Gravity-model specification for tourism flows: the case of Albania

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Abstract

The tourism sector plays a crucial role in economic growth of developing countries. Tourism increases business and employment opportunities and contributes to the development of local infrastructure. The preservation of cultural heritage and the promotion of peace between nations are other benefits of this sector. The main objective of this study is the investigation of the main demand and supply factors of international tourist arrivals to Albania, given the important role of the tourism sector on the national economy. A gravity-type equation is estimated through three different estimation techniques, controlling for basic and experimental independent variables. The basic assumption of the gravity model states that bilateral flows depend on some factors related to the origin and destination countries and other factors that approximate the bilateral distance. The analysis is based on an annual dataset of international tourist arrivals to Albania from 22 origin countries over the period 2001–2018. Empirical results show a satisfactory explanatory power of the considered equations.

Keywords: international tourism, Albania, gravity model, panel data

Introduction

Tourism is often considered as the most sustainable economic development strategy in developing countries (Yfantidou and Matarazzo, 2017). Tourism generates employment for skilled and unskilled labours in different sectors of the economy (Blake *et al.*, 2008). Development and enhancement of both hard and soft infrastructure facilities is another important benefit for local communities. Tourism helps in the sustainable development of a country and brings diversification to the economy (Morakabati *et al.*, 2014). This sector also contributes to the preservation of cultural heritage and promotes good relations between nations (Moufakkir and Kelly, 2010).

The tourism sector plays a significant role as a driving force of economic development of Albania, a European Mediterranean country with a typical nature and many ancient ruins and historical sites. Both the advantageous geographical position, and the Mediterranean climate favour

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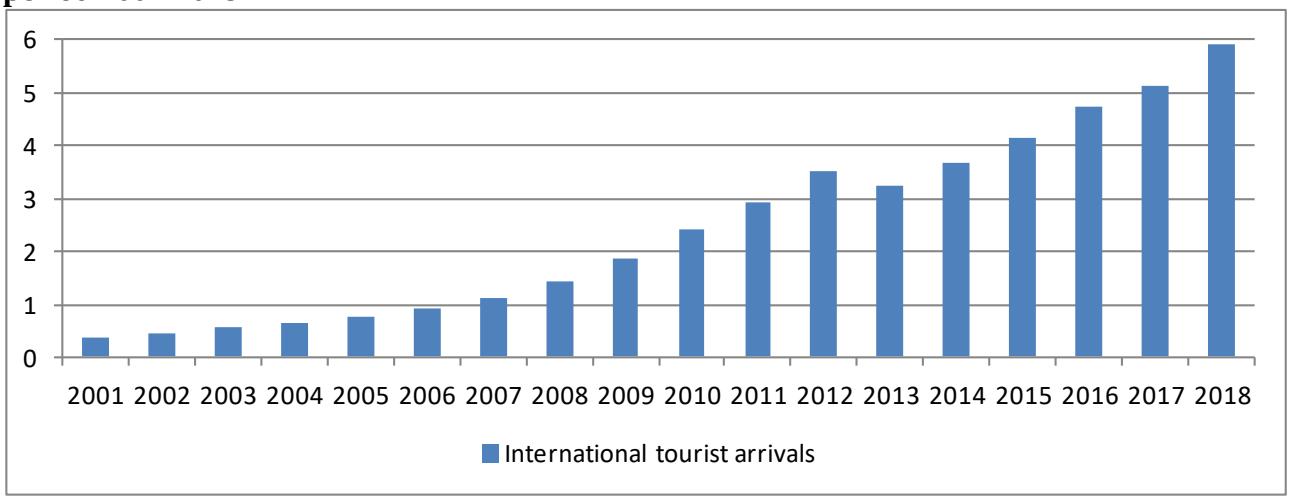
the development of the tourism industry throughout all seasons of the year. The country is characterized by an ancient archaeological and cultural heritage dating back to the Illyrian tribes that inhabited in a large part of the Balkans (Stipčević, 1977). Albania also offers beautiful beaches, mountainous landscapes, particular traditions and a typical cuisine. The country experienced one of the most significant improvements in 2019 TTCI (Travel and Tourism Competitiveness Index)[*] scores (from 98th to 86th), reflecting the effective policies related to the development of the travel and tourism sector. Figure 1 shows the total number of international tourist arrivals to Albania over the period 2001-2018. In 2018 Albania received about 5,9 million foreign tourists, showing an increase of 15,8% on the previous year. The average annual growth rate for the considered time period is 18,4%.

