Spatial distribution of touristic flows in a gravity model in South America

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Abstract

Purpose – This paper aims to investigate the determinants of international bilateral tourism demand in countries of Southern Common Market (specifically, Argentina, Brazil and Uruguay) and Chile.

Design/methodology/approach – In this study, an augmented gravity model is used to investigate the determinants of international bilateral tourism demand in countries of Southern Common Market. The novel aspect of the analysis is that three models of tourism are defined, depending on the spatial distribution of tourist arrivals and departures. An intra-regional model, an extra-regional model and a general model are estimated using a dynamic panel data model.

Findings – The results indicate that traditional gravity variables are significant in explaining bilateral inbound arrivals, but the characteristics and the behavior of the demand of tourism vary on whether the country belongs to the sub-regional bloc.

Research limitations/implications – The differences found in this paper might have some impacts on the desired design and direction of the touristic policies of each country.

Originality/value – This study analyzes the determinants of international tourism demand through different bilateral relationships, differentiating between intra- and extra-block tourisms.

Keywords International tourism, Augmented gravity approach, Dynamic panel GMM, Regional bloc

Paper type Research paper

Introduction

Tourism is one of the components of services in international trade that is becoming increasingly important in the global economy. It is a common knowledge that tourism is a source of economic growth and an instrument to create employment and reduce poverty (Ghali, 1976; Williams and Shaw, 1991; Samimi *et al.*, 2011; Schubert *et al.*, 2011; Ardahaey,

JEL classification – F10, L83

Funding The author(s) received no financial support for the research, authorship and/or publication of this article.

Journal of Tourism Analysis: Revista de Análisis Turístico
Vol. 25 No. 1, 2018
pp. 39-53
Emerald Publishing Limited
2254-0644
DOI 10.1108/JTA-02-2018-0005

2011), mainly in developing economies (Kim *et al.*, 2006; Fayissa *et al.*, 2008; Lee and Chang, 2008; Schubert *et al.*, 2011). South American countries are not the exception, although they have yet a long way to consolidate international tourism as a non-traditional export on which countries could rely for their future prosperity. In this context, knowing and analyzing the particular determinants and factors related to the evolution and characteristics of tourism in the region are key elements that will give guidelines and fundamentals to policymakers.

The aim of this paper is to investigate the determinants of tourist flows among Argentina, Brazil, Chile and Uruguay, and between these countries and the rest of the world, discriminating the different countries of origin of tourists and the role of tourism inside and outside the region. For that reason, three models are proposed: a general model (bilateral flows between Argentina, Brazil, Chile and Uruguay and the rest of the world), an intra-bloc model (only tourists flows between Argentina, Brazil, Chile and Uruguay, countries which form what we define as a sub-regional bloc)[1] and an extra-bloc model (only tourists flows between countries of the sub-regional bloc already defined and the rest of the selected regions of the world)[2].

Starting with the fundamentals of the models known as gravity models, and taking into account the spatial distribution of tourists arrivals and departures within and between regions, this paper seeks to establish the importance of emission and resistance factors – such as the GDP of tourist issuing countries or the remoteness of a country and other tourist centers – in the explanation of the dynamics of the tourism phenomenon. The novel aspect of the paper is that it analyzes the different behaviors and characteristics of tourism demand when the country of origin of tourists belongs or not to the sub-regional bloc previously defined.

One of the main results of the paper is that different behaviors are observed between the models. While the traditional gravity equation variables affect significantly the total tourism demand, other relevant variables – as habit persistence, distance and remoteness – are also considered. Specifically, while income and population of origin countries and prices affect significantly the tourism demand in the general model, the variables related to distance have a greater power of explanation in the intra-bloc and the extra-bloc model. In particular, the results for the extra-bloc model can be associated with a social status theory in which traditional variables have a different behavior. Finally, some of these results support the importance of Argentina and Brazil (the most populous countries of the bloc) as issuers and reception centers of tourism in the regional bloc.

This study reveals that the analysis of the determinants of international tourism demand cannot be generalized. The behaviors of tourism demand depend, strongly, on the bilateral relationship between destination and origin countries, showing the need to generate differentiated strategies to promote and consolidate tourism.

Literature review

Since the 1980s, several studies have focused on modeling and explaining international tourism demand (Lim, 1999; Song and Li, 2008) and on the characterization of international tourism demand from a group of countries to another one (Sinclair and Stabler, 1995). Many methods have been applied (Peng *et al.*, 2014a, 2014b). However, the use of gravity models to analyze tourism flows begins in the decade of 2000.

