading to higher growth in jobs, incomes, and foreign currency.

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