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Determinants of Employment in Travel and Tourism Industries in EU: A Panel Data Estimation

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Abstract: *This chapter presents tourism indicators and determinants of employment in tourism activities in the Member States of the European Union, analyzed for the period from 1995 to 2019. The analysis of countries' travel and tourism contribution to gross domestic product and employment shows the development and causes of each EU members' position in this field in the observed period. The countries that had both, the lowest average percentage of contribution to employment and GDP, during the analyzed period are Slovak Republic, Poland, Lithuania, Romania, Belgium, and Luxembourg. The group of countries that had the highest average contribution of tourism and tourism related industries to employment and GDP included Austria, Croatia, Greece, and Malta. The empirical analysis applied panel data techniques in order to estimate the determinants of employment in tourism industries, such as capital investment in tourism activities, and domestic and foreign tourism spending. Results confirm the positive effect of investment and domestic and foreign spending on employment in tourism industries as well as in tourism-related industries.*

1. INTRODUCTION

This chapter deals with travel and tourism data. Travel is a broader word and it means the activity of travelers. These are persons who are moving for any purpose and duration in between different geographic areas. Tourism on the other hand is a subset of travel and it refers to an activity of visitors. A visitor is a traveler who is taking a trip to the main location outside his/her ordinary environment. The duration of this trip should not be longer than 12 months and it can be performed for any purpose, but it must not be performed for employment. So, a visitor is a subset of a traveler (UNWTO, 2010). To prevent confusion, we will be using the term tourism to comprise both definitions in one word, unless otherwise noted.

Tourism has become a very important economic activity in the world, affecting the volume of gross domestic product, the foreign exchange, balance of payments, and employment. Major changes in the field of tourism in the international arena, increasing competition, and the occasional lag in tourism turnover in the economies of some European countries, which all have taken place in the last few decades, required the adjustment of the tourism economy in all above mentioned areas. Due to its constant growth, expansion, and diversity, tourism has become one of the fastest-growing industries in the world. In the last six decades, the industry advanced tremendously. From the beginning of 1960 to 2000, the number of international tourist visits worldwide increased 27 times. Since then, however, it took only less than twenty years for the number of visits to reach 1,186 million, which is almost twice as many as in the year 2000 (Ministry of Economic Development and Technology, 2017). This is another reason why the tourism sector belongs to the labor augmented sector, which means that it is relatively more efficient in creating jobs than other sectors. Tourist consumption expenditure offers direct or indirect employment opportunities

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in this sector (Önder & Durgun, 2008). Because of its fast-evolving nature, it was recognized as a positive contributor to economic growth through various channels and is known as a currency earner sector, which promotes physical and human capital accumulation and pushes technology and innovation. Tourism also promotes other economic industries directly and indirectly, which helps even more in the economic growth acceleration (Brida, Matesanz Gómez, & Segarra, 2020).

According to World Travel & Tourism Council annual report (WTTC, 2020) data for 2019 show that travel and tourism were growing a lot faster than the World economy, the growth rate was 3.5%, which is 1 percentage point more than the global economy's growth. Travel and tourism was the third biggest sector that contributed the most to global GDP in 2018. If we take a look at European Union's (EU) key travel and tourism data, we can note that the contribution of travel and tourism to GDP in the region also grew more than the real economy. The EU travel and tourism contribution to the GDP growth rate was 2.3% while the real economy's growth was 1.4%. Travel and tourism in the EU contributed 22.6 million jobs to its region, which is 11.2% of total EU employment (WTTC, 2020).

Thus, after the literature review, we first analyze the data about travel and tourism contribution to employment and GDP in each EU member state. While the empirical part attempts to estimate the determinants of direct employment in travel and tourism industries, the determinants of employment in travel and tourism industries as well as in related industries, and the effect of travel and tourism activities on total employment in EU countries. The panel data methods are applied, such as fixed effects models and random effects models.

The following section presents a literature review where similar topics were studied as well as their interdependent connection. The third section describes countries' travel and tourism contribution to employment and GDP as a good introduction to our study and for a better perception of the field being analyzed. In the next section, we continue with an explanation of the chosen indicators, data, and methodology followed by a presentation and discussion of empirical results. The chapter concludes with further research possibilities and final thoughts in the conclusion.

2. LITERATURE REVIEW

It is known that various authors have been dealing with tourism as an economic aspect since the early 1980s, as confirmed by Ladking (2011). In the last decades, the tourism sector has definitely grown fast and become a significant sector and has proven as an advantage to the economy (Yap & Saha, 2013). As Habibi and others (2018) stated, tourism can be a part of economic policy and so positively impact employment and economic growth; as well as creating a positive effect on the production of goods and services by signalizing the market when new attendees enter the market and with achieving bigger efficiency and demand-based economies of scale for goods and services, and by making better life quality with greater consumer choice options and more competitors.

Through their project, the International Labour Organization and the United Nations World Tourism Organization stated that tourism is one of the industries which creates the most jobs, being a vital component in the economy's development (UNTWO, 2021). Tourism can directly improve employment in a local environment and indirectly through other industries which are connected to the tourism industry. It can highly stimulate other industries in the economy

throughout its forward and backward connection. Becerra (2009) says this can promote local industries that significantly support the tourism industry, such as artisanal manufacturing, hospitality, transport, telecommunications, and tourist guide services. This can financially help in building or adapting facilities that can be used by domestic and international travelers or even by some national communities. Described also diminishes the unemployment rate, because of tourism there are more jobs available in the sector itself and other sectors also. Consequently, this as well improves economic activity and contributes to bigger GDP (Tang & Tan, 2013).