Figure 1. International tourism, total number of arrivals to Albania (in millions) over the time period 2001-2018



Source: Author's elaboration using available data from the Albanian Institute of Statistics (INSTAT)

The main objective of this study is the identification of the most important demand and supply factors of tourism inflows to Albania, given the crucial role of the tourism sector on the national economy. We formulate a particular gravity equation for international tourist arrivals, including basic and experimental independent variables. The rest of the study is organized as follows. Section 1 presents the gravity model and some of the most important theoretical contributions. Section 2 refers to the most significant previous applications of the gravity approach to international tourism flows.

[*] The TTCI (Travel and Tourism Competitiveness Index) is produced by the World Economic Forum (WEF) and measures the factors and policies that make a country a viable place to invest within the Travel and Tourism sector. Available online at: https://tcdata360.worldbank.org/.

The gravity model estimation and results for Albania is reported in section 3. In the last section we discuss the main findings of the study and make concluding remarks.

1. Theoretical background

After realizing the crucial role of tourism on the economy, there is a natural need to identify the determinants of tourism flows, valid for the respective policy-makers. The number of international tourists may be affected by several factors related to the origin and destination countries, such as relative prices and disposable income, natural landscapes and cultural heritage, infrastructure condition, tourism marketing, government regulations, security level, meteorological conditions etc. (Dritsakis, 2004; Figueroa *et al.*, 2018; Khadaroo and Seetanah, 2008; Priego *et al.*, 2014; Shafiullah *et al.*, 2019). The Newton's law of universal gravitation states that the gravitational force between two objects is directly proportional to the product of their masses and inversely proportional to the square of the corresponding distance. The respective formula can be expressed as:

$$F_g = G\frac{m_1 m_2}{r^2} \quad (1)$$

where F_g is the gravitational force between two objects *(1 and 2); G* is the gravitational constant; m_1 and m_2 are the corresponding masses of the two objects; and r is the distance between them. In the case of the gravity model of tourism, countries substitute the objects, whereas masses can be estimated by economic sizes or populations:

$$TOU_{ij} = C\frac{M_i^{\alpha} M_j^{\beta}}{DIST_{ij}^{\gamma}} \quad (2)$$

where TOU_{ij} is the international tourism flow from the origin country i to destination country j; M_i and M_j are the respective sizes; $DIST_{ij}$ is the bilateral distance; C, α, β and γ are coefficients that can be estimated through appropriate econometric methods. We take into consideration the logarithmic transformation of the above equality and include the error term (ε_{ij}), which is given by the difference between the observed dependent variable and the respective estimated value. A linear functional relationship is useful for many well-known estimation methods in econometrics:

$$\ln(TOU_{ij}) = C + \alpha\ln(M_i) + \beta\ln(M_j) - \gamma\ln(DIST_{ij}) + \varepsilon_{ij} \quad (3)$$

Tinbergen (1962) and Pöyhönen (1963) were the first authors to apply the gravity theory to explain international bilateral trade. According to Tinbergen (1962), bilateral trade flows depend on the respective economic sizes, which were estimated by the Gross National Products (GNPs), and the

corresponding distance as an estimator of transportation costs. Pöyhönen (1963) also affirmed that trade flows between two countries are positively related to the respective sizes and negatively related to the bilateral distance. Anderson (1979) was the first to develop a sound theoretical foundation of the gravity model. The author followed the Armington (1969) assumption, i.e., products are differentiated by their place of origin. Bergstrand (1985, 1989, 1990) included multilateral resistance terms for importers and exporters for the determination of bilateral trade flows and also showed that the gravity equation evolved from a classic Heckscher-Ohlin model. Krugman (1979, 1980, 1991) provided another important theoretical contribution in explaining the relationship between economic activity, international trade flows and economic geography. Deardoff (1998) affirmed that gravity equations are part of a large class of models and they can be explained by standard trade theories.

