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Tourism industry and employment generation in emerging seven economies: evidence from novel panel methods

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ABSTRACT

To analyze E-7 economies, the authors employ panel data and relevant panel data econometrics approaches for long-run relationships Mean group, fully modified and dynamic OLS (MG, FMOLS, DOLS) to monitor changes over time between variables, which is important in actual studies. The models' primary findings are as follows: The panel cointegration tests confirm log-run associations among the targeted variables. International tourism has the largest influence on creating direct jobs in the tourist industry. The control variables like FDI and TI increase employment opportunities in the targeted economies. Furthermore, the results confirm that total natural resources reduce employment services in the E-7 economies. Other factors that might affect the performance of the tourist activity are not included in the model. Furthermore, given the availability of official and consistent data, it only includes what has been recorded up to 2020; our target was 2022, but due to data limitation, it covers 2020. The objective is to assess both the significance of tourist-related activities in creating jobs and the effect of tourism on country-level factors where public policy may influence economic activity.

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1. Introduction

Particularly in developing countries like Brazil, China, India, Indonesia, Mexico, Russia, and Turkey, the rapid rise of tourism and its potential for expansion have accelerated lately. Since they depend on foreign currency earnings and create jobs, provide services, and engage in associated activities, tourism projects are crucial in local, national, and even worldwide economic development. The World Tourism Organization of the United Nations (UNWTO 2013) claims that tourism has developed continuously and has become a diverse and significant economic industry on a global scale. On a worldwide scale, in 2012, it produced 9% of the world's gross

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domestic product (GDP), typically one of every eleven jobs, and income accounted for around 6% of exports. In actual terms, income rose by 4% that year, setting a record high of US$1 trillion, seventy billion. This development is comparable to the 4% increase in international visitor arrivals in terms of this statistic, demonstrating the strong correlation between the two measures. According to the most recent statistics, this activity generates 10% of global GDP, creates 1 in 10 jobs, and exports US$1.6 trillion, equivalent to 7% of all exports globally and 30% of services (Higgins-Desbiolles, 2018).

According to (UNWTO 2018), the E-7 economies' international tourism revenue percentage of GDP is increasing over time. In E-7 economies, turkey is on top, with a value of 2.6% of GDP; second, Mexico is at 1.9, and third, India is at 1.08% of GDP, respectively. In addition, the Organization for Economic Cooperation and Development (OECD, 2017) has demonstrated that in E-7 economies, Mexico's national tourism contributed 88 pesos out of every 100 that was spent in the sector, which had a direct influence on the communities that tourists hosted. Compared to the flow of foreign visitors, mostly concentrated in certain locations like Cancun or Los Cabos, the flow of national tourists is dispersed over the whole territory.

The tourism-led development theory holds in E-7 economies and emerging economic environments due to the good progress of tourism and its potential for growth in recent years. Similar to exports, it is considered that an increase in tourism favorably impacts economic growth. Nevertheless, several studies have not convincingly shown that exports boost a country's capacity to generate goods and services, despite the theory's recurrent validation depicting exports as a development engine (Darrat, 1986; Dodaro, 1993; Gómez López & Barrón Arreola, 2019). The contribution of domestic tourism to economic development has been discussed for years, considering that tourism may have a comparable effect on the economy of any nation. Tourism provides several benefits, including a high degree of earning freedom as long as guest services are offered (Gómez López & Barrón Arreola, 2019). Given the inherent lack of ties to the industrial and producing industry, the concentration of tourism activities may have the undesirable impact of weakening the financial structure. In terms of public policy, promoting balanced economic development requires thoroughly examining the causes and effects of tourist activities. The need for linked services is on the rise. These factors, together with a region's affinities with its geographical, natural, and cultural qualities, are among the crucial factors to consider as the tourism industry develops nationally. While it is undoubtedly true that tourism generates a significant portion of the local economy, harmful effects on the environment and cultural resources are often seen as well. Figure 1 represents the average number of international tourists in E-7 economies from 1990–2020.

In growing economic environments, the relationship between human capital and productivity in the tourism sector has been examined, particularly in light of the challenges related to the lack of qualified personnel. The significance of customized solutions in this business, where both domestic and international visitors routinely interact with workers from this sector, necessitates considering factors like the degree of training of tourism employees and the high caliber of the services and goods. Defining the tourist business makes it difficult to research the skills required by this