Even though tourism has the potential in creating new jobs, employment is a field in tourism that is studied the least. Only some countries have a collection of relevant employment in tourism statistics UNWTO (2021). However, there are several studies analyzing the relationship between employment and tourism activities, and the impact they have on each other. Prasad and Kulshrestha (2016) analyzed the impact of tourism in creating employment in the Indian economy. Results revealed that the independent variable - foreign tourist expenditure, positively affects employment in the tourism industry and also in other industries. A study of a Brazilian tourism sector in the employment aspect, as well showed that chosen employment-oriented indicators have a positive impact on the employment growth in the tourism industry (De Santana Ribiero, Carneiro Rios Lopes, Goncalves Montenegro, & De Lima Andrade, 2018). Mozorova (2015) and others determined that there are complementary and interdependent relationships between the labor market and tourism sector in the Yaroslavl region. The study revealed that tourism has a multiplying positive impact on the level of employment in the region.

As the importance of the tourism sector for the economy grew through the decades, it was noted that the investigation of the relationship between tourism and economic growth also started growing, just oppositely to the tourism-employment relationship. This was discovered and also confirmed by Lee and Brahmasrene (2013). Brida, Matesanz Gómez, and Segarra (2020) accepted that tourism contributes to economic growth in a positive way via numerous direct and indirect channels. So, they state that it is important to include tourism as a key ingredient in the promotion of growth. In an empirical analysis of tourism-growth nexus for sixteen emerging market countries, Sokhanvar and others (2018) found that international tourism receipts have an impact on economic growth, but in some countries, there is a reverse impact too, that meaning, that the level of economic growth as well affects the tourism receipts. In their study on a sample of 144 countries, Cárdenas-Garciá and others (2015) confirmed the argument of international organizations, that economic growth experienced in some countries as a result of the expansion of the tourism activity over the last two decades influences an increase in the level of a country's economic development.

Gómez López and Barrón Arreola (2019) studied the relationship between tourism activities, employment in the tourism sector, and economic variables in the states of Mexico. Variables that directly affect employment are the number of national tourists and the state's GDP. Thus, it is a study of the relationship between all three connected areas, tourism, employment, and economic growth or development.

3. EU COUNTRIES' KEY TOURISM INDICATORS

To better understand the situation in which a particular country finds itself, in this section, we will present key tourism indicators for European countries. The chosen indicators are travel and tourism total contribution to employment (TTtE) and travel and tourism total contribution

to GDP (TTtGDP). For a more transparent presentation countries are classified into groups according to similar average values of each indicator for the period from 1995 to 2019 as shown in Table 1. While Figures 1 – 4 exhibit both indicators for individual countries in all groups for four selected years: 1995, 2004, 2008, and 2019, in percentage.

Table 1. Groups classification intervals

Groups/Indicator	Travel & Tourism Total Contribution to Employment	Travel & Tourism Total Contribution to GDP
	Average Percentage Interval	
Lowest average percentage	5.14 - 6.88	5.12 - 6.80
Medium-high average percentage	7.05 - 10.58	7.17 - 9.51
High average percentage	11.09 - 14.49	10.11 - 12.96
Very high average percentage	15.61 - 26.98	13.72 - 25.41

Source: Authors' calculation

Figure 1 presents countries with the lowest average percentage of their travel and tourism total contribution to employment and GDP. As we can see, there is majority of countries are the same for both indicators. Those are Belgium, Lithuania, Luxembourg, Poland, Romania, and the Slovak Republic. For each indicator, there are some deviations. For the travel and tourism total contribution to employment, we can see that Latvia had the minimum percentage of 2.04% in 1995, but in 10 years its percentage increased 3 times and had a further increasing trend over the presented period. This was accompanied by new and updated tourism policies years after the global financial crisis. Because of these changes, a lot of new tourist accommodations grew in Latvia and they offered many new jobs (OECD, 2020). Luxembourg experienced a very good year in tourism in 2012 and the values ranged around that height, later on by 2019 even increased (LuxTimes, 2012). Thus, Luxembourg is a country with the maximum value and it was 11.3% in 2019.

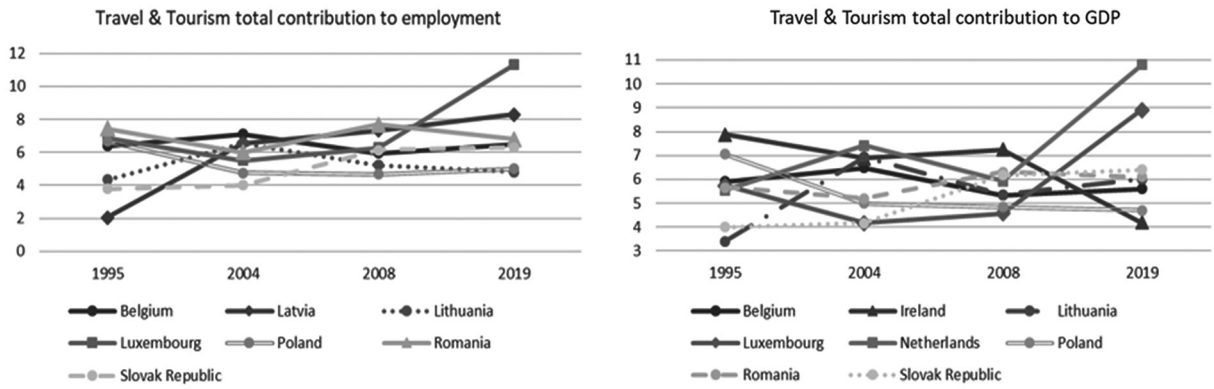

Figure 1. Group of countries with the lowest average percentage of contribution to employment and GDP

Source: Authors' elaboration based on data from The World Bank (WB, 2021a)

As shown in Figure 1 for the travel and tourism total contribution to GDP two countries have a positive deviation. These are the Netherlands and Luxembourg, for which a major rise in the contribution is seen in the period right after the global financial crisis due to a major increase in the importance of domestic and inbound tourism (OECD, 2016). Oppositely, for Ireland, a big decrease is noticeable for the same period. We can also observe a major enlargement of the percentage for Lithuania from 1995 to 2004. Other countries had small fluctuations between 4% and 8% for both indicators in the observed period.

