Tourism, Insularity and Remoteness: a Gravity-Based Approach

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Abstract

The purpose of this paper is to investigate the sensitivity of bilateral tourism flows to distance, relative prices, cultural and political proximity variables, for all tourism destinations in the world, but also for a subset of small island destinations, using a gravity model. We find that doubling the distance between origin and destination countries reduces the tourist flows by more than two third, and that doubling the economic masses of the origin or destination country increases the number of tourist arrivals by more than two third. Small remote islands are clearly at a disadvantage with regards to these factors of gravity. On the other hand, sharing a common language and a common colonial past with another country raises the likelihood of visiting it by more than ten-fold. Small islands often benefit from these positive influences on tourism, which can more than offset the negative gravity effects.

Keywords: Tourism, Small islands, Gravity Model

JEL Classification: C31, F14, O56

Introduction

International tourism is one of the few major economic activities in many Small Islands Countries (SICs), which offers opportunities for economic growth and development (UNWTO, 2004, 2012), in particular for Pacific Islands Countries (Perrottet and Garcia, 2016, World Bank, 2017). Indeed, tourism revenues cover at least 40% of imports of goods and services for 15 SICs and over 20% for 10 other small islands (Bertram and Poirine, 2018). Foreign tourists are attracted by the marine landscapes, seaside activities and other exotic experiences far from the busy and crowded cities of the world.

However, the flipside of the story is that the smallness and the remoteness of many islands give rise to various economic weaknesses and vulnerabilities (Deidda, 2016, OECD, 2016, 2018), especially a crucial lack of competitiveness for all sorts of firms, due to the lack of economies of scale and the indivisibility of public goods and infrastructure. In a much-celebrated paper, Winters & Martins (2004) showed that compared to a median country (Hungary at the time), small remote countries could suffer dramatic cost disadvantages. They show that, because of this structural wedge between their costs of production and those of bigger and more connected countries, small islands could be able to compete internationally only in a few niche markets, which could include tourism. Nevertheless, in the tourism and hospitality industry, the cost disadvantage could be as high as 57.5% (micro economies with median population of 12,000) or 28.5% (for very small economies with median population of 200,000). For personal air travel, they find that costs are 115.7% higher in Micro economies and 56.8% higher in Very Small economies. Therefore, if these small islands countries wish to rely on tourism for sustaining their economic growth, they must be attractive enough, through unique and outstanding sites or activities, to overcome the cost disadvantages of smallness and remoteness.

This question has been simply described by the World Bank (2009) as "*a three-dimensional challenge*": distance, density and division. Islands are badly ranked in these three dimensions, and among the islands, the small Pacific Islands are at a particular disadvantage: they are at the end of the distribution in terms of weighted average distance from large markets, they have very low economic density, and they suffer from acute geographical divisions from being sea-locked and isolated, as well as artificial divisions from their very often protectionist trade policies, which generate large inefficiencies and low competitiveness.

Despite the handicap of distance and small scale, Easterly & Kray (2000) find that smallness is not significant in a growth rate equation. However, Brau et al. (2003) find that smallness is indeed significant when distinguishing between small islands relying heavily on tourism and other islands. They find that "Half of the thirty countries classified as microstates in this literature [i.e. Easterly & Kray 2000] are heavily dependent on tourism. Once this distinction is adopted, it is easy to see that the small tourism countries perform much better than the remaining small countries. In our findings, smallness per se can be bad for growth, while the opposite is true when smallness goes together with a specialization in tourism." (p. 2).

This would seem to reveal a comparative advantage in tourism activities for some of the small islands, despite the handicap of distance, lack of scale economies and the high fixed costs of infrastructures. This hypothesis is further comforted by noticing that in the top 32 destinations ranked by tourism receipt per capita, we find 21 small islands, populated by less than 2 million inhabitants, as shown in table 1.

[INSERT TABLE 1 HERE]

The gravity model offers a good framework to study these difficulties confronting the small islands countries. Population size and distance play a central role in the gravity equation applied to trade between countries. The model has proved fruitful in explaining trade of goods and services around the World. In its simplest form, the gravity model predicts that the flow of goods and services between each country pair is positively related to their economic size and negatively related to the distance between them: it has also been linked to theories of trade, especially the theory of trade with monopolistic competition (see for instance Anderson, 1979; Bergstrand, 1985; Deardorff, 1998; Helpman et al., 2008; and for a textbook treatment Feenstra & Taylor, 2014, Ch. 6). The gravity model has also been applied to a wide area of issues regarding trade patterns and various sources of trade, including the effects of the Olympics games (Rose & Spiegel 2011), migrations flows (Karemera et al., 2000; Lewer & Van den Berg, 2008), the international flows of ideas (Andersen & Dalgaard, 2011), and the flows of service exports (Ceglowski, 2006; Kimura & Lee, 2006).

