Comparisons of Productivity among European Sectors and Cyprus:  
The Case of Tourism Sector  
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Abstract  
The importance of the tourism industry for economic, social and cultural 
development in Europe and the role of tourism as a driver of development are 
well known. The major objective of this study is to compare the output and 
productivity differences of the tourism industry among Cyprus and 20 European 
countries, for the period 2000-2012. We observe that in most of the countries the 
major contributor to output differences is traditional inputs (labor force and 
investment). After controlling for the size of the labor force and investment we 
observe that quality of services and the government expenditures on safety, 
culture and infrastructure have a positive contribution to the output difference. As 
expected, quality of the environment captured by waste generated has a negative 
contribution to output. Finally, with respect to productivity differences we see that 
its contribution varies and it’s a significant one. Cyprus is below the average with 
respect to output. As in the other countries, major role comes from traditional 
inputs. It seems though that government expenditures and quality of services are 
not sufficient to place Cyprus in a better position. The quality of the environment 
though is better, contributing to the decrease in the output gap difference. Cyprus 
needs to find ways to increase the productivity of the tourism sector in order to 
become more competitive.

Keywords: Tourism, Multilateral Comparisons, Productivity, Services, 
Environment, Safety, Infrastructure, Growth.

1. Introduction  
The importance of the tourist industry for economic, social and cultural 
development in Europe and the role of tourism as a driver of development are 
well known. EU countries are the leading tourism destination, with 
42% of total tourism arrivals in the world, and this position is likely to 
continue during the next decade. As tourism demand grows over time, the 
industry has increasingly generated additional employment, turnover and 
added value.
In Cyprus, the tourism sector is in the top five sectors in the GDP contributing 7% to the economy. Appearing to be resilient to the economic crisis, that has been hammering the country since 2011, the sector experienced an output growth of 3.6% while the total economy and other sectors experience negative growth rates (-2.5% for the economy). The Central Bank of Cyprus reports that in the first four months of 2014 there was a 1.4% increase in tourist arrivals and a 4.7% increase in revenues from tourism during the first two months of the particular year. Additionally the share of the sector in total employment reached 10.2% in 2014 from 8.9% in 2008. Thus, the tourist industry has been and is likely to continue being a stable pillar in the growth of the Cypriot economy.

Competition, however, is intense, with respect to tourism between Cyprus and other European countries, particularly south Mediterranean countries such as Spain, Italy, Greece, Malta and Portugal. Furthermore, new star performers in Central and Eastern Europe such as Slovakia, Bulgaria, Latvia and Lithuania pose a threat to the share of tourism. Therefore this particular sector of the Cyprus economy needs to become more competitive in order to ensure further growth; one way to improve competitiveness is via increasing productivity.

The major objective of this study is to compare the output and productivity differences of tourism among Cyprus and European countries. Productivity and output differences might arise for many reasons and therefore the former needs constant enhancements and vastly depends on the country’s ability to keep the sector competitive. Productivity is affected by the quality of the labor force and the efforts to adopt new information and communication technologies (Anastasopoulos and Patsourakis, 2004). According to The European Commission the challenges for the tourist industry is to reinforce it as a high quality service sector using a combination of strong resources with high quality services.

Improving tourism productivity depends not only on the providers of tourism services but also on Governmental policies with respect to improving infrastructure in a country, such as roads, transportations, airports and telecommunications (Mamuneas et. al, 2005; Mamuneas and Pashardes, 2003; Pashardes et. al, 2002). Another important factor that improves productivity is the cultural and national environment of a country (Sinclair, 1998; Mamuneas et. al, 2005; Mamuneas and Pashardes, 2003; Pashardes et. al, 2002). Safety and security seems to be important for higher tourist demand and therefore the growth of the industry (Clerides et. al, 2006; Cleanthous, 2008).

The European Commission (2009) suggests that the tourist industry along with the public sector could make more focused efforts to attract
additional non-EU visitors by differentiating itself from the other world destinations. Further, the tourist industry and governments should take actions to support tourism demand, to stimulate innovation and entrepreneurship, to combine available resources more efficiently, to ensure that development of tourism is sustainable. In addition the public sector should ease the complex regulation framework and tax system in which the EU tourism enterprises operate. Lionetti (2009) specifically states that the role of the Government should not be to subsidize the hotel industry directly but to support and invest on the environment and legal framework in which the tourism firms compete.

