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Measuring the Economy-wide Impact of the Tourism Industry in Cyprus

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Μέτρηση του οικονομικού αντίκτυπου της τουριστικής βιομηχανίας στην Κύπρο

Ηλίας Γιαννάκης, Νεοφύτα Έμπορα και Θεοφάνης Π. Μαμουνέας

ΠΕΡΙΛΗΨΗ

Ο τουρισμός θεωρείται ένας από τους βασικούς πυλώνες ανάπτυξης της κυπριακής οικονομίας. Παρά τη σημαντικότητα και συνεισφορά του τομέα στο παραγόμενο προϊόν, την προστιθέμενη αξία και τη δημιουργία θέσεων εργασίας, δεν υπάρχει συμφωνία ως προς την ακριβή συμβολή του στα μακροοικονομικά μεγέθη της χώρας. Σε αντίθεση με παραγωγικούς κλάδους, όπως είναι η γεωργία ή η μεταποίηση, ο τουριστικός τομέας καθορίζεται κυρίως από τη ζήτηση και ορίζεται τυπικά ως ο τομέας «Διαμονής και Εστίασης», στο Σύστημα Εθνικών Λογαριασμών. Οι στατιστικές για τον τουρισμό στην Κύπρο αφορούν τον αριθμό των επισκεπτών, τα κοινωνικοοικονομικά χαρακτηριστικά των επισκεπτών, τα έσοδα, τις ξενοδοχειακές δυνατότητες κ.λπ. Ωστόσο, τα στατιστικά αυτά στοιχεία δεν προσδιορίζουν τη μακροοικονομική συμβολή του τουρισμού. Ένα σημαντικό μειονέκτημα στις στατιστικές τουρισμού της χώρας είναι η έλλειψη Δορυφόρου Λογαριασμού του Τουρισμού (ΔΛΤ) με την εξαίρεση ενός μερικώς ανεπτυγμένου εθνικού ΔΛΤ το 2007. Οι ΔΛΤ προσδιορίζουν την άμεση επίδραση της τουριστικής βιομηχανίας στην οικονομία αλλά δεν λαμβάνουν υπόψη την έμμεση επίδραση των δαπανών των τουριστών στην οικονομία.

Το άρθρο αυτό χρησιμοποιεί το υπόδειγμα εισροών-εκροών (ΕΕ) σε συνδυασμό με στατιστικά στοιχεία από το ΔΛΤ για την εκτίμηση της άμεσης και έμμεσης συμβολής της τουριστικής βιομηχανίας στην κυπριακή οικονομία. Τα ευρήματα της ανάλυσης καταδεικνύουν ότι ο ορισμός του τουριστικού τομέα ως «Διαμονή και Εστίαση», ελλείπει δεδομένων από τους ΔΛΤ, υποεκτιμά τη συμβολή του τομέα στους βασικούς μακροοικονομικούς δείκτες της χώρας. Τα αποτελέσματα της ανάλυσης πολλαπλασιαστών εισροών-εκροών δείχνουν επίσης ότι ο ορισμός του τουρισμού ως «Διαμονή και Εστίαση» υπερεκτιμά τις πολλαπλασιαστικές επιδράσεις του κλάδου σε όρους προστιθέμενης αξίας και απασχόλησης, ενώ υποεκτιμά τις πολλαπλασιαστικές επιδράσεις του κλάδου σε όρους παραγόμενου ακαθάριστου προϊόντος. Ανεξάρτητα από τον ορισμό του τουρισμού, συνολικά ο τουριστικός τομέας δημιουργεί μεσαίες έως υψηλές άμεσες και έμμεσες επιπτώσεις στην εθνική οικονομία σε όρους παραγόμενου ακαθάριστου προϊόντος, προστιθέμενης αξίας και απασχόλησης.

Τέλος, τα ευρήματα αυτής της μελέτης τονίζουν τη σημασία δημιουργίας ετήσιων ΔΛΤ για την ολοκληρωμένη και ολιστική μέτρηση της συμβολής του κλάδου του τουρισμού στην οικονομική ανάπτυξη της χώρας.

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Measuring the Economy-wide Impact of the Tourism Industry in Cyprus

Elias Giannakis*, Neophyta Empora and Theophanis P. Mamuneas

Abstract

An input-output (IO) model is combined with Tourism Satellite Account (TSA) statistics to estimate the direct and indirect contribution of the tourism industry to the Cypriot economy. Our analysis indicates that defining tourism as 'Accommodation and Food', in the absence of TSAs, underestimates the contribution of the sector to the main macroeconomic performance indicators of the country. The results of the IO multiplier analysis reveal that the 'Accommodation and Food' definition of tourism overestimates sector's value added and employment multiplier effects, while underestimates sector's gross output multiplier effects. Irrespective of the definition of tourism, the sector in general creates medium-to-high direct and indirect effects to the economy. Finally, our findings reveal the importance of establishing annual TSAs in the country in order to provide a comprehensive and holistic measurement of the sector's contribution to economic growth.

