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Determinants of Tourism Demand in Cyprus

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Abstract

The objective of this study is to analyze the determinants of tourism demand in Cyprus. Using a new empirical industrial organization econometric methodology and monthly data from the Cyprus Statistical Service, the Cyprus Tourism Organization, the World Tourism Organization and the World Development Indicators of the World Bank from January 2003 to December 2006 the demand for tourism in Cyprus is estimated. The study shows that, overall, tourists tend to be insensitive to the relative cost of spending their holidays in Cyprus and more likely to come if the transportation cost, in terms of cost and inconvenience of travel, is less. However, when adjusting the sample for the most important factor of transportation cost, that is, a direct flight to Cyprus, the insensitivity to the cost of their holidays is reduced significantly. In addition, the climate differentials, common European Union membership and better flight coverage from origin to Cyprus play an important role on tourism demand and should be strategically targeted by the Cyprus Tourism Organization.

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ΠΕΡΙΛΗΨΗ

Ο σκοπός αυτής της έρευνας είναι να εξετάσει τους καθοριστικούς παράγοντες του Διεθνούς Τουρισμού στην Κύπρο. Χρησιμοποιώντας ένα εξειδικευμένο οικονομετρικό υπόδειγμα της νέας εμπειρικής βιομηχανικής οργάνωσης και δεδομένα από την Στατιστική Υπηρεσία, τον Κυπριακό Οργανισμό Τουρισμού, το Διεθνές Οργανισμό Τουρισμού και τη Διεθνή Τράπεζα από τον Ιανουάριο 2003 μέχρι το Δεκέμβριο 2006 η έρευνα αυτή εκτιμά τη ζήτηση του τουρισμού στην Κύπρο. Τα αποτελέσματα της έρευνας δείχνουν ότι η ζήτηση για τουρισμό στην Κύπρο δεν επηρεάζεται από το συγκριτικό κόστος των διακοπών στην Κύπρο και αυξάνεται καθώς μειώνεται το κόστος μεταφοράς των τουριστών είτε αυτό είναι το ταξιδιωτικό κόστος, είτε η δυσκολία πρόσβασης στην Κύπρο. Όταν όμως αφαιρείται ο πιο σημαντικός παράγοντας του κόστους μεταφοράς, δηλαδή, η ύπαρξη απευθείας πτήσης για Λάρνακα, τότε το κόστος των διακοπών στην Κύπρο επηρεάζει σημαντικά τη ζήτηση του τουρισμού. Επίσης, οι κλιματολογικές διαφορές, η κοινή Ευρωπαϊκή ταυτότητα και η καλύτερη κάλυψη της χώρας προέλευσης των τουριστών με απευθείας πτήσεις προς στην Κύπρο επηρεάζουν σημαντικά την τουριστική ζήτηση και πρέπει να αποτελούν στρατηγικούς στόχους του Κυπριακού Οργανισμού Τουρισμού.

I. INTRODUCTION

While one of the world's major industries, the tourism industry has failed to attract mainstream economic research. According to the World Tourism Organization receipts from international tourism have almost doubled in the 1990s reaching almost half a trillion dollars by 2000 and are expected to quadruple by 2020. A labour-intensive industry, employing an estimated 100 million people around the world, the tourism industry ranks high among other industries in foreign currency receipts making tourism an important stimulant of investments in new infrastructure, as well as a major source of government revenues. Evidence that tourism comprises a huge portion of GNP in many developing and small countries makes clear the profound importance of tourism for development.

Cyprus is one such country where tourism is a major source of income and a driver of economic growth. By the end of the 1990s revenues from tourism have reached almost 20% of GNP. The 2000s, however, have led to a slowdown in tourism arrivals and receipts, as well as in the role of tourism as a source of national income. While a major cause of the slowdown are the September 11, 2001 terrorist attacks, industry expects and related research show that the slowdown in Cyprus may be due to loss of competitiveness as a tourist destination and other possible factors. The purpose of this study is to develop a model of demand for Cyprus tourism and evaluate some of the determinants of this demand by using new empirical industrial organization techniques.

As a form of international trade, international tourism has many a times been dealt with in a general equilibrium trade framework. This study treats tourism as a separate industry and applies a structural discrete choice model of differentiated products to a dataset of tourist flows. Such a model allows for the inclusion of observed and unobserved heterogeneity in tourists, as well as observed and unobserved product characteristics, which in this study include characteristics both from the country of origin and from the country of destination. While a general theoretical model will be presented, one that can be used in a multiple destination framework as proposed by Eilat & Einav (2004), the current empirical study will focus on the case of Cyprus. The consumer's (tourist's)

choice, therefore, will be modelled as a choice between Cyprus and all other foreign or domestic tourist destinations, including staying at home.

The structure of this paper is as follows. Section II surveys the existing tourism literature. The data and variables used for this estimation are presented in Section III. Section IV presents the study's findings and Section V concludes. The appendix in the end lays the empirical foundations for this study by describing the estimation technique and its properties.

II. RELATED LITERATURE

Two strands of literature emerge that involve the tourism industry. The first is the international trade literature, still in its infancy regarding tourism, where tourism is treated as a form of international trade. The second strand of literature is the empirical tourism literature. The current study fits more closely to the latter. Specifically, the methodology in this paper follows closely the industrial organization demand model proposed by Eilat & Einav (2004).