In the field of tourism economics and management, gravity equations have been increasingly used, following the footsteps, although in a different framework, of Eilat & Einav (2004), who notice the similarities of their results with a gravity relation. More recently, Morley et al. (2014) have presented microeconomic foundations to justify the use of gravity models in their estimation of tourism flows. They conclude that "*The new version of the gravity model can be presented as a valid tool to assess the effects of tourism policies, examining changes in any of the determinants in the equation. Consequently, their use as policy instruments such as evaluation of tourist taxes or promotional expenditure policies should have the same validity than those derived from traditional tourism demand models. Increased understanding of these factors will assist policymakers in developing more effective policies to increase destination competitiveness and attractiveness within a bilateral setting.*" (Morley et al. 2014:8).

Some papers have focused on the determinants of tourism for a single country: Portugal (Matias, 2004), the Canary Islands (Garin-Munoz, 2006), the U.K (Durbarry, 2008), Turkey

(Eriyiğit et al., 2010), Korea (Keum, 2010), the Philippines (Deluna & Jeon, 2014), the USA (Vietze 2012). Other models focus on more specific aspects of the determinants of tourism flows: transportation infrastructures (Khadarooa & Seetanahb, 2008), embassies and consulates, the EMU (Gil-Pareja et al., 2007a and 2007b), Olympics and other mega events (Fourie & Santana-Gallego, 2011), religion (Fourie et al. 2011; Vietze 2012), the Confucius Institute (Lien et al., 2013).

In this paper, we use an augmented gravity model to investigate the sensitivity of bilateral tourism flows to distance, relative prices, cultural and political proximity variables, for all tourism destinations in the world, but also for a subset of small island destinations. The methodology and results are presented in the next sections, before some concluding remarks.

Methodology

We use a gravity model to study the effect of distance, smallness, remoteness and insularity on international tourism.

Ideally, we would want to investigate the effects of gravity variables on tourism revenues. But there are no data on bilateral flows of tourism revenues between countries, except for a limited number of OECD countries. The only bilateral data available for a large sample of world countries and small islands are on tourist arrivals, from the UNWTO (2018). Converting a number of foreign visitors into revenues from international tourism is not an easy task since visitors from different countries of origin usually have different habits regarding both the length of stay and the total spending per day. We will use a gravity model to study the role of distance and of the attraction of economic “masses” on the international flow of tourists, with a special inquiry on the case of small remote islands.

The main explanatory variables are the distance between the origin country and the destination country since distance is correlated with transportation costs, and the economic weights (GDP) of the origin and the destination countries, the latter being interpreted as a potential supply of tourism infrastructures and services. Other variables have been added to the basic gravity model to measure the effects of other factors on tourist flows: economic variables such as the price differential between the origin and the destination countries and a dummy variable for common currency, as well as cultural and institutional links, identified by dummy variables for common language, religion, and colonial links.

We also took “multilateral resistances” into account (see Anderson 1979; Bergstrand 1985; Anderson & van Wincoop 2003; Baier and Bergstrand 2009). Indeed, tourist flows are not only influenced by the distance between two countries, but also by the relative distance of each of these countries with respect to the rest of the world. For example, since Australia is far from all the other countries, compared to The Netherlands, Australian tourists will less hesitate to cover long distances, such as the 7831 kilometers to Japan, than Dutch tourists, who face the same distance to Japan.