Countries with a medium-high average percentage of their travel and tourism total contribution to employment and GDP are presented in Figure 2. In this figure, only three countries are the same for both indicators, France, the Czech Republic, and Denmark. The country that is the most deviating from the TTtE is Hungary, which had the maximum value (23.1%) in 1995 but in the next decade, the percentage dropped by almost 3 times. This is a consequence of the changes in the pension system and labor benefits system, therefore from 2001, the unemployment rate started to rise. A large part of the workforce was retiring early at the beginning of the nineties and in that time the learning time was also prolonged, which further contributed to the situation at the time (HCSO, 2006). This decreasing trend was continuing and turned in the opposite direction by the end of the observed period.

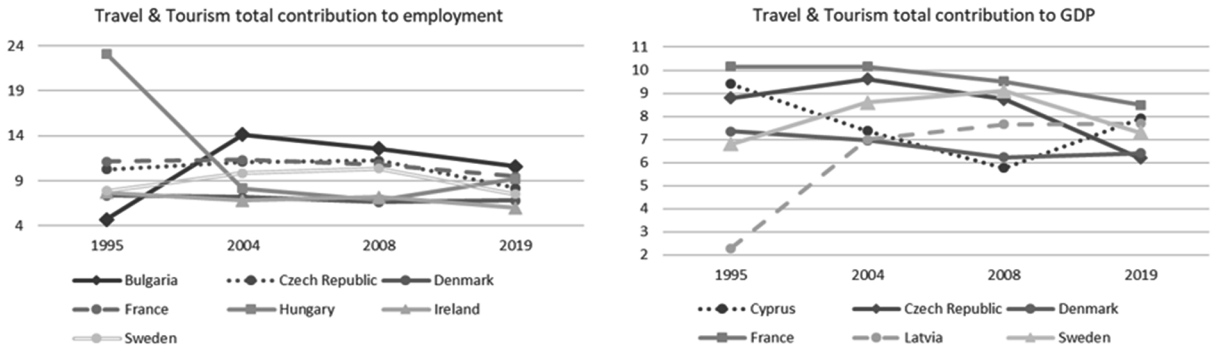

Figure 2. Group of countries with a medium-high average percentage of contribution to employment and GDP

Source: Authors' elaboration based on data from The World Bank (WB, 2021a)

On the contrary, Bulgaria started with the minimum value (4.7%) which started increasing in the following years, but after 2004 shrank a little or even stagnated. The deviations that are noticed for the TTtGDP are for Latvia and Cyprus. Latvia had the minimum percentage, which really differed from the percentage of other countries, it was only 2.29% when the second smallest was around 2 times bigger and it was Cyprus's 4.8% in 2009. But Latvia's percentage did not stay that low, as early as in the next two or three years it began to grow slowly. This is the cause of bigger tourism promotion in Latvia and also on an international level, which was determined by the 1998 Tourism Law. It is also known, that since then tourism is one of Latvia's main GDP growth drivers (OECD, 2020). It reached 9.39% in 2019 with small fluctuations throughout the period.

About Cyprus, we can also observe that its percentage started decreasing over the first decade, more precisely in 2003 and this trend continued until 2011. Even if the tourism sector is one of the services sectors that contributes the most to the country's GDP, this contribution was fluctuating in the early 2000s, because of the weak economic and political conditions. That had a great impact on the swings in tourist arrivals, which affected the competitiveness in tourism and consequently the share growth of GDP contributed by tourism. As these conditions gradually improved the percentage began to increase slowly (PAN, 2017).

Figure 3 shows countries with a high average percentage of their travel and tourism total contribution to employment and GDP. Here we can also see countries that fell in the same group for both indicators and there are five of them, Finland, Germany, Italy, Slovenia, and the United Kingdom. The first county that stands out for TTtGDP is Bulgaria. Bulgaria really improved its contribution to GDP in the first decade, the percentage grew more than 2 times, but at last, the contribution deteriorated. For the growth in the first observed decade, the culprit is the tourism

sector assets privatization, which largely invested in various tourism infrastructure and services. Modern accommodation bases and attractions have attracted visitors all of which are reflected in the growth of contribution to GDP. However, Bulgaria's high territory dependence and high seasonal fluctuations impact its tourism and consequently, this share of output suffered in the last observed years (Tapescu, 2015). However, the share of contribution has never been as low as at the beginning of the period.

Hungary's percentage started to decrease from the first observing year and the trend did not stop until the financial crisis. This was the act of the effect of the low share of capital investment in tourism, which was among the lowest in the European Union or even globally. At the same time, the number of tourist arrivals and guest nights started dropping in the 2000s or even a little before (MET, 2004). From then on to the last observed year it was fluctuating between 7.5% and 8.5%. From the first observing year to the last, the percentage decreased by around 10 %. Similar was for the United Kingdom for TTtE, just that the fluctuations after the crisis were a little bigger and the decrease was not as big as it was in Hungary. The contribution to employment dropped only by around 3%.

The country that substantially increased its contribution was the Netherlands. Its starting percentage was 10.36% and in 2019 it was 18.1%. Another interesting country is Spain of which the percentage ranged between 13.3% and 15.5% through the entire observing period, while all other countries have either reduced or increased their contribution to employment or GDP from the first to the last presented year.