Keywords: Tourism Satellite Accounts; Input-Output Analysis; Sectoral Structure; Inter-industrial Linkages; Accommodation and Food.

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1. Introduction

Tourism is a highly important economic sector and plays a vital role in stimulating economic growth (Dritsakis, 2012; Comerio and Strozzi, 2019). As a result, the assessment of the economic impact of tourism is at the heart of tourism strategies for destinations worldwide, especially for small island economies since the development of most of them largely depends on the tourism sector (McElroy and Parry, 2010). Given the high volatility in tourism demand, countries that become overdependent on tourism are highly susceptible to exogenous shocks that can severely affect the entire economy (Adamou and Clerides, 2009). Cyprus is an example of a such small island state with a tourism tradition, a fragile environment and structural characteristics that immediately affect its competitiveness when a crisis occurs (Boukas and Ziakas, 2013).

Tourism economic impact analysis is frequently used for estimating the contribution of tourism to national and/or regional economies, policy evaluation and scenario analysis (Sun and Wong, 2010). Unlike output-defined industries, e.g., agriculture or manufacturing, the primarily demand-defined tourism industry is not measured in the System of National Accounts as a sector on its own (Smeral, 2006). There are no NACE (Statistical Classification of Economic Activities in the European Community) or SIC (Standard Industrial Classification) codes assigned solely to the tourism sector, which is typically defined as the 'Accommodation and Food' sector in the national accounts (Teigeiro and Díaz, 2014; Kim and Kim, 2015). However, tourism is 'nested' in many industries and should be regarded as consisting of many different economic sectors (Hara, 2008). Therefore, to accurately measure the size and the impact of the tourism industry as a whole and be able to address questions such as 'how important is tourism for national economies', we first need to define 'what exactly is tourism' (Steenge and Van De Steeg, 2010; Comerio and Strozzi, 2019).

The Tourism Satellite Account (TSA) is a popular method for defining and measuring the contribution of tourism to the national economy (Frechtling, 2010). According to the TSA concepts and definitions, tourism is defined in terms of 'the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes, different from the exercise of an activity remunerated from within the place visited' (United Nations, 1994). The TSA provides valuable information with respect to where tourists spend their money as well as the extent to which different sectors directly benefit and depend on tourists' spending (Hara 2008), making it an appropriate tool for accurately measuring the size and the impact of tourism industry as a whole.

The TSA is mainly descriptive in nature and considers only the direct value-added effect of the tourism industry omitting any measurement of the indirect and induced effects of tourist consumption on the economic system as a whole. Therefore, a combination of TSAs with economic modelling approaches is required for a holistic and comprehensive tourism impact analysis (Smeral, 2006). Traditionally, one prevailing technique for conducting tourism economic impact assessments has been the input-output (IO) analysis (Hara, 2008). Based on their modular, product-specific documentation of results, TSAs provide optimal linkages to IO models (Ahlerl 2008). Other models used to estimate the primary and secondary effects of tourism activities include social accounting matrices (SAM) and computable general equilibrium (CGE) models (Dwyer et al., 2000; Dwyer, 2015). However, irrespective of the type of model that is preferred to predict the economic impact of tourism (SAM or CGE), IO tables and related data are needed in order to arrive at meaningful estimates (Los and Steenge, 2010).

Whilst tourism has long been regarded as one of the key pillars of the Cypriot economy, there is no consensus about the exact economic contribution of the tourism industry. Tourism statistics in Cyprus as well as in many countries concern number of visitors, socioeconomic characteristics of visitors, revenues, hotel capacities etc. However, these statistics are not directly related to the macroeconomic contribution of tourism. The first and – to our knowledge – only TSA for Cyprus was partially developed in 2007.

In this paper, an input-output model is combined with TSA statistics to analyse the direct and indirect effect of the tourism industry in Cyprus in terms of output, value added and employment generation. The results of the analysis reveal the importance of establishing annual TSAs in the country to provide a comprehensive and holistic measurement of the sector's contribution to economic growth.