According to Anderson and Van Wincoop (2003), estimated gravity models do not have a clear theoretical foundation. The equations suffer from misspecification and the comparative statics analysis is unfounded. The authors developed a technique that consistently and efficiently estimates the theoretical model and calculates the comparative statics of trade frictions. Baldwin and Taglioni (2006) analysed the theory behind the gravity model and identified several usual errors in the literature, which bias the respective results. According to the authors, Anderson and Van Wincoop (2003) technique is suitable only in the case of cross-sectional data. Dummy variables for each importer or country-year fixed effects should be included in the equation. Yotov *et al.* (2016) also analysed the theoretical foundation of gravity models, data sources for gravity analysis, the estimation techniques and the respective issues, including the handling of zero-trade flows and non-tariff barriers. The gravity model represents a general equilibrium environment and it can be used to evaluate the effects of trade policy changes in a single market on the rest of the world. The gravity model of trade is one of the most popular findings in empirical economics due to its high predictive power.

3. Empirical modelling

A significant number of authors have estimated and tested the gravity models for different types of international flows, including trade, foreign direct investments, migration and tourism. Crouch (1994) analysed the practices of several empirical studies of international tourism demand and concluded that there is a relevant number of independent variables to take into consideration, depending on the origin and destination countries, the considered samples and data frequency etc. Durbarry (2000) applied a gravity framework to study the inbound tourism demand for the United

Kingdom. Results showed that tourism expenditure depends on prices in competing destinations and exchange rates among other variables. Khadaroo and Seetanah (2008) analysed a panel sample of bilateral tourism flows among 28 countries over the period 1990–2000, following a gravity approach. Results suggested that transport infrastructure is a more sensitive factor when travelling to African and Asian countries. Furthermore, tourism is both income and price elastic, particularly for European and American destinations and African and Asian originating countries. Keum (2008) also used a panel dataset in order to examine the gravity model and the Linder hypothesis. Results confirmed the empirical robustness of the gravity model for international tourists and goods but they do not provide support for the Linder theory. Priego *et al.* (2014) studied the impact of temperature on destination choice decisions using a sample that included Spanish domestic trips during the period 2005-2007. The gravity model estimation results confirmed the importance of temperature in explaining domestic tourism flows. Furthermore, domestic tourism revealed similar characteristics to the international one. Morley *et al.* (2014) explained the gravity model for bilateral tourism flows through the individual utility theory. According to the authors, estimated gravity models can be understood as the exploration of the spatial dimension of tourism demand function. Zhang *et al.* (2019) analyzed the role of Hofstede's six cultural dimensions on international tourism flows through a sample of 81 origin countries and 32 destinations. Gravity model estimation results confirmed the statistical significance of push (low Power Distance, Individualism, Femininity, Long-Term Orientation, and Indulgence) and pull (Individualism, low Uncertainty Avoidance, and Indulgence) factors.

The number of empirical studies related to the estimation of gravity models for tourism flows to Mediterranean countries is relatively small. Eryiğit *et al.* (2010) investigated the variables affecting international tourist arrivals in Turkey during the period 1995–2005 through a gravity model. The empirical results confirmed the statistical significance of population and distance variables, Gross Domestic Products (GDPs) per capita, tourism price index, bilateral trade volume, tourism climate index, and 'earthquake', 'being neighbours' and 'September 11 attacks' dummies. Den Butter *et al.*, (2014) analysed the impact of the socio-economic and geographical factors on international tourism demand in Greece over the period 2001-2010. The gravity model estimations confirmed the important role of distance, trade, income and political stability. Santeramo and Morelli (2016) analysed the international demand for Italian agritourism through the gravity theory. The authors estimated a panel data quantile regression using data of 33 countries of origin from 1998 to 2010. Results confirmed the statistical significance of income, distance, mutual agreements and urbanization rates in origin countries on the number of incoming tourists. Deichmann and Liu (2017) studied the determinants of tourism flows to Croatia for the time period 1993-2015. The authors considered different gravity

models and concluded that tourist arrivals can be explained by GDP per capita and population of the origin country, bilateral distance and openness. Marti and Puertas (2017) studied the determinants of tourism flows to Mediterranean Europe also following a gravity approach. According to the respective results, European Mediterranean countries are not fully exploiting their tourism capacity and they should implement policies to encourage economic activity and competitiveness.