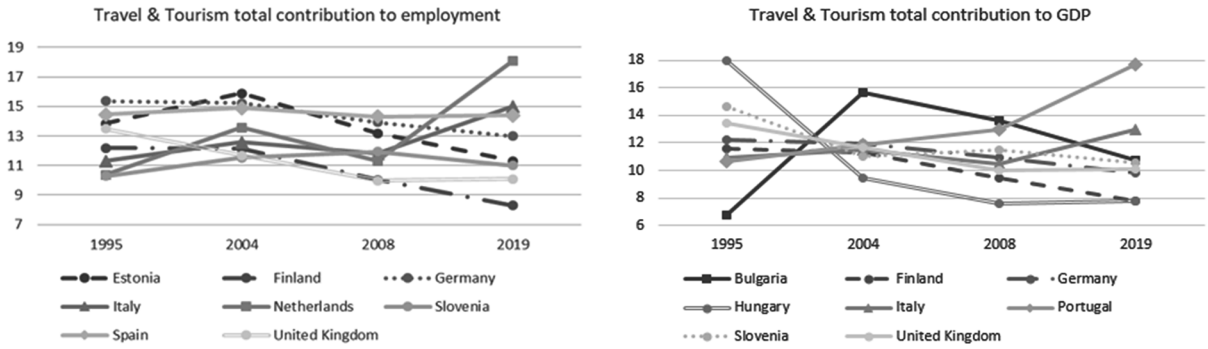

Figure 3. Group of countries with a high average percentage of contribution to employment and GDP

Source: Authors' elaboration based on data from The World Bank (WB, 2021a)

Countries with a very high average percentage of their travel and tourism total contribution to employment and GDP are presented in Figure 4. Here we can see the most deviating countries at the first look at both of the indicators. Those are Malta and Croatia. For both indicators, Malta had the biggest percentage in 1995 and after that, the percentage shrank, but the shrinkage was bigger in its contribution to GDP than it was to employment. A major reason for the decline of both is Malta's inability to compete with neighboring Mediterranean countries and its reliance on "mass tourism" from foreign visitors. It does not have in abundance the natural resources and sandy beaches to compete as a summer resort, so it is a must to diversify the products and markets. Despite the government's effort, however, it is difficult to accomplish this with capacity and other limitations (Blake, Sinclair, Sugiyarto, & DeHaan, 2003). The percentage in 1995 was 33.23 and in 2019 only 15.9.

Croatia had a very similar trend for both indicators. It started with a small percentage; then, it started to increase around 2004 and right after the international crisis it started to slowly decrease. Croatia's 1991-1995 independence war had a great negative impact on the country's tourism, but just a few years after the start of the war the tourism recovered. Among others, the reason for this was that the war took place mainly in more remote places than tourist ones, so it did not affect the foreign visits (Currie, Skare, & Loncar, 2004). Some of the structural characteristics of a country's tourism are an important factor in why the sector cannot achieve its full potential and this is seen in its oscillations of the percentages (Orsini & Ostojić, 2018).

For TTtGDP the share stayed around 25% and for TTtE around 23%. We can also mention Spain which has almost the same tendency as it was for the TTtE in the previous group of countries. For TTtE Cyprus also stands out, as it really reduced its contribution to employment with every new observing year. The contribution was reduced by more than half of the primary value. At the beginning of the observed period, tourism was a significant factor in maintaining low levels of unemployment, more than a quarter of the working population had a job directly or indirectly in tourism. This was negatively impacted by political instability which dates back to the so-called "Cyprus Problem" (Sharpley, 2001). Sector seasonality also contributed to this and caused fluctuations in the level of unemployment. However, the coming years were not favorable for the economy, as the employment situation only worsened with the onset of the international financial crisis (PwC, 2015).

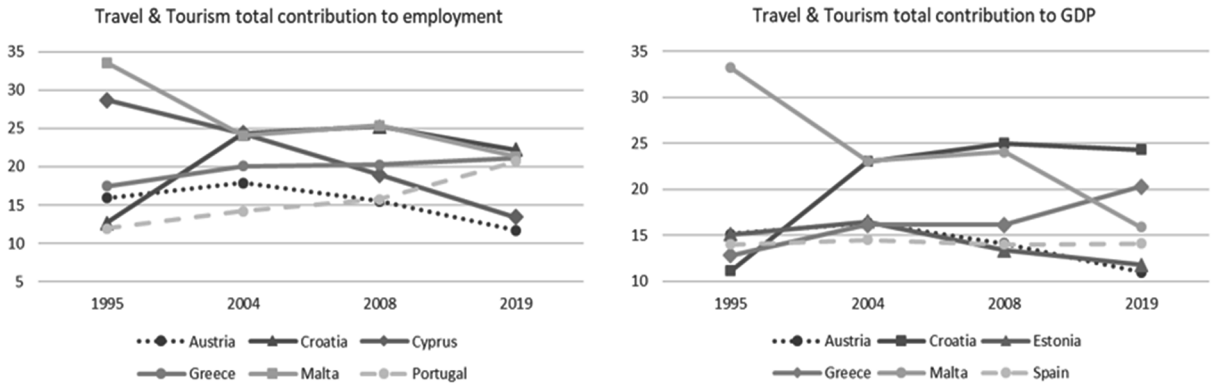

Figure 4. Group of countries with a very high average percentage of contribution to employment and GDP

Source: Authors' elaboration based on data from The World Bank (WB, 2021a)

4. METHODOLOGY AND DATA DESCRIPTION

The empirical analysis is divided into three parts. First, we examine the determinants of employment in travel and tourism activities. Second, we estimate the determinants of employment in travel and tourism industries as well as in related industries. Third, we focus on how expenditure related to travel and tourist activities and capital investment in travel and tourism activities affect total employment in the panel of 28 EU members.

The basic characteristics of the data used in this empirical analysis are reported in Table 2, including data sources, units of measurement, and abbreviations. The annual data covers a panel of 28 EU member states in the period from 1995 to 2019, resulting in 28 cross sections (i), 25 periods (t), and 700 total observations.

The emphasis is put on travel and tourism is defined as an activity of people who travel from one place to another for a short or a long-term trip, that is no longer than a year (WTTC, 2021). Travel and tourism direct contribution to employment (TTDE) measures the direct jobs that are in tourism industries. Travel and tourism total contribution to employment (TTTE) reflects direct jobs that are in tourism industries and other industries that are indirectly connected to tourism. Domestic tourism spending (DS) includes the spending of the country's residents in their country. Capital investment in travel and tourism (CI) comprises spending of all industries that directly take part in travel and tourism. It also includes other industries that invest in certain tourism facilities. Outbound travel and tourism expenditure (OE) represents spending by residents of a particular country when traveling abroad. Visitor exports (foreign spending, FS) includes spending on tourism activities of nonresidents in a particular country (WTTC, 2021). While total employment (TE) includes all people that participate in some kind of productive activity in a particular country, including employees and self-employed persons (Eurostat, 2021).

