Agritourism flows to Italy: an analysis of determinants using the gravity model approach

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Abstract

Tourism represents one of the most important income sources for Italy. In recent years, apart from "traditional" destinations, tourism supply is widely changing in order to satisfy the customers "love for variety" and valorise marginal resources, then new formulas are emerging (e.g. agritourism).

This work aims to elaborate and estimate an econometric model able to adequately explain the size of agritourists flows to Italy from main partner countries using the gravity model approach that has been broadly applied to the analysis of international flows. In this work, the "basic" model has been enlarged and improved with the introduction of other explicative variables.

The results has allowed to confirm empirical validity of the gravity model in studying international flows of any nature. Furthermore, the estimated econometric model represents a useful analytical instrument to describe, and, eventually, predict demand of foreign visitors for agritourist vacations in Italy.

KEYWORDS: Gravity Model, Agritourism, Rural tourism, Tourism flows

1. Introduction

The enormous increment of international tourist arrivals, grown from 25 million to 696 million since 1950 to 2000, rendered tourism the world's largest industry and, nowadays, it plays a very important role in the development of the economy and society in the world. In other words, tourism became one of the main priorities of the growth for all countries with favorable conditions.

Apart from traditional forms of tourism, recently rural tourism assumed an increasing relevance due to the rapid industrialization of Western societies in the 19th century: transport more efficient and rapid, increased wealth and free time have enabled visits by urban dwellers to the countryside. As a result, the characteristics of current tourist demand are continuously changing: increasing demand for environment quality and recreational functions; expanding demands for non-urbanized rural, protected areas of nature and places with cultural and historical values; increasing demand for rural and agro-tourism (WTO, 2004).

It seems very important to underscore that rural tourism is engaged by people seeking rural peace, away from areas of intensive tourism activity. Above all, rural tourism is engaged by visitors who wish to interact with rural environment.

With regards to Italy, the determinants of agritourism flows are likely to be different from those of traditional tourism. A deep insight of current trends in rural tourism could be fundamental to catch the opportunity to develop rural and disadvantages areas by which agritourists are attracted.

Actually, in Italy agritourism is regulated by a Law (n° 96 of 20 February 2006) that defines agritourism as: "accommodation and hospitality activities carried out by farmers…, through the utilization of their own farm in connection with the activities of cultivation of the land, of silviculture, and of the raising of animals". Italy is the only country in the European Union that has specific laws regulating agritourism, whereas elsewhere this particular type of accommodation is included in the more general sector of rural tourism. The main objectives of the law are to issue effective regulations that promote and further the growth, qualification and characteristics of the accommodation structures.

The present paper would be a contribute to recent studies voted to understand the phenomenon in order to define the strategy of rural tourism development on national level.

2. Objectives

The main objectives of this research are to show the most important agritouristic flows towards Italy and to contribute to the recent literature that is trying to assess the empirical validity of the "Gravity Model" with respect to international tourism flows (Matias, 2004; Dubarry, 2000).

By applying a gravity model many parameters affecting international agritourism flows can be taken into account. Studying the impact of each factor affecting international flows, at this period of time, could be very useful to understand the increasing phenomenon of rural tourism and to implement new policies for the agritouristic sector.

Another objective is to measure the importance of each economic factor influencing agritouristic flows. The factors which have been studied for affecting agritouristic flows are the standard parameters of gravity model: evolution of GDP per capita, and population, distances, supply of agritouristic beds.

In addition, it has been evaluated the empirical correlation between rurality of the country of residence and agritouristic flows towards Italy. Finally, another objective is to verify the effect that principal European agreements for regional integration, such the subscription of EU Accession Negotiations, the implementation of Schengen agreements and the adoption of Euro as a common currency, have had on international flows of agritourists towards Italy.

The results of the present work could aid to identify the main markets where concentrate marketing efforts to take advantage by opportunities deriving from an increasing demand of rural tourism. Furthermore, the present study could help policy-makers to implement new tools to encourage the Italian agritouristic sector.

