Theoretical Economics Letters, 2023, 13, 1669-1683
https://www.scirp.org/journal/tel
ISSN Online: 2162-2086
ISSN Print: 2162-2078

Pricing Policies for Sustainable Growth and Development Led by Tourism in the Region of Western Macedonia

Nicholas Tsounis[1,2,3*], George Agiomirgianakis[2,4,5], Chaido Dritsaki[1,6], Aspasia Vlachvei[1,2], Efthymia Iliopoulou[1], Gerassimos Bertsatos[1], Zacharoula Kalogiratou[7], Theodoros Monovasilis[1], Nikolaos Sariannidis[6]

[1]Laboratory of Applied Economics, Department of Economics, University of Western Macedonia, Kastoria, Greece
[2]School of Social Studies, Hellenic Open University, Patra, Greece
[3]Faculty of Economics and Management, Open University of Cyprus, Latsia, Cyprus
[4]Department of Accounting and Finance, Hellenic Mediterranean University, Chania, Greece
[5]Hellenic Scientific Institute on the Economics of Education & Life-Long Learning, Research and Innovation, Athens, Greece
[6]Department of Accounting and Finance, University of Western Macedonia, Kastoria, Greece
[7]Department of Mathematics, University of Western Macedonia, Kastoria, Greece
Email: *nitsounis@uowm.gr

How to cite this paper: Tsounis, N., Agiomirgianakis, G., Dritsaki, C., Vlachvei, A., Iliopoulou, E., Bertsatos, G., Kalogiratou, Z., Monovasilis, T., & Sariannidis, N. (2023). Pricing Policies for Sustainable Growth and Development Led by Tourism in the Region of Western Macedonia. *Theoretical Economics Letters, 13,* 1669-1683.
https://doi.org/10.4236/tel.2023.137096

Received: September 23, 2023
Accepted: December 25, 2023
Published: December 28, 2023

Abstract

In this paper, we estimate expenditure elasticities of the main spending categories of domestic tourists visiting the region of Western Macedonia, Greece with the purpose of establishing sustainable growth and development pricing policies from the actors of the region. An Almost Ideal Demand System (AIDS) model is developed and estimated with data collected by field survey. Our analysis shows that hotel entrepreneurs should adjust their pricing policy in periods with large changes in prices. Also, food expenditure is not considered as an important category in the tourists' preferences, showing some flexibility since in the case of an increase in the price of museum services, tourists could balance it out by a reduction in their spending share of food. On the contrary of this, in case of a price increase in the museum services, tourists are not willing to reduce their consumption of these services rather they prefer to compensate for this increase by a reduction in their expenses for souvenirs. Moreover, our findings suggest that if the price of museums and the price of souvenirs would increase, the share of this category could be reduced. These findings have certain policy implications for hotel owners/managers, for restaurants and taverns of the region, as well as, for the Ministry of Culture in setting their pricing policies. The methodology developed in this study and the adaptation of the AIDS model to examine tourists' expenditure patterns with primary survey data can be used by other studies for other regions of Greece or any other country.

Keywords

AIDS Model, Domestic Tourism, Region of Western Macedonia

1. Introduction

As a service sector, tourism has grown greatly over time and is crucial to the growth of many nations. As a result, in many nations, including Greece, international tourism today contributes significantly to the Gross Domestic Product (GDP) and employment. For Greece, the total contribution (direct plus indirect) of international tourism accounts for about 30% of the GDP with a multiplier reaching 2.6 (Menegaki et al., 2022).

The sole landlocked territory in Greece is the territory of Western Macedonia, which is situated in the country's northwest. It shares boundaries with Albania and Northern Macedonia to the north, Central Macedonia to the east, Albania and Epirus to the west, and Thessaly to the south. With 264,670 inhabitants in 2020, the region's 9451 km^2 area is similar to 7.2% of the nation's overall area. Its population is likewise about 2% of the nation's total. The ground's relief and morphology both exhibit colourful diversifications. The Region's geographical morphology is 82% mountainous or semi-mountainous and 18% lowland, making it excellent for alternative tourism rather than the typical summer tourist that Greece offers.