The gravity model was introduced into international trade by Tinbergen (1962). The model is based on Newton's universal law of gravitation, which states that bilateral flows between two countries are directly proportional to the countries' economic masses and inversely proportional to the distance between them. Gravity models have been extensively

used to explain international trade of goods (Tinbergen, 1962; McCallum, 1995; Rose, 2000; Anderson and Van Wincoop, 2003; Neumayer, 2010), migration (Mak and Moncur, 2003; Gil-Pareja *et al.*, 2007) and foreign direct investment (Bergstrand and Egger, 2007; Head and Ries, 2008). Since its introduction in economics, the gravity model is considered one of the most reliable empirical tools to understand bilateral trade flows and other economic flows in the world economy (Morley *et al.*, 2014).

Over time, the basic model of gravity has been augmented to incorporate non-economic variables that could have an impact on bilateral trade – such as population (Linnemann, 1966), supply factors, cultural effects, common land borders and languages, among others (Vietze, 2012; Yang and Wong, 2012; Lorde *et al.*, 2015).

In this way, the gravitational equation considers three kinds of determinants of bilateral trade flows: supply factors at the origin point, demand factors at the destination point and a number of factors that obstruct or contribute to a specific bilateral flow.

In specialized literature on international tourism demand, the use of gravity models is relatively recent, mainly due to the lack of the disaggregated data needed to afford them. A brief review and some examples of the literature are analyzed below.

Eilat and Einav (2004) analyzed the determinants of bilateral international tourism movement across time for all countries worldwide between 1985 and 1998. They found that very different factors such as price elasticities, exchange rates, destination risk, common borders and common languages matter for tourism. Gil-Pareja *et al.* (2007) defined a gravity equation to analyze the role of embassies and consulates on international tourist bilateral flows for 156 destinations countries from the G7 countries[3]. They found a positive and significant effect, which is larger for developing countries. Durbarry (2008) examined the impact of tourism taxes on demand for the UK using a gravity model, finding that increases in both real and relative prices have a negative impact on arrivals while a common language increases arrivals. Vietze (2012) studied the impact of cultural and religious factors of international tourist arrivals in the USA. The results provide evidence that cultural proximity has positive effects on tourism flows. Yang and Wong (2012) found similar results on bilateral international tourism to China.

More recently, Kosnan *et al.* (2013) examined traditional demand and supply factors in the Malaysian international tourism industry, showing that the number of hotel rooms, the quality in road infrastructure and the air transport infrastructure appear to be as the most important factors considered by tourists. Lorde *et al.* (2015) modeled international tourism demand for the Caribbean using traditional gravity variables and they also tested the Linder's hypothesis – tourist flows are partly determined by the similarity in preferences between the destination and origin markets. The results indicate that similarity in preferences between the region and its source markets, the climate, habit persistence, as well as the traditional gravity variables, are important demand factors influencing the decision of tourists.

Most research on these topics has focused on explaining tourism demand and bilateral flows in developed countries, with little attention to developing countries and even less for South American countries. Peng *et al.* (2014a) reviewed more than 195 studies on international tourism demand, and only three of these studies analyzed international tourism demand in Latin America (Bond and Ladman, 1972; Jud and Joseph, 1974; Vanegas, 2009), but none of them analyzed in detail or exclusively the South American countries.

Vargas da Cruz *et al.* (2007) identified the determinants of international tourist flows in different regions (Africa, South Asia and South America) for 1981-1999 and they presented an analysis of the main restrictions of its growth. Results show that the income is an important determinant of tourism demand but insecurity; the level of development of the country (proxy by the human development index) and the geographical proximity to rich countries also play a crucial role. Nevertheless, this study does not analyze the bilateral

relationship between countries and even less differences between sub-regional blocs, as it is proposed in this paper.

International tourism in South America

Since the past decades, international tourism has played a crucial role in economic growth around the world and in South American countries in particular. While global tourism industry generated US$7.6 tn (10 per cent of global GDP and 6 per cent of total exports) and 277 million jobs (1 in 11 jobs) in 2014, America was the third most visited region and concentrate 16 per cent of total international arrivals and 22 per cent of total international receipts of the world. During the same year, South America was the second most popular regional destination there, representing 15.7 per cent of inbound arrivals in the region (9.5 per cent of international receipts), after North America with 66 per cent of regional inbound arrivals (76.9 per cent of international receipts). The interesting fact is that in the past decade, international tourism in South America has grown, on average, steadily (except in 2009 due to the global financial crisis), with an annual average growth of 7.2 per cent in arrivals and 11.2 per cent in receipts, and above world average (which was 4.1 and 7.1 per cent, respectively) (World Tourism Organization, 2015; World Bank, 2015).