As explained in Eilat & Einav (2004), the Heckscher–Ohlin paradigm, explains trade flows mainly based on relative factor endowments; an attractive approach as it allows the approximation of factors of production by a low dimensional vector such as labour and capital. For tourism, however, the most important 'factors of production' are unique and hard to quantify or measure (e.g. the sandy Cyprus beaches). This makes the exercise of explaining cross-sectional tourism flows around the world not theoretically appealing — the ability of Protaras beaches to attract tourists is best measured by the number of tourists who visit them. A more interesting line of research when dealing with tourism is investigating the effects of variables that vary over time on tourism demand.

In the empirical tourism literature, some papers use time series and co-integration models in an attempt to forecast future tourism flows between one or several pairs of countries¹ and other papers estimate the determinants of tourism demand using multivariate regressions.² These latter papers mainly apply cross-

¹ Examples are Wong (1997), Kulendran (1996) and Turner et al. (1997).

² For a survey of this literature, see Crouch (1994a, 1994b) and Witt and Witt (1995).

sectional Ordinary Least Squares techniques for a limited number of countries around the world.

One issue that arises from reviewing the literature is how to represent tourism prices. With no indices for tourism prices generally available, researchers use relative nominal or real exchange rates to proxy for tourism prices. Whereas the latter better accounts for changes in actual cost of living in both countries, both indices suffer as they are measured relative to a base year. They can therefore trace changes in costs over time, but fail to capture the actual differences between countries in costs of living.

Another component of tourism costs is the price of transportation. Lacking consistent data on transportation prices, researchers use the distance, time and inconvenience of travel as proxies for these costs. Some models also include a price index of competing destinations to account for potential competition, redundant in this study since explicitly modelling the multinomial choice takes into account all alternative destinations. Moreover, the estimation results found in this literature regarding prices vary dramatically both within and across papers.³

Another variable that is widely used is income in the origin country. The results here seem to support the fact that tourism is a luxury good, with income elasticity roughly between one and two.⁴ A still unresolved issue, however, is the effect of income distribution on tourist trends. Additional variables that were used occasionally are weather indices, trade flows between countries, and special events.

The literature on Cyprus tourism fits closely in the above description⁵. A notable departure to the usual strands of literature is the paper by Clerides, Nearchou and Pashardes (2006) where they try to see whether the prices of certain travel

³ Witt (1980) finds elasticities between -0.05 and -0.69, and Loeb (1982), in a study on tourism to the USA, estimates these elasticities to be between -0.42 and -6.36.

⁴ For example, Little (1980) finds income elasticities between 1.4 and 2.2.

⁵ See Athanasiadou et al. (2008), Clerides & Pashourtidou (2007), Clerides et al. (2006), Haroutunian et al. (2004), Nicolaidou and Hadjistryrou (2005), Pashardes and Mamuneas (2003) and Pashardes et al. (2002).

packages that are offered in the U.K. are influenced from the ratings of several hotels in the Mediterranean, and also how the services that the hotels offer and their characteristics affect the variations in these ratings.

As pointed out in Crouch (1994b) the existing literature does not yet agree on the relationships between the demand for international tourism and its determinants. Eilat and Einav (2004) are a positive step in this direction. By using a more extensive dataset they improve upon the estimation accuracy and flexibility relative to the small data sets used so far. Specifically, they perform a rigorous panel data analysis using a three-dimensional panel data set (that is, flows between pairs of countries over time) and overcome some of the limitations of the simple reduced form OLS models that have been used so far.⁶ Following Eilat and Einav (2004), this study will view countries as differentiated products and will use a multinomial logit model that is better equipped to deal with demand systems for such goods.

III. DATA AND VARIABLE CONSTRUCTION

The main two series used to create the dependent variable are, first, data on monthly origin-to-destination⁷ tourist flows between the months of January 2003 and December 2006 and, second, data on receipts. This dataset includes all countries worldwide as origins.⁸ It is based on data collected by the Cyprus Statistical Service.⁹ Tourism in this study follows the World Tourism Organization definition: ‘the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year’. In particular, international tourists are ‘tourists who stay at least one night in a country where

⁶ One notable attempt to use a more structural model in order to calculate price elasticities was made by Papatheodorou (1999), who applied an AIDS (Almost Ideal Demand System) analysis.

⁷ The purpose of this paper is to complete the collection of panel tourism origin-to-destination data for all countries and not just for Cyprus. However, these data are not yet complete hence the empirical estimation is carried out with Cyprus as the only destination.

⁸ Countries with very small numbers of arrivals are grouped together in categories by continent.

⁹ This is compiled and published annually in the “Cyprus Statistical Service Tourism Abstract”.

they are not residents,' where a resident is 'a person who has lived for most of the past year in a country'.¹⁰

Data on length of stay are also available through the Cyprus Statistical Service. Clearly, if a price of a country increases then potential visitors can either substitute to a different destination or shorten the length of stay. In future research, the data could be used for analyzing the industry, treating tourists' actions as a two-step decision: where to go and for how long to stay. The discrete choice modeling would then be modified to accommodate the continuous choice of length of stay. To answer the current question at hand, however, a discrete choice model seems the natural path to follow. The length-of-stay data are used as a denominator to the dependent variable when conducting robustness checks.