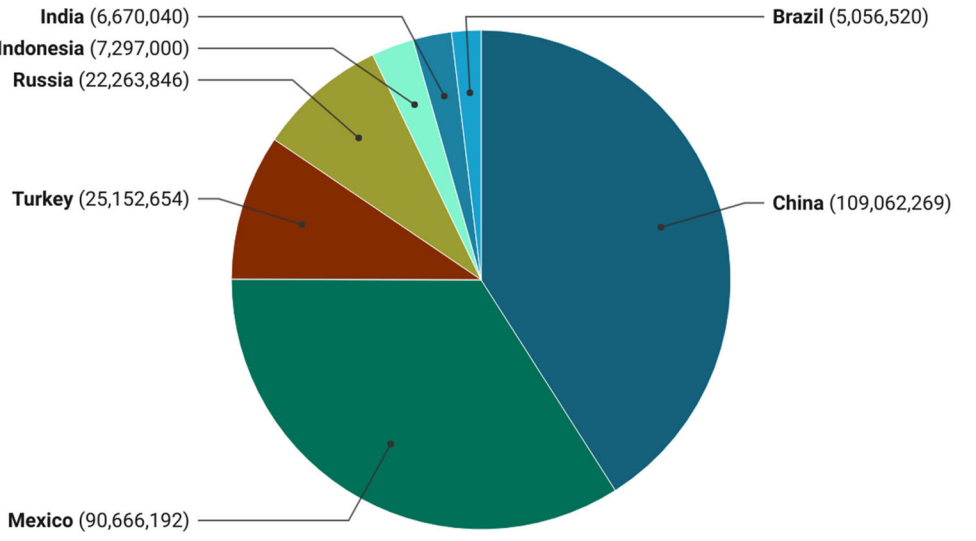

Figure 1. Averages of international tourism number of arrivals (1990–2020).
Source: Authors' own calculations based on the E-7 economies data from World Bank.

industry and human resources. The remuneration of labor, whether academically or vocationally qualified, to market efficiency and the creation of pertinent public legislation are a few of the most pertinent concerns relating to human resources in this industry.

2. Literature review

Compared to the previous literature, the number of empirical research papers validating the positive link between tourism and employment is much lower. According to the (Mathieson & Wall, 1982) explanation, the Tourism led employment (TLE) hypothesis is predicated on the idea that tourism generates direct, indirect, and induced employment in regional and national economies. This idea serves as the foundation for the TLE hypothesis. This conclusion, which had been articulated a few years earlier by (Vanhove, 1981; Vázquez Vicente et al., 2021) was strengthened by the meaning of an employment multiplier and the notion that tourism ought to be considered a driving force behind economic expansion (Archer & Fletcher, 1996). Nevertheless, (Farver, 1984) has shown that it is essential to approach these findings with some degree of caution. In addition, the challenge of determining the extent to which tourism impacts employment persists today (Onder & Durgun, 2008). Two works have been located, and they both use the Granger origin test and the Johansen cointegration technique. (Onder & Durgun, 2008; Vázquez Vicente et al., 2021) Analyze the revenue that Turkey made from tourism from 1980 to 2006. The findings suggest that tourism has a beneficial impact on employment, and the co-integration analysis demonstrates that there is a significant and lasting link between tourist revenues and employment. (Pavlić et al., 2013) Analyse the relationship between tourism and employment in Croatia using quarterly data from 2000 to 2012. According to the empirical research findings, increasing the number of tourists visiting a country can have several beneficial effects on that

country's economy, particularly in terms of gross domestic product (GDP), employment opportunities, incomes, and earnings in foreign exchange. These concluding ideas would most definitely converge with those found by Manzoor and co-workers (Manzoor et al., 2019). (Condratov, 2017) using a panel data technique, evaluates the hypothesis for Romanian regions over the period of 1990–2015, concluding that tourism contributes to the reduction in unemployment rates.

Our next factor affecting the employment rate is a foreign direct investment (FDI). FDI influx has been shown to increase employment in several studies. Few more research (Bayar & Sasmaz, 2017; Mamoon & Rahman, 2016) demonstrated favorable employment benefits of FDI in different nations. (Karlsson et al., 2009) and (Ernst, 2005) found that FDI positively impacted China and Mexico's employment growth. (Craigwell, 2006) A favorable effect of FDI influx was observed on employment prices in 20 Caribbean states from 1990 to 2000. (Strat et al., 2015) discovered a negative link between FDI and unemployment during 1995–2009. In other countries, such as the U.S. (Ajaga & Nunnenkamp, 2008) and Fiji (Jayaraman & Singh, 2007) researchers discovered beneficial consequences of inbound FDIs on work in the future. Last emphasized a unidirectional long-term genesis from FDI to labor in Fiji. Other research found that FDI increases joblessness. (Girma, 2005) found FDI inflows harm British workers. (Mamoon & Rahman, 2016) found that a rise in internet FDI leads to a drop in Bangladesh's unemployment rate. According to their analysis, internet FDI boosted GDP but hampered work. In this case, FDIs do more harm than good. Foreign direct investment introduces foreign technology and knowledge spillovers, enhancing worker productivity (Siddharthan & Narayanan, 2020). In this case, FDI doesn't create jobs. As international corporations take over local ones, they introduce technological upgrades and automation to boost performance, causing job losses due to robots replacing humans (Mamoon & Rahman, 2016). Mostly the previous literature on the impact of natural resource rents on the nation's economic development ignores other aspects. (Gross, 2012) The impact of energy use on economic development was assessed using ARDL and sectoral data. Granger causality test indicated unidirectional long-run causation from development to energy in the industrial business, but a bi-directional one in transportation. (Eregha & Mesagan, 2016) they evaluated the effect of institutional quality and oil-resource richness on financial growth to determine whether outstanding institutions may lessen source curse influence in African oil-rich nations. Institutional quality increased per-capita revenue growth but was unimportant. Negative and substantial interaction factors indicate that organization quality cannot reduce the resource curse in these nations. To maintain growth and improve establishment quality. (Ahmed et al., 2016) examine the source curse hypothesis in Iraq using 1965–2011 data. Financial development is a Cobb Douglas element that comprises natural deposits, exports, capital, and labor. The cointegration test shows that the variables are cointegrated, and future research confirms the source curse hypothesis and that natural resources limit Iran's economic progress. (Badeeb et al., 2017) identified how source profits hinder financial growth. They reviewed past evidence that shows resource curse reveals empirical misspecification. They discovered inconsistent studies. They determined that resource dependence hurts growth.

