



**An integrated demand and supply conceptual framework:  
Investigating agritourism services**

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## An integrated demand and supply conceptual framework: Investigating agritourism services

### Abstract

The present paper offers an integrated conceptual framework to jointly analyze demand and supply of agritourism services and aims to identify motivations along with perceptions of externalities that influence the choice of a service over another. On the supply side, a cluster analysis identifies homogenous groups of agritourism activities. On the demand side, a factor analysis is run on a set of motivations and externalities and a probabilistic modelling estimates the determinants that influence the likelihood to choose one type of firm over the other. The results show that traditional and genuine food, culture and authenticity are elements determining the choice of a firm over another. A further contribution of this paper is the identification of environmental externalities as determinants of firm attraction. From a marketing perspective, linking demand to supply is essential to determine product development strategies capable of satisfying actual and potential customers. Several strategies are proposed to different types of agritourist farms to attract and retain customers.

**Keywords:** Demand-supply framework; Agritourism; Probabilistic modelling; Environmental externalities.

**Jel Classification:** C38, L83, Z32.

## 1. Introduction

From the Cork Declaration issued in 1996, the European governments have adopted policies directed to protect natural resources, biodiversity and cultural identity. In this respect, rural tourism has been considered as a lever to achieve such policy objectives together with an expected increase in employment and income, in more economically depressed areas, and a decrease in outbound migration flows especially by the youth.

The definition of rural tourism in the European Union (EU) is rather heterogeneous and each country issues its own policy intervention and legislation. Agritourism can be regarded as a specific economic activity within the broader definition of rural tourism. It can be described as a combination of tourist activities that combine rural living, passive or active involvement of guests in farming activities, local culture, and genuine food.

So far, research on agritourism has mainly focused on demand and supply analysed as separate components. According to Santeramo and Barbieri (2015) further research is needed to investigate the characteristics of demand while controlling for different types of settings, motivations, as well as tourism flows (e.g., local and international tourists). So far only few works have analyzed the demand characteristics of agritourism (e.g., Carpio *et al.*, 2008; Ohe and Ciani, 2012; Gao *et al.*, 2014; Santeramo, 2015), while the majority of the studies have focused on the supply side, and in particular on characteristics of farms (Barbieri *et al.*, 2008; Barbieri, 2013; Ammirato and Felicetti, 2013 and 2014), motivations of providers (Barbieri, 2010; LaPan and Barbieri, 2013) and farms' performance (Barbieri and Mshenga, 2008; Pulina *et al.*, 2008; Mastronardi *et al.*, 2015).

As remarked by Esper *et al.* (2010) there is a need to integrate supply and demand to understand customers' preferences and services actually available in the marketplace. The authors emphasise that firms tend to develop in one or a few areas often leading to a mismatch between demand and supply. Integrating demand and supply can provide a more complete overview to assure that services are provided according to the most profitable customers' wants and expectations.

The present paper offers an integrated conceptual framework to jointly analyze demand and supply of agritourism services and aims to identify specific and general motivations along with perceptions on externalities that influence the choice of a service over another. This integration links different types of services provided by the firm with customers' motivations, satisfaction and perceptions on several

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4 externalities. The first step of the analysis, is based on a cluster analysis to classify firms into distinct  
5 groups. As the second step of the analysis, a factor analysis is run to gather orthogonal latent variables  
6 related to general and specific motivations (i.e. push and pull factors), and positive and negative  
7 perceived externalities. As a final step of the analysis, though a probabilistic modelling, it is possible to  
8 investigate the determinants that influence the likelihood of choosing a type of firm over another, based  
9 on the preliminary results obtained from the cluster analysis.  
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12 This paper is organized in six sections. Section 2 describes the literature review on agritourism.  
13 Section 3 introduces the methodological framework used to analyze data on supply and demand side.  
14 Specific subsections are included to describe the cluster analysis, the principal component analysis (PCA)  
15 and the probabilistic model. Section 4 focuses on the case study with a specific focus on South Tyrol  
16 (Italy) and on the empirical data used to test the hypotheses. Section 5 provides the results of the cluster,  
17 the PCA and the probabilistic modeling. Finally, concluding remarks are provided in the last section.  
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## 20 21 22 23 24 25 26 27 28 **2. Literature review**

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30 In the literature, several studies have investigated consumers' motivations that are likely to influence  
31 destination and accommodation choice. Motivations can be distinguished into two types. On the one  
32 hand, push motivations, that relate to items such as escapism, relaxation, freedom from the daily routine,  
33 experiencing genuine food, personal enhancement, education. On the other hand, pull motivations relate  
34 to the degree of attractiveness of a destination, such as natural amenities, cultural attractions, recreational  
35 activities (Crompton, 1979; Jansen-Verbeke and van Rekom, 1996; Formica and Murrmann, 1998;  
36 Prentice *et al.*, 1998; Jansen-Verbeke and Lievois, 1999; Lee *et al.*, 2004; Yoon and Uysal, 2005; Slater,  
37 2007; Meng *et al.*, 2008; Gil and Ritchie, 2009; Meleddu *et al.*, 2015).  
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41 Nevertheless, according to Barbieri and Mshenga (2008), which analyse the performance of  
42 agritourism farms in US, the existing literature on this topic *is fragmented and scarce* (p.167). On the one  
43 hand, the supply side is analyzed by the several authors: Nickerson and Mccool (2001) that examine  
44 motivations for diversifying in Montana (US); Barbieri *et al.* (2008) who explore the extent of farm  
45 diversification by identifying and describing eight types of enterprises that farmers and ranchers are using  
46 in North America. Barbieri (2010) employs an importance-performance analysis of motivations for the  
47 case of agritourism development in Canada; while, Tew and Barbieri (2012) employ survey data on 164  
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4 agritourism farms in Missouri and examine the perceived benefits of agritourism by examining the  
5 importance of this activity in accomplishing 16 different objectives by farmers receiving visitors for  
6 recreation on their farms. Moreover, LaPan and Barbieri (2013), using survey data collected on 592  
7 farmers in Missouri during 2008 and 2009, gather information on farmland, ownership, and farm  
8 economic characteristics, agritourism services and tangible heritage resources, as well as farmer socio-  
9 demographic profile, with the aim to examine the linkage between agritourism and heritage preservation.  
10 Furthermore, Barbieri (2013) examines economic, sociocultural and environmental indicators of  
11 sustainability among North American agritourism farms characterized by a diversified entrepreneurial  
12 portfolio, and compares indicators of sustainability between agritourism farms and other entrepreneurial  
13 farms.  
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On the other hand, the demand side is studied by Carpio *et al.* (2008), who analyze the determinants of agritourism demand in American population using data from the 2000 National Survey on Recreational and the Environment. Gao *et al.* (2014) in a sample of residents in Missouri, Pennsylvania, and Texas (250 questionnaires per state) analyze perceptions of agricultural landscapes in terms of awareness of the benefits delivered to society and preferences of specific features. If United States (US) case studies are excluded, there is not much literature on motivations related to the selection of agritourism infrastructures.