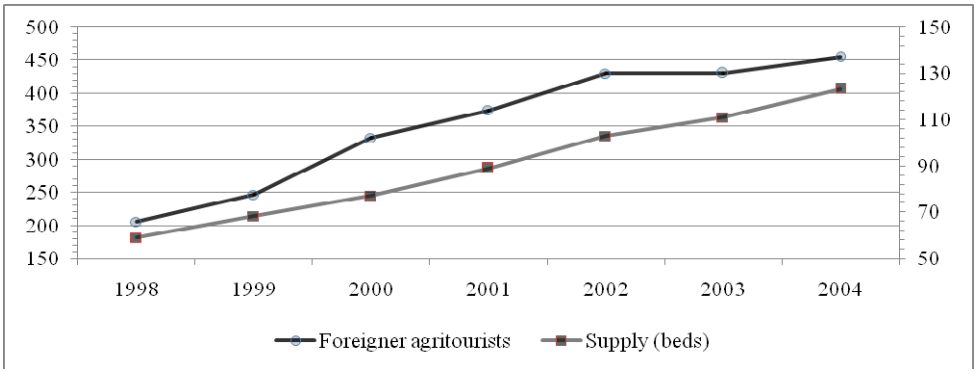
3. Overview of Italian agritourism flows

During the last decade both the number of foreigner visitors of Italian agritourisms than Italian supply of agritouristic vacations have increased significantly, as illustrated in **Figure 1**. In particular, from 1998 to 2004, the increment was, respectively, of +121% and +109%.

Notwithstanding Italian agritourisms lodge visitors coming from the whole world (**Table 1**), 6 countries account for 80 percent of total foreigner agritourists in Italy: Germany, the United Kingdom, the USA, the Netherlands, France, Switzerland.

As regards the country of residence of foreigner visitors in Italian agritourisms during last years, Germany is the first country and accounts almost 50 percent of total agritourists. Nevertheless, contrary from the general trend (+5.8%), arrivals from Germany have declined. Such a decreasing tendency is shared only by Israeli visitors, curtailed sensibly from 2002.

Figure 1 – Trend of foreigner agritourists (.000) to Italy and total number of beds (.000) in Italian agritourisms



Source: ISTAT

A considerable and increasing number of tourists (8 percent of total) come from USA and Canada. With respect to European countries, English and Dutch visitors represents, respectively, 7 and 6 percent of total, with a low growth rate. On the other hand, French and Swiss agritourists account for 5 percent each and show a considerable growth rate (almost 40 percent).

Table 1. Foreigner tourists (per country of residence) spent vacations in Italian agritourisms

Countries	***Arrivals****	***Share****	***AGR*****	***Countries***	***Arrivals ****	***Share****	***AGR*****
Germany	211,651	48,3%	-4.6%	Ireland	2,152	0,5%	36.2%
United Kingdom	31,208	7,1%	16.1%	Japan	1,546	0,4%	27.3%
USA	29,417	6,7%	41.6%	Czech Republic	1,270	0,3%	110.1%
Netherlands	26,635	6,1%	5.8%	Hungary	1,197	0,3%	81.9%
France	23,398	5,3%	40.5%	New Zealand	991	0,2%	14.5%
Switzerland	20,764	4,7%	36.4%	Finland	964	0,2%	37.1%
Austria	18,356	4,2%	6.4%	Greece	700	0,2%	7.4%
Belgium-Lux	17,141	3,9%	10.9%	Russian Fed.	629	0,1%	35.2%
Denmark	5,228	1,2%	24.5%	Brazil	491	0,1%	64.9%
Sweden	4,490	1,0%	27.7%	South Africa	472	0,1%	74.6%
Canada	4,476	1,0%	46.8%	Slovak Republic	446	0,1%	41.3%
Spain	3,721	0,8%	54.9%	Portugal	428	0,1%	3.3%
Australia	3,558	0,8%	37.9%	Argentina	340	0,1%	26.1%
Israel	3,100	0,7%	-8.4%	Venezuela	311	0,1%	7.4%
Slovenia	2,634	0,6%	28.0%	Mexico	218	0,05%	35.5%
Norway	2,448	0,6%	75.2%	China	208	0,05%	130.6%
Poland	2,229	0,5%	67.1%	**World**	438,294	100.0%	5.8%

(*) Mean from 2002 to 2004; (**) Average growth rate from 2002 to 2004
Source : ISTAT

4. Theoretical Framework of the Gravity Model

Many economists believe that the Gravity Model is a very powerful tool for international trade analysis. Tinbergen (1962) and Pöyhönen (1963) were the first to propose the idea, and later it was extended by several other researchers. After these decisive contributions, the Gravity Model was used in many empirical studies for bilateral trade analysis (Prentice et al., 1998) and for the estimation of the impact of a variety of policy issues relating to, for example, free trade blocs (Martinez-Zarzoso et al., 2003), multilateral commercial agreements (Rose, 2002), migration and tourism flows (Karemera et al., 2000), and foreign direct investment (Brenton et al., 1999).