The World Tourism Organization classifies tourism into five groups according to the purpose of travel: leisure tourism, visiting friends and relatives, business and professional travel, travel for religious purposes, and other purposes. While all these groups are interesting and worthy of independent studies an aggregation of all types of tourism may have undesirable results. The main problem is that the appropriate explanatory variables might vary by purpose of visit. In this paper it was therefore decided to focus on leisure tourism, defined as tourism for the purposes of 'sight-seeing, shopping, attending sporting and cultural events, recreation and cultural activities, non-professional active sports, trekking and mountaineering, use of beaches, cruises, gambling, rest and recreation for armed forces, summer camp, honeymooning, etc.' I therefore choose only explanatory variables that are equipped to explain this type of tourism.

The final step towards creating the dependent variable is dividing the adjusted tourist flows by the population of the origin country. The latter series was obtained from the World Development Indicators (WDI, 2007).

Turning to the explanatory variables, these can be grouped into the price variables and three additional groups: variables that describe the origin-

¹⁰ For tourism definitions visit the World Tourism Organization (WTO) website at <http://www.world-tourism.org>.

destination relationship, variables that are destination specific, and variables that are origin specific. The price variables I use for this study are the relative cost of living in the destination with respect to the origin and the price of crude oil to approximate for general transportation costs.¹¹ The proxy for cost of living is the reciprocal of the PPP conversion factor, which represents the purchasing power of one euro in the country. The relative purchasing power, therefore, shows how many ‘baskets’ of goods a tourist has to give up in his home country in order to buy a ‘basket’ of goods in the destination. Given that specific tourism price indices do not exist, I believe that this variable best represents what tourists take into consideration while making their decision about if and where to travel. Not only does this variable capture changes in real exchange rates over time, but it also captures the cross-sectional variation in the cost of travel.¹²

The group of variables that control for origin–destination relations consists of economical, cultural, and geographical variables. To proxy for the intensity of the economic relations between the countries, one uses the gross annual value of bilateral trade in goods between the countries (i.e. the sum of trade in both directions).¹³ I standardize this figure by dividing it by both countries’ GDPs (from the WDI), in line with the gravity equation. An additional benefit of using this variable is that it can control for the number of business tourists traveling between the countries. Since Cyprus is the only destination, country dummies control for similarity in culture between the origin and the destination. Finally, the geographical variables include the following: the distance between the countries, a dummy for direct flight connections, the flight frequency, the flight coverage of the origin country, the number of cities covered, the difference in average monthly temperatures that capture differences in climate, and a dummy for European Union (EU) membership. For measuring the distance between the countries the location of a country is taken to be at its capital. This variable is important since it proxies for country-specific transportation costs.¹⁴ The dummy

¹¹ Source: International financial statistics

¹² The latter cannot be captured by the real exchange rate, since it is indexed relative to a base year.

¹³ Source: Cyprus Statistical Service.

¹⁴ The distance captures the cross sectional variation in transportation costs, but does not account for changes in them over time. This is done by the price of oil variable assuming that the cost per mile of travel changes uniformly across different routes.

for direct flight connections is very important to capture the probability to travel as flying is almost always the only option to get to Cyprus. The flight frequency variable is a monthly measure of the flights between the two countries collected from daily newspaper publications of all flight arrivals into Cyprus matching them to their origin. The flight coverage variable is a constructed variable that takes into account the population density of the origin as well as the number of cities that have direct flight to Cyprus. The temperature difference variable is constructed subtracting the average monthly temperature of the origin from the average monthly temperature of the destination country. It approximates the incentive to travel to a warmer destination than home. Finally, the dummy for EU membership is needed to approximate the convenience of travel within EU borders that does not require passports, visas or other limiting documents. Note that the country-pair variables that do not vary over time are superfluous in specifications that include country of origin dummies.

For the destination only a single variable is included: GNP per capita, PPP adjusted (WDI, 2007). This variable approximates the level of development of the destination country. Other destination variables are not included since Cyprus is the only destination and they do not vary by time.¹⁵

For the origin I include GNP per capita (WDI, 2007) as an economic variable. This variable is used to measure how the traveling habits of people in the origin country respond to a change in their wealth. Additional origin-specific variables that do not change over time are not used when origin dummies are included in the specification.¹⁶ In the two specifications that I do not use origin dummies, I use a Euro area dummy that captures the additional convenience over and above EU membership since currency exchange is not involved.

Table 1 shows annual characteristics of Cyprus tourism aggregated by year for the years of the dataset, 2003 to 2006, and also shows monthly data for the month with the most arrivals in 2006 (August) and the month with the least arrivals in 2006 (December). The total arrivals in thousands of tourists are broken

¹⁵ In the full empirical model when more destinations will be added I will use the rich data collected.

¹⁶ No attempt is made in this study to explain differences in the general propensities to travel across nations that may depend on unobservable cultural factors. This is left for future research.

by purpose of visit: leisure, business or other. The table also reports the receipts from tourism in total and per tourist, the average length of stay in Cyprus and the occupancy rate in tourist accommodations such as hotels and apartments. Following the worldwide slowdown in tourism after the September 11, 2001 terrorist attack shown in Figure 1, the figures in Table 1 paint the path to the future of Cyprus tourism. Though the absolute number of tourists starts to pick up in 2003, 2004 and 2005 it falls again in 2006. However, what is evident is that the receipts per tourist and consequently the total receipts have increased. This fact in conjunction with a decreasing average length-of-stay and a decreasing occupancy rate may be a result of a strategic plan by local tourism authorities to attract luxury tourism, or tourism of 'higher quality'. From the two last columns, we can deduce that receipts per tourist also vary by purpose of visit. Leisure tourists are more willing to spend when on vacation unlike business and other tourists.