In this paper we examine how factors such as the quality of service, quality of the environment, public infrastructure, culture and safety can explain the observed output and productivity differences among Cyprus and 21 European countries. In addition, the cross country difference in the tourism output is decomposed to (i) capital and labor input differences and (ii) productivity differences. For this analysis we have collected recent data from Eurostat, covering a period before and after the economic crisis (2000-2012) on the tourism sectors of 21 European countries. Our sample consists of the following countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain and UK.

We find that the countries with the highest output difference are: Spain, Italy, UK, France and Germany, followed by, Greece, Austria, Netherlands, Portugal and Belgium. The rest of the countries are below the hypothetical country with respect to output of the tourism industry. Those with the lowest output are Estonia, Denmark, Lithuania and Czech Republic. We observe that in most of the countries the major contributor to output differences is traditional inputs. This result indicates that countries with a large labor force (size) and high investment will have larger positive output differences, while countries with a smaller labor force and less investment will tend to be below the average with respect to output.

After controlling for the size of the labor force and investment in a country, we observe that quality of services and the government expenditures on safety, culture and infrastructure have a positive contribution to the output difference of the sector. As expected, quality of the environment captured by waste generated has a negative contribution to output. Finally, with

respect to productivity differences we see that its contribution varies and it’s a significant one.

2. Productivity Comparisons

2.1. Data and Methods

In order to utilize the multilateral comparison methodology, we focus our analysis on the years 2000-2012 and on the countries of: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain and UK.

The variables used are the Gross Domestic Product, the total Hours Worked, Investment, and the Compensation of Employees. The quantity of output is defined as the GDP in constant prices. The quantity of labor is defined as the value of labor divided by the price of labor. The compensation of employees is adjusted to include the self-employed. The capital stock was constructed from investment data in constant prices by using the perpetual inventory method with a 5% depreciation rate. The value of capital was obtained by subtracting from the GDP in current prices. Following Christensen, Cummings and Jorgenson (1981) and Jorgenson and Nishimizu (1978) in order to be able to compare countries, we require comparable measures of factor inputs and output. To achieve comparability in measuring output and factor inputs one needs to employ purchasing power parities (PPP) of output, capital and labor for all the countries under consideration. Therefore, all price and quantity data are expressed in constant 2000 Euros and are PPP adjusted.

The control explanatory variables used to examine their effect on productivity were obtained from Eurostat. The variables used are: quality of services warranted by nights spent at tourism accommodations, and quality of environment captured by waste generated in each country. Also following the literature we have obtained data on government expenditures on infrastructure (transport and communications), and safety, recreation and culture.

In order to analyze the output and productivity differences among European tourism sectors we employ a production function that depend on traditional inputs, productivity and the above explanatory variable, such as:
\[ Y = F(K, L, Z, s), \]  

where \( Y \) is the quantity of output, \( K \) is the capital input; \( L \) is the labor input; \( s \) is an indicator of productivity and \( Z \) are the set of other explanatory variables that may affect the output of the tourism sector.

Caves, Christensen and Diewert (1982), develop a methodology for making consistent multilateral comparisons by measuring differences from the “average” hypothetical representative country \( h \). Therefore, one can show that the output difference of a country \( s \) with \( h \) can be written as:

\[ y = \delta + x + z, \]  

where \( y = (lnY_{st} - lnY_{ht,h}) \) is the output difference with the hypothetical country,  

\[ x = \frac{1}{2}(W_{Kst} + W_{Kht})(lnK_{st} - lnK_{ht}) + \frac{1}{2}(W_{Lst} + W_{Lht})(lnL_{st} - lnL_{ht}) \]  

is traditional input (capital and labor) differences with the hypothetical country weighted using output shares,  

\[ z = \sum b_i (lnZ_{ist} - lnZ_{ihht}) \]  

is other factors that might contribute to output differences and \( \delta = ln\delta_{st} - ln\delta_{ht} \) is the productivity differences.