The basic concept of the Gravity Model for trade analysis borrows the gravity equation from physics: the

volume of trade between two countries is proportional to their economic "mass" and inversely proportional to their respective distance.

The analytical relation of the basic Gravity Model is expressed as follows :

$$(1) \quad F_{ij} = G\frac{M_i^{\alpha} M_j^{\beta}}{D_{ij}^{\gamma}}$$

where, F_{ij} is the export flow from origin country *i* to destination country *j*, usually measured by its economic value; M_i and M_j are the economic size of the two countries, usually Gross Domestic Product (GDP) is considered; D_{ij} is the distance between the two countries, measured as physical distance between their first cities; G is a constant that depends on the units used to measure the other variables.

The multiplicative nature of the gravity equation means that it is possible to take natural logarithms and obtain a linear relationship between the log of trade flows and the log of economy sizes and distances as follows:

$$(2) \ln F_{ij} = \alpha_0 + \alpha \ln M_i + \beta \ln M_j - \gamma \ln D_{ij} + \varepsilon_{ij}$$

This equation could be estimated by the Ordinary Least Square (OLS), therefore it is assumed that the error term ε_{ij} is normally distributed.

Linnemann (1966) was the first to include several additional variables to the basic Gravity Model, obtaining what has been successively called the "Augmented Gravity Model". In fact, empirical estimations may add other variables like population, income per capita, exchange rates, and dummy variables for the presence of common language, colonial links or commercial agreements among the trading countries (Deardorff, 1995; Head, 2003).

At the empirical level, the Gravity Model gives very robust estimates and provides a good fit to the observed data. In fact, most of the estimations for bilateral trade volumes with respect to GDP, distance and other explanatory variables, have given values for the determination index (R^2) ranging between 0.65 and 0.95, depending upon the specification of the equation (Harrigan, 2001).

Despite the success of the empirical analysis of trade patterns, the Gravity Model was extensively described as a theoretical orphan. However, in the last decade several authors have worked on reconciling international trade theories with the Gravity Model specification. Starting from the work of Anderson (1979), it has been shown that the formulation of the Gravity Model can be derived from different theoretical models such as Ricardian models, Hecksher-Olin (H-O) models and Increasing Returns to Scale (IRS) models of the New Trade Theory (Serlenga et al., 2004). As highlighted by Davis (2000), it is remarkable that in a short period of time, the Gravity Model has switched from being a theoretical orphan to a model for which many people were claiming its maternity.

5. Methodology and data collection

In this work, the arrivals of foreigner agritourists to Italy is explained through an extended form of the Gravity Model. The investigation is conducted in several steps: first a basic gravity model was estimated to confirm the empirical validity of gravity theory to study international flows; second, an augmented gravity model considers the rurality of country of residence of visitors as a determinant; third, it has been assess the influence of different European agreements on agritourism flows to Italy.

5.1 Basic gravity model (BGM)

Firstly, a basic Gravity Model was applied in order to test if the assumption of the gravity theory for trade fits to the agritourism flows. The conceptual model is expressed by the following equation, where, being the values expressed in natural logarithms, each coefficient should be interpreted as elasticity:

(3) $\ln \text{Arrivals}_{jt} = \alpha_0 + \alpha \ln \text{Supply\_beds}_t + \beta \ln \text{PcGDP}_{jt} + \gamma \ln \text{Pop}_{jt} + \delta \ln \text{Dist}_j + \varepsilon_{jt}$

where:

Arrivals_{jt} = number of agritourists from country *j* in the year *t*;

α_0 = constant term;

Supply_beds_t = Italian agritourism supply in the year *t*, expressed in number of beds in agritourisms;

PcGDP_{jt} = GDP per capita of country *j* in the year *t*, expressed in U.S. dollars at constant prices;

Pop_{jt} = population of country *j* in the year *t*, expressed in millions of habitants;

Dist_j = distance between Italy and country *j*, expressed in kilometres.

The classic Gravity Model uses total GDP as a proxy for output capacity of the exporting country. Nevertheless, while total GDP is appropriate for studies using aggregated data, in the case of a specific sector such as the agritouristic one, this variable could overestimate the country's output capacity. For this reason, the supply of the specific good analyzed (or alternatively its monetary value) was considered as the most suitable proxy of the output capacity for the trading country, which is Italy in this case. The parameter of this variable is expected to be positive because the higher the agritourism supply, the higher its demand from foreign visitors.