Table 1: Annual Characteristics of Cyprus Tourism 2003-2006

	2003	2004	2005	2006	2006	
					August	December
Arrivals (thousands) ¹	2,303.20	2,349.00	2,470.10	2,400.90	314.8	71
Receipts (million €) ¹	1,734.20	1,678.40	1,718.30	1,755.30	264.8	49.2
Receipts per tourist (€) ¹	753	715	696	731	841	693
Average length of stay (days) ¹	10	9.9	9.6	9.5	12	11.9
Leisure Tourism (%) ¹	89.1	89.4	88.8	87.1	92	66.6
Business Tourism (%) ¹	5.5	5.9	5.8	6.3	2.2	12.3
Other Purpose Tourism (%) ¹	5.3	4.5	5.1	6.6	5.8	21.1
Tourist Accommodation Occupancy Rate (%)	48.9	43.7	45.1	43.3	73	14.5

Sources:

¹ Cyprus Statistical Service (tourism statistics).

² Cyprus Tourism Organization.

Along the same lines Figure 1 compares the trend of Cyprus tourism to worldwide tourism. Over the 1990s and up to September 2001, Cyprus tourism follows an upward trend fairing better than the rest of the world. After the summer of 2001, world tourism trends slowed down. Cyprus tourism, however, started decreasing and although it picked an upward trend again after 2003 like the rest of the world, Cyprus tourism rises at a lower rate. In fact, we see in Figure 1 what

was observed in Table 1 as well, that there is a fall in tourist arrivals in 2006, which remain steady in 2007 as well.¹⁷ There are two possible conclusions from the difference in the two trends. In one hand, it is possible that the local tourism organization is indeed trying to attract ‘less but better’ tourists. This translates into higher receipts per tourist observed in 2006. It is also possible that the recent slowdown in Cyprus tourism at a time when worldwide tourism increases is due to loss of competitiveness of Cyprus as a tourist destination. This necessitates the current and future research on evaluating the determinants of tourism demand.

Figure 1: Cyprus versus World Tourism Trend

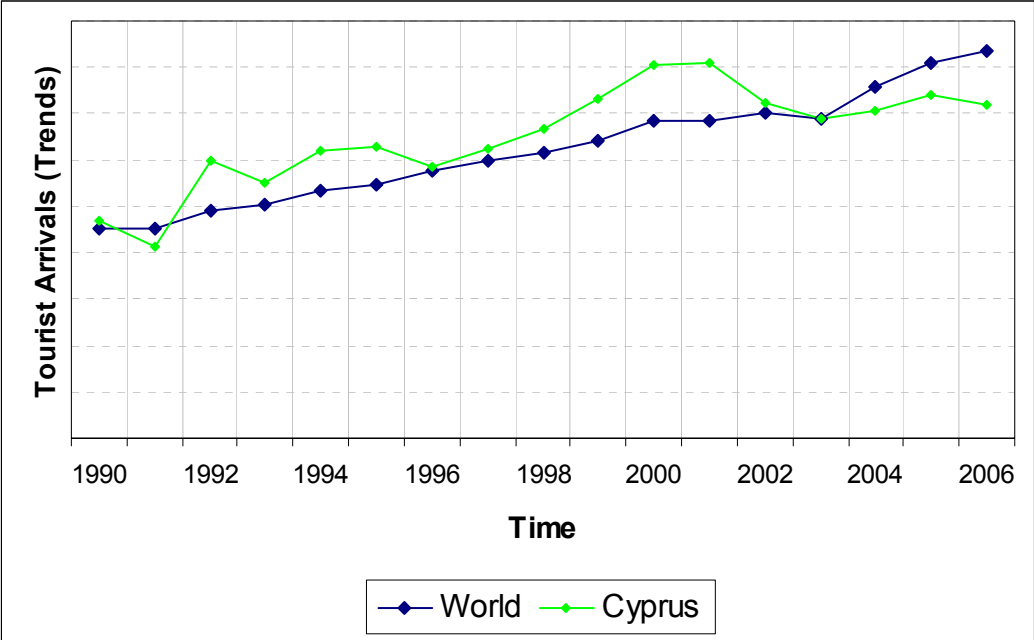


Table 2 provides a picture of incoming tourism to Cyprus in 2006 by country of origin. What is directly evident from this table is that it is not sufficient to look at the absolute tourist arrivals to understand the composition of the tourism market. An important observation is that about 56.7% of all incoming tourists are from the United Kingdom. This is immensely different from the second ranking country, which is Germany with 6.4%.

¹⁷ Cyprus Statistical Service.