While it accounts for only around 2% of all international overnight stays in Greece in 2019, domestic tourism as a whole accounts for about 17% of all overnight stays (INSETE, 2019). The region provides a wide range of tourist activities, including skiing, hiking and rock climbing, therapeutic springs, mountain caves, trekking, kayaking and rafting, cuisine, and wine and culinary-related pursuits. Additionally, the area is well-known for its Byzantine heritage, with several churches dating back to the fifth century. Consequently, domestic tourism can be accounted as important for the growth of the region. Like other forms of tourism, domestic tourism generates employment and revenue. Studies on domestic tourism are far less common than those on foreign tourism. This is due to the fact that while it is challenging to gather information on domestic tourism, it is simple when tourists cross foreign borders. Understanding the procedures used to choose tourist locations is crucial for governments, tourism organisations, and business owners in the industry. A person who visits local or regional attractions may only have weekends or a few days of free time and may have a different consumer (spending) behaviour than an international tourist.

It is important, especially for local stakeholders (entrepreneurs in the tourism sector and local municipal and regional authorities), to understand the expenditure behaviour of domestic tourists in order to maximize their revenues and provide the best possible experience for their visitors.

The scope of this study is to estimate the expenditure elasticities of the main expenditure categories for domestic tourists visiting the region of Western Macedonia, Greece. For this purpose, an Almost Ideal Demand System (AIDS) model for the tourism of the region is developed and estimated with data collected by field research in a survey designed for this purpose.

The paper proceeds as follows: Section 2 provides the literature review for the use of the AIDS model in tourism and surveys the literature on tourism in the Western Macedonia Region, Section 3 develops the methodology used for the adaptation of the AIDS model to the needs of the paper, Section 4 describes the survey conducted for the collection of the used data and presents its descriptive statistics, Section 5 presents the estimation results and Section 6 concludes and provides policy proposals for the local stakeholders.

2. Literature Review

2.1. The Almost Ideal Demand System (AIDS) Model in Tourism

Many empirical studies on tourist demand are based on one equation model. These studies were based on the analysis of independent countries and neglected the interactions among competitive tourist destinations which have consequences in the level of tourist demand for a particular destination. Although there are alternative system modelling approaches, the Almost Ideal Demand System (AIDS) model by Deaton and Muellbauer (1980) is the most popular and is regarded as one of the most useful tools for the examination of consumers' behavior due to its flexibility and other desirable properties. However, the AIDS model is difficult to estimate as the price index is not linear to its parameters. The AIDS model has been applied to model household expenditures (Blundell et al., 1994), goods consumption and shares (Parikh, 1988). Moreover, many studies applied the AIDS model to the analysis of tourist demand (Chang et al., 2012).

Initially, the AIDS model was focused on the selection of linear and nonlinear models and on different estimation methods. The pioneering studies that modelled tourist demand of the USA on European countries contain the paper of O'Hagan and Harrison (1984), which analysed the market share of tourist expenditure of the USA to Europe from 1960 to 1981. White (1985) conducted a similar analysis for 1964-1981 clustering the countries in seven regions. The results showed the classification of regions of Western Europe as substitutes or complements according to the preferences of travelers.

Syriopoulos and Sinclair (1993) used the Almost Ideal Demand System (AIDS) model to estimate the share of tourism expenditure from USA countries and Western European countries to Mediterranean destinations for the period 1960-1987. The results of their paper showed that expenditure elasticities demonstrated considerable differences in the preferences of tourist demand among destination countries and among traditional and newly developing destinations. The own and cross-price elasticities indicated the importance of efficient prices determining

expenditure distribution among destinations.

Durbarry and Sinclair (2003) examined the determinant factors of changes in destinations' shares of an important tourist origin market. The Almost Ideal Demand System model is used to quantify the response of French tourist demand in Italy, Spain, and the United Kingdom to changes in relative prices, exchange rates, tourist' expenditure budgets, and external events. The results show that effective price competitiveness is a key variable that drives changes in market shares.

Li et al. (2004) in order to examine the tourist demand of the residents of the United Kingdom in Western Europe used both the static and dynamic Linear Almost Ideal Demand System (LAIDS) for the period 1972-2000. For the analysis of tourist expenditure of the United Kingdom in twenty-two European countries, demand elasticity was estimated both in the short and long run. The results of their paper showed that long-run expenditure elasticities in most major destinations of Western Europe seem to be a luxury for tourists from the United Kingdom. Travelling to these destinations from UK tourists is more likely to be price elastic in the long run than in the short run. Furthermore, the cross-price elasticities suggest that the substitution-complementarity effects vary from destination to destination.

Mangion et al. (2012) apply a dynamic Almost Ideal Demand System (AIDS) model to quantify the impact of the demand elasticity of Malta for supporting British inclusive tour holidays. Their analysis contributes to the improvement of the tourist policy of Malta reporting tourist policymakers about how and to what extent the market has responded to previous tourism policies.