We estimate the following model:

$$\ln(F_{ij}) = \beta_0 + \beta_1 \ln(D_{ij}) + \beta_2 \ln(DM_j) + \beta_3 (GDP_i) + \beta_4 \ln(GDP_j) + \beta_5 \ln(P_j/P_i) + \beta_6 (ComCur) + \beta_7 (ComLang) + \beta_8 (ComRel) + \beta_9 (PastCol) + \varepsilon_{ij}$$

where i denotes the tourist origin country, j denotes the destination country, *ln(.)* denotes the natural logarithm operator, and the variables are defined as: F_{ij} : number of annual tourist arrivals from i to j; D_{ij}: distance between i and j; DM_j: multilateral distance of country j (geometrically weighted average distance between country j and the 50 most powerful countries in terms of GDP); *GDP* : annual Gross Domestic Product converted in US$ at current exchange rates; *Pj/Pi* : the price differential ratio, computed by the World Bank's International Comparison Program; *ComCur*: a common currency dummy variable (= 1 if same currency in country i and country j); *ComLang*: a common language dummy variable, proxy of cultural proximity (= 1 if same official language); *ComRel*: a common religion dummy variable (= 1 if same religion); *PastCol*: a dummy variable for institutional proximity (= 1 if past colonial links). A dummy variable is added for small islands destination country (= 1 if country j is an island and if its population is under 1 million residents) in order to obtain specific estimates and compare them with estimates for world countries.

A dataset of bilateral tourist flows between 174 countries is used to perform regression analysis, first on cross-sectional data in 2015, then on panel data from 1995 to 2015. Unit root hypotheses for this dependent variable were strongly rejected by panel unit root tests (common unit root for the Levin, Lin and Chu test, or individual unit roots for the Im, Pesaran and Shin test, the Fisher Chi-square ADF and PP tests).

Another important econometric issue concerned the potential endogeneity of some explanatory variables. In particular, GDP of the destination country can partly depend on tourism, especially in small countries where the tourism industry represents a large share of the economy. The following instrumental variables are used to proxy for this endogenous factor: the share of secondary school enrollment (World Development Indicators) which represents the role of education in economic development; an average index of six governance indicators (Worldwide Governance Indicators), to highlight the importance of institutions in economic growth, and latitude (CEPII database) to take geography into account in economic development (see Poirine & Dropsy, 2018).

We use two alternative techniques of estimation for the two datasets: (i) Two Stage Least Squares (2SLS) estimation for the 2015 cross-sectional data; (ii) Generalized Method of Moments (GMM Arellano-Bond two-step) estimation for the 1995-2015 dynamic panel data. In both cases, the instrumental variables described above are included, and appropriate weighting matrices (Generalized Least Squares for heteroskedasticity) are selected to provide for robust covariance calculation (panel corrected standard errors) and additional efficiency. Since bilateral tourist flows are count data, alternative estimation techniques such as Quasi Maximum Likelihood estimation (e.g. with a Poisson or an exponential distribution) were also tested, and yielded similar results in terms of the coefficients' sign and significance. Yet, these nonlinear estimators do not allow to calculate elasticities, or easily include instruments, as the selected estimation techniques above are able to do. These results are thus not shown.

Empirical findings

The regressions are not only run on a full sample of 174 countries (world), but also on a subset of 32 small islands (whose population is inferior to 1 million inhabitants), selected as destination countries or territories. The empirical results for the gravity model are presented in Table 2. This model appears to fit the data quite well, since the adjusted R^2 are above 76% for the world sample and 80% for the small islands' sample.

[INSERT TABLE 2 HERE]

As expected, bilateral distance between each pair of countries negatively and very significantly affects tourist flows for the two samples (and for the two estimation methods). A column to the right of the coefficients ("Diff.") indicates the significance (z-statistics) of their difference. For example, this difference between the distance coefficients for the world sample and for the islands' sample is significant at a 5% level (z-statistics = 2.5) for the cross-sectional data, but insignificant (z-statistics = 1.8) for the panel data.

The coefficients for the multilateral resistance terms, which reflect the relative remoteness of each country in the world, and act as benchmarks for the distance between the countries of origin (i) and destination (j) mentioned above, are positive and significant for the destinations, as it should be, but not for the origins of the travelers, notably for the island sub-sample. In any case, a significant difference in the marginal impacts of this overall remoteness of the destination countries (j) is observed between the two samples, and could be related to the relative isolation of small islands compared to continental nations.

Similarly, the coefficients for GDP, which are all very highly significant and positive, as expected from a gravity model, differ also significantly for the two samples. More precisely, GDP of the origin countries (i) seem to be a less important factor for travelers coming from islands than from continents, whereas GDP of island destinations (j) appear to have more attractive force than for other nations, at least in 2015. In other words, raising an island's income enables it more easily to alleviate its limited capacity to welcome a larger number of tourists, and to increase its infrastructure to provide for more tourism services. Fluctuations in GDP can be decomposed into changes in GDP per capita and changes in population size: a rise in either component benefits tourism, since an upsurge in labor productivity is likely to improve the quantity and quality of tourism services, and a demographic increase brings about a rise in the labor force, which can help welcome more tourists: this effect is stronger than in the rest of the world. Small islands, which are here defined as island nations or territories with a population inferior to one million inhabitants, are therefore relatively more at a disadvantage for tourism than other destinations.