The impact of technology on employment has long been controversial. Existing literature divides advancement into 2 key streams, process innovation and product development, and emphasizes their various job obligations (Coad & Rao, 2011; Najafi-Tavani et al., 2018). Process innovation boosts productivity and reduces costs by upgrading production methods (Audretsch & Belitski, 2020; Berggren & Bjørnskov, 2020). Notable is the fact that process innovation may directly affect human resources, which can negatively affect job opportunities (Calvino & Virgillito, 2018; Mhlanga, 2020; Khan et al.,2021). However, the payment effect of this invention is yet unknown. Because process technology increases efficiency, rates are lowered, and revenue is boosted. So, it should promote increased demand and production, offsetting the initial labor put into developing that development technique. (Piva & Vivarelli, 2018) Product innovation will lead to new product demand, providing job possibilities (Van Roy et al., 2018; Zhu et al., 2021). However, the alternative effect of product development is uncertain since it relies on the cost of replacing new and old items (Feder, 2018). Therefore, the influence of technology on work is not evident and will likely change with the moment and market circumstances.

Based on the previous literature, it is shown that international tourism boost employment services in the destination economies. Tourists bring wealth to that nation and mostly stay in that country and consume commodities which ultimately increase that country's economic growth and employment. When tourists stay in a country for a short period, they also think about future investment in those countries, so they think they should invest in these countries. So those economies which mostly depend on tourists have a huge chance of foreign direct investment, and due to this investment, the employment services of that country increase. The literature also focuses on FDI; foreigners bring many chances for technological innovation to those countries. This innovation plays an important role in the economic development of those countries. On the other hand, Economic advancement pushes countries to the industrialization process, which increases the exploitation of natural resources. Overexploitation of natural resources affects a country's bio-capacity and employment services related to different sectors.

3. Theoretical framework

According to (Johnson & Thomas, 1990) analysis of the relationship between tourism and employment (who cite the Mexico paper as a source) reveals three major trends: (a) studies on the creation of potential jobs by tourists and the role it has been attributed to play in the economic rebirth of depressed regions; (b) summaries of trends that help to explain architectural changes and produce diagnoses that aid in planning; and (c) racial profiling (Gómez López & Barrón Arreola, 2019). An increasing need for labor is perhaps the most important aspect of the tourist sector. More than half of the employed people in small and developing nations are involved in activities directly or indirectly related to tourism. Compared to other economic sectors, tourism creates more jobs in developing countries. The tourism industry's monetary contributions to the country's economy are readily apparent. Since tourists spend money to pay their expenses, the influence on money circulation is a highly important

consequence for the economy. Locals benefit from these expenditures and reinvest them in the economy *via* their purchases. Thus, it is anticipated that tourism will positively impact employment services *EMPL* i.e., $TOUR > 0$.

The employment opportunities produced by the knowledge service industry are far more common than those created by the manufacturing sector. Simply said, technological advancements in the workplace will help increase the frequency of employment. Technological innovation will eventually lead to an increase in the work in other labor markets, particularly *via* the financing expansion and development of automation in other sectors. Looking back over the long haul, we can see that the prevalence of automation often leads to an increase in labor demand, which in turn has a favorable influence on wages. Thus, it is predicted that technological innovation will positively impact employment services *EMPL* i.e., $TI > 0$.

The increased usage of natural resources due to improved economic conditions is creating serious employment issues in the tourist industry. To continue developing, they must undergo the industrialization process, which increases the exploitation of natural reserves (Tufail, Song, Adebayo, Kirikkaleli, & Khan et al., 2021; Tufail et al., 2022). If a country's natural resources are overused, it will not only reduce its bio-capacity, but it will also have a negative effect on the environment. These monetary practices add to the growing natural resource shortage and negatively affect the tourism industry. Because the tourist industry relies so heavily on a pristine environment, the ongoing depletion of natural resources inevitably negatively impacts the tourism industry as a whole and, therefore, the Consequently, it is expected that total natural resources rent will have a negative impact on employment services $IMPL_{i,t,}$ i.e., $TTNR_{i,t} < 0$.