2. Cyprus Tourism Trends

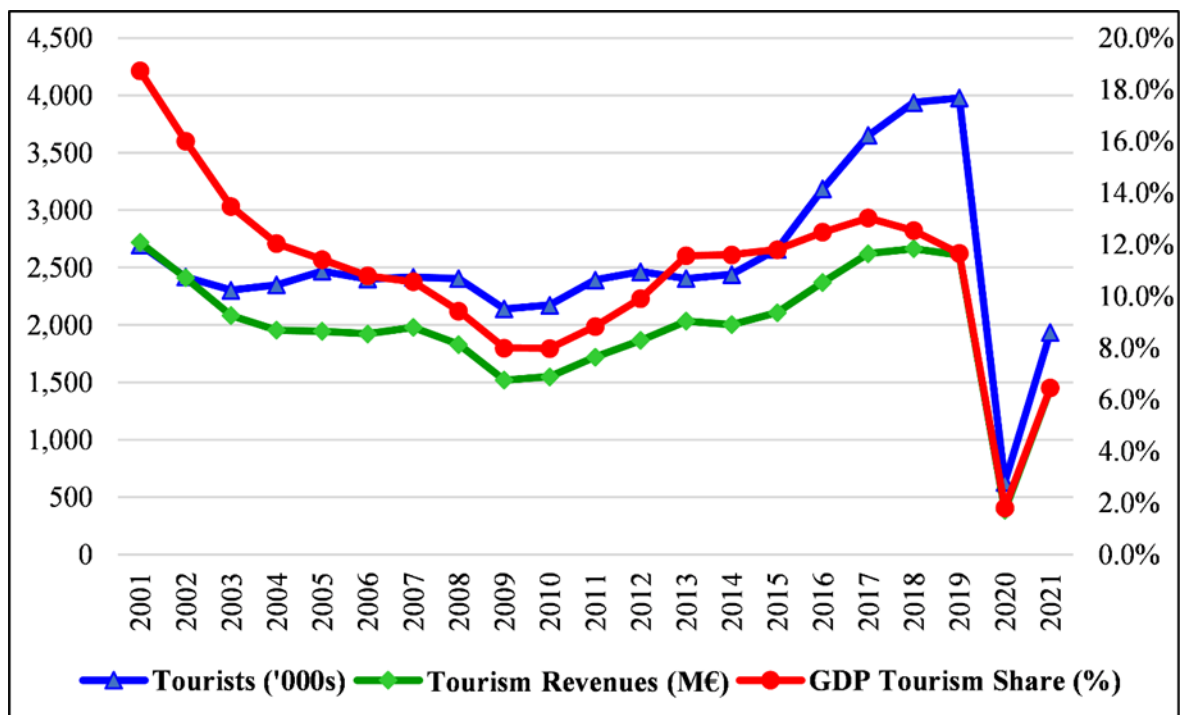
Cyprus has been a popular tourism destination over the past decades due to favorable climate and natural resources, large coastlines and rich cultural heritage. Tourism has been a major engine of growth for the Cypriot economy in the post-1974 period and the sector grew rapidly throughout the past decades (Clerides and Pashourtidou, 2007).

Figure 1 shows the tourist arrivals in Cyprus for the period 2001-2021 along with the tourism revenues in constant (2010) prices and the contribution of tourism to GDP. Tourist arrivals peaked at 3.98 million in 2019 (3.94 million in 2018). Between 2001

and 2019 the arrivals increased by 47%. On the contrary, tourism revenues decreased by 4.1% in the period 2001-2019 in constant (2010) prices. Specifically, in the period 2001-2011 the revenues decreased by 37%, while for the period 2011-2019 the revenues increased by 52%. The revenues from tourism as a percentage of gross domestic product (GDP) was 11.7% in 2019, down from 18.7% in 2001.

The tourism industry in Cyprus was hit hard by the Covid-19 pandemic crisis. Tourist arrivals and revenues decreased by 84% and 85%, respectively, between 2019 and 2020 (Figure 1). Similarly, the contribution of tourism revenues to national GDP dropped to 1.8% in 2020. Tourism, however, has played a critical role in the recovery of the economy; tourism arrivals and revenues increased by 207% and 276% between 2020 and 2021, respectively.

FIGURE 1
Tourist arrivals ('000s), tourism revenues in constant (2010) prices (million euro) and contribution of tourism revenues to GDP (%)



Source: Statistical Service of Cyprus (2022); Eurostat (2022a).

3. Methodology and Data

3.1 Tourism Satellite Account

The relationship of tourism with various economic activities has triggered interest in measuring its economic contribution at macroeconomic level and in evaluating its interdependence with other socioeconomic activities. However, tourism's contribution to the economy as well as its interdependence with other economic sectors, is difficult to quantify as it does not fall within the System of National Accounts (SNA) because of its demand-driven nature. Thus, it was recommended that tourism statistics should be aligned with the SNA 2008 through the use of satellite accounts (Commission of the European Communities, 2009). The concept of the 'satellite account' was developed by the United Nations (UN) to measure the size of economic sectors that are not defined as sectors in the SNA. Within this perspective, the TSA applies the principles and structure of the internationally-adopted SNA 2008 to create a comprehensive and consistent measure of the economic impact of tourism. It allows the analysis of all the aspects of demand for goods and services associated with tourism, the analysis of the supply of goods and services within or outside the economy of reference and the quantification of the interaction of this supply with other economic activities (United Nations, 2010a).