In this paper, Chang et al. (2012) examine the responsiveness of Thai outbound tourism to destinations in East Asia, such as China, Japan, and Korea to changes in the effective relative price of tourism, real total tourism expenditure, and one-off events using monthly data from 1998:1 until 2007:12. The nonlinear and linear Almost Ideal Demand (AID) models are estimated using monthly data for the definition of price competitiveness and interaction of tourism demand for competitive destinations both in long run (static) and short-run (dynamic) error correction specifications. The homogeneity and symmetry are imposed on the long-run and short-run AID models for elasticities' estimation. The empirical results show that price competitiveness is important for tourist demand in Japan and Korea in the long run.

Wu et al. (2012) examine the dynamic consumer behaviour of tourists from an economic perspective. The advance of various demand elasticities is investigated using a time-varying parameter almost ideal demand system model. The four major markets for tourism in Hong Kong area and the three large tourism expenditure categories including shopping, hotel accommodation, and meals outside hotels in each market are examined. Elasticity analysis reveals different trends and consumption patterns in source markets.

Gatt and Falzon (2014) employ the AIDS model developed by Deaton and

Muellbauer (1980) to estimate tourist demand elasticities for particular Mediterranean countries like Cyprus, Greece, Italy, Malta, Portugal, Spain, and Turkey in relation to tourists coming from the United Kingdom during the period 1963 until 2009. The estimation of their paper indicates that while Spain and Portugal achieved keeping a stable share market over time, Malta and especially Italy lost market share against Cyprus, Greece, and Turkey. Furthermore, they noted that Italy and Spain have the lowest price elasticities, whereas Greece, Portugal, Spain, and Turkey are expenditure-inelastic holiday destinations. Also, according to the AIDS model examining the stability of estimated elasticities over time, the results indicate that some elasticities are time-varying and highlight the potential pitfalls of assuming fixed and stable elasticities over a long period.

Koike and Yoshino (2014) claim that when proposing policies aimed at the promotion of inbound and outbound tourism markets, emphasis should be given not only on the tourist demand of a particular region but also on interregional relationships. To deal with this issue, authors developed a methodology for quantitative analysis of the structure of tourism demand focusing on the elasticity of destination choice activities for the period 1970-2005. The demand function of destination choice activities is defined as a Dynamic AIDS model. The main goal of this research is to examine the applicability of the AIDS model on the estimation of the Japanese international tourism demand.

Chaivichayachat (2018) used the Almost Ideal Demand System (AIDS) model and the Seemingly Unrelated Regression (SUR) to calculate the tourism elasticities: price, cross, and income elasticities on quarterly data from 1995 to 2016 for Malaysia, Thailand and Indonesia. The results of the paper show that Thailand has the lowest price elasticity, while for the other countries, price elasticity is high. Tourism in every destination can be regarded by foreign tourists as both complementary and substitution destinations with different degrees. Foreigners regard tourism in Malaysia and Singapore as luxury tourism whereas Indonesia, Thailand, and other destinations are treated as normal tourism. Thailand's tourism registers the lowest price elasticity and cross elasticity because of the unique character of the tourism sector.

Loganatan et al. (2019) applied the AIDS model to examine the impact of Malaysia's tax policy, price competitiveness, and exchange rates with neighbouring countries on the international tourist demand of Malaysia based on the quantile estimation. Using time series data based on a monthly basis, for the period 1996-2017, they adopted a bootstrap quantile regression in order to provide an integrated relationship of international tourism demand theory in Malaysia. The empirical results showed that sales tax has a negative relationship with international inbound tourism demand, mainly at the middle quantile stages. Furthermore, it was found that price competition from Thailand has a positive effect on Malaysia and the appreciation of Indonesia's exchange rate competitiveness tends to lead Malaysia's tourism demand.

Chaivichayachart (2020) applies the Almost Ideal Demand System (AIDS) to

evaluate the substitution role between tourist destinations in Thailand. There are eight choices of tourist destinations for Thai tourists including locals, tourists from Africa, East Asia, Europe, the Middle East, Oceania, South Asia, and the USA. The demand system for the choices of tourist destinations of Thai tourists was estimated using quarterly data for the period 2008-2016 and applying the Seemingly Unrelated Regression (SUR) technique. The results of the paper showed first that tourism in all estimations is claimed as a normal good. Also, negative elasticities were found in all destinations, and domestic destinations can substitute for all destinations.