Table 2. Definitions of variables and sources

Variable	Abbreviation	Unit of measure	Source
Travel and Tourism direct contribution to employment	$TTDE_{it}$	Thousands of jobs	WB and WTTC
Travel and Tourism total contribution to employment	$TTTE_{it}$	Thousands of jobs	WB and WTTC
Total employment	TE_{it}	Thousand persons	Eurostat
Domestic Tourism Spending	DS_{it}	US$ in bn, real prices	WB and WTTC
Capital Investment in Travel and Tourism	CI_{it}	US$ in bn, real prices	WB and WTTC
Outbound Travel and Tourism Expenditure	OE_{it}	US$ in bn, real prices	WB and WTTC
Visitor Exports (Foreign Spending)	FS_{it}	US$ in bn, real prices	WB and WTTC

Notes: WB –World Bank, WTTC - World Travel and Tourism Council

Source: Authors' compilation

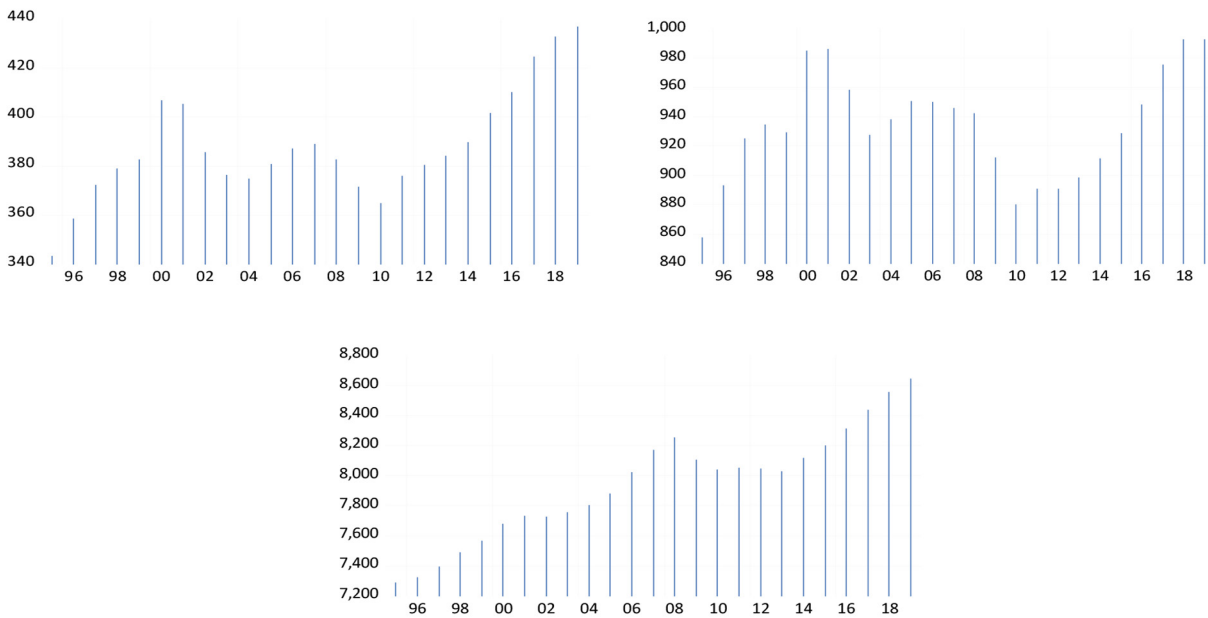

Figure 5. Means of cross sections of direct employment in tourism (left), total employment in tourism and tourism related industries (right), and total employment (bottom)

Source: Authors' compilation based on WTTC (2021) and Eurostat (2021) data

Figure 5 presents the means of cross sections (EU member states) for the observed period for the three dependent variables. The upper left panel displays the mean of cross sections for direct employment in tourism industries, while the upper right panel exhibit the mean of cross sections

for total employment in tourism and tourism-related industries. Both variables exhibit similar trends in the observed period with a peak in 2000 and 2001 and again in 2019. The bottom panel offers insight into the mean of cross sections for total employment, which shows an upward trend with a decline in 2009, which did not recover until 2014.

Three equations were estimated. The first one employed travel and tourism direct employment ($TTDE_{it}$) as the independent variable, in the second equation total employment in travel and tourism and related industries ($TTTE_{it}$) represented the independent variable, and in the third equation, the independent variable was total employment (TE_{it}). The three equations were assessed by panel data estimation techniques. First, we employed the one way fixed effect model, which takes into account the heterogeneity among cross sections and allows the constant to vary for each cross section, represented by β_{1i} in Equation 1 (Wooldridge, 2002):

$$E_{it} = \beta_{1i} + \beta_2 CI_{it} + \beta_3 DS_{it} + \beta_4 OE_{it} + \beta_5 FS_{it} + u_{it} \quad (1)$$

where E_{it} stands for one of the employment variables ($TTDE_{it}$, $TTTE_{it}$, TE_{it}).

Furthermore, the one way random effects in the panel model were estimated, which assume that the β_{1i} is a random variable with the mean value of β_1 and random term ε_i for each individual cross-section observation:

$$E_{it} = \beta_1 + \beta_2 CI_{it} + \beta_3 DS_{it} + \beta_4 OE_{it} + \beta_5 FS_{it} + w_{it} \quad (2)$$

In the random effects model the error term (w_{it}) has two components: $w_{it} = \varepsilon_i + u_{it}$, where ε_i is the cross section specific error term, while u_{it} represents idiosyncratic term varying over cross sections and over time (Gujarati, 2015).