In South America, Argentina and Brazil are the major destinations and represent more than 40 per cent of the international arrivals and receipts in the region. Chile is the third most visited destination and Uruguay is the fifth (until 2007 was the fourth destination but then it was overtaken by Peru)[4]. A group of selected economic and tourism indicators for South America is presented in Table I.

Figure 1 shows the evolution of international tourism arrivals in the sub-regional bloc (Argentina, Brazil, Chile and Uruguay) in 1990-2014. Arrivals fell in the region between 2000 and 2002 (nearly 3 million tourists) because of several negative events (including economic and social crises in Argentina that strongly affected arrivals and departures in the region) and during 2009 because of the global financial crisis. However, in recent years, a growing trend can be seen in most countries, except for Uruguay. At the same time, relative changes of the market share of the countries were observed in the period. In the early 1990s, Argentina was the main destination with a mean share of 30 per cent, followed by Brazil but since 1996, the

Countries	International arrivals (in million)	Average arrivals growth (2003-2013)	Tourism receipts (US$m)	Tourism receipts/ arrivals (US$)	Per capita GDP (US$)	Tourism receipts/ GDP	Tourism receipts/ exports
Brazil	5.8	4.2	7,021	1,208	16,008	0.2	2.5
Argentina	5.6	6.7	5,032	903	22,067	0.5	5.2
Chile	3.6	8.9	3,182	890	22,509	0.8	3.6
Uruguay	2.7	7.5	2,011	750	20,084	2.9	14.6
Peru	3.2	10.5	3,925	1,241	11,577	1.1	8.2
Colombia	2.3	18.7	4,759	2,080	12,830	0.8	7.1
Ecuador	1.4	6.6	1,251	917	10,884	0.7	4.5
Venezuela	1.0	10.9	926	939	18,487	0.2	1.0
Bolivia	0.8	8.5	635	796	5,917	1.0	5.0
Paraguay	0.6	8.5	299	490	8,127	0.6	2.1
Total	27.2	9.1	29,041	1,068	14,849	0.5	3.9

Sources: World Bank, International Monetary Fund, Statistics official websites, UN data

Table I.
Tourism and economic indicators for South America countries, 2014

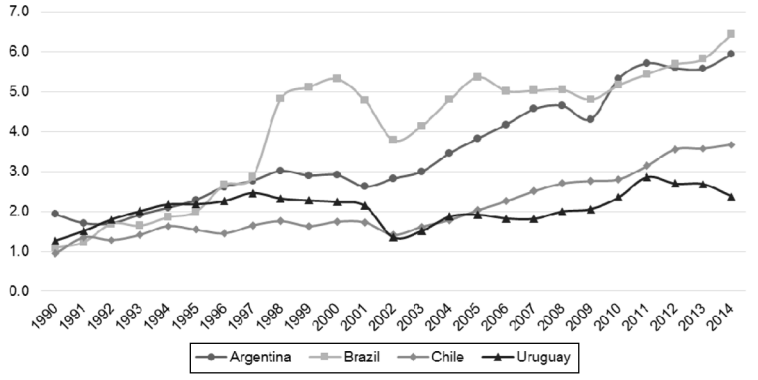
situation had reverted. Chile and Uruguay showed a similar situation over time, whereas in the past years, Chile had become the third most visited destination in the regional bloc.

Table II shows the origin of tourists to the sub-regional bloc in 2014. Uruguay is highly dependent on tourism from the sub-regional bloc, mainly from Argentina (which represents more than 62 per cent of arrivals to the country), whereas in Brazil, 64.2 per cent of tourists come from countries outside the bloc. In the cases of Chile and Argentina, international arrivals share is divided nearly equally between intra and extra-bloc arrivals, although a large part of international arrivals in Chile comes from Argentina (38 per cent).