The components \( \delta \) and \( b_i \) for \( z \) are not directly observable. In order to obtain these components, we proceed, as a first step, and construct the observed productivity difference with the hypothetical country using only capital and labor which:

\[ \lambda = y - x = \delta + z \]  

We then have:

\[ \lambda_{st} = \delta_{st} + \sum b_i (lnZ_{ist} - lnZ_{ist}) \]  

where the left hand side, \( \lambda \), is the observed productivity difference, and from the right hand side the first component \( \delta = ln\delta_{st} - ln\delta_{ht} \) is productivity difference and the second is the contribution of other factors to be estimated.

In the context of this analysis, first we construct the observed productivity that depends only on capital and labor; and then we proceed on estimating the effects of the explanatory variables listed above in order to obtain their contributions to productivity differences among the countries in our sample.
2.2. Results: Productivity Differences

Using equation:

\[ \lambda = y - x = (\ln Y_{st} - \ln Y_{ht}) - \left[ \frac{1}{2} (W_{kst} + W_{kht})(\ln K_{st} - \ln K_{ht}) + \frac{1}{2} (W_{lst} + W_{lht})(\ln L_{st} - \ln L_{ht}) \right] \]

we obtained the following, see Figure 1, observed productivity differences of countries when compared to the hypothetical one (positive numbers means that a country is above the hypothetical with respect to productivity while negative the opposite). Following Caves, Christensen and Diewert, the hypothetical country’s variables are defined as the geometric means of output, input and share vectors of the countries in our sample.

Figure 1, presents the productivity ranking of countries for the year 2000-2012, based on their difference from the average. From Figure 1 one can categorize countries in three groups. The first group with the highest observed productivity differences (above average) includes: Luxembourg, France, Finland, UK, Slovenia, Belgium, Netherland, Spain, Portugal and Italy. The country with the highest observed productivity is Luxembourg, followed by France and Finland. The second group includes countries near the average (hypothetical). These are: Germany, Austria, Slovakia, Cyprus and Greece. Finally Estonia, Bulgaria, Lithuania, Poland, Denmark and Czech are the countries in the third group which appear to have the lowest observed productivity (below the average). Czech Republic is the country that is last in the ranking with respect to observed productivity of the tourism sector.

In a recent report (Eurostat, 2015) it is observed that the tourism accommodation sector continues to grow in terms of overnight stays. Only in three countries - Cyprus, Italy and Finland did the rate decrease in 2013. In six member states (Bulgaria, Greece, Latvia, Lithuania, Malta and Portugal) the rate recorded growth over 6%. According to the latest figures, international tourist arrivals in Europe grew by 5% during the first half of 2013. Among the Mediterranean countries, Spain led the way in 2013. Tourism in Greece has grown along with Malta and Portugal. Less satisfactory figures come from Cyprus where arrivals of tourists decreased in 2013. Star performers in Central and Eastern Europe were Slovakia, Latvia and Lithuania. In Northern Europe results were also good but more modest, except for the UK. France benefited from an increase in

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international visitors, which compensated for a decrease in the number of local tourists.

FIGURE 1

*Productivity Differences from the average*

Cyprus needs to improve its competitiveness; otherwise the share of tourism arrivals and night stays will further decrease because of other more competitive tourism destinations. The major drivers of higher productivity and therefore competitiveness come from human capital, education, skills, training on and off the job and quality of management, technology and innovation (Blake and Sinclair; 2006). Specifically, skills are needed if best practice techniques are to be implemented and innovations that result in product quality and service than from cost-cutting are required for growing markets such as business and cultural tourism. As Lionetti (2009) also stated: although there are many factors that influence the levels and changes in tourism supply, the level of literacy, the level of communication technologies and openness to foreign markets are very important in explaining different levels of productivity across countries. The more these variables are taken into consideration in a country, the
more productive the tourism industry is in that country, the more these countries are able to compete in the world market.

3. Decomposition of Output Differences

Next, we proceed to investigate the extent to which different factors (capital and labor inputs, the quality of services and of the environment, safety/culture and infrastructure) and productivity explain differences in tourism output across countries (as shown in equation 2).