A complete TSA is developed in the form of ten tables. The first three tables identify tourism consumption by products and forms of tourism (international, domestic and outbound) and the fourth table consolidates these to give the total tourism consumption. The fifth table presents the supply-side information through the industries' production account. The sixth table used in this study, brings the demand-side and supply-side data together to arrive at the tourism industry ratios, which are used to evaluate the tourism value added and GDP. The seventh table gives an estimate of tourism related employment. The last three tables were suggested for the presentation of the detailed gross capital formation of the tourism industries, tourism collective consumption expenditure by government and some non-monetary tourism indicators, respectively. Details on the concepts and data requirements for a TSA can be found in United Nations (2010a;b).

3.2 Input-Output Analysis

Input-output (IO) method is a quantitative technique for studying the interactions and interrelationships of production sectors in an economy (Miller and Blair, 2009). An IO table identifies the major economic sectors and records the financial flows among them. The columns of the table describe the composition of inputs that each sector

obtains from the other sectors, while the rows describe the distribution of the sectors' output throughout the economy.

Despite their well-known limitations, IO models have been widely used to examine the economic impact of tourism (Teigeiro and Díaz, 2014) either at the national (Steenge and Van De Steeg, 2010; Giannakis and Mamuneas, 2018) or at the regional level (Giannakis and Bruggeman, 2017; Tohmo, 2018). A main criticism in the IO framework is that it does not consider price changes resulting from changing demand for tourism products; as such economies of scale and substitution effects are not considered. It also does not reflect resource limitations in the production sectors; as such additional tourism demand can be theoretically met infinitely which might lead to overestimation of secondary effects (Richardson, 1972).

The majority of economic impact models are concerned with tracing the flow of tourism spending throughout the broader economy based on the principle of sectoral linkages and multipliers (Comerio and Strozzi, 2019). The inter-sectoral linkages reflect the demand and supply relationships between sectors and provide an effective tool for impact analysis by estimating the overall – direct and indirect – impact of an initial change in the final demand for the output of a particular sector on the entire economy, thus providing a systematic approach for understanding the importance of a certain sector. In this study, output and employment multipliers are estimated. Details on the formulas of IO multipliers can be found in Miller and Blair (2009) and Giannakis and Mamuneas (2018; Appendix I).

3.3 Methods Application and Data

The economy-wide effects of the tourism industry and the inter-sectoral structure of the Cypriot economy, through the estimation of IO multipliers, are assessed on the basis of the 2018 symmetric IO table, that is, the latest available by the Statistical Service of Cyprus. We used the first and – to our knowledge – only edition of the Cyprus TSA of 2007 to construct the tourism industry as a separate sector in the IO table (Eurostat, 2009). Specifically, the 2007 tourism industry shares, obtained from the sixth table of the TSA, are used to extract the tourism components from each of the tourism-related sectors to form an individual tourism industry (Table 1). As such, the ratio of 0.43 for 'Land transport and transport via pipelines' suggests that 43% of the total output of the sector is on account of its tourism-related activity.

We calculate the tourism industry shares for the year 2018 – in the absence of annual TSAs – by multiplying the tourism industry shares of 2007 with the industries' gross value added (GVA) for 2007 to obtain sectoral tourism revenues for 2007. We

then apply the 2018/2007 ratio of tourists' revenues in constant prices (Statistical Service of Cyprus, 2022) to estimate sectoral tourism revenues for 2018. By dividing the sectoral tourism revenues of 2018 with the sectoral GVA for 2018, we obtain the tourism industry shares for 2018 (Table 1).

We create the tourism IO sector row and column by extracting the tourism component embedded within each row and column, respectively. The sectors from which the tourism component was extracted were left with the non-tourism components only. The initial scheme of 64 sectors of economic activity is extended to a matrix of 65 economic sectors (Appendix I).

TABLE 1
Tourism industries shares in 2007 and 2018

NACE sectors of economic activity	Tourism share in 2007	Tourism share in 2018
H49 - Land transport and transport via pipelines	0.54	0.43
H50 - Water transport	0.02	0.02
H51 - Air transport	0.46	0.54
H52 - Warehousing and support activities for transportation	0.60	0.55
I - Accommodation and food service activities	0.74	0.80
N77 - Rental and leasing activities	0.79	0.97
N79 - Travel agency, tour operator and other reservation service and related activities	1.00	1.00
R90-R92 - Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	0.12	0.10
R93 - Sports activities and amusement and recreation activities	0.14	0.19

Source: Statistical Service of Cyprus (2007; 2018, 2022), Eurostat (2009; 2022b) and authors calculations.

4. Results and Discussion

Table 2 presents the contribution of the tourism industry to the Cypriot economy using two alternative definitions, namely, tourism defined according to the TSA framework (TSA-tourism) by applying the 2018 tourism shares and tourism defined as 'Accommodation and Food'. The TSA-tourism represents about 11.4% of total intermediate inputs, 10.3% of the gross value added and 9.6% of the total gross output. On the contrary the contribution of the Accommodation and Food sector is significantly lower (Table 2). Variations in employment are relatively smaller.