Since the random effects model results in inconsistent estimates of regression coefficients if the composite error term (w_{it}) is correlated with regressors, we have applied the Hausman test, which searches for the correlation among the cross section specific error component and regressors. If the error term and regressors are correlated, the fixed effects model is appropriate (Gujarati, 2015). The results are presented in the next sections. In all three cases, it turned out that the fixed effect model is more appropriate than the random effects model. Thus, the residual cross-section dependence tests and serial correlation tests were performed for fixed effects models. Finally, the robust standard errors and covariances were estimated by applying the White cross-section and White period approach (Arellano, 1987, and White, 1980).

5. DETERMINANTS OF EMPLOYMENT IN TOURISM INDUSTRIES

The first equation estimates the determinants of direct employment in tourism industries. The results of fixed and random effects models presented in Table 3 exhibit similar results among the two models. Domestic tourism spending (DS) and foreign visitors spending (FS) have a statistically significant and positive effect on employment, while outbound tourism expenditure statistically significantly negatively influences employment. Despite the anticipated positive effect, for both models, the estimated coefficients for capital investment in travel and tourism activities have negative signs. However, the coefficient is statistically significant only when the random effects model is applied. The Hausman test provides evidence in favor of the fixed effects model since the $\chi 2$ statistic is statistically significant, rejecting the null hypothesis that

the fixed and random effect models do not differ substantially and proving evidence that the cross section specific error component and regressors are correlated.

Table 3. Panel data estimation of employment in tourism industries in EU, for the period 1995–2019 (dependent variable: employment in tourism industries)

Independent variable	Fixed effects	Random effects
Constant 154.5987*** (8.958888)		107.3297*** (20.75148)
CI	-1.222576 (0.757327)	-1.814160*** (0.747965)
DS	5.774770*** (0.287938)	7.258616*** (0.225693)
OE	-2.982063*** (0.712862)	-0.930494 (0.655242)
FS	6.708953*** (0.627360)	4.982246*** (0.568081)
Root MSE	39.92186	42.64303
R^2	0.996134	0.715781
DW statistic	0.496132	0.497915
F-statistic	5552.444***	437.5743***
Periods included	25	
Cross sections included	28	
Total panel observations	700	
Hausman test (χ^2)	71.168591***	

Notes: ***statistically significant at 1% significance level. Standard errors in parenthesis.

Source: Authors' calculation

In panel data estimation, it is assumed that the errors for different cross-sectional units are uncorrelated. Table 4 exhibits the results of residual cross-section dependence tests for the fixed-effects model. All three tests reject the null hypothesis that there is no cross-section dependence in the residuals. Ignoring cross-sectional dependence in panel estimation results in the worst efficiency of estimators and, consequently, invalid test statistics (HIS, 2019). Robust standard errors and covariances were computed by applying the White cross-section method (White, 1980). In this case, the estimators are robust to cross-section correlation and heteroscedasticity. The results of White cross-section standard errors and covariances are presented in Table 6.

Table 4. Residual Cross-Section Dependence Tests for Fixed Effects Model (dependent variable: employment in tourism industries)

Null hypothesis: No cross-section dependence (correlation) in residuals

Test	Statistic	p-value
Breusch-Pagan LM	1647.625	0.0000
Pesaran scaled LM	46.17581	0.0000
Bias-corrected scaled LM	45.59247	0.0000

Source: Authors' calculation

The Wooldridge panel data autocorrelation test (Wooldridge, 2002) in Table 5 displays the fact that the estimation fails to fulfil the requirement of the absence of autocorrelation, for the estimated coefficients to be the best and efficient. Since there is evidence of positive autocorrelation, the standard errors of the coefficients might be underestimated and consequently their

statistical significance overrated. In order to take the possible impact of the autocorrelation into account, robust standard errors and covariances of estimated coefficients were assessed by applying the White period approach (Arellano, 1987, and White, 1980).

Table 5. Serial Correlation Test for Fixed Effects Model
(dependent variable: employment in tourism industries)

	Coefficient/Statistic	p-value
Autocorrelation coefficient (ρ)	**ρ = 0.794444**	0.0000
Wald F test (ρ=-0.5)	1991.591	0.0000

Source: Authors' calculation

Table 6 displays the results of the White cross section and the White period procedure for calculating the robust standard errors and coefficient covariance. Within these methods all other parameters of the equations (coefficients, root MSE, adjusted R2) remain the same, only standard errors diverge from ordinary estimates in Table 3. The White cross section estimation of robust standard errors and coefficient covariance takes into account cross-section correlation and heteroscedasticity, while the White period estimates of standard errors and coefficient covariance allow for arbitrary heteroscedasticity and with-in cross-section serial correlation (Gujarati, 2015).

Table 6. Fixed Effects Model with Robust Standard Errors and Covariances
(dependent variable: employment in tourism industries)

Independent variable	White cross-section		White period	
	Coefficient	Standard Error	Coefficient	Standard Error
Constant	154.5987***	32.30233	154.5987***	32.28513
CI	-1.222576	1.009992	-1.222576	1.684829
DS	5.774770***	0.940378	5.774770***	1.117157
OE	-2.982063***	0.845518	-2.982063	2.097856
FS	6.708953***	0.768967	6.708953***	2.124683

Notes: ***statistically significant at 1% significance level.

Source: Authors' calculation

Since both are important for the above-stated problem of autocorrelation and cross-sectional dependence, we have calculated both types of robust standard errors estimated by the White cross-section and the White period approach. Thus, Table 6 shows that most of the coefficients remain highly statistically significant and of expected sign (domestic tourism spending, foreign visitors spending, outbound tourist expenditure) in the case of White cross-section robust standard errors and covariance. While the capital investment remains statistically insignificant for both methods of robust standard error estimation. Additionally, outbound tourism expenditure becomes statistically insignificant when White period standard errors are taken into account.