There are two possible interpretations for this result, which can be simultaneously operative. The first one would be that the main obstacle to the development of a high-impact tourist industry in small islands is the lack of an adequate labor supply. The second one would be that very small and less populated islands cannot afford the kind of infrastructures needed to develop international tourism due to the lack of significant economies of scale in the cost of building ports, airports, as well as telecommunications and health care infrastructures. For example, it costs about the same to build an international airport, or a deep seaport able to offer docking space for big container ships and big cruise ships, whether the local population numbers 100,000 or 2 million people. But the cost per capita is much higher in the first case, making it hard to afford such public infrastructure needed to attract international tourists (whether destination or day cruising tourism). Such lack of economies of scale is even a greater challenge for small archipelagos of islands.

It also makes sense to assume that the relative cost of living in the destination country, represented here by the price ratio of the destination country to the origin country (i.e. the real exchange rate), has also an impact on the tourist destination choice. The corresponding coefficients are all negative, in line with the model's theoretical predictions, and highly significant. According to these estimates, tourism demand also appears to be about twice more price elastic for small islands than for the rest of the world. This is consistent with the hypothesis that island vacations are often considered a luxury item, given their higher costs due to their remoteness (cost of travel) and lack of economies of scale (cost of living).

The impact of using of a common currency at origin and destination is positive and significant for continental countries, but not for small islands. Once again, such monetary considerations are probably less crucial in selecting a remote luxury destination than a neighboring continental nation, for example in the European Monetary Union.

In terms of cultural proximity, a common language has a very significant and positive effect in both samples, but the two methodologies contrast in terms of their significant differences. Similarl, a common religion appeared to be a significant and surprisingly negative factor for deciding about a travel destination over the last two decades, but not anymore in 2015. Institutionally however, having a colonial past together very significantly increases tourism flows, similarly to small islands or to continental nations.

Bertram and Poirine (2018) point to the '*small island paradox*': the economic development of small islands often depends on trade openness and tourism growth (21 of the top 32 destinations ranked by tourism receipt per capita Table 1 are small islands), but their remoteness and smallness, which constitute the two major ingredients of a gravity model, are daunting challenges to overcome. A comparison of the magnitude of the marginal effects of doubling these bilateral factors (distances, GDP weights, or cost differentials) or narrowing ties (currency, language, religion, colonial past) on tourism flows is now presented in Table 3.

[INSERT TABLE 3 HERE]

Based on the preceding panel regression results from 1995 to 2015, it is interesting to note that doubling the distance between two countries causes a similar loss of 72% of tourist flows to small islands and 70% to other nations. For example, the distance between Los Angeles, California and Papeete, French Polynesia (6 621 km) is 1.64 times greater than the distance between Los Angeles and Honolulu, Hawaii (4 028 km): as a result, the model predicts 60% less Angelinos vacationing in Tahiti than in Hawaii, ceteris paribus ($0.60 = 1.64^{(-1.83)} – 1$, given a logarithmic regression coefficient of --1.83, cf. Table 2).

Doubling GDP of the country of origin raises tourist arrivals to a small island by 66%, but to another destination by 79%. For example, given that France's GDP is about 13% of U.S. GDP in 2015, the number of French tourists around the world is predicted to be 77% lower than the number of American tourists abroad.

Similarly, doubling GDP of an island destination increases the number of tourists by 71%, whereas the same relative rise in GDP in another country causes tourism inflows to grow by 86%. For example, given that French Polynesia's GDP is about 7% of Hawaii's GDP in 2015, the total number of tourists visiting the former island should be 87% lower than the latter island, according to the model.

Doubling the price level in the destination countries relative to the price level in the origin country reduces the number of tourists visiting small islands by about 60%, but those traveling to other foreign countries by only 22%. For example, Tahiti's notoriously high cost of living, even by comparison to the Hawaii (we estimate prices to be 46% higher in Papeete than in Honolulu), causes a relative loss of 40% tourists in French Polynesia.

Having a common currency increases the number of tourist arrivals to small islands only by a mere 1%, but more significantly by 26% to other countries.