Table 2: Characteristics of Cyprus arrivals total & by country of origin, 2006

	Cyprus arrivals (tourists)	Country arrivals / Total Cyprus arrivals (%)	Country arrivals / Population (%)	Country arrivals / Total leisure travel (%)	Country arrivals / Total outbound leisure travel (%)
Total	2,399,841	100	0.044		
Austria	23,782	1.0	0.290	0.555	1.359
Belarus	1,929	0.1	0.020		
Belgium	24,261	1.0	0.234	0.348	0.497
Bulgaria	3,761	0.2	0.051		
Czech Republic	18,759	0.8	0.183	0.054	0.455
Denmark	30,795	1.3	0.133	0.219	0.467
Estonia	1,450	0.1	0.109	0.090	0.279
Finland	30,327	1.3	0.580	0.125	0.969
France	37,773	1.6	0.060	0.017	0.197
Georgia	316	0.0	0.007		
Germany	152,803	6.4	0.185	0.159	0.329
Greece	126,760	5.3	1.186	1.232	15.782
Hungary	11,452	0.5	0.115	0.040	0.306
Iceland	127	0.0	0.042		
Ireland	47,457	2.0	1.168	0.333	0.687
Israel	34,191	1.4	0.538		
Italy	17,860	0.7	0.031	0.013	0.077
Latvia	3,068	0.1	0.135	0.000	0.343
Lithuania	2,785	0.1	0.078	0.032	0.093
Luxembourg	863	0.0	0.182	0.039	0.040
Netherlands	28,205	1.2	0.171	0.047	0.070
Norway	50,660	2.1	1.099	0.328	1.048
Poland	13,700	0.6	0.036	0.021	0.160
Portugal	1,196	0.0	0.011	0.007	0.054
Romania	7,028	0.3	0.032	0.023	0.318
Russia	114,758	4.8	0.081		
Slovakia	5,047	0.2	0.093	0.031	0.066
Spain	4,213	0.2	0.010	0.004	0.046
Sweden	94,023	3.9	1.043		
Switzerland	41,551	1.7	0.552		
United Kingdom	1,360,129	56.7	2.244	4.055	15.551
Ukraine	6,369	0.3	0.014		
Other European	10,277	0.4	0.010		
Africa	11,327	0.5	0.001		
America	26,347	1.1	0.003		
Asia	41,739	1.7	0.002		
Oceania	12,753	0.5	0.038		

Country arrivals are the numbers of tourists arriving in Cyprus from the corresponding origin country.

Total leisure travel is the number of tourists by country that has gone on holiday for at least one day.

Total outbound leisure travel is the number of tourists by country that has gone on holiday abroad for at least one day.

Data for total or outbound leisure tourism by country only exists for certain countries. Hence, the totals used to derive the total percentages rely only on the data from these countries.

The fourth column shows arrivals as a percentage of population. This is the way market shares are constructed in this paper as the market size is taken to be all

prospective tourists, which could conceivably be all the people living in an origin country. A better measure of the market size could be the sum of those people that at every time period intend to carry out travel for leisure. This is captured in the fifth column. An alternative measure of the market size could be the sum of those people that at every time period intend to carry out outbound travel for leisure. This is captured in the last column. However, since a lot of the observations are missing in the last two columns this is left for future research.¹⁸

IV. ESTIMATION RESULTS

Using the variables constructed above, in this section the estimation based on the empirical strategy described in the appendix is performed. A pooled logit regression was run, imposing a uniform set of coefficients across all origin countries. This allows one to arrive at a better understanding of general tendencies in the tourism market.¹⁹

The results of the estimation are described in Table 3. Table 3 displays six model specifications that are grouped into a set of regressions for country-time observations when direct flights existed (Models 1 to 3) and into a set of regressions for all observations (Models 4 to 6). The reason for this separation is that it is presumed, and this is later confirmed by the results, that factors that affect tourists' choices when there is a direct flight to Cyprus are different from those influencing their choice of traveling with a connecting flight.

Within each set three different specifications used. The second regression includes dummy variables for every destination–origin pair. These account for relationship-specific unobservables, as well as for origin fixed effects. The goal then remains to explain variation over time in flows of tourists to Cyprus. One

¹⁸ In the case of Cyprus it is very important to consider these alternative measures of market size in future research since capacity constraints have to be taken into account. Data on capacity have been collected and are to be used in a subsequent study.

¹⁹ When key coefficients are allowed to vary by origin country this enables one to calculate country-specific own elasticities in a more flexible and accurate way, as depicted by Equation 5.

also attempts to explain, with the help of the economical and geographical variables, why there are more tourist flows between some country pairs than between others. The first and third regressions drop the country dummies. Here the explanatory variables try to explain the propensity to travel of each origin country, rather than just assume a country has an unobserved propensity that is fixed over time. This is an interesting exercise, and is perhaps more appealing in this study with one destination than the second regression since many country characteristics are not fixed over time as explained in Section IV. Note also that in all these specifications month dummies are included to account for seasonal trends of traveling. The last regression differs from the first regression in its combination of these variables used in the regression.

I now move to a discussion of the results. First, it is reassuring that most coefficients in all regressions obtain the expected signs and reasonable orders of magnitude. Furthermore, the key coefficients are stable across the different specifications that were tried.

The coefficient on price is between -0.77 to -0.65 in the first set of regressions and between -0.24 to -0.19 in the second set. This is statistically significant for the regressions that do not include the country dummies but is statistically insignificant for the regressions that include country dummies. A possible explanation is that the PPP conversion factor does not vary a lot on a monthly basis. This result is in line with economic intuition. Tourists that have direct flight connections are more price-sensitive; they might consider Cyprus as a possible destination because of the convenience of the direct flight or can exploit directly advertised packages to Cyprus that are most of the times accompanied by a direct flight or they might be last minute travelers, less probable when there is a flight connection. When I include all tourists in the second set of regressions the sensitivity to prices reduces. In these cases the cost of travel is also driven by other costs such as transportation costs, costs of organized tours or the alternative cost of leisure, which are all independent of the cost of living in the destination country.