4. A gravity model for Albania

We estimate in this section a particular gravity equation for international tourist arrivals to Albania, considering some basic and experimental determinants. The basic gravity model includes the respective countries population or economic sizes, and the bilateral distance, which approximates tourism costs. Country sizes are estimated through the GDPs per capita in our case. We consider the following theoretical model:

$$tou\_o\,t = \alpha_1 + \alpha_2(gdpcap\_o\,t) + \alpha_3(gdpcap\_t) + \alpha_4(tii\_t) + \alpha_5(psavt\_t) + \alpha_6(dist\_o) + \alpha_7 CLIMA\_o + \alpha_8 BORDER\_o + \varepsilon\_o\,t \quad (4)$$

Table 1. Definition and expected sign of the coefficients for the considered factors.

Variable	***Definition***	***Expected sign***
tou_ot	*Natural logarithm of international tourist arrivals from origin o at year t.*	*Dependent variable*
gdpcap_ot	*Natural logarithm of GDP per capita in origin o at year t.*	+
gdpcap_t	*Natural logarithm of GDP per capita in Albania at year t.*	+
tii_t	*Natural logarithm of total infrastructure investments in Albania at year t.*	+
psavt_t	*World development indicator of political stability and absence of violence/terrorism in Albania at year t.*	+
dist_o	*Natural logarithm of the distance between Albania and origin o.*	-
CLIMA_o	*A dummy variable that equals one if Albania and origin o have a similar climate, and equals zero otherwise.*	*'+' or '-'*
BORDER_o	*A dummy variable that equals one if Albania and origin o share the same border, and equals zero otherwise.*	+

Source: own representation.

Table 1 presents the definition and expected sign of the coefficients for the considered factors. The sample includes tourist arrivals to Albania from 22 relevant origin countries (table 2), which

constitute about 87% of all international visitors for the selected period; Kosovo, North Macedonia and Greece were the main origins with respectively 35%, 11% and 9% of total tourists.

Table 2. Considered origin countries

Austria	*Netherlands*
Belgium	*North Macedonia*
Bulgaria	*Norway*
Croatia	*Poland*
England	*Romania*
France	*Serbia*
Germany	*Sweden*
Greece	*Switzerland*
Italy	*Turkey*
Kosovo	*Ukraine*
Montenegro	*United States*

Source: own representation

We consider an annual dataset over the period 2001-2018, which depends on the availability of data provided by the national statistical institute and other official sources. International tourist arrivals were sourced from the Albanian Institute of Statistics (INSTAT). Indicators of political stability and absence of violence/terrorism and GDPs per capita were gathered from the World Bank's World Development Indicators. Bilateral distances between Albania and the origin countries were collected from 'CEPII GeoDist' database (Mayer and Zignago, 2011). Total infrastructure investments data were gathered from the Albanian Ministry of Finance and Economy. The 'climate similarity' dummy is based on the Köppen–Geiger climate classification system (Kottek *et al.*, 2006).

Table 3 shows the estimated coefficients, the corresponding p-values and the adjusted R-squared for the considered gravity models. Three different estimation methods are applied: 'pooled ordinary least squares' (pooled OLS), fixed effects and random effects, respectively. In the case of the pooled OLS estimator, the panel structure of the dataset is ignored, so it is assumed that the coefficients do not change across the countries. In the case of the fixed effect estimator, the effect of time-varying predictor variables is determined. We assume that each country-pair has some specific features that can impact the independent variables, hence we suppose that there is a correlation between the error term and the predictor variables. By applying the fixed effect method we eliminate the impact of these time-invariant individual features, and evaluate the influence of the factors on tourism flows. In the case of the random effect estimator, we assume that the variation between

country-pairs is unsystematic and it is not correlated with the considered explanators, so we can also determine the effect of time-invariant independent variables.