As regards to studies related to agritourism in Italy (the geographical focus of the present paper), Ohe and Ciani (2012) stated that, despite a high number of supply-side studies, there exists a gap in the literature on the demand side. In their paper, the authors analyze the demand characteristics of agritourism in Italy along with the supply and demand trend. According to a survey conducted by Baloglu and McCleary (1999) on US travellers, Italy was rated significantly higher than other countries on its appealing on local cuisine, beautiful scenery and natural attractions. This finding is in line with the Brown and Getz (2005) study on wine destinations. The authors found that Italy and France are considered as wine destinations “*because both possess an abundance of cultural, landscape, and wine-related attractiveness*” (p. 273). In particular, Ammirato and Felicetti (2013, 2014) analyze the case of a specific Italian Region – Calabria – by using the Alternative AgriFood Networks (AAFNs) to discover the presence of agritourism rural network and study the potentials of agritourism as a means of sustainable development for rural areas. The supply side and the link between the life cycle of agritourism and the

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4 legislation in the Sardinian region are analyzed by Pulina *et al.* (2006). More recently, Mastronardi *et al.*  
5 (2015) study the environmental performances of Italian farms engaged in agritourism compared with  
6 farms not engaged in agritourism, using a logit model. Santeramo (2015) employs a gravity model to  
7 study the international demand for agritourism in Italy for the time span 1998-2004. The author finds that  
8 the Italian supply of agritourism is a major determinant of the demand and, in particular, that Italian  
9 supply is not saturated by international demand. Galluzzo (2015) investigates the evolution of the Italian  
10 agritourism sector in the time span 2003-2013 in order to find a nexus between tourism flows to farms  
11 and services offered by Italian agritourism farms (e.g. horse riding activity, excursion, naturalistic  
12 activity, trekking mountain bike, courses in rural topic). Results of the time series analysis show that  
13 tourists are sensitive to the different services offered by agritourism firms. In particular, sport activities  
14 and tasting certified quality foods are two relevant variables affecting flows towards agritourism farms in  
15 Italy. Services offered by Italian agritourism farms are also analyzed by Ohe and Ciani (2011) within a  
16 hedonic price model. Findings show that the presence of a swimming pool is the most significant variable  
17 in increasing the price. Positive and statistically significant are also the coefficients of the presence of  
18 restaurants, accessibility for disabled, number of nearby World Heritage Sites and DOC wines.  
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32 As far as the authors are aware, in this thread of the literature, there are no studies that focus on an  
33 integrated conceptual framework linking demand and supply side at a microeconomic level (see also  
34 Manrique *et al.* 2015 for the case of Emilia Romagna region using the Bayesian Belief Network - BBN).  
35 The present paper represents the first attempt to investigate this topic by using data on both the  
36 components within the farming sector.  
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### 43 3. Methodological framework

44 Figure 1 frames the methodological demand-supply setting of the present investigation. On the supply  
45 side, the first step of the research consists of a classification of the sample of tourism farms, through a  
46 cluster analysis. In this manner, it is possible to find distinct groups of agritourism farms characterized by  
47 homogenous features. On the demand side, one considers the standard customers' socio-demographic and  
48 economic characteristics as controls, as well as other economic variables (e.g. pro capita expenditure),  
49 their general and specific motivations and perceived positive and negative externalities. The latter are  
50 identified as factor variables obtained through a principal components analysis that allows one to  
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4 parsimoniously reduce the initial set of items into a more manageable set. The last step of the analysis  
5 links agritourism demand and supply through a probabilistic modelling. In this manner, it is possible to  
6 investigate the determinants that influence the likelihood to choose a given type of tourism farm.  
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11 INSERT FIGURE 1 HERE  
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### 14 15 *3.1 The supply side: cluster analysis*

16 Following the previous methodological framework, the sample of tourism farms are clustered based on  
17 the number of beds, number of employees, months of activity, and percentage of profit through the  
18 tourism activity on the total profit of the farm. A non-hierarchical analysis is employed as this clustering  
19 technique is designed specifically to group cases rather than variables. Hence, the k-mean cluster analysis  
20 is adopted in order to assign agritourism activities into clusters according to the smallest distance between  
21 cases and cluster centroid. As a parsimonious procedure, it is desirable to exclude from the sample  
22 possible outliers that may produce clusters with dispersed items. A further characteristic of the k-means  
23 cluster analysis is the need to specify the number of clusters desired. Hence, following the technique used  
24 by Aguiló and Roselló (2005), a stepwise methodology from four to two clusters is adopted.  
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### 35 36 *3.2 The demand side: A principal components analysis*

