5. COVID-19, TOURISM AND THE ECONOMY - EVIDENCE FROM PANDEMIC EPICENTERS OF EUROPE

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Abstract

The outburst of the COVID-19 pandemic put the world in quarantine, tourism being the most severely affected of all major economic sectors. The paper aims to capture the impact of COVID-19 shock on the tourism industry and economic progress using a dynamic distribution lag model. The data from 2001 to 2019 along with the epidemic shock are used to produce forecasts for Germany, France, Spain, and Italy until 2030. The results reveal that Germany's "smokeless industry" will fall by 6.9%, which puts 1.09 million jobs at risk. The declining trends will continue until 2023; however, they will match the current trends in 2024. Similarly, the expected losses for France, Spain, and Italy during 2020 are 9.63%, 9.35%, and 9.34%, respectively. The lockdown situation will shrink the real output and dampen GDP per capita. The highest per capita losses of 7.31% are recorded for Spain, while individual outputs in Germany, France, and Italy will fall by 6.55%, 6.73% and 7.2%, respectively. Thus, public-private cooperation is required for responsible tourism after the travel bans are lifted. The Governments should develop and communicate post-pandemic policies for the tourism value chain, go for smart lockdowns in order to protect jobs, and uplift the real outputs.

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***Acknowledgment**: The article is supported by Beijing Social Science Foundation, Youth Project No. 21jjc021. The grant is received by Xinyu Wang.*
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Keywords: COVID-19 pandemic; tourism; GDP per capita; real outputs; employment

JEL Classification: I18; Z32; O1; J21

1. Introduction

The global smokeless industry is more vulnerable to pandemics and economic crises (Page *et al.,* 2006). The emergence and propagation of the COVID-19 pandemic have altered every sector of the economy around the world (ILO, 2020). The spread of contagious virus suspended all economic activates and froze people's mobility that made it the most relevant topic for policymakers, academics, and media. As all of the economic sectors experienced difficulties around the world, tourism was no exception. It is one of the victims of the pandemic in terms of both travel supply and demand, with negative effects predominating. Travel and Tourism is a severely affected industry, with planes grounded, hotels closed, and travel bans imposed by almost every country in the world. The impact can be evident in terms of the decline in spending and market shares (UNWTO, 2020). It considers that it is too early to formulate an exhaustive assessment of the effects of a pandemic on international tourism. However, the UNWTO uses the previous SARS epidemic of 2003 as a proxy for the impact of COVID-19 on tourism-related business. Though the institution's advice in favor of taking its early estimations with a grain of salt and caution, the put out figures indicate a reduction between 20% to 30% in international tourist arrivals, which can translate into $30 to $50 billion losses (UNWTO, 2020). On the same note, the WTTC (2020) offers a grimmer perspective of a loss amounting up to 2.1 trillion USD in 2020.

The tourism sector plays a significant role in the cultural, socio-economic development and contributes to the economic growth of recipient economies (Qiang *et al*., 2019; Leiper *et al*., 2008; Shahbaz *et al*., 2017; Wang *et al*., 2022), being extremely vulnerable to uncertainty shocks (Pablo-Romero and Molina, 2013; Khurshid *et al*., 2020). Similarly, uncertainty plays an important role and affects touring decisions, lowering traveling expenditures and economic activity (Bertola *et al*, 2005; Gozgor and Ongan, 2017; Ghosh, 2019; Khurshid and Deng, 2021; Khurshid and Khan, 2021; Duan *et al*, 2022). COVID 19 has caused uncertainty, which may have severe consequences for the tourism industry. Global growth is expected to increase from 2.9 % to 3.3 % from 2019 to 2020 and to 3.4% in 2021, down by 0.1% point for 2019 and 2020 and by 0.2% point in 2021.[1] This decline in economic growth implies that people will have less disposable income and can divert less to consumption and saving, which ultimately hurts tourism activities. Similarly, the lockdown resulted in restrictions on transportation and enhanced the visa restrictions. These countries are amongst the hard-hit countries by the COVID 19, and the situation might continue in order to curb the pandemic completely. The post-pandemic scenario is uncertain, and normalization can take the long route. Thus, it is essential to examine the tourism industry's response in the current as well as in the post-pandemic period and devise useful contributions in the existing literature by policy implications.