At the same time, the purchasing capacity for the importing countries is considered by including total GDP in the standard Gravity Model. However, the main partner for Italian agritourisms have substantial differences in terms of their economy size and income per capita. Therefore, GDP per capita has been included in this model as it is a stronger variable to explain the income effect in importing countries. We expect a positive parameter for GDP per capita since the higher the individual income, the higher the demand for Italian agritourisms. In addition, population of countries is included in the model because, although GDP per capita controls for the income effect of one individual, it does not consider the size of the economy; by including population, total purchasing capacity of importing countries is captured. As regards the population, a positive coefficient is also expected because it is assumed that the larger the population, the more the country will demand agritouristic vacations.

Finally, in this basic model, the distance between Italy and each country has been included as a proxy of transport and transaction costs. According to the theory, a negative coefficient is expected because the longer the distance, the higher the costs and so the less touristic flows will occur.

5.2 Augmented gravity model (AGM): effect of rurality

As a second step of analysis, the gravity model was expanded with dummy variables in order to assess how much the rurality (expressed in term of percentage of population living in rural areas) influences the agritouristic flows towards Italy. The estimated equations are expressed by equations (4), (5) and (6):

(4) $\ln \text{Arrivals}_{jt} = \alpha_0 + \alpha_1 (R < 20) + \alpha \ln \text{Supply\_beds}_t + \beta \ln \text{PcGDP}_{jt} + \gamma \ln \text{Pop}_{jt} + \delta \ln \text{Dist}_j + \varepsilon_{jt}$

(5) $\ln Arrivals_{jt} = \alpha_0 + \alpha_2 (R = 20 \div 40) + \alpha \ln Supply\_beds_t + \beta \ln PcGDP_{jt} + \gamma \ln Pop_{jt} + \delta \ln Dist_j + \varepsilon_{jt}$

(6) $\ln Arrivals_{jt} = \alpha_0 + \alpha_3 (R > 40) + \alpha \ln Supply\_beds_t + \beta \ln PcGDP_{jt} + \gamma \ln Pop_{jt} + \delta \ln Dist_j + \varepsilon_{jt}$

where:

(R < 20) = dummy variable (1 if population living in rural areas is less than 20% of total, 0 otherwise)

(R = 20 ÷ 40) = dummy variable (1 if population living in rural areas is between 20% and 40%, 0 otherwise)

(R > 40) = dummy variable (1 if population living in rural areas is more than 40%, 0 otherwise)

The dummy variables take into account the rurality of country and shift up or down the intercept term of regression. In particular, the three dummies allow to estimate the effect of a low, average or high rurality country where visitors reside on demand of Italian agritouristic vacations. The coefficients of dummies are expected to be positive in the case of low rurality and negative in the case of high rurality. In fact, according to the concepts mentioned in the introductive paragraph, the higher urbanization, the higher rural vacations population will demand. No prediction could be made for the dummy that take into account an average rurality, in the present work fixed at the range 20 ÷ 40%.

5.3 Augmented gravity model (AGM): effect of European agreements

One of the objectives of this work is to estimate the effects of regional integration considering the performances of Italian agritouristic sector. The most common method to estimate the effects of regional integration in a Gravity Model is to include dummy variables for each integration regime during the sample period (see, for example, Cheng, 1999).

To assess the effect of European integration four dummies were taken into account: a dummy equals to one if the countries belongs to European Union; a dummy for the countries of Euro-area; another one to consider the Schengen area; the last dummy variable regards the Central and Eastern European countries (Cyprus, Estonia, Hungary, Poland, the Czech Republic, Slovenia, Bulgaria, Latvia, Lithuania, Malta, Romania and Slovakia) to take into account the submission of EU Accession Negotiations (EUAN).

The correlation matrix highlighted an high correlation between the EU dummy and the other dummy variables. This suggested to not consider the former in the empirical model in order to avoid problems of specification. To sum up, in this empirical model only three dummy variables were included to estimate the regional integration effects: the first one is related to the Euro-area (EU); the second regards the Schengen agreements; finally, a dummy variable is related to the Central and Eastern European countries that submitted EU Accession Negotiations (EUAN), which would involve a progressive reduction (up to a cancellation) of customs barriers to all EU imports. Most countries started in the agreements during the sample period. As is widely known, the presence of the same currency could significantly facilitate trade exchanges. Similarly, the absence of barriers for touristic flows among countries that submitted the Schengen agreements could represent a strong advantage for migration and international tourism. Finally, EU Accession Negotiations involve a progressive reduction (up to a cancellation) of customs barriers to all EU exchanges that could represent an advantage for international trade and tourism. Thus, the coefficients of the three dummy variables, if statistically significant, are expected to be positive.