Methods and data

The model

A gravity equation model where international arrivals are used to proxy international tourism demand is developed. The study analyzes the international tourism demand of



Source: Statistics official websites

Figure 1. International arrivals in Argentina, Brazil, Chile and Uruguay (in millions of tourists), 1990-2014Source: Statistics official websites

Origin country	International arrivals share (%) Argentina	Brazil	Chile	Uruguay
Intra-bloc				
Argentina	–	27.1	38.0	62.1
Brazil	18.2	–	11.7	19.4
Chile	18.8	5.2	–	2.2
Uruguay	15.3	3.5	1.1	–
Subtotal	52.4	35.8	50.8	83.7
Extra-bloc				
Rest of Latin America	27.0	15.6	28.3	5.9
North America	5.4	11.4	5.5	3.4
Europe	11.8	28.7	11.6	6.1
Other	3.4	8.4	3.8	1.0
Subtotal	47.6	64.2	49.2	16.3
Total	100.0	100.0	100.0	100.0

Source: Statistics official websites

Table II. International arrivals share by origin countries, 2014

Argentina, Brazil, Chile and Uruguay (the sub-regional bloc). To understand the determinants of tourist arrivals in the sub-regional bloc and distinguish the effects among tourists from different countries, a general model (all data), an intra-bloc model (only tourists flows between Argentina, Chile, Brazil and Uruguay) and an extra-bloc model (only tourists flows between countries of the sub-sub-regional bloc and the rest of the selected regions of the world) are carried out.

The general specification for the empirical estimation is as follows:

$$ln(y_{ijt}) = \alpha_{ijt} + \gamma_i + \delta_j + \theta ln(y_{ijt-1}) + \beta ln(X_{i(j)t}) + \mu_{ijt} \quad (1)$$

where y_{ijt} represents the inbound arrivals from country j (origin) to country i (destination) in period t[5]; α_{ijt} is the regression constant; γ_i and δ_j are special characteristics of country i and j, respectively, which are presumed to be constant over time; y_{ijt-1} is the number of lagged inbound arrivals; $X_{i(j)t}$ is a vector of control variables (per capita GDP of country i (j); population of country i (j); real bilateral exchange rate between i and j; price of alternative destinations; remoteness indexes of country i and j, respectively, and the geographical distance between country i and j; and μ_{ijt} is an error term that satisfies the properties that ensure the consistency of the estimators. The logarithmic specification is convenient because it allows the estimated parameters to be interpreted as elasticities and, moreover, it attenuates the differences in scale of the variables.

This specification suffers different sources of bias: omitted variable, third-party effects and multilateral resistance. The standard econometric approach for dealing with these problems is to introduce dummies for origin and for destination countries, both fixed and time variants (Anderson and van Wincoop, 2003; Baier and Bergstrand, 2007; Egger, 2004; Baldwin and Taglioni, 2011; Culiuc, 2014)[6].

Methodological strategy

Several techniques have been used to estimate tourism gravity models, and the correct specification depends crucially on the nature of the problem. The usual procedures for estimating panel data models are inconsistent in a dynamic setting like the one followed here. Essentially, when the lagged dependent variable is included as an independent variable, it generates an endogeneity problem: the equation's disturbance term and the lagged dependent variable are correlated (Sevestre and Trognon, 1985). Arellano and Bond (1991) derived a *difference general method of moments (difference GMM)* estimator to estimates a first-order dynamic panel data model. This method takes first differences to remove the fixed effects by countries and, at the same time, uses the endogenous lagged variables as instruments.

Some authors have shown that *difference GMM* estimators are biased in short samples, in the presence of autocorrelation in the error terms and with many moment conditions (Kiviet, 1995; Blundell and Bond, 1998; Hsiao *et al.*, 1999). Biased estimators are also present when the coefficient of the autoregressive variable is very close to 1 (when the series are highly persistent or when they are near to a unit root process), so that the parameter cannot be identified using the moment conditions for equations of first differences. In these cases, Blundell and Bond (1998) showed that the estimator will be strongly biased, and particularly so when the period of time is short. If the explanatory variables are persistent over time, their lags in levels have a weak correlation with the first differences and therefore they fail as instruments and may lead to biased results. Arellano and Bover (1995) and Blundell and Bond (1998) proposed an alternative estimator, *system general method of moments (system GMM)*, which avoids these issues. It combines, in a system, the regression in differences with the regression in levels. The

instruments for the regression in differences are the lagged values of the dependent and other explanatory variables and the instruments for the regression in levels are the lagged differences of the explanatory variables. This method has the advantage that allows the estimation of the variables that are fixed across the time – as the distance between countries – which are essential in the gravity theory. Mainly, for this last reason, this paper uses *system GMM* to estimate the model. *Tests for autocorrelation* and *Sargan test* of over-identifying restrictions are used to determine that the specification is adequate.