This study used a targeted approach and picked four destinations from Europe, namely Spain, Germany, France and Itay. The reason behind the selection is based on tourist arrival, economic size and number of COVID cases in these countries. The economies of these countries rely on tourism industries; for instance, Spain is a well-established tourist

[1] *https://www.imf.org/en/Publications/WEO.*

destination, not just in Europe, but also internationally.[1] Spain received over 100 million tourist arrivals in 2013, and the figure kept rising until 2019, when it reached 125 million. That amount was more than 2.5 times the total population of Spain at the time, which was 47.1 million people. As a result, the tourism industry is among the most important economic drivers in Spain. The gross value added (GVA) of sectors associated with tourism reached over 50 billion euros per year in the first half of the 2010s. During the following decade, this figure increased, totaling 70.3 bn. euros in 2019. The tourism GDP of Spain in that year crossed 150 bn. euros and contributed by 11.8% to GDP.[2] When the coronavirus epidemic struck, Spain's tourism industry had a catastrophic fall. For example, as compared to August 2018 and 2019, Spain lost over 10.8 million international tourists in August of 2020, which is generally the busiest month for tourism in the country. In a similar vein, tourism consumption by Spanish people decreased dramatically in 2020, with 77 million domestic trips and 15 million outbound excursions less than in the previous year.

Italy is the fifth most visited country in the world and the third most visited country in Europe, with 94 million visitors per year (2019), with 217.7 million international visitors night stayed and a sum of 432.6 million visits. According to Bank of Italy estimates from 2018, the tourism sector directly contributes by more than 5% to the country's GDP (13 percent when indirect GDP is taken into account) and employs more than 6% of the workforce.[3] With the advent of the COVID-19 pandemic in 2020, however, this expansion came to a halt, and the number of tourist arrivals in Italy plummeted to below 40 million.

Germany is among Europe's most visited destinations. Year after year, the German tourism sector has shown significant growth. This destination jumped from eighth place in 2011 to third place in 2017.[4] The overall revenue from tourist lodging in the country was 33 billion euros in 2019, accounting for 8.6% of GDP.[5] According to the World Travel and Tourism Council (WTTC), the tourism industry's contribution due to COVID-19 lowers the country's GDP by 46.9%. More precisely, the sector's contribution to from €344 billion (9.8%) in 2019 before the COVID-19 pandemic to €183 billion (5.5%) in 2020.[6]

France is a prominent tourism destination for the European travel sector, with world-famous landmarks and major international events. Tourism has a huge impact on the French economy, contributing by 8% to GDP and providing 2 million jobs directly or indirectly. Paris is the world's third most visited city.[7] In 2018, 89 million foreign tourists visited France, which increased to 90 million in 2019, highest in any country in the world. After the United States and Spain, France, as the world's top tourist destination, suffered the third highest tourism loss because of the pandemic. Arrivals plummeted by 66 percent in 2020, while tourism income fell by 50 percent. According to Tourism Secretary of State "*The year 2020*

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[1] https://english.elpais.com/elpais/2019/02/01/inenglish/1549014848_149720.html.

[2] https://www.oecd-ilibrary.org/sites/8ed5145b-en/index.html?itemId=/content/component/8ed5145b-en.

[3] Bank of Italy, https://www.bancaditalia.it/pubblicazioni/collana-seminari-convegni/2018-0023/Petrella_11dic.pdf.

[4] https://web.archive.org/web/20150101005051/http://www.unwto.org/facts/eng/pdf/barometer/UNWTO_Barom11_iu_april_excerpt.pdf.

[5] https://www.oecd-ilibrary.org/sites/9633dbda-en/index.html?itemId=/content/component/9633dbda-en.

[6] https://www.schengenvisainfo.com/ the German GDP plummeted news/germanys-gdp-drops-by-e161-billion-due-to-restrictions-imposed-on-travel-tourism-sector-research-reveals/.

[7] https://www.condorferries.co.uk/france-tourism-statistics#.

was a shock. The tourism sector was down by 41% causing a shortfall of 61 billion euros [nearly $74.6 billion].[1]

The literature related to empirical and theortical linckages between health emergencies and ITA have different standings. Gössling *et al*. (2020) offer an interesting contribution that deals with the comparison of the effects of previous pandemics/epidemics and crises in general on the economy and especially on tourism. The study creates an analogy between COVID-19 and the climate crisis and between COVID-19 and previous major epidemics that occurred during the last 40 years. The investigation is industrious and covers a wide range of aspects, such as airlines, sports events, restaurants, and cruises. The results of the study advocate the idea of envisaging a transformation of the global tourism system instead of a return to the classic pre-crisis business approach. A similar theoretical approach is introduced by Duan *et al*., (2021a). It has been reviewed from the UNWTO and WTTC estimations and concluded that it is difficult to provide an efficient forecast of future developments.