Foreign investors may find high-unemployment countries attractive because of the large availability of cheap labor and the lower cost of doing business there. However, suppose the unemployment rate is too high. In that case, it may message overseas investors that the economy is in a state of macroeconomic instability and is thus not a good place to invest (Suyunov, 2022). There is still some room for confusion about how FDI influx impacts employment. Foreign direct investments (FDIs) affect the workforce in various ways, some of which are beneficial and others that are not. But as a whole, the impact of FDI on employment is expected to be positive. So consequently, it is anticipated that FDI will have a positive impact on employment services $IMPL_{i,t,}$ i.e., $FDI_{i,t} > 0$ (Figure 2).

4. Data and model specification

This paper examines tourism's role in employment and other control variables such as foreign direct investment, technological innovation and total natural resource rent in E-7 economies. The selected variables' data is derived from world development indicators (WB, WDI 2020). The broad specification of the model is mentioned below.

$$EMPL_{,it} = f(TOUR_{it}, TI_{it}, TNRR_{it}, FDI_{it}, ENEF_{it}) \tag{1}$$

The cross-sections, represented in Equation(1), 'i i.e., China, India, Brazil, Turkey, Russia, Mexico and Indonesia. 't' Is for a period from 1990 to 2020. The basic regression from equation 1 is given below.

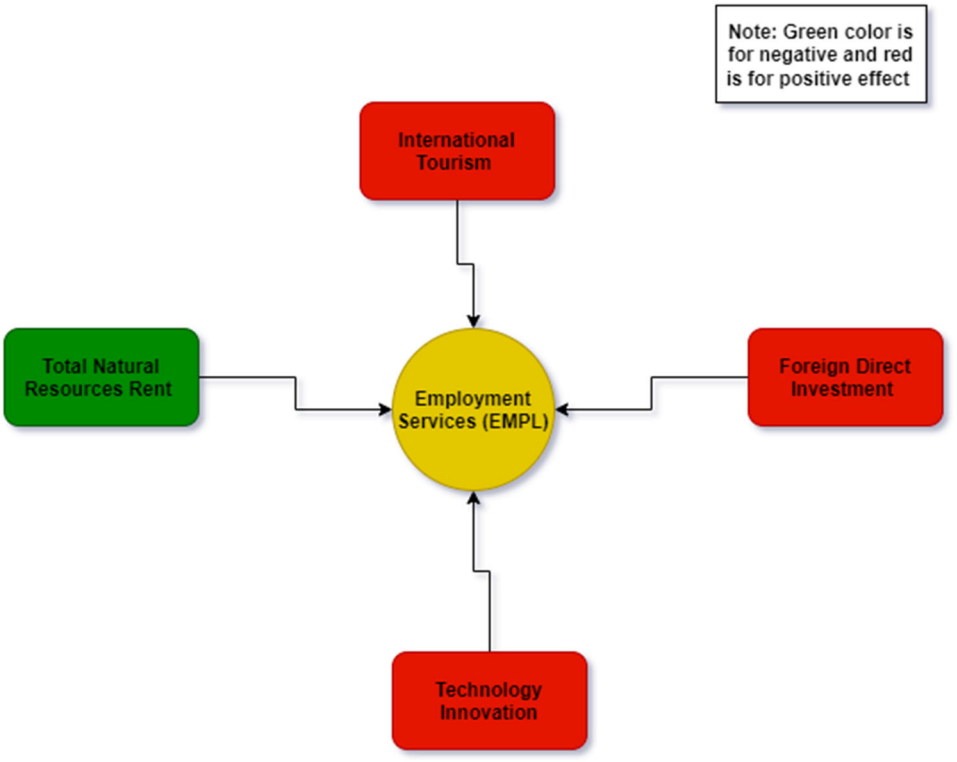

Figure 2. Conceptual framework of this study.
Source: World Bank, World Development Indicators.

$$EMPL_{,it} = \pi\ {}_{i}^{1}TOUR_{i,t} + \pi\ {}_{i}^{1}\ TI_{i,t} + \ \pi\ {}_{i}^{1}TNRR_{i,t} + \pi\ {}_{i}^{1}FDI_{i,t} \quad (2)$$

Where $EMPL_{,it}$ Employment in services is described as people of working age who create things or offer services for pay or profit, whether at work during the reference period or not owing to temporary absence or working-time schedule. $TOUR_{i,t}$ International inbound tourists (overnight visitors) are tourists who go to a country other than their regular residence for less than a year for a reason other than a remunerated activity in the country visited. $TI_{i,t}$ Patent applications are submitted *via* the PCT or a national and international patent office. $FDI_{i,t}$ FDI is the net inflow of money to acquire a managerial stake (10% or more of voting shares) in a company in a different economy. Equity capital, reinvestment of profits, and other long-term and short-term capital are indicated in the balance of payments. The π_i is cross-section error term and $\varepsilon_{i,t}$ is the error term (Table 1).