2.2. Tourism Industry in Western Macedonia

Western Macedonia is the only Greek region that borders two countries and until recently was considered one of the most hardly reached regions within the country and abroad. In the past, the inaccessibility used to be not only a protection for the local economy but also a motive for the development of endogenous entrepreneurship. But, under the new conditions, the abolishment of isolation, the intensity of international and inter-regional competitiveness, the European energy crisis in the market, and the low performance of innovation all these factors created a suffocating framework and if it will not change, Western Macedonia cannot exit from the economic crisis.

Tourist growth is considered an activity that will allow Western Macedonia to exit from the crisis. The growth of tourism will be a considerable choice for Western Macedonia. However, this choice cannot substitute, directly and in the short run, other main activities of the residents. The tourist demand is dependent mainly on the domestic market whereas the tourist demand of foreigners is quite low. As far as the tourist supply is concerned, a remarkable dynamic has been observed during the last few years.

The main primary factors affecting the potential of tourism in the Western Macedonia Region are the climate and the relief. The combination of these factors forms the rich water channel and also the mountainous, forest, and lake ecosystems.

From a study examining the alternative forms of tourism in Western Macedonia and specifically the Valia Calda National Forest, Tampouri (2016) found that the tourist demand is higher during winter and the main reason for visiting this area is for the beauty of the natural environment and tranquility. Also, this area attracts mainly domestic tourists aged from 36 - 44 years old and the domestic tourist growth is of medium level. Another main point that constrains local tourist growth is the inadequate promotion of tourism products of Western Macedonia in Greece and abroad.

Maleas (2020) in his dissertation examined walking tourism as an important form of tourism in the Western Macedonia Region as it fits with the specific characteristics of this area. The main objectives are to diagnose the perception of certain institutional and permanent factors of the contribution of tourism

at both local and regional levels as a driving force for economic development and to develop a model of participation in the tourism sector, which will make it possible to stimulate networking and promote more sustainable practices.

3. Methodology

Consumer demand theory is used in research on tourism demand providing an explicit theoretical basis for the latter modelling. In that way, tourism demand at an aggregate level is linked to individual consumer behaviour. Systems of equations, based on consumer demand theory, can be derived using the Almost Ideal Demand System (AIDS) approach formulated by Deaton and Muellbauer (1980). The Linear Expenditure System (LES) model has also been used, although it tends to produce less satisfactory results than the AIDS model (Fujii et al., 1987). According to Deaton and Muellbauer, consumer demand theory proposes that the consumer has a fixed amount of income (budget) which, by a procedure known as "stage budgeting", is first allocated between major categories of commodities such as food, accommodation, and leisure. The consumer then distributes the expenditure on each of the categories between the commodities included in it. For the purposes of our study the major category is considered to be leisure services received by a tourist in the Western Macedonia region of Greece and the commodities included in this category are accommodation, food, entertainment, visits to museums and archaeological sites, souvenirs/local commodities and transport services.

The application of consumer choice theory involves making a number of assumptions about consumer behaviour, such as consistency of choice so that the shares of total expenditure allocated to tourism in different expenditure categories are treated as the results of choices by rational individual consumers. The shares of total expenditure on tourism allocated to expenditure categories can be estimated by means of the AIDS model. The latter aggregates individual consumers' demand functions without the assumption of linear and parallel Engel curves. Additionally, it is relatively easy to econometrically estimate it.

The AIDS model is based on the selection of a proper type of expenditure function $E\left(p_1, p_2, \cdots, p_n, U^0\right) = E\left(p, U^0\right)$:

$$\log\left(E\left(p,U^0\right)\right) = a_0 + \sum_{i=1}^{n} a_i \log\left(p_i\right) + \frac{1}{2}\sum_{i=1}^{n}\sum_{k=1}^{n}\delta_{ik}\log\left(p_i\right)\log\left(p_k\right) + U^0\beta_0\prod_{i=1}^{n}p_i^{\beta_i},$$

where I and k indicate commodity categories, U^0 is the targeted level of utility that expenditure is minimized by the consumer and p denotes prices. $E\left(p,U^0\right)$ is homogeneous of degree one in prices.