TABLE 2
**Tourism's contribution to intermediate inputs, gross value added,
gross output and employment in Cyprus in 2018**

Tourism Definitions	Intermediate Inputs	Gross Value Added	Gross Output	Employment ^{1*}
Accommodation and Food	6.0%	7.4%	5.0%	12.0%
TSA-Tourism	11.4%	10.3%	9.6%	12.6%

Source: Statistical Service of Cyprus (2007; 2018, 2022), Eurostat (2009; 2022b) and authors calculations.

The input-output multiplier analysis identified the most important sectors of economic activity with respect to their capacity to generate output, value added and employment. Table 3 depicts the gross output, value added and employment multipliers of the TSA-tourism sector and the Accommodation and Food sector. The TSA-tourism sector exhibits a slightly higher output multiplier (1.76) compared to the Accommodation and Food sector (1.73). The meaning of this multiplier is that for every million euro change in the final demand for the tourism products and services, the total output of the economy increases by 1.76 million euro. On the contrary, the Accommodation and Food sector exhibits higher value added multiplier, that is, for every million euro increase in the final demand for the sector's products and services, the value added of the economy increases by 0.76 million euro. Similarly, the Accommodation and Food sector exhibits higher employment multiplier, that is, for every million euro increase in the final demand for the sector's products and services, about 24 new jobs are created in the economy. The gross output, value added and employment multipliers of all 65 economic sectors are presented in detail in Appendix I. The highest output multiplier effects are reported for sectors such as Constructions (CPA_F), Water treatment and Supply (CPA_E36) and Water Transport (CPA_H50). In terms of value added generation, the highest multiplier effects are observed for services sectors such as Repair Services of Computers and Personal Goods (CPA_S95) and Imputed Rents of Owner-Occupied Dwellings (CPA_L68A). Finally, the highest employment multiplier effects are observed for services sectors such as Education (CPA_P), Health (CPA_Q86) and Public Administration (CPA_O).

¹ There are no employment data available in the pilot 2007 TSA (Eurostat, 2009). Therefore, we applied the output tourism shares (Table 1) to estimate the employment of the tourism industries.

TABLE 3
Tourism’s gross output, value added and employment direct and indirect effects in Cyprus in 2018

Tourism Definitions	Accommodation and Food			TSA-Tourism		
	Gross Output	Value Added	Employment	Gross Output	Value Added	Employment
	1.73	0.76	23.9	1.76	0.58	15.8
	(16)	(18)	(9)	(14)	(33)	(23)

Note: Numbers in parentheses denote the rank of multipliers among all 65 economic sectors, from the highest to the lowest.

Source: Statistical Service of Cyprus (2007; 2018, 2022), Eurostat (2009; 2022b) and authors calculations.

As a robustness check, we estimated the gross output, value added and employment multipliers for 2018 using, however, the original 2007 tourism shares. The magnitude and the rankings of the multipliers, which are portrayed in Appendix II (Table II.1), remained similar.

5. Discussion and Conclusions

Tourism is a key economic sector and plays a vital role in stimulating economic growth in Cyprus. Despite the importance of the sector in terms of output, value added and employment generation, there is no consensus about its exact contribution. A major drawback in the tourism statistics of the country is the absence of TSAs with the exemption of a partially developed national TSA in 2007. In this paper, we updated this information to measure the current effect of the tourism industry to the national economy and labour market. Whilst TSAs are highly relevant, they don’t measure the overall contribution of tourism to the economy since they omit the indirect effect of tourists’ spending on the economy. Therefore, we combined the TSA information with an IO model to estimate the overall effect of tourism on the economy.

Our findings indicate that defining tourism as ‘Accommodation and Food’, as it is typically done in the literature, underestimates the sector’s contribution to the main macroeconomic performance indicators of the country such as gross output, value added and employment compared to the TSA definition of the sector. The results of the IO multiplier analysis revealed similar tourism gross output multipliers under the two alternative definitions of tourism. On the contrary, defining tourism as ‘Accommodation and Food’ leads to overestimation of the value added and

employment economy-wide effects. Irrespective of the definition of tourism, the sector in general creates medium-to-high direct and indirect effects to the economy.

Similar findings have been reported in the literature. Giannakis and Mamuneas (2018) assessed the changes in the inter-sectoral structure of the Cypriot economy during growth and crisis periods using the 2010 and 2016 symmetric IO tables. The Accommodation and Food Services sector had the fifth highest output multiplier effects in 2016 exhibiting marginal losses of its capacity in generating output in the other economic sectors between 2010 and 2016. Hadjikakou et al. (2014) found that increasing spending on food and beverage as well as on culture and recreation has the highest potential for improving the tourism's economic contribution in Cyprus. Giannakis (2014) developed a regional input-output model for the rural areas of Cyprus. The findings of the study highlight the strong linkages of rural tourism with the rest of the sectors of the rural economy, especially with food manufacturing and agriculture, consisting an important means for diversifying economic activities in rural Cyprus. Similar strong backward linkages of tourism sector, in terms of employment generation, are reported for the Greek rural areas (Giannakis and Bruggeman, 2017). Steenge and Van De Steeg (2010) employed input-output analysis based on the National Accounts and the TSA for Aruba, a small Caribbean island state. The authors reported relatively small multipliers indicating a lack of interconnectedness between the island's sectors. Hor (2021) and Munjal (2013) also reported low tourism backward linkages in Cambodia and India, respectively.