The model also predicts that having a common language can more than triple the flows of tourists, whether to a continental nation or a small island. This is one of the reasons why a large proportion of tourists visiting Hawaii are American (61%), and a significant share of tourists traveling to Tahiti are French (20%), despite the great distance (17 401 km) and the long flights (about 20 hours) separating France and French Polynesia.

Similarly, sharing a colonial past can almost quadruple the number of tourists, which is another important reason for the proportions discussed above.

This gravity model could also be used as a benchmarking tool to assess the performance of each small island in terms of tourism volume. However, it should be acknowledged that each island will have such a series of idiosyncratic factors, inherited from nature or history, that cannot be easily considered by a gravity equation. Indeed, the residuals, i.e. the differences between the model's predictions and the actual data, analyzed for the three most important sources of tourists for each of 15 small islands (for which forecasting data are available), exhibit substantial heteroskedasticity, despite the statistical correction in the regressions and a high coefficient of determination above 80%. For example, the ratio of 2SLS-predicted to actual tourist arrivals from the three most important origin countries varies from 29% (Tonga), 31% (Samoa), 67% (Fiji), 77% (Bahamas), 81% (Saint Lucia), to 110% (Saint Kitts and Nevis), 140% (Seychelles), 140% (Kiribati), 144% (Antigua and Barbuda), 167% (Barbados), 174% (Solomon Islands), 204% (Dominica), 263% (Marshall Islands), 294% (Saint Vincent and the Grenadines), and even 676% (Malta). On average, the ratio of the sum of predicted tourists to the sum of actual tourists is equal to 134%, but removing this latter outlier (Malta) brings this ratio down to 63%.

The augmented gravity model nevertheless offers some useful forecasts about the likely evolution of tourism in these small islands. In particular, the increasing importance of the Asia-Pacific region in terms of GDP is significantly affecting the flows of trade and tourism in the Pacific countries. According to Gibson (2007), the Pacific islands have already reduced their GDP-weighted remoteness, due to the growth of Asian countries. As a result, the number of Chinese tourists rose about ten-fold to Fiji (from 2009 to 2015), to French Polynesia (from 2007 to 2015), to the Mariana Islands (from 2003 to 2015), to Palau (from 2013 to 2015), but also to the Maldives (from 2007 to 2015) and to the Seychelles (from 2010 to 2015).
Among the variables on which a public policy can be effective, one can highlight the relative price Pj/Pi. For example, the French overseas collectivities of New Caledonia and French Polynesia have so far suffered from a lack of tourism competitiveness due to their overvalued currency (the CFP franc, alias the "Pacific" franc, which is pegged to the euro and previously

to the French franc since 1949), to protectionist policies, poor competition, and high prices in various sectors, especially in the network industries such as electricity, telecommunications and transportation networks (Gay 2011). The implementation of a modern competition policy, including antitrust law and the regulation of utilities is likely to improve the competitive landscape, as it has already been observed in Iceland, Malta or the CARICOM countries. Harmful evolutions for remote islands in the future may involve the increase in the cost of airplane transportation or the negative perception of CO_2 emissions by an increasing proportion of potential visitors. These negative trends could counteract the positive effects of the Asian growth on island destinations.

Conclusion

International tourism tends to be the key sector in the development of small island economies. Indeed, 21 islands can be found in the top 32 world destinations, ranked by tourism receipts per capita. Yet, these small island destinations suffer from the handicap of distance and the lack of economies of scale, which reduce their tourism competitiveness. On the other hand, island countries are often historically linked to larger nations, which can provide a boost to the attractiveness of the destination.

Our empirical results show that doubling the distance between origin and destination countries leads to a decrease in the number of tourists by more than two thirds, regardless of the insular status or not of the destination. Yet, small islands tend to be more remote than continental nations, and thus more negatively affected by distance with regards to tourism. Given the impossible task of shrinking physical distances, reducing the transportation time (e.g. though an hyperloop) and cost (e.g. with more efficient technology) to destination is an alternate objective to increase tourism flows.

Vice versa, doubling the country of the origin's GDP increases the flows of tourists by two thirds to small islands and four fifths to other travel destinations. Doubling the destination country's GDP raises the number of visitors by about five points more than for doubling GDP of the visitors' country. Once again, small islands are initially at a substantial disadvantage, because of their limited labor force and lack of economies of scale in infrastructures such as ports, airports, hospitals, roads and satellite telecommunications.