5. Econometric methodology

5.1. Panel unit root tests

Traditional unit root tests traditionally handled testing one temporal series at a time. Nevertheless, testing for unit root in a panel structure overall is a relative new procedure with much more complex asymptotic properties that depend deeply on the

Table 1. Nomenclature of variables and sources.

Variables	Measurement Unit	Sources
Employment in Services (EMPL)	Employment in services (% of total employment)	World Bank 2020
International tourism (TOUR)	International tourist, number of arrivals.	World Bank 2020
Technological Innovation (TI)	Patents by residents and non-residents.	World Bank 2020
Total Natural Resource Rent (TNRR)	Total rent as a percentage of GDP by using different natural resources.	World Bank 2020
Foreign direct investment (FDI)	net inflows (% of GDP)	World Bank 2020

assumed structure of the data to be tested. We have carried out many tests to evaluate the appropriateness of our findings in accordance with a variety of criteria and also theories. Instead of doing particular unit root tests for every random sample, (Levin et al., 2002) propose using a panel unit root test instead. This test is thought to be more effective. In contrast to the alternative hypothesis, which postulates that each time collection must start from a unit root, the null hypothesis states that each time collection must have a unit root. The collection remains in place. The shape of the structure that will be examined is similar to that of a panel-based framework of the augmented Dickey-Fuller (ADF) test. The equation is in the following way.

$$\Delta y_{it} = \sigma_i y_{i,t-1} + \sum_{L=1}^{p_i} \emptyset_{iL} y_{i,t-L} + \alpha_{mi} d_{mt} + \varepsilon_{it}, \quad m = 1, \ 2, \ 3 \tag{1}$$

As said, LLC test needs to be homogenous among individuals. (Im et al., 2003) allow a heterogeneous coefficient on $Yi, t-1$ offering a testing approach that averages unit root test statistics. The equation gives the calculated model (1). The null hypothesis indicates that each series in the panel has a unit root H0 : $\rho i = \rho = 0$. The alternative hypothesis postulates that certain series have unit roots while others are stationary, H1 : $\rho i < 0$ for $i = 1, 2 \ldots\ldots$, N and and $\rho i = 0$ for $i = N + 1, \ldots\ldots\ldots$N. The *IPS* t statistic is the average of all N individual ADF statistics are given below.

$$\bar{t} = \frac{1}{N} \sum_{i=1}^{N} t_{\delta_i} \tag{2}$$

In addition to the most common LLC and IPS testing, we also carried out three more advanced panel root tests. These tests attempted to rectify several faults found in the earlier tests. They are the (Breitung, 2001) test, which demonstrates a higher power than the LLC or IPS examinations when they are compared to one another in Monte Carlo experiments; the ADF Fisher chi-square examination, Pesaran IPS examination, as well as PP fisher chi-square remainder of the panel unit root tests for each and every sample, and also is located to be superior to the IPS test.

5.2. Panel cointegration test

In the context of conventional time series, the term 'cointegration' refers to the idea that given a group of variables that can be characterized as being fixed separately I (1), some linear combination of these variables may be stated as stationary, say I (0).

The vector of slope coefficients that gives this constant stationarity is referred to as the cointegrating vector. This vector, which is often not unique and therefore has to be normalized in some way, is characterized as having this fixed mix. The following exams do not deal with concerns of normalization or questions about the precise number of cointegrating partnerships; rather, they focus on the basic void theory of no cointegration vs. cointegration. Taking the residuals from a panel regression that includes I (1) variables and then using any of the above-mentioned panel unit root examinations to those residuals is one apparent approach to carry out this kind of test. This is also one of the most straightforward ways to do so. Nevertheless, more complex tests are accessible, which not only have a greater amount of power but also take care of certain specific structural faults that panels might present. As a test for the hypothesis that there is no cointegration, DF and ADF tests of unit root for the residuals were suggested (Kao, 1999). The DF test is performed on the fixed effect residuals with the following specification in mind:

$$\hat{e}_{it} = \delta\hat{e}_{i,\ t-1} + v_{it} \tag{3}$$

Furthermore to conduct our panel cointegration analysis, we adhere to the Johansen-Fisher tests developed by (Maddala & Wu, 1999). These researchers suggested two statistics: the Fisher fact from the trace test and the Fisher from the maximum eigenvalue test. These tests allowed us to determine the lag order, which ranges from 1 to 3.5. The alternative hypothesis predicts a cointegrating relationship, but the alternative hypothesis predicts that such a cointegration does not exist.