Table 3: Multinomial logit estimation of determinants of Cyprus tourism

	Direct Connection			All Connections		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
log (destination cost / origin cost)	-0.650*** (0.172)	0.022 (0.133)	-0.766*** (0.197)	-0.240*** (0.018)	-0.022 (0.158)	-0.185*** (0.014)
log (price of oil)	-0.308* (0.140)	-0.565*** (0.080)	-0.190*** (0.016)	-0.273*** (0.074)	-0.700*** (0.114)	-0.139*** (0.013)
Country-pair						
log (trade)	0.246*** (0.039)	0.137*** (0.097)	0.322*** (0.046)	0.437*** (0.049)	0.203*** (0.055)	0.437*** (0.037)
log (distance)	-0.587*** (0.107)	-0.570*** (0.155)	-1.789*** (0.109)	-0.432*** (0.112)	-0.276*** (0.069)	-1.900*** (0.086)
direct flights				1.690*** (0.097)	0.278*** (0.080)	0.433*** (0.081)
flight frequency	0.803*** (0.040)	0.412*** (0.041)	0.148** (0.052)	0.006*** (0.000)	0.002* (0.000)	0.004*** (0.000)
flight coverage	-0.018 (0.035)	-0.057 (0.035)		0.000 (0.000)	0.000 (0.000)	
cities covered			0.044* (0.017)			0.023* (0.009)
temperature diff.	0.071*** (0.013)	0.339** (0.013)	0.156*** (0.014)	0.061*** (0.014)	0.309*** (0.017)	0.146*** (0.011)
travel within EU	-0.173 (0.112)		0.942*** (0.130)	0.073 (0.129)		0.791*** (0.099)
Destination: Cyprus						
log (GNP pc)	0.500 (1.970)	0.132 (0.114)	-3.202 (2.278)	0.553 (2.410)	2.440 (1.580)	1.480 (1.850)
Origin						
Origin dummies		yes			yes	
log (origin GNP pc)	1.860*** (0.144)	0.349* (0.142)	3.241*** (0.166)	1.040*** (0.145)	0.685** (0.343)	2.240*** (0.112)
Euro area	-0.695*** (0.100)		-0.993*** (0.113)	-0.299* (0.127)		-0.711*** (0.098)
Month dummies	yes	yes	yes	yes	yes	yes
Observations	816	816	823	1581	1581	1581
Adjusted R-squared	0.709	0.909	0.740	0.498	0.789	0.677

The dependent variable in all regressions is $\log(s_{odt}) - \log(s_{o0t})$ as given by Equation 3. Model 3 and 6 adapt the outside option to specific origin characteristics as explained in the Section IV.

The table is based on a specification that imposes the same coefficients across different origins.

Significance at the 1%, 5%, 10% level is denoted by ***/**/* respectively. Standard errors in parentheses.

Description of the variables and list of excluded categories are provided in Section III.

The fact that these elasticities are less than one, as estimated by Eilat and Einav (2004), positions Cyprus, in their framework, somewhere between low and high GNP destinations, the latter being the more price sensitive choices. In general, the results on the price coefficients suggest that the general level of prices in

destinations is taken into account by travelers when making travel decisions and only the fluctuations in prices over time are unimportant.

The coefficient on price is between -0.77 to -0.65 in the first set of regressions and between -0.24 to -0.19 in the second set. This is statistically significant for the regressions that do not include the country dummies but is statistically insignificant for the regressions that include country dummies. A possible explanation is that the PPP conversion factor does not vary a lot on a monthly basis. This result is in line with economic intuition. Tourists that have direct flight connections are more price-sensitive; they might consider Cyprus as a possible destination because of the convenience of the direct flight or can exploit directly advertised packages to Cyprus that are most of the times accompanied by a direct flight or they might be last minute travelers, less probable when there is a flight connection. When I include all tourists in the second set of regressions the sensitivity to prices reduces. In these cases the cost of travel is also driven by other costs such as transportation costs, costs of organized tours or the alternative cost of leisure, which are all independent of the cost of living in the destination country. The fact that these elasticities are less than one, as estimated by Eilat and Einav (2004), positions Cyprus, in their framework, somewhere between low and high GNP destinations, the latter being the more price sensitive choices. In general, the results on the price coefficients suggest that the general level of prices in destinations is taken into account by travelers when making travel decisions and only the fluctuations in prices over time are unimportant.

The coefficient on the price of crude oil enters all specifications with a negative sign and is statistically significant. This is consistent with economic theory. Demand for travel, regardless of destination, is reduced when transportation costs are higher. This is more pronounced for Cyprus towards which travel involves at least one flight.

The volume of bilateral trade also enters all specifications with a negative sign and is statistically significant. The coefficient is varies between 0.14 and 0.44. When country dummies are omitted the parameter estimate increases, suggesting that bilateral trade possibly captures some of the 'stable' unobserved links between origin and destination.