According to the explanation mentioned above, the equations estimated are the following three:

(7) $\ln Arrivals_{jt} = \alpha_0 + \alpha_1 (R < 20) + \alpha_4 EUAN + \alpha \ln Supply\_beds_t + \beta \ln PcGDP_{jt} +$

$+ \gamma \ln Pop_{jt} + \delta \ln Dist_j + \varepsilon_{jt}$

(8) $\ln Arrivals_{jt} = \alpha_0 + \alpha_1 (R < 20) + \alpha_4 EUAN + \alpha_5 Schengen + \alpha \ln Supply\_beds_t + \beta \ln PcGDP_{jt} +$

$+ \gamma \ln Pop_{jt} + \delta \ln Dist_j + \varepsilon_{jt}$

(9) $\ln Arrivals_{jt} = \alpha_0 + \alpha_1 (R < 20) + \alpha_4 EUAN + \alpha_6 Euro + \alpha \ln Supply\_beds_t + \beta \ln PcGDP_{jt} +$

$+ \gamma \ln Pop_{jt} + \delta \ln Dist_j + \varepsilon_{jt}$

where:

EUAN = dummy variable that assumes the value of 1 if the country *j* has benefited of EU Accession Negotiations in the year *t,* 0 otherwise;

Schengen = dummy variable (1 if the country *j* submitted Schengen agreements, 0 otherwise);

Euro = dummy variable (1 if the official currency of country *j* is the Euro, 0 otherwise).

5.4 Dataset

The data-set for this analysis has 231 observations over a period of 7 years (1998–2004). There are 33 countries included in the analysis and they encompass the main partners for Italian agritouristic sector. The dataset account more than 95 percent of the total agritourism flows to Italy.

Data on arrivals of foreign agritourists to Italy (dependent variable) was extracted from the database of the Italian Institute of Statistics (ISTAT). Arrivals are expressed in thousands of Euros at current prices. Data for Italian supply of agritouristic vacations was also obtained from the ISTAT database and expressed in number of available beds. The "per capita GDP" was obtained from the World Economic Outlook Database of International Monetary Fund and is expressed in current U.S. dollars which were deflated using Consumer Price Indexes (CPI) from the U.S. Bureau of Labor Statistics. Data for population was obtained from the FAO database and are expressed in millions of habitants. Finally, data for distance between Rome, the Italy's capital, and the first cities of the others countries is obtained using the Haversine formula that was applied on the coordinates from the CIA's The World Factbook; distance is expressed in kilometers.

6. Estimation Results

6.1 BGM

The analysis was driven by GRETL 1.6 software. The basic gravity model was estimated through OLS ordinary least squares (OLS) and standard errors and covariance are consistent to heteroskedasticity through the White correction (**Table 2**).

Table 2. Regression results (BGM)

Variable	Coefficient	Std Error	T-Statistic	p-value	Significant
α_0	-5.808	2.865	-2.027	0.043	**
ln PcGDP	1.499	0.072	21.308	0.000	***
ln Pop	0.596	0.062	9.798	0.000	***
ln Dist	-0.678	0.077	-8.809	0.000	***
ln Supply_beds	1.134	0.251	4.531	0.000	***

Dependent Variable = ln $Arrivals_{jt}$ — Number of observations = 231
F-Statistic (4, 226) = 173.33 (p-value < 0,00001) — R^2 = 0.723 (Adjusted R^2 = 0.718)
Akaike Information Criterion (AIC) = 650.89 — Schwarz Information Criterion (BIC) = 668.13
Hannan-Quinn Information Criterion (HQC) = 657.83
Significant: *** at 1% ; ** at 5% ; * at 10%

As shown by estimation output, the F-statistic is 173.33 with a p-value that is less than 0.01, which means a good overall significance of the model, while the R-squared measure is 0.723, which indicates a good fit to the observed data.

The size of Italian supply of beds in agritourisms is a variable with a significant effect (at a level of 1%) on demand of vacations in Italian agritourisms and its coefficient is positive, as expected. GDP per capita and population also have a significant effect (at 1%) on dependent variable, and, according to the theory, present a positive coefficient. Finally, the distance variable is also statistically significant (at 1%) and it has a negative coefficient, as expected.