37 From the demand side, a principal components analysis - also called a correspondence factor analysis  
38 - is run based on a set of variables measured within a 5-point Likert scale from one (not at all) to five  
39 (very much), according to respondents' level of agreement. This approach allows one to parsimoniously  
40 reduce the number of categorical variables to a more manageable group and to eliminate the irrelevant  
41 items that incorporate the noise (Anderson and Gerbing, 1988; Kim *et al.*, 2010).  
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46 A set of categorical items expresses respondents' general motivations about their holidays choice as  
47 well as specific motivations that drive the choice of a particular type of tourism farm. Furthermore, a set  
48 of items relates to customers' perceived environmental positive and negative externalities. The items  
49 reduction is pursued via an orthonagonal *Varimax* rotation. According to the Kaiser criterion, only factors  
50 with eigenvalues greater than one are retained. Following Hatcher (1994), the items with a loading score  
51 (i.e. variable contribution) less than a critical value (in this case 0.50) are excluded from the analysis. The  
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4 Cronbach's alpha is calculated to test the reliability of the extracted factors; a value greater than 0.7  
5 suggests for reliability. The relative weight of each factor in the total variance is also calculated, that  
6 takes into account how much each factor explains the total variance. Cumulative inertia shows the amount  
7 of variance explained by  $n+(n+1)$  factors (Escofier and Pages, 1988). Besides, the Kaiser-Meyer-Olkin  
8 Measure of Sampling Adequacy (KMO) test with a value between 0.50 and 1.00 implies that the analysis  
9 is satisfactory; as a further adequacy measure, the Bartlett's Test of Sphericity requires that the null  
10 hypothesis of a correlation identity matrix fails to be accepted.  
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### 19 *3.3 Linking demand and supply: probabilistic modelling*

20 A probabilistic modeling can be employed as a useful approach to understand the factors that  
21 influence customers' agritourism choice. Within a two clusters setting, the dependent variable is defined  
22 as  $Y_i = (Y_1, Y_2)$ , where  $Y_1$  takes the value zero if the agrotourism farm belongs to the "tourism  
23 opportunistic" group; likewise,  $Y_2$  takes the value one if the agrotourism farm belongs to the "tourism  
24 enthusiast" group. Since the dependent variable in the present study is dichotomous, a logit model is  
25 employed. In this manner, it is possible to investigate the determinants that are likely to influence  
26 consumers' choice of the farm typology. Specifically, the following hypothesis is considered:  
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33 **H<sub>p</sub>.** Tourists' choice of a given type of agritourism is positively influenced by specific and general  
34 motivations, as well as perceptions on positive externalities, while is negatively influenced by perceptions  
35 on negative externalities.  
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## 43 **4. The case study**

44 To make this conceptual framework operational it is important to test a set of theoretical hypotheses  
45 with empirical data.  
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### 48 *4.1. Agritourism in Italy*

49 The number of agritourism farms in Italy has constantly increased in the last years (Figure 2). This  
50 fact confirms the Italian trend observed in recent time regarding the diversification in the accommodation  
51 supply. Indeed, it is recorded on the one hand the decrease in the number of traditional hotels, on the  
52 other hand the increase in the number of alternative forms of accommodation, in particular Bed &  
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4 Breakfast and agritourism infrastructures (Candela and Figini, 2010). Moreover, the *Travel & Tourism*  
5 *Competitiveness Report* (WEF, 2015) shows that Italy represents one of the most competitive countries in  
6 the world (ranked 2<sup>nd</sup>) for natural tourism. Because of the growing demand of rural living for relaxation  
7 and recreational purposes, the potential market for agritourism is increasing.  
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11 Italy represents the first tourist destination for “*food and wine vacations*” proposed by international  
12 tour operators. Moreover, in the last years this type of tourism has been rising at a rate of 12% per year  
13 (ISNART, 2013) and can be considered more resilient to the economic crisis than other forms of *tourism*.  
14 The link between food and wine and vacations includes agritourism. Amongst the Italian regions, the  
15 autonomous province of South Tyrol ranks second, after Tuscany, for the number of agritourism in 2014  
16 (Istat, 2015).  
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#### 28 4.2. South Tyrol 29

30 The present paper focuses on South Tyrol province as a case study, located in the Trentino-South-  
31 Tyrol region. Administratively, this region is divided into two autonomous provinces: Trentino (Trento)  
32 and South Tyrol (Bolzano). The region, located in the North-East of Italy, is one of the most popular  
33 tourism destinations in Europe especially for mountain tourism. Historically the region was part of the  
34 Austrian-Hungarian Empire, as a consequence nowadays the majority of the inhabitants in South Tyrol  
35 are German speaking and of Austrian culture descent. In addition, a constitutional law approved a special  
36 status of autonomy in 1948, which allows the region to introduce its own laws on a wide variety of  
37 subjects.  
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45 Tourism represents a significant driver for the regional economy. The accommodation supply is one  
46 of the largest in Italy; indeed, the region ranks second after Emilia Romagna for number of hotels. In  
47 terms of demand, in 2013 it ranked second for nights of stay with respect to other Italian regions, and in  
48 the last decade, tourist arrivals have recorded a high rate of growth. On average, statistics indicate that in  
49 this region tourist length of stay (approximately five days) is higher than in the other Italian regions,  
50 suggesting that this area is characterized by a high appeal as a tourist destination.  
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4 South Tyrol has an area of 7,400 Km<sup>2</sup>, the total population in 2014 was approximately 518,000  
5 inhabitants. The presence of the Dolomites is a strong attraction for international and domestic tourists.  
6 According to Brida *et al.* (2009) the majority of the tourists in South Tyrol comes from Germany and has  
7 constantly increased in the last 20 years (p. 306). Because tourists travel to South Tyrol mainly for the  
8 mountains, the landscape, the nature and the *food and wine vacation*, agritourisms play a key role in this  
9 sector. Agritourism activities in South Tyrol are around 2,800 (Istat, 2016) and they represent 15% of the  
10 total Italian supply. In the last ten years the total number of agritourism activities recorded a growth of, on  
11 average, 3% per year.  
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#### 19 20 21 4.3. The survey