6. DETERMINANTS OF EMPLOYMENT IN TOURISM AND TOURISM RELATED INDUSTRIES

The second equation deals with determinants of employment in tourism industries as well as employment in industries related to tourism. Again, fixed and random effects models were estimated (Table 7). All estimated coefficients are of anticipated signs and highly statistically significant in both types of models. Thus, capital investment in tourism, and domestic and foreign tourism spending have a statistically significant positive influence on employment in tourism and tourism-related industries. On the other hand, outbound tourism expenditure has a

statistically significant negative effect on employment. The coefficients in the fixed effects model and random effects model are also jointly significant as shown by the F-test. Based on the Hausman test, we can conclude that the random effects model is not appropriate since the random error terms are correlated with one or more independent variables.

Table 7. Panel data estimation of employment in tourism and tourism related industries in EU, for the period 1995 – 2019 (dependent variable: employment in tourism and tourism related industries)

Independent variable	Fixed effects	Random effects
Constant	511.5285*** (23.57667)	374.0621*** (48.25847)
CI	4.855496*** (1.993019)	4.144551** (1.962863)
DS	13.08638*** (0.757754)	16.93514*** (0.568598)
OE	-10.45752*** (1.876003)	-6.323768*** (1.698825)
FS	7.487809*** (1.650992)	4.906076*** (1.466075)
Root MSE	105.0604	113.5246
R^2	0.994473	0.636303
DW statistic	0.295422	0.265017
F-statistic	3877.207***	303.9830***
Periods included	25	
Cross sections included	28	
Total panel observations	700	
Hausman test (χ^2)	88.970680***	

Notes: ***statistically significant at 1% significance level, ** statistically significant at 5% significance level. Standard errors in parenthesis.

Source: Authors' calculation

Residual cross-section dependence tests for the fixed effects model are presented in Table 8. The results of all three applied tests show that we can reject the null of no cross-section dependence in residuals. Thus, there is cross-section dependence in residuals, which is violating one of the main assumptions in the panel data approach. Consequently, we calculated robust standard errors and covariances, which are presented in Table 10.

Table 8. Residual Cross-Section Dependence Tests for Fixed Effects Model (dependent variable: employment in tourism and tourism related industries)

Null hypothesis: No cross-section dependence (correlation) in residuals

Test	Statistic	p-value
Breusch-Pagan LM	1955.064	0.0000
Pesaran scaled LM	57.35727	0.0000
Bias-corrected scaled LM	56.77394	0.0000

Source: Authors' calculation

Table 9 displays the results of the Wooldridge serial correlation test in the fixed effects panel data model. If no serial correlation, the autocorrelation coefficient should have the value of -0.5. The Wald F test provides no evidence of that, rejecting the null about the expected value of the autocorrelation coefficient, suggesting there is serial correlation in the model.

Table 9. Serial Correlation Test for Fixed Effects Model (dependent variable: employment in tourism and tourism related industries)

	Coefficient/Statistic	p-value
Autocorrelation coefficient (ρ)	**ρ = 0.836107**	0.0000
Wald F test (ρ=-0.5)	4258.613	0.0000

Source: Authors' calculation

Taking into account the presence of cross-sectional dependence and serial correlation the White cross-section and White period standard errors were estimated for the fixed effect model. The results demonstrated in Table 10 show that we can confirm the statistically significant and positive effect of domestic tourism spending and the statistically significant and negative effect of outbound tourism expenditure on employment in tourism and tourism-related industries. While coefficients for capital investment and foreign visitors spending become statistically insignificant when our decision is being based on the robust standard errors estimated by the White cross-section and the White period method.

Table 10. Fixed Effects Model with Robust Standard Errors and Covariances (dependent variable: employment in tourism and tourism related industries)

Independent variable	White cross-section		White period	
	Coefficient	Standard error	Coefficient	Standard error
Constant	511.5285***	40.32899	511.5285***	118.4854
CI	4.855496	5.117292	4.855496	7.270135
DS	13.08638***	1.172406	13.08638***	1.821652
OE	-10.45752***	2.998536	-10.45752***	3.405276
FS	7.487809**	3.615480	7.487809	6.538231

Notes: ***statistically significant at 1% significance level, ** statistically significant at 5% significance level.

Source: Authors' calculation

7. EFFECTS OF TOURISM SPENDING AND INVESTMENT ON TOTAL EMPLOYMENT

When estimating the effects of tourism capital investment and tourism spending on total employment in the observed 28 EU economies, the ordinary estimates of fixed and random effects models result in the statistically significant and positive influence of all included explanatory variables (Table 11). These results are in line with expectations for all regressors but for the outbound tourism expenditure. The positive effect of the latter might be explained by the possibility that most of the outbound expenditure is spent within the EU and thus providing a positive transmission effect on total employment in the EU as a whole.

However, before we rely on these results, let us examine the appropriateness of the estimated regression coefficients. The Hausman test and the resulting χ^2 value reveal that the fixed effects model is more appropriate than the random effect model. Furthermore, the outcome of cross-section dependence tests, such as Breusch-Pagan LM test, Pesaran scaled LM test, and Bias-corrected scaled LM test, rejects the null of no the cross-section dependence in residuals for the fixed effects model. These results are demonstrated in Table 12. That is why the White cross section method was applied to estimate the robust standard errors and covariances of estimated regression coefficients (left panel of Table 14).

Additionally, the Wooldridge serial correlation test, which results are displayed in Table 13, provides evidence of serial correlation in the fixed effect model. The Wald F-test did not confirm the null about the autocorrelation coefficient, thus, proving evidence that in the fixed effects model

residuals are serially correlated. Hence, the White period method for estimating robust standard errors and covariances was utilized with results presented in the right panel of Table 14.