As mentioned though, the components $z$ and $\delta$ are not directly observed and need to be estimated. The OLS dummy variable regression of equation (4), will give us estimates of the effects ($b_i$) of the explanatory variables differences (and therefore we will be able to obtain $z$) and also allows us to estimate the productivity differences ($\delta$) among the countries of our sample, captured by a set of dummy variables.

TABLE 1
Regression results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimated Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Services</td>
<td>0.114</td>
<td>0.069</td>
</tr>
<tr>
<td>Quality of Environment</td>
<td>-0.163</td>
<td>0.096</td>
</tr>
<tr>
<td>Safety and Culture</td>
<td>0.157</td>
<td>0.100</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>0.035</td>
<td>0.053</td>
</tr>
</tbody>
</table>

$R$-squared = .964650
Adjusted $R$-squared = .960739
$F$ (zero slopes) = 246.685 [.000]

Note: Dummy variables are included in the analysis to capture exogenous productivity differences.

The estimation results are reported in Table 1. The nights spend at tourism establishments used as alternative measure of quality of services, and government expenditure on safety, culture and infrastructure have a positive effect on the observed productivity of the tourism sector. Quality of the environment proxied by the waste generation has a negative effect on the observed productivity. As indicated by $R$-square and $F$-test the model fits well and variables included are jointly significant and cannot be rejected.
Using these results along with the traditional variables (capital and labor) we can obtain a decomposition of output in each country (equation 2) to:

- The productivity difference component, $\delta$, which can be also viewed as the unobserved productivity of the sector after controlling for all available exogenous factors.
- The contributions $z$ from the available factors. These contributions have two components.
- The contributions of traditional inputs capital and labor, $x$

Table 2 reports the decomposition of output differences and the contribution of traditional inputs, quality of service, environment, safety and culture, infrastructure and productivity. More precisely, the second column in the Table shows how much the output of the tourism sectors in each country differs from the average; whereas the subsequent columns show the contribution of different factors to these differences.

The countries with the highest output difference from the hypothetical country (average) are: Spain, Italy, UK, France and Germany. Followed by, Greece, Austria, Netherlands, Portugal and Belgium. The rest of the countries appear to be below the hypothetical country with respect to output of the tourism industry. The last four are Estonia, Denmark, Lithuania and Czech Republic.

From Table 2 we observe that in most of the countries the major contributors to output differences are traditional inputs (in most cases above 75%). This, is not surprising, given that the size of the labor force and the stock of capital (investment in equipment, machinery and building) inputs, are the major drivers of growth in tourism, as are in all the sectors of the economy.

Specifically, in countries where traditional inputs are higher than the average this results in a higher output difference, while in the opposite scenario where countries have less inputs than the hypothetical, this results in negative output differences. In both cases traditional inputs play a major role (either positive or negative) in the output difference of a country. Only three exceptions exist in our sample; Belgium with 44% contribution of inputs, Poland with 13% and Czech with 48%. Several studies suggest that the major drivers of growth in the tourism sector are labor followed by physical capital (equipment, machinery and building). Low investment result in the accumulation of old capital stock having a negative effect on the production efficiency. This is particularly the case for
small businesses that often face problems in raising funds for investment (Blake and Sinclair, 2006; Lionetti, 2009).

After controlling for the size of the labor force and investment in a country we observe the other factors that may affect the output difference such as productivity and other components such as quality of services, environment and government expenditures.

After controlling for differences in the traditional inputs, we observe that quality of services and the level of government expenditures on safety and culture have a positive contribution to the output difference of the sector, especially in countries which have overnight stays and expenditure higher