22 The survey was divided into two parts. The first part interviewed sampled agritourism infrastructures  
23 located on the downs and the hilly areas of South Tyrol (located up to 450 meters above the sea level) and  
24 collected information about the characteristics of the farms. During the telephone interview, agritourism  
25 infrastructures were asked for their cooperation in collecting self-administered questionnaires among their  
26 visitors. Interviewed visitors had to be tourists staying at the infrastructure for at least one night.  
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30 Altogether, 26 infrastructures were interviewed and of these, 20 agreed upon cooperation to the second  
31 part of the survey for the collection of data among visitors.  
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34 The sample of agritourism infrastructures are fairly small and count from 6 to 21 beds, with an average of  
35 12.72 and a median of 12 beds. In their breakfast/restaurant room they count between 6 and 25 seats, with  
36 an average of 16.78 and a median of 15. Six infrastructures do not offer a restaurant room. Also in terms  
37 of employees, the farms are fairly small employing from a minimum of 2 to a maximum of 16 employees,  
38 with an average of 5.68 and a median of 6 employees. Almost half (44%) of the infrastructures are open  
39 to tourists 8 months a year, with 1 infrastructure being open only 5 months and 3 being open all year  
40 around. The decision by the owner of the farms to engage into agritourism, is mainly taken to get in  
41 contact with people, to value estate assets, and to integrate profits. The profit from the agritourism  
42 activity over the entire profit of the business varies from 15% to 80% with an average of 40.40% and a  
43 median of 40%. The most important products of the farms are orchards, vineyards, vegetables and herbs.  
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46 The infrastructures offer to their visitors: playgrounds (88%), bicycles (72%), and swimming pools  
47 (44%). For their visitors, they also organize active participation to the farm (79.2%), trekking (54.2%),  
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4 wine tasting (4.8%), and cooking, botany, or other courses (33.3%). They mainly try to differentiate their  
5 offerings from the competitors through comfort, activities offered, detailed information of the area,  
6 quality, an integrated offer, and personal contact with the guests. They mainly promote themselves  
7 through the World Wide Web, the local tourism board and through word of mouth.  
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11 Their main guests are families followed by couple of all ages, who travel for leisure purposes.  
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13 The second part of the survey involved the collection of data among the guests of the sampled agritourism  
14 infrastructures. Altogether, 375 questionnaires were collected among the 20 infrastructures, who  
15 cooperated in the data collection.  
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18 Tables 1 and 2 present the descriptive statistics of the sampled guests. Visitors are mainly from Germany  
19 (81%); 42% are over 50 years old and 40% have a bachelor or postgraduate degree.  
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INSERT TABLES 1 and 2 HERE

## 5. Results

### 5.1 The cluster analysis

As the aim of the paper is to link guest motivations to agritourism type of offer, to analyse the supply side, a non-hierarchical cluster analysis was conducted on the 20 agritourism farms who participated in the data collection among their visitors. To determine the number of clusters, a combination of techniques were adopted. Firstly, a hierarchical cluster analysis (through the “between linkage” method and the “Squared Euclidean Distance” measure) was performed and the resulting dendogram showed the largest distance to be in the two final clusters, determining the suitability of dividing the sample into two homogeneous groups. Secondly, due to the small size of the sample, in order to select a cluster analysis with representative clusters, it was decided to use a 20% threshold (i.e. at least 4 cases in each group). Therefore, a stepwise methodology (as suggested by Aguiló and Roselló, 2005) from 4 to 2 was adopted. As Table 3 highlights, if three or more groups are selected, minority groups accounting for less than 20% of the sample are obtained. Therefore, taking into account the dendogram of the hierarchical analysis, the complexity of the results’ interpretation and the representation of each cluster, the two-cluster solution was examined.

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INSERT TABLE 3 HERE

Consequently, the farm tourism activities involved in the data collection can be divided into two groups (see Table 4). Group 1, the so called “tourism enthusiasts” are farms which offer a higher number of beds (14), have a longer seasonality being open 9 months a year, having a high percentage of profit (about 50%) coming from the tourism activity, but having a smaller number of employees (4). On the other side, the second group, the so called “tourism opportunists” are those farms who engaged in the tourism activity only as a side business to produce a small percentage of the total profit of the farm (less than 30%), are offering less number of beds (12), have a slightly shorter seasonality (opened 8 months a year) and need more personnel (7) to ran their core business, which is farming.

INSERT TABLE 4 HERE

First of all, some slight differences between the two clusters can be seen in the initial decision to engage in the tourism activities. The two most important factors for “tourism enthusiasts” are the opportunity to get in contact with people and to value the estate assets followed by the opportunity to integrate the income of the farm. Tourism “opportunist” also consider the contact with people as the most important reasons to engage in the tourism activity, however they assigned to this item a lower importance. The second and third most important factors are the creation of job opportunities for family members and the value enhancement of the estate assets.

Furthermore, “tourism enthusiasts” are equally divided into farm activities with a focus on wine and fruit production; “tourism opportunists” are mainly fruit producers. In terms of facilities available to tourists, the two groups do not differ much. “Tourism enthusiasts” are slightly more prone in offering swimming pools and playgrounds for children; “tourism opportunists” are slightly more prone in offering bicycle rentals.

### 5.2 The principal components analysis

As a first step of the analysis, a PCA is carried out for each of the latent variables, that is: *general motivations*, comprising push and pull factors to choose agritourism accommodation with respect to other types of hospitality infrastructures; *externalities*, including positive and negative perceptions; *specific*

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4 *motivations*, including push and pull factors to choose that specific agritourism accommodation with  
5 respect to others.  
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8 With respect to general motivations, the initial ten items are parsimoniously reduced to nine items,  
9 having set the sampling adequacy at the threshold of 0.50. Full results are reported in Tables 5-7. Two  
10 statistically congruent factors are identified which present an eigenvalue greater than one. The first factor  
11 (**Factor 1: Push Factor**) includes push items that relate to respondents' attitude towards this typology of  
12 holidays, that is *living in contact with nature, to experience a familiar environment, to experience*  
13 *relaxing places, sharing an experience with local people, having more freedom, to experience genuine*  
14 *food*. The second factor (**Factor 2: Pull Factor1**), which explains approximately 12% of the total  
15 variance, includes a set of exogenous items, that is *not finding other place to stay, experience something*  
16 *new, to live according to nature rhythm*. Overall, these two factors take into account just more than 50%  
17 of the total variance. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy presents a value of  
18 0.77 and implies that the analysis is satisfactory and the Bartlett's Test of Sphericity indicates that the null  
19 hypothesis (i.e. correlation matrix is an identity matrix) can not be accepted. Although, an acceptable  
20 Cronbach's alpha levels greater than 0.7 is found for the first factor, the second factor presents a rather  
21 low value of 0.65.  
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39 A further PCA is carried out for the ten initial items related to respondents' perceived externalities.  
40 Also in this case, two factors are obtained. The first factor (**Factor 1: Negative externalities**) includes  
41 *neglected environment* (e.g. rubbish, unkempt road verges), *presence of polluting factories, congested*  
42 *roads, high voltage trellis, view on urban centre, tourism congestion*. This factor presents a rather high  
43 value of Cronbach's alpha equal to 0.90. The second factor (**Factor 2: Positive externalities**) includes the  
44 following items: *orchards, forests, vineyards, meadows*. Overall, these two factors take into account  
45 approximately 50% of the total variance. A Cronbach's alpha level greater than 0.7 is found for the first  
46 factor, while the second factor presents a rather low value of 0.65. Overall, the Kaiser-Meyer-Olkin  
47 Measure of Sampling Adequacy presents a value of 0.83 implying that the analysis is satisfactory; also,  
48 the Bartlett's Test of Sphericity indicates that the null hypothesis can not be accepted.  
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INSERT TABLE 6 HERE