The coefficients on distance, direct flights, and flight frequency all obtain the expected signs, and are all statistically significant. These coefficients are meant to capture the origin-specific transportation costs that include the inconvenience of traveling to the chosen destination. Flight coverage and cities covered are meant to measure the extent to which the country of origin is covered by the existing flights for travel to Cyprus. The former is a constructed variable as explained in Section III that comes out as insignificant. It is possible that what this variable is trying to capture is already captured by flight frequency. The much simpler latter variable, a simple count of the different cities with flights to Cyprus comes out positive and significant. This shows that in addition to the positive effect of how frequently there exist flights to Cyprus, it is important to have flights covering different regions in the country of origin. A richer dataset could actually split the country of origin into regions and regional characteristics could be included in the model. Finally, the temperature differential shows that the colder it is in the country of origin the higher the possibility to travel to Cyprus.

The coefficients on GNP for the origin are all positive and statistically significant and are implying an income elasticity of between one and three. This is consistent with previous results in the literature, suggesting that tourism is a luxury good. A worrisome result is that the coefficients on GNP for the destination are all positive but statistically insignificant. One may be worried that the coefficient on destination GNP is insignificant due to a possible endogeneity problem. This is because higher tourism receipts increase the GNP and in Cyprus tourism receipts account for 20% in GNP.²⁰

Finally, in all the specifications low serial correlation is obtained in the error term (correlation coefficient of less than 0.2 in most cases), even when country dummies are included. This may suggest that fashions do not play an important role in the choice of destination unlike what research that uses annual data has shown. Using Equation 5 one may proceed to calculate price elasticities. The same model is estimated but the price coefficients are allowed to vary across origins.

²⁰ Endogeneity concerns can also be raised regarding the price variable. However, when one estimated the reported regressions omitting the destination countries for which tourism receipts accounted for a high fraction of the GNP (5% was used as the cutoff) very similar results were obtained, suggesting that endogeneity is not driving these results.

V. CONCLUSIONS

The purpose of this study is to address some of the peculiarities of the tourism industry continuing the task by Eilat and Einav (2004). As a fast growing industry, it is important to identify the determinants for tourism demand. Using flows of tourists between origin countries and Cyprus the demand for tourism in Cyprus was estimated. An estimation technique was used which is common in the industrial organization literature, and those aspects that are important for leisure tourism demand were emphasized.

The main findings are that tourism to Cyprus from countries with direct flights to Cyprus has a price elasticity of about 0.7, while overall tourism to Cyprus is less responsive to price changes as shown by a price elasticity of about 0.2. It is possible that tourists who come to Cyprus with at least one flight connection have a strong, unobserved preference to come to Cyprus that lowers the overall sensitivity to prices. In an extension to the current study, it would be interesting to try and differentiate between the two groups and with better data uncover the possible causes for this difference.

Transportation cost, overall and origin-specific is shown to be quite important for choosing Cyprus as a destination. The local tourism authorities may be unable to cut down the cost that is related to distance and the price of airplane fuel but they could address the issue of inconvenience and coverage. In other words, there should exist frequent direct flights from the target origin countries and they should be departing from many cities so as to cover as much of the population of the target origin country as possible.

Equally important finding is the relative effect of country-of-origin characteristics on the demand for tourism in Cyprus. It seems that colder countries should be the main target for local authorities' marketing efforts: the colder the better. At the same time, when choosing among two similarly cold countries, the one closer to Cyprus would be a better target. Finally, the convenience of travel within the European Union should not be underestimated. On one hand, this might be due to the convenience of travel without passports, with shorter lines at immigration and no worries going through customs. On the other hand, EU membership could signal safety and accountability of local tourist authorities to provide the best service to tourists.

Compared to previously obtained results, the results are based on a more detailed dataset and a more rigorous estimation technique is used. They are quite stable across specifications and may provide more subtle evidence for the determinants of Cyprus tourism. Further research on this topic is important and may be feasible once more data becomes available. It can follow several paths. To name a few, one could take advantage of data on multi-destination trips in order to analyse whether country pairs are substitutes or complements. This would shed a better picture on how to contrast Cyprus as a destination to substitute in marketing efforts by the Cyprus Tourism Organization and how to co-advertise Cyprus with complement destinations. Individual-level data can shed light on tourism habits and complement aggregate level studies such as the present one to help better determine the best target countries of origin. Combining this with willingness to spend on tourism, the goal of the Cyprus Tourism Organization should be to attract fewer (cost-minimizing) but better-quality (profit-maximizing) tourists. Finally, one may extend the framework to allow for the possibility that a country improves flight schedules and develops tourism facilities to endogenously increase its inflow of tourists.

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APPENDIX: EMPIRICAL STRATEGY

Following Berry (1994) and Eilat and Einav (2004) I will treat international tourism flows as a demand system for differentiated products, where different destination countries are viewed as the different products supplied. Each country of origin in a certain year is treated as a separate demand market. The consumers in each market make the discrete decision regarding their most preferred destination. The discussion that follows describes the general theoretical model that can be used in a multiple destination framework. In the estimation I will focus on one destination, Cyprus.