For the general model, the data are a panel that runs from 1990 to 2014 on an annual basis, whereas for the intra-regional and extra-regional models, the data are a panel with selected years (1991, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012 and 2014). The latter is because the observations are reduced when the sample is divided between the two groups, so in these cases T is too big relative to N and when there are few individuals in a sample is most likely the existence of over-identification in the model selected. The rule is to have the number of instruments equal to or less than the number of groups of individuals. An empirical strategy to avoid this problem is to reduce T (Labra and Torrecillas, 2014)[7], as we have done here. In the general model, 28 bilateral relationships per year are analyzed and in the intra- and the extra-bloc models, 12 and 16 bilateral relationships per year are analyzed, respectively.

Control variables

Traditional gravity variables as income, population and distance are analyzed. In the broad sense, a destination's income and population can be viewed as indicators of potential supply, and the origin's income and population as indicators of potential demand (Linnemann, 1966). The income is approximated by per capita GDP and is expected to be positively associated with tourism demand: as a destination country becomes richer, it offers more services and infrastructure to attract tourist; as income of origin country increases – if international tourism is a normal consumption service – its demand will increase. The size of the economies is approximated through its populations. Most populous countries have higher potential supply of tourism services (destinations countries) and generate higher potential amount of tourism (origin countries). Therefore, the sign on both origin and destination population parameters is likely to be positive.

Because of the complexities of the price structure of transportation and the lack of consistent data, transportation costs in gravity studies are typically approximated by the distance between capital cities (Lorde *et al.*, 2015, p. 4). This variable captures the cross-sectional variation in transport costs but it does not change over time. A more accurate variable, which considers not only the distance between countries but also their bilateral and multilateral relationships in terms of their size, is the remoteness indicator. The main idea of this variable is that the flow of bilateral tourism is only a simplification of a multilateral system and may be sensitive to changes anywhere in the system, such as those in the rest of the countries that are considered alternative destinations. For this reason, the gravity equation has been corrected to include remoteness, both of origin and destination countries. The remoteness indicator was used by Anderson (1979) and Deardorff (1998), and is calculated as:

$$rem_{it} = \sum_{h} \frac{dist_{ih}}{GDP_{ht}} \tag{2}$$

where $dist_{ih}$ is the distance between source market i to other tourist centers h weighted by their size (approximated by the GDP). This index establishes that the remoteness of any economy i (related to economy j) is given by the sum of the distances between that economy i and all its potential tourism partners h (excluded j), each divided by the GDP of the

respective partner. The potential partner h is less attractive for the country i (in relation to country j) when the distance between i and h is greater, and the GDP of h is lower. A positive relationship is expected between an increase in the remoteness indicator (between i and j) and tourist flows in a particular region. That is, when country i is more remote related to h origin partners (except country j), more tourists arrive to i from origin country j. An additional advantage of the remoteness indicator is that it serves to control by multilateral resistance factors (Culiuc, 2014).

In relation to price variables, destination prices and prices of alternative destinations are used. The first are proxied by the bilateral real exchange rate and reflect the cost of touristic activities in each selected destination country relative to those in the origin country. Tourists tend to be more aware of exchange rate changes before they travel than they are of inflationary effects in the destination country (Peng *et al.*, 2014b)[8]. The proxy of destination prices is positively related to demand. A depreciation of the bilateral real exchange rate improves the competitiveness of destination country, reducing costs of tourism goods and services, increasing the number of arrivals.

The effect of the prices of alternative destinations is estimated using the following specification:

$$pc_{it} = \sum_{h} \frac{rber_{iht}}{nh} \tag{3}$$

where $rber_{iht}$ is the real bilateral exchange rates of destination country i and alternative destinations h, and nh is the amount of alternative destinations. The price of potential destinations should have a positive effect on the flow of tourism between any pair of countries.

Arrivals lagged by one year are included as another determinant in the gravity equation to capture the quality of the experience of the tourist in a particular destination. It is used as an indicator of the strength or durability of habit persistence in travel preferences (Naudé and Saayman, 2005; Peng *et al.*, 2014b; Lorde *et al.*, 2015). This variable is expected to have a positive effect on tourism demand.

The data were obtained from several sources of information. Arrivals are obtained from the National Institute of Statistics and Census of Argentina (INDEC), the Brazilian Institute of Tourism (EMBRATUR), the National Tourism Service of Chile (SERNATUR) and the Ministry of Tourism and Sports of Uruguay. The GDP purchasing power parity and populations are obtained from the International Monetary Fund; bilateral real exchange rates are constructed on the basis of the bilateral real exchange of each country with respect to the USA from the USA Agriculture Department (USDA); and distances between commercial centers of the countries come from Geo Bytes[9].

Results

Table III presents gravity equation results using *system GMM* for the three models: general, intra-bloc and extra-bloc.