We can calculate the share w_{ij} of expenditure of each commodity category i in total expenditure for each tourist j visiting the region of Western Macedonia:

$$w_{ij} = a_{ij} + \sum_{k=1}^{n}\gamma_{ikj}\log\left(p_{kj}\right) + \beta_{ij}\log\left(\frac{X_j}{P_j}\right), i,k = 1,\cdots,n; j = 1,\cdots,m \quad (1)$$

where I and k are commodity categories, j are tourists, X is the budget for tourism expenditure of tourists visiting the region

$$X_j = \sum_{k=1}^{n} p_k q_{kj},$$

where q_{kj} is quantity consumed from commodity category k by tourist j,

$$\gamma_{ikj} = \frac{1}{2}\left(\delta_{ikj} + \delta_{kij}\right), \sum_{k=1}^{n} \gamma_i = 0, \sum_{k=1}^{n} a_i = 1, \sum_{k=1}^{n} \beta_i = 0,$$

where P is the Stone Price Index taking into account prices in the range of all commodity categories:

$$\log P_j = \sum_{i=1}^{n} w_{ij} \log p_{ij}.$$

The model permits the calculation of expenditure, own-price, and cross-price elasticities of tourism demand for the specific region. The expenditure elasticities give the percentage change in the tourism budget share of category i resulting from a percentage change in the expenditure budget. The own-price elasticities also expressed as percentages, give the percentage change in the tourism budget share of category i resulting from a percentage change in its own prices, whereas cross-price elasticities give the percentage change in the budget share of category i resulting from a percentage change in prices in another categories k. Both compensated elasticities, based on constant real expenditure, and uncompensated elasticities taking account of the change in expenditure resulting from the relative price changes, can be calculated. The approach thus provides a large amount of information.

The advantage of the AIDS model compared with the single equation approach to tourism demand modelling is that the former uses economic reasoning to justify the variables that are used to explain tourism demand and the form in which they are included in the model (i.e. the specification of the set of equations used to estimate the model). In contrast, the single equation approach is specified a priori and, in the absence of a rigorous economic underpinning, it is not possible to assess the accuracy of the results that it provides.

In our study, data for six distinctive expenditure categories have been collected from tourists who visited the region of Western Macedonia (see next section for the description of the field research). Therefore, from (1) the formulation of the AIDS model in our case is the following:

For every expenditure category i, i.e. six equations:

$$w_{ij} = a_i + \sum_{i=1}^{6} \gamma_{ij} \log p_{ij} + \beta_i \log\left(\frac{X_j}{P_j}\right) \tag{2}$$

where i: expenditure category; $i = 1, \cdots, 6$;

j: cross-section, i.e. tourist j; $j = 1, \cdots, 501$.

And

$$\log P_j = \sum_{i=1}^{6} w_{ij} \log p_{ij} \ .$$

The latter is the Stone Price Index. Here, we calculate one price P_j for every cross-section summing up the six expenditure categories.

4. Data and Description of the Field Research

This survey was conducted to study the tourist satisfaction of people visiting the region of Western Macedonia. For this reason, primary data were collected from a questionnaire sent to tourists who have visited the area. An online questionnaire was promoted via social media to tourists. The same questionnaire was distributed to hotels in the area and forwarded to their customers. At the end of the research, the questionnaires were collected, and the data were transferred to the same platform as the online questionnaire. The sample used was only for people who have visited Western Macedonia. The survey was conducted from 1st October to 15th November 2021 and 501 questionnaires were collected.

In order to study the impact of the factors influencing tourist demand in the region of Western Macedonia the questionnaire was divided into two sections. The first section included twelve questions regarding the consumer behaviour of the households that visited the region and stayed at least one night, and the second section was related to the demographics of the sample, such as gender, age, marital status, and educational level.

Primary data were collected from the 501 fully completed questionnaires from tourists that have visited the Region of Western Macedonia. Table 1 shows

Table 1. Demographic data.

Sample features		Frequency (N)	Percentage (%)
Gender	Male	254	50.7
	Female	247	49.3
Age	18 - 34	171	34.1
	35 - 54	241	48.1
	55+	89	17.8
Marital status	Married	301	60.1
	Unmarried	179	35.7
	Other	21	4.2
Educational level	Elementary school	121	24.2
	High school	26	5.2
	Training institute	70	14.0
	University	159	31.7
	Postgraduate/Ph.D.	125	25.0

Source: Authors' calculations.

visitors' profiles. The largest percentage of respondents is males with a percentage of 50.7%. The main age group of the sample with a percentage of 48.1% is 35 - 54 years old, 34.1% falling in the category 18 - 34, and another 17.8% of the survey respondents being 55 or older. The largest part is married participants with a percentage of 60.1%, graduates of University Education at 31.7%, and postgraduate level 25%.