5.3. Panel long run estimation

To account for changes in intercepts, slopes, and error correction among groups, (Pesaran & Smith, 1995) propose using a mean group (MG) estimator based on the mean price quote of the whole population. The estimator calculates both the independent design and arithmetic mean of the coefficients. In contrast, if the temporal dimension of the data collection is increased, the MG estimator will undoubtedly provide a consistent estimate. Because of this, the MG estimator is used to create a long-lasting and reliable price estimate for the underlying variables in this study, known as the long-run estimate. The MG estimate proposed by Pesaran and Smith, (1995) takes into account all coefficients across the countries included in the study. 'Individual returns for each country are estimated and are then calculated as an unweight average of the estimated coefficients of all countries in question (Ozcan & Apergis, 2018) Construction details are given in the following equation.

$$\Delta y_{it} = \sum_{j=1}^{p_i} \emptyset_{ij} y_i, \quad t - j + \sum_{j=1}^{q} \acute{\vartheta}_{ij} \acute{X}_{i,t-j} + \mu_i + \tau_t + \varepsilon_{i,t} \tag{4}$$

Furthermore, for the long run relationship among the targeted variables, we used Fully Modified Ordinary Least Squares (FMOLS) and dynamic ordinary least square (DOLS) tests. (Phillips & Hansen, 1990) created the Fully Modified Least Square

(FMOLS) to offer the most accurate assessment of co-integration in regression. However, the (Pedroni, 2001) heterogeneous FMOLS estimator was applied for the panel cointegration regression because of its usefulness in addressing endogeneity bias and serial connection (Ozcan, 2013). (Hamit-Haggar, 2012) claims that FMOLS is one of the best methods for analyzing a heterogeneous cointegration panel. Asymptotic distributions for the Dynamic OLS estimator and the panel FMOLS estimate produced by (Pedroni, 2001) were identical. The results are consistent since the DOLS and FMOLS estimations were performed as described.

5.4. Robustness test

To achieve this goal, this study applies (Hurlin & Dumitrescu, 2008) panel causality test. This test delivers exact findings in the case of cross-sectionally dependent repeating terms. The pre-requisite issue for the investigation is $T > N$, and stationarity properties of the observed variables which in our instance best suit our model for the chosen E-7 economies covering the period of 1990 to 2020. The equation for the test is given below:

$$Z_{i,t} = \alpha_i + \sum_{j=1}^{p} \gamma_t^j Z_{i,t-j} + \sum_{j}^{p} \gamma_t^j T_{i,t-j}$$

Where γ_t^j denotes autoregressive parameters while lag length is represented by j.

6. Results and discussion

The descriptive statistics are reported in Table 2 while Table 3 present the results of the panel unit root tests based on the five methods test for all variables used in modeling international tourism effect on employment services along with other variables like total natural resources rent, foreign direct investment and technological innovation in E-7 economies. The (Levin et al., 2002) method test indicates that, EMPL, TOUR, TI and FDI are at the level of insignificance for accepting the null of a unit root. While only the total natural resources rent (TNRR) at level is significant at 1% level. The (Breitung, 2001) method test indicates that EMPL, TOUR, TI and FDI at level of insignificance for accepting the null of a unit root but TNRR have is significant at 1% level. The (Im et al., 2003) method test indicates that all variables are insignificant at level while only Foreign direct investment (FDI) is significant and become stationary at 1% level. Furthermore (Maddala & Wu, 1999) and (Choi, 2001)

Table 2. Descriptive statistics.

	EMPL	TOUR	TI	TNRR	FDI
Mean	1.644039	7.224842	4.192662	0.464702	0.187611
Median	1.679973	7.191535	4.202516	0.528203	0.296929
Maximum	1.850891	8.210955	6.188085	1.342646	0.791472
Minimum	1.276462	6.299071	2.922725	−0.854456	−1.565023
Std. Dev.	0.152000	0.563516	0.649697	0.491232	0.388196
Skewness	−0.635408	0.155055	0.805226	−0.722592	−1.302731
Kurtosis	2.206541	1.733475	4.278430	3.114706	5.141997

Source: World Bank, World Development Indicators.

Table 3. Panel unit root testing.

Variables					
Level I(0) Trend and Intercept					
	LLC	BR	IPS	ADFF	PPF
EMPL	0.10933	3.45875	0.11767	15.6560	7.36432
TOUR	5.01483	8.96174	3.31907	5.82037	4.54183
TI	0.08404	−0.90989	−0.59058	18.9455	27.6813
TNRR	1.33567	−3.12903***	0.75282	7.49772	13.4051
FDI	−3.92496***	−0.14457	−2.70969***	35.1073***	31.0040***
First-Difference I(1) Trend and Intercept					
Δ EMPL	0.94650	1.94453	−2.99757***	33.6987***	67.8537***
Δ TOUR	9.46731***	9.86797***	0.48023***	16.9532***	40.6773***
Δ TI	−7.11083***	−5.12961***	−6.85169***	68.8924***	530.992***
Δ TNRR	−4.35824***	−6.75739***	−6.60450***	64.9644***	223.859***
Δ FDI	–	–	–	–	–

Note: 1%, 5% and 10% significance is denoted by ***, ** and *. While LLC, BR, IPS, ADFF and PPF represent *(Levin, Lin & Chu t*), (Breitung t-stat), (Im, Pesaran and Shin W-stat), (ADF - Fisher Chi-square), (Pesaran IPS test) and (PP - Fisher Chi-square) respectively.*
Source: World Bank, World Development Indicators.