A final set of items relates to the motivations that lead respondents to spend their holidays in the selected tourism farm. In this case, all the thirteen items are retained and three orthogonal factors are identified as follows: **Factor 1= authenticity** includes the following variables: *experience traditional food, purchase own made products, experience genuine food, experience local culture*, and for the presence of *professional and skilled staff*. **Factor 2= activities** includes *to take part into farming activities, to observe farming activities, presence of children activities*. **Factor 3= price-quality** includes *good prices, nice view, services quality, easy mobility, excursions*. Overall, these three factors take into account almost 60% of the total variance. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy presents a value of 0.83 and implies that the analysis is satisfactory; the Bartlett's Test of Sphericity indicates that the null hypothesis (i.e. correlation matrix is an identity matrix) cannot be accepted. An acceptable Cronbach's alpha level greater than 0.7 is found for the first two factors, while the third presents the lowest value (0.69).

INSERT TABLE 7 HERE

### 5.3 Probabilistic modelling

To evaluate the determinants that are likely to influence customers' choice on the type of agritourism farm, a probabilistic modelling is employed. In Table 8 the odds ratio are reported, defined as  $OR = e^{\beta_i}$ . An odds ratio less than one is associated with a coefficient with a negative sign, and in this case, the probability to choose a type of agritourism farm is less likely than the probability to choose the other. Alternatively, an odds ratio greater than one is associated with a coefficient with a positive sign and, in this case, the probability to choose a type of agritourism farm is more likely than the probability to choose the other. When the odds ratio is exactly one, this implies that the odds are even. *Ceteris paribus*, for continuous variables, an odds ratio greater than one implies that the probability of a successful event increases as the value of the continuous variable increases. For dichotomous variables, an odds ratio greater than one implies that the probability of success is higher than for the reference group. For each of

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4 the models, marginal effects are also calculated to take into account the amount of change in the  
5 dependent variable which is due to a one-unit change in the explanatory variable, *ceteris paribus*.

6  
7 On this basis, the logit model is constructed on the dependent variable, obtained from the cluster  
8 analysis, as discussed previously, and defined as  $Y_i = (Y_1, Y_2)$ . Specifically,  $Y_1$  takes the value one if  
9 customer  $i$  chooses a “tourism enthusiast” farm; whereas,  $Y_2$  takes the value zero, if customer  $i$  chooses a  
10 “tourism opportunist” farm. To run this probabilistic framework the STATA 13 software is employed.

11  
12 A general to specific approach is used, starting with an unrestricted specification that is then  
13 parsimoniously reduced to a final restricted model. In Table 6 main results are reported. Model 1\_A is the  
14 best unrestricted model obtained when including the control variables, the economic variables and the  
15 factors where the coefficients are expressed as odds ratio. Model 1\_B presents the same model with the  
16 coefficients expressed as marginal effects. Model 2\_A is the best final restricted model obtained when  
17 including only the statistically significant coefficients, in this case expressed as odds ratio. Model 2\_B  
18 reports the same model with the coefficients expressed as marginal effects. From all the variables that  
19 reflect respondents’ individual characteristics, only the coefficient of *gender* is statistically significant,  
20 although only in the unrestricted specification. The positive sign of the coefficient indicates that male are  
21 more likely to choose “tourism enthusiast” farms than female.

22  
23 As a further outcome, it is less likely that customers choose an apartment, with respect to a room,  
24 when spending their holidays in “tourism enthusiast” farms. This finding is also confirmed by the  
25 restricted specification. Interestingly, the factors that influence the most the choice of agritourism are the  
26 ones that in the PCA presented the highest loading value as well as the highest Cronbach’s alpha level  
27 being the most reliable latent variables. Specifically, *Factor 1: push factor* presents a positive and  
28 statistically significant coefficient at the 1% level in both the unrestricted and restricted models. Hence,  
29 determinants such as *living in contact with nature, to experience a familiar environment, to experience*  
30 *relaxing places, sharing an experience with local people, having more freedom, to experience genuine*  
31 *food*, on the whole are likely to positively influence the probability to choose a “tourism enthusiast” farm,  
32 rather than a “tourism opportunist” farm.

33  
34 A negative sign coefficient is found for the coefficient of *Factor 1: negative externalities*, both in the  
35 unrestricted and restricted specification. This finding implies that perceptions on items such as *neglected*  
36 *environment* (e.g. rubbish, unkempt road verges), *presence of polluting factories, congested roads, high*  
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4 *voltage trellis, view on urban centre, tourism congestion*, on the whole, are likely to negatively influence  
5 the probability to choose a “tourism enthusiast” farm with respect to the other type.  
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8 Finally, only the coefficient of *Factor 1: food/culture/authenticity* presents a positive sign and a  
9 statistically significant coefficient only in the restricted model. As a reminder, this determinant includes a  
10 set of items related to *experience traditional food, purchase own made products, experience genuine*  
11 *food, experience local culture*, and presence of *professional and skilled staff*. Hence, the finding implies  
12 that an overall authenticity of the products and services supplied is more likely to positively influence the  
13 likelihood to choose a “tourism enthusiast” farm rather than a “tourism opportunist” farm.  
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25 Figure 3 represents a summary of the results the probabilistic models and show the determinants of  
26 choosing a “tourism enthusiast” farm over a “tourism opportunist” one.  
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### 33 **6. Discussion and conclusions**