6.2 AGM: effect of rurality

The estimation outputs of equations (4), (5) and (6) are reported in **Table 3**. The R^2 increased with respect to the BGM and error terms are still normally distributed. Furthermore, the three equations of AGM present lower value of Information Criterions.

Table 3. Regression results (AGM)

	(4) OLS	**(5) OLS**	**(6) OLS**
α_0	-2.843	-1.675	-5.050 *
	(2.522)	(2.567)	(2.823)
ln PcGDP	1.377 ***	1.377 ***	1.409 ***
	(0.059)	(0.059)	(0.073)
ln Pop	0.652 ***	0.652 ***	0.568 ***
	(0.048)	(0.048)	(0.061)
ln Dist	-0.920 ***	-0.920 ***	-0.697 ***
	(0.076)	(0.076)	(0.076)
ln Supply_beds	1.016 ***	1.016 ***	1.115 ***
	(0.218)	(0.218)	(0.246)
R < 20	1.167 ***	-	-
	(0.143)		
R = 20 ÷ 40	-	-1.167 ***	-
		(0.143)	
R > 40	-	-	-0.453 **
			(0.155)
R^2	0.797	0.796	0.731
R^2 adjusted	0.792	0.792	0.724
AIC	581.32	581.31	646.92
BIC	601.96	601.95	667.58
HQC	589.63	589.63	655.26

Note: Robust standard errors (White correction) are in parentheses. Error terms are normally distributed (at 1%).
Significant: *** at 1% ; ** at 5% ; * at 10%.

The comparison of three equations allow to underline the stability of coefficients of BGM parameters, suggesting the robustness of such a model.

The coefficients linked to low-rurality (R < 20) and high-rurality (R > 40) are statistically significant and, respectively, positive and negative, as expected. As regards the dummy for an average rurality (R = 20 ÷ 40), it presents a significant and negative coefficient.

In particular, dwellers of low rural countries (in this sample Belgium and Luxembourg, Australia, Israel, Argentina, the United Kingdom, Germany, Venezuela, New Zealand, Denmark, Brazil, Sweden) seems to prefer Italian agritourisms much more than habitants of countries with high rurality.

As regards the USA, Canada and Norway, such distinction is not precisely defined: even if, since 1998 to 2004, the average ratio of habitants who live in rural areas was higher than 20 percent, actually the proportion, for North American countries, passed this threshold. As regards Norway, the proportion is slightly higher than 20 percent.

Five countries of the examined sample present the highest percentage of population living in rural areas: South Africa, Slovak Republic, Portugal, Slovenia and China. The arrivals from the mentioned countries to Italian agritourisms are sensibly lower than arrivals from countries with a low rurality index, *ceteris paribus*.

6.3 AGM: effect of European agreements

The estimation outputs of equations (7), (8) and (9) are reported in **Table 4**.

Table 4. Regression results (AGM)

	(7) OLS	**(8) OLS**	**(9) OLS**
α_0	-4.508 *	-4.461 *	-4.927 *
	(2.573)	(2.571)	(2.256)
ln PcGDP	1.412 ***	1.414 ***	1.404 ***
	(0.073)	(0.075)	(0.075)
ln Pop	0.663 ***	0.668 ***	0.668 ***
	(0.051)	(0.052)	(0.048)
ln Dist	-0.839 ***	-0.856 ***	-0.805 ***
	(0.081)	(0.078)	(0.076)
ln Supply_beds	1.091 ***	1.086 ***	1.033 ***
	(0.218)	(0.221)	(0.222)
R < 20	1.073 ***	1.073 ***	1.107 ***
	(0.144)	(0.143)	(0.144)
EUAN	0.353 **	0.363 **	0.498 ***
	(0.156)	(0.148)	(0.158)
Schengen	-	0.018	-
		(0.151)	
Euro	-	-	0.211
			(0.161)
R^2	0.803	0.802	0.803
R^2 adjusted	0.797	0.795	0.795
AIC	564.53	566.52	564.46
BIC	588.63	594.91	592.01
HQC	574.25	577.48	575.57

Note: Robust standard errors (White correction) are in parentheses. Error terms are normally distributed (at 1%).
Significant: *** at 1% ; ** at 5% ; * at 10%.

Generally, the R^2 of the three equations increased with respect to the AGM of equation (4) and error terms are normally distributed. Comparing the three equations the first specification (equation 7)

seems the best one: it shows an higher R^2 adjusted, and lower information criterions, than the other estimated specifications. So, in order to describe the effects of independent variables on agritouristic flows the attention will be focused on results of equation 7.