Table 4. Cointegration tests.

Kao Residual Cointegration Test				
ADF			Test Statistics	Probability value
			−2.645520***	0.0041
Johansen Fisher Panel Cointegration Test				
Cointegration Equations	Fisher Statistic (Trace Test)	Prob.	Fisher Statistic (Max. Eigenvalue)	Prob.
None	145.0***	0.0000	99.14***	0.0000
At most 1	60.69***	0.0000	46.65***	0.0000
At most 2	24.68**	0.0378	16.65	0.2754
At most 3	16.86	0.2636	14.24	0.4317
At most 4	21.18*	0.0970	21.18*	0.0970

Note: 1%, 5% and 10% significance is denoted by ***, ** and *.
Source: World Bank, World Development Indicators.

methods based on the ADF-Fisher Chi-square test indicate that all the variables have unit root except FDI which is significant at 1% level. The last PP-F fisher chi-square test results show the same as the ADFF test. From the results of the panel unit root test, it can be concluded that most variables used in this model have unit root except FDI. So all variables should be taken first differing or take second differing as well as after take first differing in all variables then the results of the panel unit root test based on five methods are presented in Table 2. All five tests results show that EMPL, TOUR, TI and TNRR become stationary. While the foreign direct investment has already become stationary at level, it doesn't need to test for unit root at first difference respectively.

Table 4 shows the findings of the panel cointegration test of the effect of tourism on employment services along with other control variables in E-7 economies for the period of 1990–2020. We have used the Kao Residual Cointegration test and Johansen Fisher Panel Cointegration test. Most of these strategies were employed to test for this model showing that all variables used in this model are significant for turning down the null hypothesis (no cointegration). The empirical findings reveal that all variables utilized in this paper have long-run associations with each other.

Table 5. Empirical outcomes.

Variables	MG estimator	FMOLS estimator	DOLS estimator
TOUR	0.0446149	0.053830***	0.055013**
	(0.118)	(0.0007)	(0.0292)
TI	0.1015984***	0.108410***	0.109256***
	(0.000)	(0.0000)	(0.0000)
TNRR	−0.0248645**	−0.035449***	−0.035454**
	(0.041)	(0.0010)	(0.0517)
FDI	0.0201235 **	0.022912***	0.013190
	(0.041)	(0.0007)	(0.3944)

Note: 1%, 5% and 10% significance is denoted by ***, ** and *.
Source: World Bank, World Development Indicators.

The empirical results based on the Mean Group estimator (MG), Fully Modified Ordinary Least Squares (FMOLS) and dynamic ordinary least square (DOLS) are shown in Table 5. The MG estimates report that all variables except TOUR are insignificant, while TI and TNRR are significant at 1% and TR at 5%, respectively. The remaining results of the FMOLS and DOLS are the same except for FDI, which is insignificant in the DOLS model. All explanatory factors are proven to be significant in the basic empirical analysis, which directed that (TOUR, TI, TNRR, and FDI) are important factors explaining employment services (EMPL).

Tourism (TOUR) is found to be improving employment services in the selected E-7 countries. The results of FMOL and DOLS show that tourism boosts employment. In the case of FMOLS, a 1% increase in tourism boost employment by 0.05%, respectively, while in the case of DOLS, a 1% increase in tourism enhances employment by 0.05%. As far as general tourism is concerned, from the very beginning, there was the idea of assessing its impact on economic growth and job creation. This can be justified that mostly when a tourist visits these economies, they spend time over there. They consume and purchases commodities from the host countries and spend their incomes. Ultimately the tourist income attracts the services sector, which is ultimately involved in job creation and economic growth in the destination economies. Similar findings were found by (Honari et al., 2010; Vázquez Vicente et al., 2021).

Technological innovation is found to be boosting employment opportunities in the selected economies. The long-run results of MG, FMOLS and DOLS show that a 1% increase in TI will increase employment services by 0.10, 0.10 and 0.10, respectively. China is one of the main countries in the E-7 economies. In China, the National Scientific Research and Technology Job Seminar in 2015 suggested increasing the community's interest and creativity in scientific research and technology and increasing the capacity for independent invention. The alteration of the industrial structure brought on by technological progress has supplied new opportunities for the labor market, even if the rate of economic growth has decreased and the downward pressure on the economy has continued to grow (Mello et al., 2020). In the areas of innovative growth, product processes, electronic material, and monitoring, for instance, the 'Wechat Employment Influence Report' provides evidence that the company's public systems, minor projects, business, and remittance have created work opportunities. Since 2014, Wechat has been responsible for over 2 million annual job additions. Similar findings were found by (Greenan & Guellec, 2000; Su et al., 2022).