Table 11. Panel data estimation of total employment by spending related to tourism in EU, for the period 1995 – 2019 (dependent variable: total employment)

Independent variable	Fixed effects	Random effects
Constant	5185.089*** (112.7663)	4860.619*** (606.7333)
CI	58.77523*** (9.532537)	56.57532*** (9.506165)
DS	11.53068*** (3.624307)	21.21379*** (3.414497)
OE	133.8821*** (8.972852)	144.8521*** (8.782350)
FS	34.24432*** (7.896634)	25.76102*** (7.710091)
Root MSE	502.4999	540.7859
R^2	0.997607	0.613772
DW statistic	0.197496	0.192744
F-statistic	8982.374***	276.1141***
Periods included	25	
Cross sections included	28	
Total panel observations	700	
Hausman test (χ^2)	82.668845***	

Notes: ***statistically significant at 1% significance level, ** statistically significant at 5% significance level. Standard errors in parenthesis.

Source: Authors' calculation

Table 12. Residual Cross-Section Dependence Tests for Fixed Effects Model (dependent variable: total employment)

Null hypothesis: No cross-section dependence (correlation) in residuals

Test	Statistic	p-value
Breusch-Pagan LM	2264.172	0.0000
Pesaran scaled LM	68.59940	0.0000
Bias-corrected scaled LM	68.01606	0.0000

Source: Authors' calculation

Table 13. Serial Correlation Test for Fixed Effects Model (dependent variable: total employment)

	Coefficient/Statistic	p-value
Autocorrelation coefficient (ρ)	**ρ = 0.897768**	0.0000
Wald F test (ρ=-0.5)	552.1304	0.0000

Source: Authors' calculation

Finally, the robust standard errors by the White cross-section and by the White period method were assessed and are exhibited in Table 14. Taking into account the cross-section correlation and heteroscedasticity the White cross-section standard errors result in a statistically insignificant coefficient for domestic tourism spending, while all other coefficients remain statistically significant and of the same sign as in Table 11, when ordinary standard errors were considered. Nevertheless, when a serial correlation is acknowledged by the White period standard errors estimates, only outbound tourism expenditure remains statistically significant. For all other regressors, the standard errors are too large for the coefficient to prevail in their statistical significance.

Table 14. Fixed Effects Model with Robust Standard Errors and Covariances (dependent variable: total employment)

Independent variable	White cross-section		White period	
	Coefficient	Standard error	Coefficient	Standard error
Constant	5185.089***	217.0249	5185.089***	344.7225
CI	58.77523***	13.46969	58.77523	35.82390
DS	11.53068	8.849082	11.53068	12.48428
OE	133.8821***	11.51581	133.8821***	23.45979
FS	34.24432***	11.70419	34.24432	27.54253

Notes: ***statistically significant at 1% significance level.

Source: Authors' calculation

Taking into account the serial correlation in the residuals, we have estimated the first difference equation for the fixed effects model. The results are demonstrated in Table 15. After all, in this case, all estimated coefficients remain highly statistically significant and with a positive effect on total employment. Thus, capital investment in travel and tourism activities, outbound tourism expenditure, domestic tourism spending, and foreign tourism spending positively influence the total employment in EU member states.

Table 15. Fixed Effects Model for First Difference Equation (dependent variable: total employment)

Regressors	Coefficient	Standard error	t-statistic	p-value
Constant	35.83135***	6.190757	5.787877	0.0000
d(CI)	7.996961**	3.480741	2.297488	0.0219
d(DS)	3.569845**	1.772341	2.014198	0.0444
d(OE)	40.22061***	5.755521	6.988179	0.0000
d(FS)	17.71233***	4.700287	3.768352	0.0002

Notes: ***statistically significant at 1% significance level, ** statistically significant at 5% significance level.

Source: Authors' calculation

8. FUTURE RESEARCH DIRECTIONS

The empirical results presented in this research allow for several extensions for further empirical analysis. Firstly, all three equations could be estimated by dynamic panel data including lagged dependent variables as regressors. This research focused on several expenditure variables related to travel and tourism activities. Due to the limited availability of data for some EU member states for the whole observed period about the number of tourists, the number of rooms occupied, and the number of nights spent for some of the EU member states, we could not assess the effects of these variables on employment. Hence, the next study could concentrate on the effects of the above-mentioned variables on selected EU members. Nowadays, we cannot avoid the Covid-19 pandemic, which has undoubtedly substantially affected travel and tourism activities all around the World. Due to data availability, the present empirical analysis comprises the period prior to the pandemic. Thus, it remains for future research to estimate the effects of the pandemics on employment in travel and tourism activities.

9. CONCLUSION

Despite the undoubtedly important effects that travel and tourism industries provide for domestic economic activities, it is clear from this research that in the EU member states the contribution of travel and tourism activities to employment in these and related industries as well as

to GDP varies substantially. The average contribution to employment in the period 1995-2019 ranges from 5.1% to 27%, while the average contribution to GDP is from 5.1% to 25.4%. The lowest average contribution to employment and GDP was recorded in Belgium, Lithuania, Luxembourg, Poland, Romania, and Slovak Republic (from 5.1% to 6.8%). On the other hand, the highest contribution to employment and GDP was reported in Austria, Croatia, Cyprus, Greece, Malta, and Portugal, ranging from 15.6% to 27% contribution to employment and from 13.7% to 25.4% contribution to GDP.

However, this empirical analysis confirms the importance of travel and tourism activities and related spending and expenditure for direct employment within the sector as well as indirect employment in industries related to travel and tourism and, moreover, also for total national employment. The results are in line with other similar empirical studies, which are presented in the literature review. The fixed effects panel data model with robust standard errors of regression coefficients estimating determinants of direct employment in travel and tourism industries has confirmed the positive effect of domestic and foreign tourism spending as well as the negative effect of outbound tourism expenditure. It turned out that determinants of total employment in travel and tourism together with employment in related industries comprise domestic tourism spending with a positive effect and outbound tourist expenditure with a negative effect. The first difference equation estimating the fixed effects model for total national employment resulted in confirming the positive effect of capital investment in travel and tourism industries, domestic and foreign tourism spending as well as outbound tourism expenditure. The latter might be explained by the possibility that most of the outbound tourism expenditures are spent within the EU as a whole, thus proving a positive effect on total national employment in the EU.

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