The empirical strategy will concentrate on consumer choice. The existing literature suggests that capacity constraints and other tourism supply factors do not play a major role in explaining short-run variation in tourist flows. Even in the long run, tourism supply is very elastic with respect to total tourism costs. This is because, the most important factors of production are usually non-substitutable (e.g. sights) or non-rival (e.g. weather) goods. They therefore determine the level of demand, but their supply does not respond to prices. The supplementary inputs of tourism services are likely to adjust to any level of demand without having a drastic effect on tourism prices. Moreover, tourists consume non-tourist goods as well, the supply of which is elastic with respect to the tourism industry. Tourism prices, therefore, cannot be completely disentangled from the general price level of the destination country. For these reasons, most of the variation over time in tourist flows can be captured by modeling the demand as a function of the cost of the destination country and other variables. The exogenous changes in the price level of the country (i.e. the exchange rate) shift the elastic supply curve and identify the downward sloping demand curve.

To estimate this demand system, a standard multinomial logit technique as in McFadden (1973) is used. Each destination country in a given year can be described as a bundle of characteristics, so that the utility of consumer i , resident of origin country o , from traveling to destination d in year t , is given by:

$$u_{iodt} = X_{odt}\beta^o + \xi_{odt} + \varepsilon_{iodt} \quad (1)$$

where X_{odt} denotes the different characteristics of the origin country and the destination country, which may either be fixed (e.g. language) or vary across years (e.g. relative price). ξ_{odt} is the unobserved (to the econometrician) perceived quality of destination d in a given year t for residents of origin o , and ε_{iodt} is an individual error term, which is distributed i.i.d. across individuals and country pairs, as well as over time. β^o is a vector of parameters to be estimated, which may be allowed to differ across origin countries.

Consumer i of country o in year t evaluates his utility from any destination d given by Equation 1 and chooses the destination that maximizes his utility. One possible choice is the outside good (denoted as destination zero), i.e. the choice not to travel abroad and travel domestically or not travel at all. Since only the differences in utilities between the destinations are identified in this model, the utility from the outside good is normalized to be zero in each market.

If it is assumed that the ε_{iodt} are distributed according to a type I extreme value distribution (whose cumulative distribution function is $F(x) = \exp(-e^{-x})$), then they can be integrated out, so that the predicted market share of destination d in market o in year t becomes:

$$s_{odt} = \frac{\exp(\delta_{odt})}{1 + \sum_k \exp(\delta_{okt})} \quad \text{where } \delta_{odt} = X_{odt}\beta^o + \xi_{odt} \quad (2)$$

Equation 2 can be rearranged so that one obtains the following equation, which can be then taken to the data:

$$\log(s_{odt}) - \log(s_{o0t}) = X_{odt}\beta^o + \xi_{odt} \quad (3)$$

The observed market share used for the estimation is the annual number of tourists arriving from origin country o to destination d divided by the total population in origin o . This implies that each resident decides once a year whether to go abroad, and to which destination. The above specification, with prices in natural logarithms, implies the following own price elasticity η_{od} of destination d in the market of country o (the time subscript is dropped for simplicity):

$$\eta_{od} = \frac{\partial s_{od}}{\partial p_{od}} \frac{p_{od}}{s_{od}} = \beta^o (1 - s_{od}) \quad (4)$$

where p_{od} is the relative price in destination d with respect to the origin o . β^o is the coefficient on the logarithm of price, which may be allowed to vary across origins.

There are several generalizations of the multinomial logit model that partially solve this problem, such as the nested logit (Cardell, 1997) or random coefficients (Berry et al., 1995). While these are possible directions to follow, they are not essential here since the use of a three-dimensional dataset can somewhat compensate for the limitations of the logit model, allowing it to yield reasonably flexible results. This is true because, in the authors' view, for most practical applications the parameter of interest is not the own (or cross) price elasticities for tourists from a single origin, but the own (or cross) price elasticities from the overall world market. This requires aggregating data from different market segments. Doing this, one gets (again, the time subscript is dropped for simplicity):

$$\eta_d = \frac{\partial arr_d}{\partial p_d} \frac{p_d}{arr_d} = \frac{\sum_o \beta^o M_o s_{od} (1 - s_{od})}{\sum_o M_o s_{od}} \quad (5)$$

where η_d is the own price elasticity of destination d . arr_d is the total arrivals to destination d in a given year, M_o is the size of the market of origin country o , which in this case is just the population size, and p_d is the price level in destination d .

The above model is estimated using several specifications, and including alternative sets of fixed effects. There are a few important things to note about the different specifications and their interpretations. First, in this application the unobserved characteristics of the destination may be of great importance. This is also the case with cultural links. The data set proves very useful for overcoming these difficulties, by allowing the inclusion country fixed effects in the utility function. This specification significantly improves the identification power of the parameters of interest, by basing them on the within variation in the data.

Second, as mentioned earlier, a market is a given origin country in a given year. Therefore, any set of explanatory variables that depend only on the origin (o) and the year (t), but do not vary across products (destinations), can be interpreted as affecting the utility level of the outside good. For example, year fixed effects can be interpreted as varying degrees of the propensity to travel abroad over time. It is apparent that over the observation period people travel more, so the utility of the outside good (not traveling abroad) is decreasing. Similarly, origin fixed effects capture the variation in the propensity to travel across origins. In principle, one does not aim at explaining variations in the propensity to travel, so year and origin fixed effects are included in all specifications.

Finally, it is interesting to note that even though the estimation model is based upon the aggregation of individual decision-makers, eventually an estimable equation is reached that resembles a gravity equation. As is shown in the estimation, some regularities of gravity equations for trade in goods carry over also to international tourism. Yet, the use of gravity equations seems here less founded, since a priori there is no reason to believe a country should attract and export tourists in proportion to its GDP.

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