5. Estimation Results and Discussion

The variables for estimating (2) are the following:

Dependent Variables

Given that travel costs in the Region of Western Macedonia are divided into six categories, the dependent variables in this study consist of the share of each of these expenses to the total cost of travel in the Region. These costs include food, accommodation, transport, entertainment, museums, and souvenirs.

Independent Variables

The independent variables include the variable price of goods and the variable total travel cost adjusted to the following measures: The independent variables consist of the variable of price of goods. Specifically, the price of transport and the price of souvenirs were measured as per capita expenditure of these goods. The price for accommodation, food, entertainment, and museums was measured as per capita expenditure per day.

Also, the variable of adjusted total travel expense is the travel expenses allocated by the tourists traveling to Western Macedonia and we obtained this by dividing the total cost of travel by the Stone Price Index.

To estimate the results, EViews12 econometric software was used.

All variables and their symbols are presented below in Table 2.

Empirical Analysis and Discussion of the Estimation Results

In Table 3, the results of the estimations of (2) for each one of the six expenditure categories are presented. The dependent variable is the share of expenditure of each commodity category i (i = 1, …, 6) in total expenditure and the estimated coefficients are price elasticities.

Table 2. Description of variables.

Variables	Description
ACCOM	Price of accommodation (accommodation expenditure per capita)
FCD	Price of food (food expenditure per capita per day
FUN	Price of entertainment (entertainment expenditure per capita per day)
MUS	Price for museums (expenditure for museum visits per capita per day)
SUV	Price of souvenirs (expenditure for souvenirs per capita)
TRAN	Price of transport (transport expenditure per capita per day
SPI	Total cost of travel (Stone Price Index)

Table 3. Estimation results of the AIDS model for tourism in the region of Western Macedonia.

Equation	Variable	Coefficient	Prob	Equation	Variable	Coefficient	Prob
Equation (1) (accommodation)	ACCOM	0.004630	0.2360	Equation (2) (food)	ACCOM	0.002303	0.2381
	FCD	0.010392	0.7312		FCD	0.010082	0.5048
	FUN	0.003702	0.9127		FUN	−0.0000097	0.9954
	MUS	−0.238458	0.1085		MUS	−0.12793*	0.0850
	SUV	−0.003661	0.4793		SUV	−0.002078	0.4217
	TRAN	0.186086***	0.0066		TRAN	0.090472***	0.0082
	SPI	−0.092860	0.7388		SPI	−0.067512	0.6276
Equation (3) (entertainment)	ACCOM	0.001445	0.2672	Equation (4) (museum)	ACCOM	0.000113***	0.0094
	FCD	0.003061	0.7614		FCD	2.70E−05	0.9362
	FUN	0.004092	0.7163		FUN	−0.000539	0.1525
	MUS	−0.079736	0.1074		MUS	0.018228***	0.0000
	SUV	−0.001205	0.4848		SUV	4.77E−05	0.4083
	TRAN	0.060321***	0.0082		TRAN	−0.003396***	0.0000
	SPI	−0.036182	0.6967		SPI	−0.005061	0.1038
Equation (5) (souvenir)	ACCOM	0.000674	0.5082	Equation (6) (transport)	ACCOM	0.003296	0.3381
	FCD	0.005280	0.5036		FCD	0.014592	0.5840
	FUN	0.000822	0.9257		FUN	0.002945	0.9212
	MUS	−0.107448***	0.0057		MUS	−0.304940**	0.0200
	SUV	−0.000197	0.8837		SUV	−0.003362	0.4609
	TRAN	0.069367***	0.0001		TRAN	0.198453***	0.0010
	SPI	−0.071831	0.3231		SPI	−0.224889	0.3596

Note: ***, **, and * indicate 1%, 5%, and 10% level of significance respectively.

In the first equation, the equation of accommodation is examined. On this equation, we can see that if the price of museums and souvenirs increases, the share of accommodation to the total cost of travel is reduced. Also, when the ratio of the total cost of travel to the Stone Price Index increases, the share of accommodation on the total travel costs is reduced. It is also notable that when the price of accommodation increases the share of accommodation expenditure to the total expenditure increases marginally as the estimated coefficient although positive is very small. The above indicates that tourists visiting the region are not willing to increase the share of accommodation expenditure or keep it constant if a price increase occurs to another expenditure category therefore, hotel entrepreneurs should adjust their pricing policy accordingly in periods with large changes in prices.