Our findings stress the need of developing TSAs in Cyprus to accurately measure the direct contribution of tourism demand on gross output, value added, employment and other macroeconomic indicators. Future research could analyze long run systematic developments of the tourism industry in Cyprus through the development of a time series of IO tables and corresponding multipliers.

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Appendix I

TABLE I1
Gross output, value added and employment multipliers under different
definitions of tourism sector (TSA & no-TSA) in 2018
(using 2018 tourism shares)

	Gross Output		Value Added		Employment	
	TSA	no-TSA	TSA	no-TSA	TSA	no-TSA
CPA_A01 - Products of agriculture, hunting and related services	1.694	1.693	0.550	0.550	21.48	21.45
CPA_A02 - Products of forestry, logging and related services	1.146	1.143	0.897	0.897	16.47	16.45
CPA_A03 - Fish and other fishing products; aquaculture products; support services to fishing	1.571	1.570	0.680	0.680	12.18	12.15
CPA_B - Mining and quarrying	1.434	1.416	0.261	0.259	6.58	6.29
CPA_C10-12 - Food, beverages and tobacco products	1.690	1.688	0.371	0.371	12.53	12.51
CPA_C13-15 - Textiles, wearing apparel, leather and related products	1.071	1.071	0.059	0.059	2.48	2.48
CPA_C16 - Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	1.657	1.655	0.437	0.437	18.87	18.86
CPA_C17 - Paper and paper products	1.283	1.282	0.160	0.160	5.25	5.24
CPA_C18 - Printing and recording services	1.806	1.800	0.614	0.612	20.20	20.17
CPA_C19 - Coke and refined petroleum products	1.002	1.002	0.002	0.002	0.02	0.02
CPA_C20 - Chemicals and chemical products	1.115	1.113	0.090	0.089	2.06	2.04
CPA_C21 - Basic pharmaceutical products and pharmaceutical preparations	1.288	1.286	0.292	0.291	4.63	4.59
CPA_C22 - Rubber and plastic products	1.279	1.277	0.166	0.166	4.92	4.90
CPA_C23 - Other non-metallic mineral products	1.748	1.745	0.445	0.444	8.80	8.75
CPA_C24 - Basic metals	1.180	1.179	0.131	0.131	2.43	2.41
CPA_C25 - Fabricated metal products, except machinery and equipment	1.642	1.640	0.439	0.439	11.03	11.02
CPA_C26 - Computer, electronic and optical products	1.034	1.033	0.055	0.055	0.40	0.39
CPA_C27 - Electrical equipment	1.112	1.112	0.079	0.079	2.20	2.19
CPA_C28 - Machinery and equipment n.e.c.	1.127	1.125	0.100	0.100	2.35	2.32
CPA_C29 - Motor vehicles, trailers and semi-trailers	1.019	1.019	0.013	0.013	0.39	0.39
CPA_C30 - Other transport equipment	1.009	1.009	0.007	0.007	0.09	0.09
CPA_C31_32 - Furniture and other manufactured goods	1.213	1.211	0.183	0.182	6.10	6.08
CPA_C33 - Repair and installation services of machinery and equipment	1.540	1.534	0.686	0.685	16.36	16.34
CPA_D - Electricity, gas, steam and air conditioning	1.741	1.739	0.432	0.431	6.68	6.64
CPA_E36 - Natural water; water treatment and supply services	2.396	2.393	0.692	0.692	8.29	8.26
CPA_E37-39 - Sewerage services; sewage sludge; waste collection, treatment and disposal services; materials recovery services; remediation services and other waste management services	1.795	1.790	0.845	0.843	15.63	15.56
CPA_F - Constructions and construction works	2.401	2.396	0.695	0.694	20.67	20.62
CPA_G45 - Wholesale and retail trade and repair services of motor vehicles and motorcycles	1.734	1.730	0.687	0.686	28.07	28.06
CPA_G46 - Wholesale trade services, except of motor vehicles and motorcycles	1.537	1.529	0.834	0.831	20.75	20.61
CPA_G47 - Retail trade services, except of motor vehicles and motorcycles	1.597	1.596	0.865	0.863	28.30	28.21
CPA_H49 - Land transport services and transport services via pipelines	1.606	1.597	0.639	0.638	17.18	17.03
CPA_H50 - Water transport services	2.093	2.131	0.752	0.719	8.20	6.62
CPA_H51 - Air transport services	1.326	1.314	0.040	0.040	3.10	2.86
CPA_H52 - Warehousing and support services for transportation	1.937	2.004	0.446	0.392	9.41	6.78