The current literature on smokeless industry forecasted the influence of COVID-19 in a different prospective. Studies such as Abbas *et al*., (2021) examine the impact of the pandemic on tourism in the USA and provide implications for its sustainable recovery. Simlilarly, Wang *et al*., (2021) discussed the lockdown strategies on COVID-19 spillover effect in South Asia while Mohammad Ebrahimi *et al*., (2021) argued about the matter while focusing on the Middle East. Foo *et al*., (2021) discussed the same relationship in the case of Malaysia and concluded that it is adversely affecting the tourism sector and its spillover effect on the economy will have long lasting effect. Payne, Gil-Alana, and Mervar (2021) examine the change in the degree of resilience in the Croatian tourism industy, ITA, and overnight stays, because of pandemic by employing a fractional integration model. The outcomes show that the impact of pandemic is more permanent. The study suggested that extensive policy reforms are required to restore the situation.

Jaipuria, Parida and Ray (2021) examine the influence of COVID-19 on tourism sector in India and forecasted the international tourist arrivals by using exchange rate data along with its effect on the economy. The study predicted the values until September 2021 and concluded that it is negatively influencing the ITA and economy as well. Similarly, Škare, Soriano and Porada-Rochoń (2021) forecasted the influence of COVID-19 on tourism sector and economy for 2020-2021 using panel structural vector auto-regression (PSVAR) model. This study choosed Covid-19 cases as an eplanatory variable and concluded with its negative effect on employment sector of smokeless industry and economy.

The purpose of the current study is to measure the impact of COVID-19 shocks on the tourism industry and economic progress in relevant tourist destinations countries. The empirical literature mainly used exchange rate, number of patients to forecast the ITA in different countries. This study uses the dynamic lag distribution model and macroeconomic fundamentals to forecast ITA, which is done by employing the COVID-19 shock. This study investigated the relationship in individual settings with a targeted approach. However, most of the previous studies examine the relationship a in panel setting that cannot be generalized on individual economies due to the differences in the size of economy and ITA. Our main results show that the COVID-19 shock will negatively affect the international tourist arrivals and GDP per capita (Wenqi *et al*., 2022). The declining trends will continue until 2023. The fall in business activities and tourism will suppress per capita income, which will dampen the

[1] *https://www.diplomatie.gouv.fr/en/french-foreign-policy/tourism/*.

tourism sector in these countries. The break-in supply chain and the tourism shock will diminish the economy as well. The governments in these countries should improve the visa process and implement SOP's for workers linked to industry, businesses, and travelers. Moreover, governments should support officials and firms to endorse and execute post-pandemic revised health safety and hygiene practices. On the other hand, the government should take measures to maintain the per capita incomes in order to support domestic travelers.

The remainder of this paper is organized in the following manner. Section 2 is dedicated to data and methodology. Section 3 covers our estimation results, while Section 4 deals with a discussion on the findings. Section 5 concludes.

2. Data

This study examines the impact of COVID-19 pandemic shock on the tourism industry and per capita income in Germany, France, Spain, and Italy. Economic and other exogenous variables, such as GDP per capita (*GDPPC*) representing individual income (domestic tourism) which helps in attracting international tourists (Anggraeni, 2017), infrastructure investment (*INFST*), greenhouse gas emission (*GHG*-for climate change) as suggested by (Hudson and Ritchie, 2001), the exchange rate (*EXR*), economic policy uncertainty (*EPU*) and cost of living (CPI) suggested by Xuan *et al*. (2021) are used to get accurate estimates. Due to data availability and consistency constrains for all variables, time-series data from 2001 to 2019 are used for projecting values until 2030.