In the second equation, the food equation is examined. On this equation, we

notice that if the price of entertainment, the price of the museums, the price of souvenirs, and the ratio of the total cost of travel to the Stone Price Index increase, the share of food on the total travel costs decreases. Therefore, food is not an important expenditure category in the tourists' preferences. Tourists visiting the Region, in case of an increase in the price of museum services, will reduce the expenditure share of food.

Additionally, from the estimation of the third equation the results show that if the price of the museums, the price of souvenirs, and the total cost of travel increase, the share of entertainment decreases. Therefore, tourists visiting the region do not consider the tourist destination as an opportunity for entertainment but for seeing around and indulging in the rich history of the place dating back to 5 millennia B.C. (e.g. the unique prehistoric lake village of Dispilio, etc.). In the third equation, the equation of entertainment is examined.

Equation four follows with the share of museums to act as the dependent variable. In this equation, we notice that when the price of accommodation, transport and the price of museum tickets increase, the share of the museum is reduced. However, the coefficient of the price of accommodation, although statistically significant, has a very small value. Therefore, visiting museums is important for tourists, and from the coefficient of its price which is positive and statistically significant can be seen that the tourist of the region is willing to increase the museum's share in total expenditure when the price of the museum services is increased.

In the fifth equation, the share of the expenditure for souvenirs is examined. We can see that if the price of museums and the cost of transport are increased, the share of souvenirs in total tourists' expenditure is reduced. Therefore, again it is found that tourists are not willing to reduce the consumption of museum services if their price increases, and in such case, they will compensate for a reduction in the expenses for souvenirs. The cost of transportation also affects negatively the share of the expenditure for souvenirs in total expenditure. Since there is a significant local souvenir market, especially in the prefecture of Kastoria where there is an ample variety of souvenirs produced locally in connection to the prefecture's fur industry tradition, this result can be used by local authorities and other stakeholders to enforce price-reducing policies for the transportation of tourists to the region.

Finally, in the sixth equation, the share of transport to the total tourists' expenditure is examined. We observe that if the price of museums and the price of souvenirs increase, the share of this category is reduced. This result is in line with the rest of the findings. Additionally, an increase in the price of transportation, as expected, increases the share of this expenditure category in the total cost of travel to the region.

6. Conclusion and Future Research

Expenditure elasticities of the main expenditure categories for domestic tourists

visiting the region of Western Macedonia, Greece are estimated with the purpose of establishing sustainable growth and development pricing policies from the actors of the region. An Almost Ideal Demand System (AIDS) model for the tourism of the region is developed and estimated with data collected by field research in a survey designed for this purpose.

Our findings suggest that: 1) tourists visiting the region are not willing to increase the share of accommodation expenditure or keep it constant if a price increase occurs to another expenditure category, therefore, hotel entrepreneurs should adjust their pricing policy accordingly in periods with large changes in prices; 2) tourists visiting the Region, in case of an increase in the price of museum services, will reduce the expenditure share of food, therefore, municipal authorities may exercise a high-price policy for access to local attractions if their scope is to increase revenues from museums. Tourists of the region are willing to increase the museum's share in total expenditure when the price of the museum services is increased; 3) it was found that the cost of transportation affects negatively the share of the expenditure for souvenirs in total expenditure. Since there is a significant local souvenir market, especially in the prefecture of Kastoria where there is an ample variety of souvenirs produced locally in connection to the prefecture's fur industry tradition, this result can be used by local authorities and other stakeholders to enforce price-reducing policies for the transportation of tourists to the region.

The limitation of the study is that the results are focused on the domestic tourism of the Region of Western Macedonia in Greece. However, the methodology developed in this study and the adaptation of the AIDS model to examine tourists' expenditure patterns with primary survey data can be used by other studies for other regions of Greece or any other country.

Funding

This work was supported by the European Regional Development Fund and the Greek Government (Project AGROTOUR, grant no. MIS 5047196, project no. 80318).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Blundell, R., Browning, M., & Meghir, C. (1994). Consumer Demand and Life-Cycle Allocation of Household Expenditures. *Review of Economic Studies, 61,* 57-80. https://doi.org/10.2307/2297877

Chaivichayachart, B. (2020). The Elasticity of Tourism Demand of Thai Tourists from the Model AIDS. *Journal of Humanities and Social Sciences, 12,* 14-26.