CPA_H53 - Postal and courier services	1.611	1.579	0.769	0.768	23.76	23.32
CPA_I - Accommodation and food services	1.739	1.734	0.758	0.759	23.90	23.88
CPA_J58 - Publishing services	1.967	1.955	0.503	0.501	5.38	5.23
CPA_J59_60 - Motion picture, video and television programme production services, sound recording and music publishing; programming and broadcasting services	1.520	1.506	0.568	0.565	13.58	13.34
CPA_J61 - Telecommunications services	1.668	1.665	0.692	0.692	8.14	8.10
CPA_J62_63 - Computer programming, consultancy and related services; Information services	1.919	1.912	0.394	0.393	5.30	5.30
CPA_K64 - Financial services, except insurance and pension funding	1.768	1.765	0.557	0.556	7.75	7.73
CPA_K65 - Insurance, reinsurance and pension funding services, except compulsory social security	1.780	1.770	0.507	0.501	9.06	8.95
CPA_K66 - Services auxiliary to financial services and insurance services	1.891	1.889	0.372	0.371	6.68	6.66
CPA_L68B - Real estate services excluding imputed rents	1.516	1.515	0.891	0.890	4.65	4.64
CPA_L68A - Imputed rents of owner-occupied dwellings	1.260	1.258	0.940	0.940	2.21	2.21
CPA_M69_70 - Legal and accounting services; services of head offices; management consultancy services	1.413	1.406	0.859	0.855	12.86	12.77
CPA_M71 - Architectural and engineering services; technical testing and analysis services	1.374	1.371	0.745	0.743	23.41	23.36
CPA_M72 - Scientific research and development services	1.134	1.133	0.621	0.622	1.79	1.80
CPA_M73 - Advertising and market research services	1.684	1.672	0.350	0.353	8.93	8.98
CPA_M74_75 - Other professional, scientific and technical services and veterinary services	2.068	2.023	0.601	0.597	19.43	18.62
CPA_N77 - Rental and leasing services	1.401	1.387	0.548	0.547	9.06	8.83
CPA_N78 - Employment services	1.644	1.620	0.831	0.819	23.35	23.01
CPA_N79 - Travel agency, tour operator and other reservation services and related services		1.484		0.891		22.68
CPA_N80-82 - Security and investigation services; services to buildings and landscape; office administrative, office support and other business support services	1.486	1.482	0.756	0.758	29.39	29.46
CPA_O - Public administration and defence services; compulsory social security services	1.506	1.503	0.804	0.802	36.68	36.63
CPA_P - Education services	1.568	1.564	0.818	0.817	257.92	257.91
CPA_Q86 - Human health services	1.468	1.464	0.653	0.651	41.68	41.65
CPA_Q87_88 - Residential care services; social work services without accommodation	1.791	1.769	0.750	0.751	21.39	21.46
CPA_R90-92 - Creative, arts, entertainment, library, archive, museum, other cultural services; gambling and betting services	1.636	1.627	0.819	0.817	35.93	35.97
CPA_R93 - Sporting services and amusement and recreation services	1.482	1.481	0.568	0.568	36.21	36.20
CPA_S94 - Services furnished by membership organisations	1.386	1.384	0.884	0.884	14.14	14.18
CPA_S95 - Repair services of computers and personal and household goods	1.000	1.000	1.000	1.000	4.28	4.28
CPA_T - Services of households as employers; undifferentiated goods and services produced by households for own use	1.241	1.240	0.891	0.891	13.44	13.45
CPA_U - Services provided by extraterritorial organisations and bodies	1.287	1.279	0.911	0.909	3.54	3.43
TSA-Tourism industry	1.762	-	0.578	-	15.79	-

Appendix II

TABLE III
Gross output, value added and employment multipliers under
the TSA definition of tourism in 2018 (using 2007 tourism shares)