The size of Italian supply, in terms of beds in agritourisms, is a variable with a significant effect (at 1%) on agritouristic flows and its coefficient is positive, as expected. Considering the logarithmic form of the equation, this coefficient can be read directly as elasticity. Therefore, a coefficient slightly higher than one (1.091) can be interpreted that an increase or a decrease in Italian supply of agritouristic beds will lead, respectively, to a proportional increase or decrease of foreign agritourists to Italy. This can be explained by taking into account that the agritouristic sector represents only a small share of Italy's touristic sector, thus a supply variation generates directly proportional effects on agritouristic flows. This has two important implications: first, Italy shows an "export-oriented" nature regarding the analyzed good and, second, there is a real possibility that a strong increase in Italian supply of agritourisms could be absorbed by the international market. In other words, Italy should increase the proportion of agritourisms respect the usual touristic structures because there are favourable conditions in place which would increase tourism.

GDP per capita in countries of origin also has a significant effect (level of 1%) on agritouristic flows to Italy. This variable is a measure of demand in countries of origin and its effect is positive. More precisely, a one percent increase in per capita GDP in a given country could have as a consequence an increase of 41 percent in the number of arrivals of foreign agritourists to Italy, if other variables remain constant. Therefore, according to these results, the number of arrivals of foreign agritourists is income elastic. On the other hand, income elasticity greater than one is predictable for a specific good such as agritouristic vacations, and this could be explained considering that the international market is larger if a bigger amount of product is available. Consequently, if Italian agritourisms intend to expand their business, it is natural to look to those countries where income growth is constant and solid. It is also important to observe that any decrease in income for the foreign partners, in other words an economic recession, would have serious negative consequences on the volume of arrivals in agritourisms.

Population in importing countries also has a significant effect. This variable is a measure of the purchasing capacity in countries of origin and its effect is positive as expected. Nevertheless, according to the estimation results, the number of arrivals of foreign tourists in agritourisms is inelastic with respect population variations. More precisely, a one percent increase (or decrease) in population in a considered country could have as a consequence an increase (or decrease) of 0.66 percent in the number of arrivals to Italy, if other variables remain constant. Consequently, population variations seems to have a small consequences on the agritouristic sector.

The distance variable is also statistically significant and it has a negative coefficient, as expected. This empirical investigation suggests that an increase of 1% in physical distance could lead to a less proportional reduction (84%) of number of arrivals of foreigner tourists in agritourisms. In particular, the effect of the distance is lower than the average value reported in literature by studies using aggregated data (Head, 2003).

The Schengen Agreement is an agreement among most European countries which allows for the abolition of systematic border controls between the participating countries and establishes co-ordinate external controls among participating nations. Although the Schengen Agreement undoubtedly facilitated trade and flows of visitors among participating countries, the Schengen dummy resulted not significant for agritouristic flows, as underlined by its coefficient in equation (8) that is statistically not different from zero. Similarly, the Euro dummy is not significant.

Before their EU adhesion, some Central and Eastern European countries had started EU Accession Negotiations to consider a progressive reduction of customs barriers on EU imports, including those from

Italy. More precisely, EU Accession Negotiations began on 31 March 1998 with the six best-prepared countries (Cyprus, Estonia, Hungary, Poland, the Czech Republic and Slovenia) and on 15 February 2000 were expanded to include all other candidate countries (Bulgaria, Latvia, Lithuania, Malta, Romania and Slovakia). As regards the last equation, the coefficient of EUAN dummy variable is positive and statistically significant (at 1%). In quantitative terms, the third model shows an increase of 65 percent ($e^{0.498} - 1 = 0.65$) of the foreign agritourists towards Italy from all the Central and Eastern European countries that have started EU Accession Negotiations, *ceteris paribus*.

7. Conclusions and Final remarks

In the present work it has been shown that the Gravity Model is a very useful analytical tool even when analysis of international flows is conducted on a specific sector of tourism. In particular, this model which has been optimally adapted for these specific research purposes, is able to explain with great accuracy the size of rural tourism flows using easily disposable data. Moreover, the Gravity Model may also be used to forecast potential trends in agritourism flows and to estimate the impact of a variety of policy issues.

Examining the results of the analysis of agritourism flows to Italy some points can be highlighted.