Chaivichayachat, B. (2018). Demand for Tourism in AEC with AIDS Model. *Advanced*

Science Letters, 24, 9465-9469. https://doi.org/10.1166/asl.2018.12299

Chang, C. C., Khamkaew, T., & McAleer, M. (2012). Estimating Price Effects in an Almost Ideal Demand Model of Outbound Thai Tourism to East Asia. *Journal of Tourism Research & Hospitality, 1,* 1-43. https://doi.org/10.4172/2324-8807.1000103

Deaton, A., & Muellbauer, J. (1980). An Almost Ideal Demand System. *American Economic Review, 70,* 312-326.

Durbarry, R., & Sinclair, M. T. (2003). Market Shares Analysis: The Case of French Tourism Demand. *Annals of Tourism Research, 30,* 927-941. https://doi.org/10.1016/S0160-7383(03)00058-6

Fujii, E. T., Khaled, M., & Mak, J. (1987). An Empirical Comparison of Systems of Demand Equations for Tourism Expenditures in Resort Destinations. *Philippine Review of Economics, 24,* 79-102.

Gatt, W., & Falzon, J. (2014). British Tourism Demand Elasticities in Mediterranean Countries. *Applied Economics, 46,* 3548-3561. https://doi.org/10.1080/00036846.2014.934432

INSETE (2019). *Annual Report for the Region of Western Macedonia.* INSETE.

Koike, A., & Yoshino, D. (2014). Short and Long-Run Structural International Tourism Demand Modeling Based on the Dynamic AIDS Model: Empirical Research in Japan. *Asian Transport Studies, 3,* 125-142.

Li, G., Song, H., & Witt, S. (2004). Modelling Tourism Demand: A Dynamic Linear AIDS Approach. *Journal of Travel Research, 43,* 141-150. https://doi.org/10.1177/0047287504268235

Loganatan, N., Ahmad, N., Mursitama, T. N., Taha, R., Mardani, A., & Streimikiene, D. (2019). The Effects of Exchange Rate, Price Competitiveness Indices and Taxation on International Tourism Demand in Malaysia. *Economics and Sociology, 12,* 86-97. https://doi.org/10.14254/2071-789X.2019/12-3/6

Maleas, M. (2020). *Walking Tourism as a Tool for Sustainable Tourism Development in the Western Macedonia Region*. Master's Thesis, Aristotle University of Thessaloniki. http://ikee.lib.auth.gr/record/321276/files/GRI-2020-28564.pdf

Mangion, M. L., Chris Cooper, C., Jimenez, I. C., & Durbarry, R. (2012). Measuring the Effect of Subsidization on Tourism Demand and Destination Competitiveness through the AIDS Model: An Evidence-Based Approach to Tourism Policymaking. *Tourism Economics, 18,* 1251-1272. https://doi.org/10.5367/te.2012.0167

Menegaki, A., Tsounis, N., & Agiomirgianakis, G. (2022). The Economic Impact of Climate Change on Tourism. *Environment, Development and Sustainability, 24,* 8145-8161. https://doi.org/10.1007/s10668-021-01776-4

O'Hagan, J. W., & Harrison, M. J. (1984). Market Shares of US Tourist Expenditure in Europe: An Econometric Analysis. *Applied Economics, 16,* 919-931. https://doi.org/10.1080/00036848400000060

Parikh, A. (1988). An Econometric Study on Estimation of Trade Shares Using the Almost Ideal Demand System in the World Link. *Applied Economics, 20,* 1017-1039. https://doi.org/10.1080/00036848800000024

Syriopoulos, T. C., & Sinclair, M. T. (1993). An Econometric Study of Tourism Demand: The AIDS Model of US and European Tourism in Mediterranean Countries. *Applied Economics, 25,* 1541-1552. https://doi.org/10.1080/00036849300000158

Tampouri, D. (2016). *Alternative Tourism Forms of the Western Macedonia Region. Possibilities and Limitations of the Touristic Development of Pindos National Park (Valia Kalda).* MSc Thesis, Open University. https://apothesis.eap.gr/handle/repo/32786

White, K. J. (1985). An International Travel Demand Model, US Travel to Western Europe. *Annals of Tourism Research, 12,* 529-545. https://doi.org/10.1016/0160-7383(85)90076-3

Wu, D. C., Li, G., & Song, H. (2012). Economic Analysis of Tourism Consumption Dynamics: A Time-Varying Parameter Demand System Approach. *Annals of Tourism Research, 39,* 667-685. https://doi.org/10.1016/j.annals.2011.09.003