### TABLE 2

*Output Decomposition (Contributions to Output Differences)*

<table>
<thead>
<tr>
<th>Country</th>
<th>Output</th>
<th>Traditional Inputs</th>
<th>Quality of Services</th>
<th>Quality of Environment</th>
<th>Safety and Culture</th>
<th>Infrastructure</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>3.093</td>
<td>2.894</td>
<td>0.265</td>
<td>-0.279</td>
<td>0.282</td>
<td>0.065</td>
<td>-0.133</td>
</tr>
<tr>
<td>Italy</td>
<td>2.773</td>
<td>2.613</td>
<td>0.261</td>
<td>-0.314</td>
<td>0.351</td>
<td>0.072</td>
<td>-0.210</td>
</tr>
<tr>
<td>UK</td>
<td>2.644</td>
<td>2.246</td>
<td>0.217</td>
<td>-0.327</td>
<td>0.423</td>
<td>0.070</td>
<td>0.015</td>
</tr>
<tr>
<td>France</td>
<td>2.408</td>
<td>1.942</td>
<td>0.235</td>
<td>-0.326</td>
<td>0.355</td>
<td>0.075</td>
<td>0.127</td>
</tr>
<tr>
<td>Germany</td>
<td>2.369</td>
<td>2.254</td>
<td>0.244</td>
<td>-0.387</td>
<td>0.394</td>
<td>0.086</td>
<td>-0.222</td>
</tr>
<tr>
<td>Greece</td>
<td>1.262</td>
<td>1.302</td>
<td>0.099</td>
<td>-0.018</td>
<td>0.001</td>
<td>0.003</td>
<td>-0.125</td>
</tr>
<tr>
<td>Austria</td>
<td>1.218</td>
<td>1.154</td>
<td>0.130</td>
<td>-0.011</td>
<td>0.036</td>
<td>0.022</td>
<td>-0.113</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.984</td>
<td>0.764</td>
<td>0.026</td>
<td>-0.123</td>
<td>0.193</td>
<td>0.047</td>
<td>0.076</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.931</td>
<td>0.761</td>
<td>0.044</td>
<td>-0.015</td>
<td>-0.002</td>
<td>-0.002</td>
<td>0.145</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.472</td>
<td>0.208</td>
<td>-0.053</td>
<td>-0.017</td>
<td>0.094</td>
<td>0.029</td>
<td>0.211</td>
</tr>
<tr>
<td>Finland</td>
<td>-0.323</td>
<td>-0.786</td>
<td>-0.059</td>
<td>0.093</td>
<td>-0.045</td>
<td>0.002</td>
<td>0.472</td>
</tr>
<tr>
<td>Poland</td>
<td>-0.826</td>
<td>-0.106</td>
<td>-0.019</td>
<td>-0.151</td>
<td>0.072</td>
<td>0.017</td>
<td>-0.638</td>
</tr>
<tr>
<td>Slovakia</td>
<td>-0.988</td>
<td>-1.037</td>
<td>-0.145</td>
<td>0.175</td>
<td>-0.171</td>
<td>-0.046</td>
<td>0.236</td>
</tr>
<tr>
<td>Cyprus</td>
<td>-1.065</td>
<td>-1.098</td>
<td>-0.060</td>
<td>0.349</td>
<td>-0.359</td>
<td>-0.089</td>
<td>0.192</td>
</tr>
<tr>
<td>Slovenia</td>
<td>-1.281</td>
<td>-1.594</td>
<td>-0.174</td>
<td>0.255</td>
<td>-0.267</td>
<td>-0.060</td>
<td>0.559</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>-1.300</td>
<td>-1.093</td>
<td>-0.063</td>
<td>0.008</td>
<td>-0.228</td>
<td>-0.063</td>
<td>0.140</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>-1.751</td>
<td>-2.226</td>
<td>-0.334</td>
<td>0.430</td>
<td>-0.353</td>
<td>-0.059</td>
<td>0.792</td>
</tr>
<tr>
<td>Estonia</td>
<td>-2.380</td>
<td>-2.174</td>
<td>-0.228</td>
<td>0.358</td>
<td>-0.378</td>
<td>-0.094</td>
<td>0.136</td>
</tr>
<tr>
<td>Denmark</td>
<td>-2.477</td>
<td>-1.611</td>
<td>-0.100</td>
<td>0.034</td>
<td>-0.048</td>
<td>-0.004</td>
<td>-0.748</td>
</tr>
<tr>
<td>Lithuania</td>
<td>-2.848</td>
<td>-2.256</td>
<td>-0.292</td>
<td>0.202</td>
<td>-0.309</td>
<td>-0.073</td>
<td>-0.120</td>
</tr>
<tr>
<td>Czech</td>
<td>-2.916</td>
<td>-1.424</td>
<td>0.005</td>
<td>0.064</td>
<td>-0.042</td>
<td>0.004</td>
<td>-1.523</td>
</tr>
</tbody>
</table>
than the average. We observe a negative contribution from countries with overnight stays and expenditures below the average. But in combination with the regression results and the positive effects from these variables, we can conclude that, increases in the number of nights spent and in the government expenditure on safety and culture causes an increase in the output of the tourism sector.