It has been observed that FDI increases job possibilities in the E-7 economies. MG's long-run results show a positive and significant value of 0.02 at a 5% level. While FMOLS

and DOLS have positive and significant values of 0.02 and 0.01, respectively. This is to argue that FDI has a major influence on the promotion of employment, both directly and indirectly. Foreign direct investment may directly contribute to economic growth by creating new jobs. Through its employment transfer impact, it also helps with the movement and reemployment of domestic workers in other geographic areas or industries. According to the findings of our study, the major contributors to employment are small and medium-sized businesses and state-owned businesses. Nonetheless, foreign direct investment (FDI) is still subject to restrictions or even prohibitions in a number of sectors inside E-7 countries, notably China. When foreign direct investment (FDI) is allowed to remain an open-door policy, its positive impact on employment will eventually become more pronounced. Despite this, our findings at least establish an employment impact of FID with respect to the flexibility of the labor market, which is noteworthy in and of itself. Similar findings were found by (Hou et al., 2021; Rong et al., 2020).

The total natural resource rent negatively affects employment services in the case of E-7 economies. The MG, FMOLS and DOLS results show that TNNR significantly and negatively affects employment services. A plausible explanation for this phenomenon is that the price of the primary commodity becomes less expensive than the price of the manufactured product (Ben-Salha et al., 2021) . Another reason is that the prices of major products tend to be rather volatile as a direct consequence of their rates being resolved on the worldwide market. The greater the decline in prices of main products, the lower the revenues will be, making resource-dependent economic climates susceptible. Additionally, these economic climates will not have any incentives for investors to acquire them, which will increase the level of uncertainty and further increase unemployment in different sectors. Similar findings were found by (Dogan et al., 2021; Tufail et al., 2021).

6.1. Robustness analysis

We further examined for the robustness check (Hurlin & Dumitrescu, 2008) causality test for our important study variables such as employment services (EMPL), tourism (TOUR), technology innovation (TI), foreign direct investment (FDI) and total natural resources rent (TNRR). In each case, TOUR and EMPL were shown to have a one-way causal relationship, as were TI and EMPL, TNRR and EMPL. While bidirectional causality runs from FDI to EMPL and EMPL to FDI. Specifically, we find that the variables we focused on have a significant role in explaining the EMPL. Table 6 displays the results from the test (Hurlin & Dumitrescu, 2008).

Table 6. Dumitrescu-Hurlin causality test.

H_0	Wald−Stats	$\bar{Z}$−Stats	p−value(s)
TOUR -EMPL	3.87486***	1.87416	0.0609
EMPL - TOUR	3.19926	1.12629	0.2600
TI - EMPL	4.17572**	2.20722	0.0273
EMPL - TI	3.01308	0.92019	0.3575
TNRR - EMPL	4.59161***	2.66759	0.0076
EMPL - TNRR	3.23505	1.16591	0.2437
FDI - EMPL	5.05629***	4.13896	0.0000
EMPL - FDI	7.24602***	5.60597	0.0000

Note: 1%, 5% and 10% significance is denoted by ***, ** and *.
Source: World Bank, World Development Indicators.

7. Conclusions

This article examines the link between international tourism and employment services in the E-7 economies. The research on this issue needs to be more conclusive on the association between these variables. Among these studies, some imply a relationship between greater levels of employment in the tourism business and traits associated with that occupation. We use panel data and cointegration to see whether E-7 countries are feasible from 1990 to 2020. The findings show that such a link exists, implying that visitors influence job creation. Technological innovation and foreign direct investment enhance employment, while natural resource rents constrain it. The results are important for the time period analyzed since they complement federal and state tourism objectives.

7.1. Policy recommendations

1. Increased tourism activity in E-7 countries highlights the need to continue developing the tourism industry on both a global and national scale, as the strength of the economies of the E-7 significantly influences the number of people employed in the hospitality business.
2. The industry's public legislation has to be geared toward its expansion and the social and economic growth of both worldwide tourist hotspots and the E-7's economies.
3. Those in charge of public legislation for the expansion and development of the tourism industry in E-7 countries should keep in mind that the market's potential for expansion has limits and that increased tourism-related activity relies on many other factors. As reflected in family income, financial development is one of these factors; others include social and political stability in E-7 countries; security; the growth of tourist sites; and the growth of enterprises related to tourism, such as manufacturing and the provision of tourist services.

7.2. Limitation and future guidelines

Finally, we want to discuss the limitation of our research and how they may inspire future studies. Regarding E-7 nations, we had set 2022 as our goal year. Despite this, our investigation concluded in 2020 owing to data constraints. Undoubtedly, it would be worthwhile to investigate future research incorporating one of the most current modifications, such as the COVID-19 economic crisis. Additionally, our study was restricted to the E-7 nations. The conclusions of this research study may be used in the future for other groupings of nations, such as the BRICS, G8, and G20. Also, observable is the interaction between international tourism and the inflation rate concerning the unemployment rate.

Disclosure statement

No potential conflict of interest was reported by the authors.

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