Furthermore, a doubling of relative prices in the destination countries reduces the number of tourists traveling to small islands by three fifths, that is almost three times as much as visitors in other countries. This higher price elasticity for small islands is another major challenge for them to overcome, since their remoteness and smallness tend to raise their cost of living and therefore the relative price of a vacation for nonresidents.

On the other hand, historical ties between the origin and the destination countries are expected to be a force of attraction for tourism. Having a common currency improves tourism flows by a quarter on average in the world, but has unfortunately no significant effect for island destinations. Furthermore, sharing a common religion appears to reduce the likelihood of receiving visitors in small islands by a fifth. Speaking the same language however more than triples the expected flows of tourists, and having a colonial past almost quadruples these flows, though a little less so for small islands.

It is interesting to observe that the compound effects of a having a common language and a former colonial links tend to multiply the flow of tourists by a factor greater than eleven for islands and twelve for other nations. These strong effects of cultural and/or political proximity on tourism flows confirm the results of Vietze (2012) and Mc Elroy and Pearce (2006).

This augmented gravity model may also be used as a benchmarking tool. However, the heteroskedasticity of the residuals appears to reflect the role of idiosyncratic and often non-quantifiable factors which cannot easily be included in the regression models.

Overall, the gravity equation, when applied to international tourism, reveals that small and remote islands face serious geographical and scale handicaps as tourist destination countries, which in some cases can be more than compensated by the cultural, historical and/or political proximity with the tourists' origin countries. However, smallness and remoteness could also be an advantage when aiming at the high-end tourism market. This may command a high price premium, which can translate into higher tourism receipts for luxury destinations.

In the future, it will be increasingly harder to find small isolated and pristine islands with a tropical climate and exceptional scenery. The islands closest to the main tourist markets (Europe, North America, China, Japan and Korea), will be increasingly under environmental pressure as tourist density increases. The remotest islands of the South Pacific cannot compete with the Caribbean and Mediterranean islands for mass tourism and the low to medium end cruising market (except Fiji and the Cook Islands, which caters to the Australian and New Zealand tourists). But provided that they offer an exceptional level of service and very good transportation, communication and public health infrastructures, they still have a chance of gaining a greater share of the very high-end niche market. This might be enough to sustain their economy, provided their population does not increase, which will probably be the case thanks to emigration and the brain drain (see De la Croix et al., 2013).

Future research could explore these relationships between tourism, economic growth in small islands, and emigration to denser economic centers. Moreover, the gravity model could still be enriched by adding bilateral variables that are more difficult to quantify, as data become available.

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Table 1. International tourism statistics in 2015

Country or territory	Number of tourists	Number of tourists per capita	Tourism Receipts (% exports)	Tourism Receipts (% GDP)	Per capita tourism receipts (US$)
Sint Maarten (Dutch part)	505 000	13.01	75.1%	#N/A	$23 516
British Virgin Islands	393 000	13.05	#N/A	#N/A	$16 073
Aruba	1 225 000	11.74	68.1%	#N/A	$15 900
Virgin Islands (U.S.)	642 000	5.96	#N/A	35.2%	$12 292
Cayman Islands	385 000	6.42	#N/A	#N/A	$10 857
The state of Hawaii, USA	8 680 000	6.09	88.8%	18.3%	$10 500
Luxembourg	1 090 000	1.91	4.1%	8.2%	$8 344
Palau	162 000	7.61	87.1%	52.4%	$7 328
Antigua and Barbuda	250 000	2.50	69.1%	52.3%	$7 146
Bahamas, The	1 484 000	3.84	74.8%	22.7%	$6 602
Maldives	1 234 000	2.95	85.6%	67.2%	$6 432
Bermuda	220 000	3.37	29.3%	#N/A	$5 916
Hong Kong SAR, China	26 686 000	3.66	7.0%	13.6%	$5 792
St. Kitts and Nevis	122 000	2.25	58.0%	35.1%	$5 673
Seychelles	276 000	2.95	37.2%	33.6%	$5 170
Iceland	1 289 000	3.90	18.0%	9.6%	$4 891
Qatar	2 941 100	1.19	13.1%	7.4%	$4 888
Grenada	155 000	1.45	85.2%	49.4%	$4 615
St. Lucia	345 000	1.95	77.9%	49.1%	$4 571
Curacao	468 000	2.96	36.2%	#N/A	$4 507
Malta	1 783 000	4.13	9.4%	13.4%	$3 198
Singapore	12 051 000	2.18	3.1%	5.6%	$2 992
Dominica	75 000	1.03	80.3%	40.2%	$2 939
Switzerland	9 305 000	1.12	4.7%	2.9%	$2 371
Ireland	9 528 000	2.05	3.0%	3.7%	$2 325
Croatia	12 683 000	3.02	37.0%	18.4%	$2 145
Cyprus	2 659 000	2.29	19.6%	12.6%	$2 144
Austria	26 728 000	3.10	9.1%	4.8%	$2 118
New Zealand	3 039 000	0.66	18.7%	5.2%	$1 989
United Arab Emirates	#N/A	#N/A	#N/A	4.9%	$1 910
St. Vincent and the Grenadines	75 000	0.69	72.3%	26.7%	$1 846
French Polynesia	184 000	0.66	41.6%	8.3%	$1 678