A similar picture is observed with respect to government expenditure in infrastructure but the contribution of this variable to output is smaller compared to the other variables. As expected, waste generated in a country used to proxy environment pollution has a negative contribution to output, especially in countries with pollution higher than the average. In countries with pollution lower than the average (better with respect to pollution), the contribution is positive. Finally, the extent to which productivity contributes to differences in tourism output varies between countries, with the highest contribution made in Luxembourg, Slovenia and Finland; whereas its contribution is lowest in Poland, Denmark and the Czech Republic.

The results are in accordance to an OECD paper stressing the indicators defining competitive in tourism (Dupeyras and MacCallum, 2013). In their article they state that based on detailed survey evidence, OECD countries largely agree on the following key elements to be considered in a tourism competitive assessment. These are: Governance of tourism (Government support through regulations, a whole tourism strategy, safety and security and budget allocated to tourism support); product development which includes product differentiation, innovation, investments and increase in the added value of tourism; improving quality of tourism services; price competitiveness; infrastructure development and geo-strategic position of the destination (accessibility and connectivity); branding of the destination through good promotion and marketing; natural and cultural resources such as good climate and biodiversity; and human resource development (skills, education and training).

The output of the Cyprus tourism sector performs below the hypothetical country. The main reason for this is found in traditional inputs (capital and labor) which are also below the average. The observed productivity difference is above and close to the average, thus contributing to closing the gap in output difference. With respect to nights spend and government expenditures on safety, culture and infrastructure Cyprus is below the hypothetical. So the government expenditures and nights spend are not sufficient to put Cyprus in a better position with respect to output. With respect to environmental pollution Cyprus appears to be doing better. It is again below the hypothetical country, but in this case it suggests lower
pollution. Finally, with respect to productivity (unobserved) Cyprus is above the average, which contributes to decreasing the output difference with the hypothetical country. The Cypriot tourism sector is lacking in output and somehow in productivity, when compared to other countries. It needs to constantly improve its productivity and therefore output in order to remain competitive and become an even bigger contributor to the economic growth of the country. Cyprus, has the available natural and cultural resources, but may be lacking in the other key elements needed to improve productivity and competitiveness of the tourism sector.

4. Conclusion

The purpose of this study is to compare the output and productivity of the tourism sector among European countries and Cyprus. For this analysis we have collected recent data from Eurostat, covering a period before and after the economic crisis (2000-2012) on the tourism sectors of 21 European countries. Our sample includes: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain and UK.

The output ranking of the countries beginning with the highest to the lowest is: Spain, Italy, UK, France, Germany, Greece, Austria, Netherlands, Portugal, Belgium, Finland, Poland, Slovakia, Cyprus, Slovenia, Bulgaria, Luxembourg, Estonia, Denmark, Lithuania and Czech Republic. The results obtained from the analysis suggest that the major factors that determine the competitiveness of the tourism sector go beyond the level of the labor force and the stock of capital used in production. Government support through regulation and formation of a tourism strategy placing emphasis on maintaining high levels of safety and security can contribute substantially to the competitiveness of the tourism sector. The same can also be said about the protection of the physical environment and the development of supportive infrastructure (better transportation and telecommunications).

In Cyprus the output of the tourism sector appears below the average on the ranking list. The main reasons for this outcome are smaller labor force and lower investment than the average. The lower than the average quality of services as well as the low government expenditures on safety, culture and infrastructure also contribute to the position of the Cypriot economy in the ranking. Cyprus appears to be doing better, with respect to the environment since the results indicate a smaller pollution than the average. Finally, with respect to productivity (unobserved) Cyprus is above the
average, which contributes in decreasing the output difference with the hypothetical country.

In conclusion, the attractive physical environment should not be a source of government complacency about the tourism sector. It appears that there is room for the Cypriot tourism sector to enhance its competitiveness primarily through improvements in safety, culture and to a smaller extent, in infrastructure and quality of services vis-a-vis other European countries.

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