	Gross Output	Value Added	Employment
CPA_A01 - Products of agriculture, hunting and related services	1.694	0.550	21.48
CPA_A02 - Products of forestry, logging and related services	1.146	0.897	16.48
CPA_A03 - Fish and other fishing products; aquaculture products; support services to fishing	1.571	0.680	12.19
CPA_B - Mining and quarrying	1.432	0.260	6.55
CPA_C10-12 - Food, beverages and tobacco products	1.690	0.371	12.54
CPA_C13-15 - Textiles, wearing apparel, leather and related products	1.071	0.059	2.48
CPA_C16 - Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	1.657	0.437	18.87
CPA_C17 - Paper and paper products	1.283	0.160	5.25
CPA_C18 - Printing and recording services	1.805	0.614	20.19
CPA_C19 - Coke and refined petroleum products	1.002	0.002	0.02
CPA_C20 - Chemicals and chemical products	1.115	0.090	2.06
CPA_C21 - Basic pharmaceutical products and pharmaceutical preparations	1.288	0.292	4.62
CPA_C22 - Rubber and plastic products	1.279	0.166	4.92
CPA_C23 - Other non-metallic mineral products	1.748	0.445	8.80
CPA_C24 - Basic metals	1.180	0.131	2.43
CPA_C25 - Fabricated metal products, except machinery and equipment	1.642	0.439	11.03
CPA_C26 - Computer, electronic and optical products	1.034	0.055	0.40
CPA_C27 - Electrical equipment	1.112	0.079	2.20
CPA_C28 - Machinery and equipment n.e.c.	1.126	0.100	2.34
CPA_C29 - Motor vehicles, trailers and semi-trailers	1.019	0.013	0.39
CPA_C30 - Other transport equipment	1.009	0.007	0.09
CPA_C31_32 - Furniture and other manufactured goods	1.213	0.183	6.10
CPA_C33 - Repair and installation services of machinery and equipment	1.539	0.686	16.34
CPA_D - Electricity, gas, steam and air conditioning	1.741	0.431	6.68
CPA_E36 - Natural water; water treatment and supply services	2.396	0.692	8.28
CPA_E37-39 - Sewerage services; sewage sludge; waste collection, treatment and disposal services; materials recovery services; remediation services and other waste management services	1.795	0.844	15.64
CPA_F - Constructions and construction works	2.401	0.694	20.67
CPA_G45 - Wholesale and retail trade and repair services of motor vehicles and motorcycles	1.734	0.686	28.08
CPA_G46 - Wholesale trade services, except of motor vehicles and motorcycles	1.538	0.833	20.82
CPA_G47 - Retail trade services, except of motor vehicles and motorcycles	1.597	0.864	28.32
CPA_H49 - Land transport services and transport services via pipelines	1.606	0.638	20.20
CPA_H50 - Water transport services	2.092	0.753	8.41
CPA_H51 - Air transport services	1.324	0.040	2.94
CPA_H52 - Warehousing and support services for transportation	1.936	0.448	10.09
CPA_H53 - Postal and courier services	1.608	0.768	23.70
CPA_I - Accommodation and food services	1.738	0.758	19.15
CPA_J58 - Publishing services	1.965	0.502	5.34
CPA_J59_60 - Motion picture, video and television programme	1.519	0.568	13.51

production services, sound recording and music publishing; programming and broadcasting services			
CPA_J61 - Telecommunications services	1.668	0.692	8.12
CPA_J62_63 - Computer programming, consultancy and related services; Information services	1.918	0.394	5.28
CPA_K64 - Financial services, except insurance and pension funding	1.768	0.557	7.74
CPA_K65 - Insurance, reinsurance and pension funding services, except compulsory social security	1.779	0.505	9.04
CPA_K66 - Services auxiliary to financial services and insurance services	1.891	0.372	6.67
CPA_L68A - Imputed rents of owner-occupied dwellings	1.259	0.940	2.21
CPA_L68B - Real estate services excluding imputed rents	1.516	0.890	4.65
CPA_M69_70 - Legal and accounting services; services of head offices; management consultancy services	1.412	0.858	12.83
CPA_M71 - Architectural and engineering services; technical testing and analysis services	1.373	0.744	23.40
CPA_M72 - Scientific research and development services	1.134	0.621	1.80
CPA_M73 - Advertising and market research services	1.683	0.349	8.89
CPA_M74_75 - Other professional, scientific and technical services and veterinary services	2.062	0.600	19.21
CPA_N77 - Rental and leasing services	1.399	0.548	4.20
CPA_N78 - Employment services	1.642	0.828	23.31
CPA_N79 - Travel agency, tour operator and other reservation services and related services	-	-	-
CPA_N80-82 - Security and investigation services; services to buildings and landscape; office administrative, office support and other business support services	1.486	0.756	29.38
CPA_O - Public administration and defence services; compulsory social security services	1.506	0.804	36.67
CPA_P - Education services	1.568	0.818	257.92
CPA_Q86 - Human health services	1.468	0.652	41.66
CPA_Q87_88 - Residential care services; social work services without accommodation	1.790	0.748	21.35
CPA_R90-92 - Creative, arts, entertainment, library, archive, museum, other cultural services; gambling and betting services	1.635	0.818	36.66
CPA_R93 - Sporting services and amusement and recreation services	1.482	0.568	34.35
CPA_S94 - Services furnished by membership organisations	1.386	0.884	14.13
CPA_S95 - Repair services of computers and personal and household goods	1.000	1.000	4.28
CPA_T - Services of households as employers; undifferentiated goods and services produced by households for own use	1.241	0.891	13.43
CPA_U - Services provided by extraterritorial organisations and bodies	1.286	0.910	3.50
TSA-Tourism industry	1.775	0.573	16.14