Table 3. Estimated coefficients, p-values and adjusted R-squared of the estimated models.

Dependent variable: tou_ot						
	Pooled OLS		*Fixed Effects (FE)*		*Random Effects (RE)*	
Supply-side variable	*Estimate*	Pr(>|t|)	*Estimate*	*Pr(>|t|)*	*Estimate*	Pr(>|t|)
gdpcap_t	0.496	0.132	0.762**	0.021	0.605*	0.073
tii_t	0.387***	0.004	0.734***	0	0.412***	0
psavt_t	0.093	0.372	0.485***	0.003	0.293***	0.008
Demand-side variable	*Estimate*	*Pr(>|t|)*	*Estimate*	*Pr(>|t|)*	*Estimate*	*Pr(>|t|)*
gdpcap_ot	0.706***	0	1.169***	0	0.728***	0
Frictions	*Estimate*	*Pr(>|t|)*			*Estimate*	*Pr(>|t|)*
dist_o	-2.431***	0			-2.549***	0
CLIMA_o	-0.169**	0.035			-0.176***	0.004
BORDER_o	0.917***	0.008			0.938***	0.002
Constant	5.249***	0	6.546***	0	4.755***	0
Adjusted R^2	0.421		0.578		0.638	
Observations	396		396		396	

Note: 'Pr(>|t|)' indicates the observed p-value. *Coefficients are significant at 10% level. **Coefficients are significant at 5% level. ***Coefficients are significant at 1% level.

As shown in table 3, the random effects model yields the highest adjusted R-squared. All the coefficients are statistically significant at the five per cent level in this case, with the exception of the 'Albanian GDP per capita' variable, which is significant at the ten per cent level. Adjusted R-squared values are relatively satisfactory and the variable signs follow the initial expectations (e.g., Gouveia *et al.*, 2017; Marti and Puertas, 2016; Priego *et al.*, 2014; Santeramo and Morelli, 2016). We confirm the statistical significance of the basic gravity factors (fixed effects and random effects methods), i.e., the number of international tourists depends on the bilateral distance and on the respective economic sizes. Tourism flows are negatively affected by the 'climate similarity' dummy variable. There is a higher probability that an international visitor to Albania arrives from a colder country, ceteris paribus. Increased infrastructure spending, a higher level of political stability and the existence of a common border stimulate tourism inflows to Albania. The development of an appropriate basic infrastructure, not only enhances the accessibility to different regions of the country, but also stimulates private investments in the tourism industry. Regardless of the numerous natural attractions in Albania, the quality of roads and the lack of accommodation facilities in several remote areas, can discourage foreign tourists. Furthermore, political stability and the relations with other countries are directly related to the image of Albania and to the perceived safety of international visitors.

Government and opposition parties might contribute to the minimization of the insecurity associated with a conflictual political environment.

Conclusions

The main objective of this study was the identification of the most important demand and supply factors of international tourist arrivals to Albania, given the crucial role of the tourism sector on the national economy. We considered a particular gravity model that included basic and experimental independent variables. According to the gravity theory, the response variable, which is a flow of assets, goods or humans, depends on some factors related to the home and host countries, and other factors that approximate the bilateral distance.

We took into account an annual panel sample which constitutes about 87% of total tourist arrivals to Albania over the period 2001-2018. The gravity model was estimated through three estimation techniques, pooled OLS, fixed effects and random effects, respectively. Empirical results showed that international tourist arrivals to Albania are positively related to GDPs per capita in destination and origin countries, total infrastructure investments, political stability and absence of violence/terrorism, and to the existence of common borders. On the other hand, the dependent variable is negatively related to the distance between Albania and origin countries, and to the 'climate similarity' dummy variable. The adjusted R-squared varies from 42,1 to 63,8%, showing a satisfactory explanatory power of the estimated equations. The Albanian government must deploy policy packages that stimulate the long-term economic growth, increase the investments in infrastructure and contribute to the internal stability, in order to stimulate tourism inflows.

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