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35 Typical service and marketing studies at the micro level take into account consumers' behaviour patterns  
36 and preferences based on the analysis of the demand. But, from the literature, a gap emerges in linking  
37 demand segments to supply according to its feature and characteristics. So far, limited work has been  
38 carried out to match demand and supply and, within tourism and the service industries in general, the  
39 main focus is still on either forecasting (Reiner and Fichtinger, 2009; Fei et al., 2001), demand  
40 fluctuations and seasonality (Kandampully, 2000) or the service encounter (Sharma, et al., 2009; Mattile,  
41 et al., 2003; Brown and Kirmani, 1999; Mattila and Enz, 2002). The present paper broadens the existing  
42 knowledge and provides an integrated conceptual framework to jointly analyse demand and supply for  
43 small hospitality firms, and specifically agritourism farms. From a marketing perspective, linking demand  
44 to supply is essential to determine product development strategies capable of satisfying actual and  
45 potential customers.  
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55 The first step of the investigation involved a hierarchical clustering analysis to group tourism farms  
56 into homogenous clusters. From the analysis, two distinct groups were identified: “tourism enthusiast”  
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4 farms and “tourism opportunist” farms. The two clusters were then defined as a dichotomous dependent  
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6 variable in the probabilistic modelling. The objective was to investigate the main determinants that  
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8 influence customers’ likelihood to choose a given type of agritourism with respect to the other. To this  
9  
10 aim, a set of variables was included into the demand equation: respondents’ individual characteristics, as  
11  
12 control variables; a set of economic variables (e.g. pro-capita expenditure); a set of factors, that included  
13  
14 general and specific motivations, as well as a set of perceived positive and negative externalities, as  
15  
16 obtained by a principal components analysis. A general to specific approach was employed to further test  
17  
18 the robustness of the empirical results.

19  
20 On the whole, this research demonstrates a good match between demand and supply in the case of  
21  
22 agritourism activities in the studied area. *Tourism Enthusiasts* farms, which are more prone to the tourism  
23  
24 industry and are engaging in the tourism sector pushed by a genuine wish to get in contact with people,  
25  
26 attract tourists who are looking for traditional and genuine food, culture and in general authenticity.  
27  
28 Across different studies in the service industries, authenticity has resulted to be a relevant component  
29  
30 both in the service encounter (Yagil and Mendel-Liraz, 2013; Grandey *et al.*, 2005), in general  
31  
32 satisfaction (Wong, *et al.*, 2016; Lee *et al.*, 2016) and as a determinant factor of expenditure (Brida *et al.*,  
33  
34 2013). In this study, authenticity has resulted to be an attractive component, therefore, enhancing the  
35  
36 competitive advantage of the firm. Authenticity has been defined as objective (Mc Cannel, 1973),  
37  
38 subjective (Cohen, 1988) and existential (Wang, 1999). In the present study, authenticity incorporates  
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40 both the aspects of objective/subjective authenticity (local culture, traditional and genuine food, own  
41  
42 made products) and existentialism. Indeed, when spending holidays at an agritourism, customers will  
43  
44 experience intrapersonal authenticity (physical and psychological aspects such as relax, freedom, contact  
45  
46 with nature), as well as interpersonal authenticity (sharing experience with local people, encounters with  
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48 staff) and these factors result to be determinants in the choice of a *tourist enthusiast* farm rather than  
49  
50 *opportunistic* farms.

51  
52 A further contribution of this paper to the literature is the identification of environmental externalities as  
53  
54 determinants of firm attraction. The perception of landscape is subjective and derives from a personal  
55  
56 interpretation of it (Beza, 2010) and it can be considered as “the final product, in visual and aesthetic  
57  
58 terms, of a series of interacting factors including climate, relief, water, soil, natural flora and fauna, and  
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60 human actions” (Sayadi *et al.*, 2009, p. 335). Regarding mountain landscape, past research has

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4 demonstrated that tourists are attracted to mountain landscapes because of their aesthetic aspects (Munic,  
5 1997 and Price et al., 1999 cited in Beza, 2010). This study further investigated the value of landscape for  
6 the tourism industry in general and applies it to single hospitality firms. Indeed, results showed that the  
7 overall quality of the surrounding areas play a role in the choice of an enthusiastic farm. Customers'  
8 perception of a neglected environment, pollution, congestion were found to decrease the likelihood to  
9 choose this type of farm.  
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15 From a practical perspective, agritourism farms may attract demand by marketing an experience  
16 lived in contact with nature, in a familiar and relaxing environment. Also, farms should encourage a  
17 wider participation in specific activities by local people who may be able to express the authenticity of  
18 the visited destination sharing their knowledge and traditions. Integrating demand and supply also  
19 enabled to give further directions on how to target customers based on specific needs and requirements  
20 obtained through the empirical investigation. Farms should activate a bundle of specific products and  
21 services that involves the possibility to experience traditional and genuine food, local culture, purchase  
22 own made products and be served by a professional staff.  
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30 Although the empirical data and findings can be regarded as rather narrow from a sample and  
31 territorial view point, the paper provided some homogenous findings with previous studies offering at the  
32 same time a demand and supply framework as a more comprehensive approach that can be tested in other  
33 settings as well as in other economic sectors.  
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APPENDIX A

INSERT TABLE A.1 HERE

For Peer Review

**Table 1.** Descriptive statistics of the demand sample

		%			%
<b>Gender</b>	Male	62.60	<b>Nationality</b>	German	80.97
	Female	37.40		Italian	3.75
<b>Age</b>	18-30	6.09		Other	15.28
	31-40	18.55	<b>Education</b>	Primary and secondary school	15.84
	41-50	33.33		Professional and college	44.10
	51-60	23.48		Graduate and Post graduate	40.07
	> 60	18.55			

Source: Authors' elaboration on sample data

**Table 2.** Descriptive statistics of the per capita expenditures

Type of expenditure	Obs.	Mean	S.D.	Min	Max
Accommodation	338	168.63	197.60	0.00	2,500.00
Food	338	115.10	160.53	0.00	2,000.00
Products	338	22.71	40.71	0.00	300.00
Other	338	19.68	44.89	0.00	333.33
Total	338	326.12	372.83	0.00	4,500.00