General model

In the general model, results show that the habit persistence has a positive and statistically significant coefficient, implying that there is a relatively high level of repeat visitation to the region. This result is in line with some findings of recent literature (Peng *et al.*, 2014a; Lorde *et al.*, 2015). The high degree of habit persistence should be taken into account by the

Variables	General model (1)	Intra-bloc model (2)	Extra-bloc model (3)
Log of tourist arrivals in *t-1*	0.6736*** (0.0692)	0.4769*** *(0.0899)*	0.4983*** *(0.1054)*
Log of the per capita GDP of country *i*	2.7299 (9.5165)	15.9446 *(11.7459)*	−2.0156*** *(0.5273)*
Log of the per capita GDP of country *j*	0.4110*** (0.0938)	0.1927 *(0.2502)*	0.4389** *(0.2196)*
Log. of the population of country *i*	−0.1092 (2.4892)	2.0383 *(3.0387)*	−0.3294 *(0.4181)*
Log. of the population of country *j*	0.3779** (0.1640)	3.4686*** *(0.6492)*	−0.3467 *(0.3003)*
Log. of bilateral real exchange rate	0.1846*** (0.0567)	−2.8232* *(1.5363)*	−1.3054* *(0.7034)*
Log of the price of the competing countries (*h*)	0.1129** (0.0512)	3.0099** *(1.3859)*	−1.5356** *(0.7126)*
Log. of the remoteness of *i*	−0.9949*** (0.2433)	−1.1259*** *(0.3729)*	4.2359** *(2.0552)*
Log. of the remoteness of *j*	0.1888 (0.2051)	0.7368** *(0.3660)*	−7.4077*** *(2.6160)*
Log of distance between *i* and *j*	−0.3957** (0.1910)	−15.5239*** *(3.5635)*	6.3354*** *(2.1307)*
Constant	3.7998 (8.8064)	62.4616*** *(14.5272)*	−21.3039** *(10.6362)*
Fixed effects by country and bilateral relation	*Yes*	*Yes*	*Yes*
Effects by year	*Yes*	*Yes*	*Yes*
Variables effects by country	*Yes*	*Yes*	*Yes*
Observations	*575*	*125*	*161*
Number of id	*28*	*12*	*16*
Sargan test	*18.64*	*21.60*	*12.80*
p-value	*0.722*	*0.305*	*0.307*
AR(1)	*−13.82*	*−4.177*	*−6.812*
AR(1) p-value	*0*	*0*	*0*
AR(2)	*2.038*	*0.434*	*−0.708*
AR(2) p-value	*0.041*	*0.664*	*0.479*

Notes: Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$; Hansen test is an over identification test for instruments and AR are tests of autocorrelation

Table III. Estimates of gravity models, system GMM

destinations if they want to increase their share in tourism worldwide, exploring in detail the determinants of the preferences of this regular tourists.

In line with the expected signs of economic theory, income and population elasticities for origin countries are significantly positive, showing that an increase of 10 per cent in per capita GDP (population) of the origin country increases the number of international arrivals in 4.1 per cent (3.7 per cent). These results suggest that the tourism demand in the region depends fairly on economic conditions existing in the origin countries. The attraction capacity of destinations countries is not a relevant indicator for regional tourism demand: income and population elasticities for destinations countries are not statistically significant.

In relation to resistance factors, the competitiveness of destinations and price of the competing countries, both have a positive and significant effect in explaining the behavior of arrivals in the region: there is more arrival when the destination country is more competitive and the other alternative destination is more expensive. An increase of 10 per cent in the bilateral real exchange rate increases arrivals in 1.8 per cent, whereas the price of the competing countries causes an increase of 1.1 per cent in the total arrivals.

The effect of distance is statistically significant and negative. Countries farthest, with higher transportation cost, generate a less demand of tourism in the region. The remoteness indicator for origin country is positive, according to the theory, but not significant. Nevertheless, the remoteness indicator for destination country is negative, not as expected. This means that greater distance between the destination countries in comparison to the rest

of the tourist destinations or a lower per capita GDP of the other destinations generates a reducing bilateral flow of tourists: 10 per cent increase in the remoteness of the destination country i related to alternative countries h (excluded j, for which the index is calculated) generates a reduction of 9.9 per cent tourist arrivals from country j to country i, showing that tourists may place a premium on destinations that are "off the beaten path" (relatively far from larger economics). This also may be due to the fact that the countries that are closest to other tourist centers are chosen by the tourist who prefers to make tourism using the economies of scale to travel to tourist poles. These results in both remoteness indicators are consistent with those found by Culiuc (2014).