The supply of Italian agritourisms should be increased because there are advantageous opportunities in international markets. Considering that the demand of this specific kind of vacations is income elastic, as shown by the empirical model, Italy should diversify their targeted markets/countries taking into account their income growth. In other words, the research results indicate that agritourism-owners and promoters should focus on reducing the dispersion of their profits by choosing a diversified portfolio that focus on countries with high income growth rates, in order to take advantage of the income growth effect on agritourism flows. However, it should also include countries with moderate but stable income growth rates in order to maintain market share. The aforementioned approach should reduce the risk of a negative impact on the demand of high income growth countries, given that these economies could be less stable in the long run.

According to the model results, the marketing efforts should be concentrated in countries with a low and decreasing percentage of population situated in rural areas. In this way, it is likely that strategies of promotion will have a more incisive effect on markets, standing the natural propensity of dwellers of such countries to choose Italian agritourisms as touristic accommodations.

The estimated model provided results about the effects of European integration on Italian agritourism flows: on one hand, it is unlikely that when a certain country stipulate Schengen agreements, or adopt the Euro as legal currency, there will be an increase of agritourists from that country; on the opposite hand, the EU Accession Negotiations (EUAN) submitted by countries in a phase of pre-adhesion to European Union influenced positively the agritourism flows from Central and Eastern European countries to Italy.

8. References

Anderson, P. S. (1979). A Theoretical foundation for the gravity equation. American Economic Review, 69: 106-116

Bergstrand, J. H. (1989). The generalized gravity equation, monopolistic competition, and the factor-proportions theory in international trade. Review of Economics and Statistics, 71(1): 143-153

Brenton, P., Di Mauro, F., Lucke, M. (1999). Economic integration and FDI: An empirical analysis of foreign investment in the EU and in Central and Eastern Europe, Empirica, 26 (2): 95-121

Cheng, I-H. (1999). The political economy of economic integration. Ph.D. Dissertation, Birkbeck College,

University of London
Davis, D.R. (2000). Understanding international trade patterns: advantages of the 1990s. Unpublished manuscript, Columbia University
Deardorff, A. V. (1995). Determinants of bilateral trade: does gravity work in a neoclassical world?. NBER Working Papers No. 5377. Cambridge, MA.
Dubarry R. (2000). Tourism expenditure in the UK: Analysis of competitiveness using a Gravity-Based Model. Tourism & Trade Research Institute, Discussion paper 2000/1, University of Nottingham.
Glick, R., Rose, A.K. (2001). Does a currency union affect trade? The time series evidence. NBER Working Paper N. 8396. National Bureau of Economic Research
Harrigan, J. (2001). Specialization and the volume of trade: do the data obey the laws?. FRB of New York Staff Report N. 140
Head, K. (2003). Gravity for beginners. Working Paper. University of British Columbia
Karemera, D., Oguledo, V. I., Davis, B. (2000). A Gravity Model analysis of international migration to North America. Applied Economics, 32 (13): 1745-1755
Kennedy, P. (ed.) (2003). A guide to Econometrics. Cambridge University Press
Linnemann, H. (1966). An econometric study of international trade flows. Amsterdam: North-Holland Pub. Co.
Martinez-Zarzoso, I., Nowak-Lehmann, F. (2003). Augmented Gravity Model: an empirical application to Mercosur-European trade flows. Journal of Applied Economics, VI (2): 291-316
Matias A. (2004). Economic Geography, Gravity and Tourism Trade: the case of Portugal. In Brebbia C. A., Wessex Institute of Technology, United Kingdom & F.D. PINEDA, Complutense Univerisity (eds). *Sustainable tourism*. Spain.
Matyas, L. (1997). Proper econometric specification of the Gravity Model. The World Economy, 20(3): 363-368
Pöyhönen, P. (1963). A tentative model for volume in trade between countries. Weltwirtschaftliches Archiv, 90 (1): 93-100
Prentice, B.E., Wang, Z., Urbina, H.J. (1998). Derived demand for refrigerated truck transport: a Gravity Model analysis of Canadian pork exports to the United States. Canadian Journal of Agricultural Economics, 46 (3):317-328
Rose, A. (2002). Do we really know that the WTO increases trade. NBER Working Paper N. 9273
Serlenga, L., Shin, Y. (2004). Gravity Models of intra-EU trade: application of the Hausman-Taylor estimation in heterogeneous panels with common time-specific factors. Edinburgh School of Economics Discussion Paper, n. 88, University of Edinburgh
Tinbergen, J. (1962). Shaping the World Economy: Suggestions for an international economic policy. New York, The Twentieth Century Fund
World Tourism Organization (2004). Rural Tourism in Europe: Experiences, Development and Perspectives. World Tourism Organization.