P.S. Small islands (population under 2 million residents) are in italics

Sources: World Bank, U.N. World Tourism Organization, Hawaii Tourism Authority, ISPF (French Polynesia)

Table 2: **Bilateral augmented gravity model for all countries and small island countries**

Sample	Cross section (2015)						Panel (1995-2015)					
	World		Small Islands		Diff.		World		Small Islands		Diff.	
Number of countries	174		32				174		32			
Number of obs.	9800		1055				114843		9654			
Estimation method:	Two-Stage Least Squares						Generalized Method of Moments					
Dependent variable:	Log (Number of Tourists)						Log (Number of Tourists)					
Log(Distance)	-1,78	**	-1,90	**			-1,74	**	-1,83	**		
	(54,2)		(30,8)		(2,5)	*	(591)		(104)		(1,8)	
Log(Multilateral	0,08		-0,91	**			0,17	**	-0,38	**		
distance of country i)	(1,1)		(4,6)		(5,4)	**	(21,8)		(7,7)		(16,2)	**
Log(Multilateral	0,98	**	1,37	*			1,28	**	0,66	**		
distance of country j)	(10,2)		(2,2)		(1,2)		(105)		(4,1)		(4,4)	**
Log(GDP of country i)	0,91	**	0,79	**			0,84	**	0,73	**		
	(91,7)		(32,5)		(4,7)	**	(670)		(105)		(16,4)	**
Log(GDP of country j)	1,00	**	1,32	**			0,90	**	0,78	**		
	(34,0)		(16,0)		(4,5)	**	(524)		(20,5)		(6,1)	**
Log(Price ratio Pj/Pi)	-0,55	**	-1,55	**			-0,36	**	-1,33	**		
	(10,4)		(11,5)		(7,3)	**	(98,2)		(38,4)		(17,0)	**
Common currency	0,36	**	-0,26				0,23	**	0,01			
	(3,6)		(1,1)		(2,2)	*	(17,6)		(0,2)		(1,5)	
Common language	1,26	**	1,28	**			1,16	**	1,12	**		
	(21,7)		(10,2)		(1,6)		(198)		(34,0)		(3,8)	**
Common religion	0,13		0,26				-0,04	**	-0,22	**		
	(1,6)		(1,4)		(0,8)		(4,3)		(3,6)		(0,3)	
Past colonization	1,06	**	1,50	**			1,36	**	1,30	**		
	(6,7)		(5,2)		(1,1)		(81,2)		(16,4)		(0,0)	
Constant	-35,05	**	-31,06	**			-34,26	**	-16,58	**		
	(22,0)		(4,4)		(0,1)		(235)		(7,4)		(10,2)	**
R2	76,7%		84,1%				99,1%		80,8%			
Adjusted R2	76,7%		83,9%				99,1%		80,7%			

Z-statistics are presented in parentheses; statistical significance levels of 1% (resp. 5%) are represented by "**" (resp. "*"). The columns entitled "diff." show the level of significance (based on Z-statistics) of the differences between the estimates for the world sample and the estimates for small islands.

Table 3. Marginal effects of significant factors on tourism flows (1995-2015)

Effect of:	World	Small Islands
Doubling the distance between the origin and destination countries	-70%	-72%
Doubling GDP of the origin country	+79%	+66%
Doubling GDP of the destination country	+86%	+71%
Doubling the relative cost of living in the destination country	-22%	-60%
Having a common currency	+26%	+1%
Having a common language	+218%	+205%
Having a common religion	-4%	-20%
Having a common colonial past	+290%	+268%