Intra-bloc model

In the intra-bloc model, an effect of habit persistence is observed: those people who prefer these destinations continue to choose them along time. Tourism is highly persistent overt time.

The size of the destination country has no significant effect on explaining tourism demand: not always the most populous countries are the most visited. However, the size of the origin country is significantly positive, probably because the most populous countries (Argentina and Brazil) are the principal issuers of tourists in the region. The GDP of destination and origin countries are not statistically significant.

The bilateral real exchange rate – proxy of the inverse of destination price – does not present the expected sign. This could be explained by the hypothesis of cheaper destinations: countries of the region prefer to visit other destinations similarly accessible out of region. Another explanation may be that a devaluation of bilateral real exchange rate is associated to some negative social historical events that deteriorate the image of destination country, countering the positive effect via competitiveness. However, it is only significant at 10 per cent. Competitors' prices are positive and significant in this bloc: an increase in 10 per cent in the price of alternative destination increases arrivals in 30 per cent.

The distance is significantly negative, suggesting that there is a preference to visit neighbor countries, which is confirmed with the remoteness indicator of origin country. The effect of the remoteness indicator of destination country is positive and significant as in the general model.

Extra-bloc model

In the extra-bloc model, most of the explanatory variables are statistically significant, except elasticities population, both for origin and destination countries. In relation with income elasticities, an increase of 10 per cent in per capita GDP of origin countries increases arrivals in the region in 4.3 per cent, whereas income elasticity of destination countries shows a negative sign. This means that extra-bloc tourists prefer to visit countries with lower per capita GDP, as they can see them as some type of exotic places[10].

For the rest of the variables, some interesting and a bit surprising results arise:

- as we already said, income elasticity of destination has a negative sign;
- the proxy of the inverse of the destination price has a negative and statistically significant coefficient at 10 per cent (an increase in the bilateral real exchange rate decreases the number of arrivals to the destination country);
- competitors' price coefficient is negative;
- the remoteness of destination countries has a negative effect on arrivals[11]; and
- the distance is significant in explaining tourism demand and has a positive effect.

Summarizing these extra-bloc results, we can conclude that, for that market, expensive destinations, cheaper alternative destinations, remoteness of origin countries and more far

away economies, are the factors that increase tourist arrivals. Opposite to the theoretical expected results, the extra-bloc model behavior shows that it responds to different determinants than those related to the general or the intra-bloc models. Literature based on motivation of tourists may help to give these results some support. In particular, Pappas (2014) found that tourists use their travel as a pathway to reconfirm to friends, relatives and colleagues their social positioning, and they usually perceive it as an interconnection between their social class and the distance or type of voyage they do.

A summary of results is presented in Table IV. The last column shows the results for Caribbean countries obtained by Lorde *et al.* (2015), using a similar estimation model[12]. Many differences are observed taking into account the spatial distribution of tourist arrivals and departures, both in size and signs, demonstrating that the behavior of tourism demand depends, in part, on the relationship of the countries or bloc of countries being analyzed.

Conclusions

Tourism is a sector with particular characteristics. It is a set of goods and services that are summarized in a non-traditional export. Trade in tourism involves the consumption of goods and services in a territory, which needs the physical displacement of the people who make tourism. In the analysis of the determinants of tourism, the traditional variables that affect trade in goods and services come into play, but in addition, there are many other factors that influence the decision of the tourist: the endowment of touristic attractions of a country, the climate, social and political security conditions and availability of free time for holidays, among others.

Despite the complexity that encompasses the analysis of the tourism phenomenon and the multiplicity of factors that can influence the decision of an individual to make a trip and choose a location to visit, this paper is a first step in the exploration of the flows of inbound

	International tourism demand Argentina, Brazil, Chile and Uruguay			Total Caribbean
Variable	Total	Intra-bloc flows	Extra-bloc flows	(Lorde *et al.*, 2015)
Habit persistence	0.67	0.47	0.49	0.61
Per capita GDP of destination countries	Not significant	Not significant	−2.01	0.27
Per capita GDP of origin countries	0.41	Not significant	0.43	0.29
Population of destination countries	Not significant	Not significant	Not significant	−0.41
Population of origin countries	0.37	3.46	Not significant	0.28
Bilateral real exchange rate	0.18	−2.82	−1.30	−0.25
Price of the competing countries	0.11	3.00	−1.53	−0.10
Remoteness indicator of destination countries	−0.99	−1.12	4.23	
Remoteness indicator of origin countries	Not significant	0.73	−7.4	
Distance	−0.39	−15.5	6.33	

Source: Lorde *et al.* (2015)

Table IV. Summary of results of this study for Mercosur countries and Lorde *et al.*'s (2015) for Caribbean countries

tourism in Argentina, Brazil, Chile and Uruguay, taking into account the country of origin of the tourists.