Source: Authors' elaboration on sample data

**Table 3.** Cluster analysis

	2-cluster solution	3-cluster solution	4-cluster solution
Cluster 1	10	7	7
Cluster 2	10	11	5
Cluster 3		2	2
Cluster 4			6

**Table 4.** Final Cluster Centers

	Cluster	
	1	2
Maximum number of beds	14	12
Total number of employees	4	7
Opening months of the infrastructure	9	8
Profit from tourism over total profit (%)	49	27

**Table 5.** General motivations; variables with higher contribution

	Variable Contribution	% Variance Explained	% Cumulative Variance	Cronbach's alpha
<b>Factor 1: Push factor</b>		<b>29.52</b>	<b>29.52</b>	<b>0.74</b>
Living in contact with nature	<b>0.81</b>			
Experience a familiar environment	<b>0.70</b>			
Experience relaxing places	<b>0.65</b>			
Sharing experience with local people	<b>0.65</b>			
Having more freedom	<b>0.60</b>			
Experience genuine food	<b>0.51</b>			
<b>Factor 2: Pull factor</b>		<b>20.83</b>	<b>50.35</b>	<b>0.65</b>
No other place to stay	<b>0.82</b>			
Experiencing something new	<b>0.81</b>			
To live according to nature rhythm	<b>0.60</b>			

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.77; Bartlett's Test of Sphericity (45)= 621.96 \*\*\*

**Table 6.** Respondents' perceived positive and negative externalities; variables with higher contribution

	Variable Contribution	% Variance Explained	% Cumulative Variance	Cronbach's alpha
<b>Factor 1: negative externalities</b>		<b>37.35</b>	<b>37.35</b>	<b>0.90</b>
Neglected environment	<b>0.92</b>			
Presence of polluting factories	<b>0.90</b>			
Congested roads	<b>0.87</b>			
High voltage trellis	<b>0.83</b>			
View on urban centre	<b>0.70</b>			
Tourism congestion	<b>0.70</b>			
<b>Factor 2: positive externalities</b>		<b>20.67</b>	<b>50.03</b>	<b>0.69</b>
Orchards	<b>0.77</b>			
Forests	<b>0.76</b>			
Vineyards	<b>0.70</b>			
Meadows	<b>0.68</b>			

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.83; Bartlett's Test of Sphericity (55)= 1582.00 \*\*\*



**Table 7.** Specific motivations; variables with higher contribution

	<b>Variable Contribution</b>	<b>% Variance Explained</b>	<b>% Cumulative Variance</b>	<b>Cronbach's alpha</b>
<b>Factor 1: authenticity</b>		<b>25.97</b>	<b>25.97</b>	<b>0.84</b>
Traditional food	<b>0.79</b>			
Purchase own made products	<b>0.77</b>			
Genuine food	<b>0.70</b>			
Local culture	<b>0.69</b>			
Professional staff	<b>0.68</b>			
<b>Factor 2: activities</b>		<b>17.19</b>	<b>43.16</b>	<b>0.74</b>
To take part into farming activities	<b>0.80</b>			
To observe farming activities	<b>0.79</b>			
Children activities	<b>0.68</b>			
<b>Factor 3: price-quality</b>		<b>16.58</b>	<b>59.75</b>	<b>0.69</b>
Good price quality	<b>0.73</b>			
Nice view	<b>0.67</b>			
Services quality	<b>0.65</b>			
Mobility	<b>0.53</b>			
Excursions	<b>0.52</b>			

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.83; Bartlett's Test of Sphericity (78)= 1268.81\*\*\*

**Table 8.** Probabilistic modeling results

	<b>Model 1_A</b> <i>Odds ratio</i>	<b>Model 1_B</b> <i>Marginal Effects</i>	<b>Model 2_A</b> <i>Odds ratio</i>	<b>Model 2_B</b> <i>Marginal Effects</i>
<b>Nationality: German (ref. other nationality)</b>	1.128	0.120		
	-0.612	-0.543		
<b>Gender (ref. female)</b>	2.977**	1.091**		
	-1.296	-0.435		
<b>Age</b>	0.969	-0.031		
	-0.104	-0.107		
<b>Age_squared</b>	1.000	0.000		
	-0.001	-0.001		
<b>Education</b>	1.048	0.047		
	-0.156	-0.149		
<b>Accommodation (ref. room)</b>	0.263***	-1.335***	0.306***	-1.184***
	-0.126	-0.480	-0.127	-0.415
<b>Pro-capita_expenditure</b>	1.000	0.000		
	-0.001	-0.001		
<b>Factor 1: push factor</b>	2.654***	0.976***	2.138***	0.760***
	-0.712	-0.268	-0.454	-0.212
<b>Factor 2: pull factor</b>	1.194	0.178		
	-0.331	-0.278		
<b>Factor 1: positive externalities</b>	0.692	-0.368		
	-0.153	-0.222		
<b>Factor 2: negative externalities</b>	0.550**	-0.597**	0.602**	-0.508**
	-0.130	-0.237	-0.123	-0.205
<b>Factor 1: authenticity</b>	1.463	0.380	1.712***	0.538***
	-0.368	-0.251	-0.337	-0.197
<b>Factor 2: activities</b>	0.754	-0.282		
	-0.179	-0.238		
<b>Factor 3: price-quality</b>	0.909	-0.095		
	-0.192	-0.212		
<b>Constant</b>	3.598	1.280	1.417	0.349
	-9.316	-2.589	-0.620	-0.438
<b>Number of observations</b>	153	153	179	179
<b>LogLikelihood ratio test</b>	LR chi2(14) = 45.02 ***		LR chi2(4) = 38.78 ***	
<b>Akaike information criterion</b>	195	195	215	215
<b>Bayesian information criterion</b>	241	241	234	234

Notes: For each of the variables, standard errors in the second line; level of statistical significance:

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

## APPENDIX A

Table A.1 Variables description

Variable	Definition	Reduced sample				
		Obs	Mean	St.D.	Min	Max
<b>Dependent variables</b>						
Cluster	dummy = 1 if respondent spends his/her holidays in a "tourism enthusiastic" farm; dummy = 0 if respondent spends his/her holidays in a "tourism opportunistic" farm.	Tot=375 (1=197 0=178)	0.52	0.50	0.00	1.00
<b>Explanatory Variables</b>						
Nationality	dummy = 1 if the respondent is from Germany/Austria, and zero otherwise	Tot=373 (1=302 0=71)	0.81	0.39	0.00	1.00
Gender	dummy = 1 if male dummy = 0 if female	Tot=353 (1=221 0=132)	0.63	0.50	0.00	1.00
Age		Tot=345	49.19	12.49	18.00	86.00
Education	2= primary; 3= secondary; 4=professional school; 5=high school; 6=bachelor; 7=post graduate	Tot=322	5.22	1.47	2.00	7.00
Accommodation	dummy = 1 if apartment dummy = 0 if room	Tot=374 (1=281 0=93)	0.75	0.43	0.00	1.00
Pro capita_ expenditure		Tot=338	326.12	372.83	15.00	4,500.00
Factor 1: push factor	General motivations: <i>living in contact with nature, to experience a familiar environment, to experience relaxing places, sharing an experience with local people, having more freedom, to experience genuine food</i>	Tot=244	0.00	1.00	-4.36	1.84
Factor 2: pull factor	General motivations: <i>not finding other place to stay, experience something new, to live according to nature rhythm.</i>	Tot=244	0.00	1.00	-1.51	3.03
Factor 1: negative externalities	<i>Externalities: neglected environment (e.g. rubbish, verges), presence of polluting factories, congested roads, high voltage trellis, view on urban centre, tourism congestion</i>	Tot=303	0.00	1.00	-6.11	0.93
Factor 2: positive externalities	<i>Externalities: orchards, forests, vineyards, meadows</i>	Tot=303	0.00	1.00	-1.76	1.50
Factor 1: authenticity	Specific motivation: <i>experience traditional food, purchase own made products, experience genuine food, experience local culture, and for the presence of professional and skilled staff.</i>	Tot=257	0.00	1.00	-3.73	4.06
Factor 2: activities	Specific motivation: <i>to take part into farming activities, to observe farming activities, presence of children activities</i>	Tot=257	0.00	1.00	-3.15	2.53
Factor 3: price-quality	Specific motivation: <i>good prices, nice view, services quality, easy mobility, excursions</i>	Tot=257	0.00	1.00	-3.15	2.81

Figure 1. Methodological framework

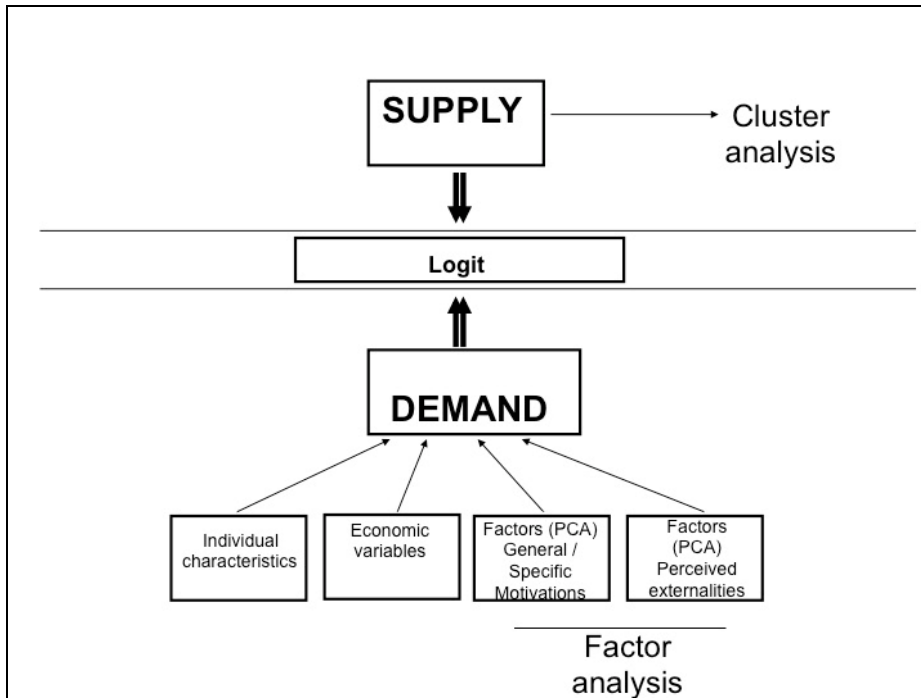
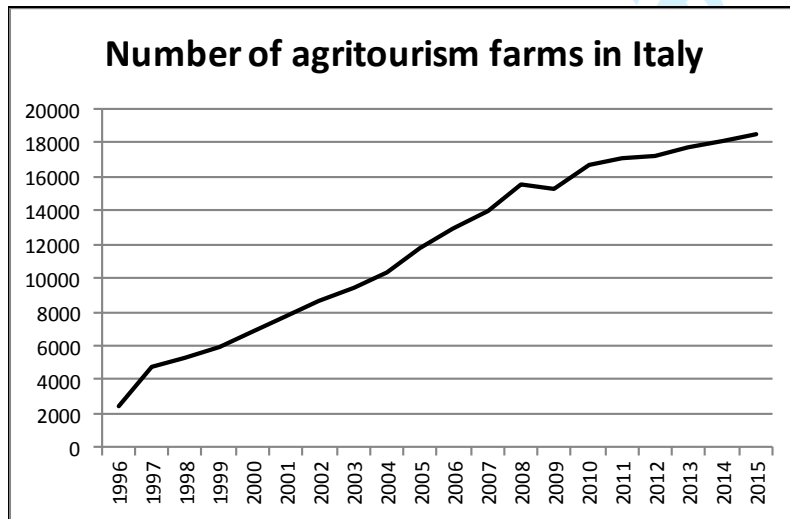


Figure 2. Increase of agritourism farms in Italy



1  
2  
3 **Figure 3.** Determinants in agritourism choice  
4