Beyond the estimations and the results obtained, this paper contributes to the systematization of information flows of international tourism and its characterization in the countries of this regional bloc, considering the spatial distribution of tourist arrivals and departures.

The results show that there are other key variables besides the traditional gravity ones – habit persistence, distance and remoteness – which have a role in explaining tourism in the region. The habit persistence is a relevant determinant of tourism demand revealing the importance of designing strategies to maintain the level of arrivals at their long-run trend. However, there are some differences in the relative importance of these variables according to whether the model considers the total flows of tourism, those restricted to the sub-regional bloc or those restricted to the rest of the world (extra-bloc). The spatial distribution of tourism flows is a key variable that can give insights about strategies for tourism policies. In particular, motivations for visiting exotic destinations and tourism as expression of perceived social status are new key variables to consider when looking for the extra-bloc tourism demand. As already said, this demonstrates that the explanation of tourist flows is not unique, and that it is possible to generate differentiated strategies for each case, depending on the origin country of the demand.

With more proactive action from policymakers to understand the dynamics of the tourism phenomenon, the region will be able to increase the quality of the tourism industry to be the main center for tourism. In particular, the regional-bloc must generate a differentiated brand for its touristic products to capture the motivation and time of tourism, mainly of the extra-bloc countries.

The challenge is to identify the correct policy, at the correct time and for the relevant market.

Notes

1. The commercial sub-regional bloc of the region, which is defined in this paper, is formed by three of the member countries of MERCOSUR (Mercado Común del Sur in Spanish), Argentina, Brazil and Uruguay, and one of the associated countries of Mercosur, Chile. The MERCOSUR is a commercial regional bloc that promotes free trade and the fluid movement of goods, people and currency between members.
2. The extra-bloc regions selected are North America, Europe, Paraguay (as a representation of the rest of Latin American countries) and Asia.
3. G7 countries are Canada, France, Germany, Italy, Japan, the UK and the USA.
4. It is interesting to note that Uruguay presents the highest contribution of tourism to GDP and exports in South America, being of 2.94 per cent and 14.64 per cent, respectively. This reveals a great dependence of the country on tourism, with values similar to those of the Caribbean countries. In Argentina, these contributions are 0.54 per cent and 5.22 per cent; in Brazil, these are 0.21 per cent and 2.51 per cent, respectively.
5. The number of tourist arrivals is the most popular measure to proxy tourism demand (Song and Li, 2008) but many times, it is used because of the wide unavailability of data on international tourism receipts for many countries.
6. The inclusion of so many fictional variables affects the performance of the estimation method. For this reason, the dummies by country of origin that varies in time are not included.
7. A robustness analysis was conducted through the estimation of the gravity equations for different sets of years within the period, arriving at similar results. The results can be requested from the authors.

8. In the case of North American and Asian regions, this indicator is proxy by the bilateral real exchange rate of the USA and China, respectively, as these markets are the main sources of tourism in these regions.
9. The panel is unbalanced due to the lack of some data and this may implicate a selection bias. Data on arrivals from Chile in 1995-1997 and from Brazil in 1995-2002 and data on the bilateral relationship between Uruguay and Asia since 2008 are not available. For practical purposes, it is assumed that there is no selection bias since it is a common factor when considering data from countries or regions (Wooldridge, 2002).
10. There is enough literature that studies tourist's motivations. Mahica (2011) argued that tourists who belong to a particular group or social class choose holiday in exotic destinations. Correira *et al.* (2007, p. 20) considered "the decision to travel to exotic places arises from the desire of knowledge, having social status and intellectual leisure."
11. The remoteness of origin countries has a positive effect as expected.
12. Lorde *et al.* (2015) analyzed 18 destination countries: Antigua and Barbuda, the Bahamas, Barbados, Bermuda, the British Virgin Islands, the Cayman Islands, Dominica, the Dominican Republic, Grenada, Haiti, Jamaica, Montserrat, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago and the United States Virgin Islands. These countries were selected on the basis of the availability of data for the variables in the demand model. The origins are the four main source markets: the USA, Europe, Canada and the Caribbean. This study does not differentiate between intra- and extra-bloc relationships.

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Further reading

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