Table 1

Descriptive Statistics

		ITA	GDP	GDPPC	INFST	GHG	EXR	EPU
Germany	Mean	26.81	3177.0	39.58	11.61	0.964	0.842	108.7
	Std. Dev.	6.989	652.81	8.404	0.885	0.056	0.128	26.71
	Skewness	0.296	-0.815	0.199	0.816	0.395	0.963	0.056
	Kurtosis	1.823	2.378	1.830	3.353	1.636	2.875	2.472
	Jarque-Bera	1.373	2.407	1.209	2.209	1.966	2.950	0.230
France	Mean	80.01	2373.3	35.25	11.66	0.516	0.842	133.9
	Std. Dev.	4.564	511.10	5.927	1.981	0.038	0.128	43.03
	Skewness	0.730	-0.951	0.092	-0.324	-0.120	0.963	0.492
	Kurtosis	2.836	2.587	1.907	2.186	1.409	2.875	2.463
	Jarque-Bera	1.709	3.001	0.972	0.857	2.050	2.950	0.995
Spain	Mean	59.79	1210.6	31.11	6.236	0.378	0.842	111.2
	Std. Dev.	11.34	301.51	5.276	1.918	0.042	0.128	35.64
	Skewness	1.232	-0.902	-0.160	0.088	0.239	0.963	0.462
	Kurtosis	3.639	2.712	2.350	1.573	1.661	2.875	2.366
	Jarque-Bera	5.127[c]	2.641	0.415	1.637	1.600	2.950	0.995
Italy	Mean	45.38	1901.6	33.96	6.652	0.508	0.842	178.0
	Std. Dev.	7.118	370.07	4.446	3.500	0.061	0.128	86.79
	Skewness	1.145	-0.931	0.147	1.165	-0.198	0.963	0.112
	Kurtosis	3.868	2.828	2.254	3.182	1.371	2.875	1.727
	Jarque-Bera	4.745[c]	2.769	0.509	4.324	2.224	2.950	1.322

Note: Where a represents significance at 10%.

The data set is collected from WDI and OECD statiscal data bases and tested using a dynamic distribution lag model to forecast the international tourist arrival (*ITA*) and economic growth. The ITA data is in million, GDPPC in thousand, INF in billion dollars and EXR in currect dollar exchange rate. Table 1 outlines the list of variables and descriptive statistics.

The mean values of ITA and GDPPC range between 26.8 to 80 and 17.6 to 39.6, respectively. The GDPPC in Spain, INFST in France, GHG in France, and Italy and GDP are negatively skewed in all countries. The outcomes signify more change over time. The kurtosis values of ITA in Spain and Italy, INFST in Germany, and Italy indicate that the distribution is peaked and possess thick tails.

The cross-sectional dependency should be investigated since unknown variables and shocks can affect the error and lead to conflicting results (De Hoyos and Sarafidis, 2006). Structural distortions and changes in results are likely as a result of its absence; thus, cross-sectional dependency assessments based on Monte Carlo simulations are required (Pesaran, 2006). To assess cross-sectional dependency, we apply the Pesaran CD, Pesaran Scaled LM, Breusch and Pagan LM, and Bias-corrected Scaled LM tests. The results presented in Table 2 validate the alternative hypothesis of the cross-sectional dependency hypotheses test.

In the presence of cross-sectional dependency, first-generation root values might be deceptive (Khurshid *et al*., 2022b). As a result, we applied the CIPS and CADF tests, robust to heterogeneity and cross-sectional dependency. The outcomes show that variables are stationary at first difference. Table 3 summarizes the unit root results using 2nd generation testing approaches.

Table 2

Cross-Sectional Dependence Results

	ITA	CPI	INFST	GDPPC	EXR	EPU	GHG
Breusch-Pagan LM	148.1***	112.2***	53.87***	179.4***	114.2***	73.81***	147.9***
Pesaran Scaled LM	30.87***	30.65***	9.810***	37.87***	23.28***	14.27***	30.83***
Bias-corrected Scaled LM	30.74***	30.55***	9.671***	37.73***	23.15***	14.13***	30.69***
Pesaran CD	12.13***	10.59***	-1.027	13.39***	8.021***	8.411***	2.459***

Table 3

Unit Root Results

Test	ITA	CPI	INFST	GDPPC	EXR	EPU	GHG
CIPS I(0)	-0.882	-0.783	-0.792	-1.632	-2.986***	-2.689***	-1.061
CIPS I(0)	-2.699***	-2.314**	-3.413***	-3.031***	-3.284***	-5.932***	-4.539***
CADF I(0)	-0.946	-0.904	-0.489	-2.176	-3.119	-1.651	-1.333
CADF I(I)	*-2.154***	*-2.479***	*-2.686****	*-2.634***	*-5.209****	*-4.071****	*-3.627****

*Note: **, *** represents significance at 5 and 1%, respectively.*

3. Econometric Methodology

3.1. Panel Data & Individual-level Forecasting

We create a dynamic distribution lag model to forecast the ITA. The specification of the baseline model is the following;

$$ITA_{it} = \alpha_0 + \alpha_1 ITA_{i,t-1} + \alpha_2 ITA_{i,t-2} + \cdots + \alpha_k ITA_{i,t-k} + f(X, \boldsymbol{\beta}) + u_{it}, \quad (1)$$

where: *ITA* represents the international tourists' arrival with *t* periods and k^{th} order. α_0 is the intercept whereas, $\alpha_1, \alpha_2, \ldots, \alpha_k$ denote the coefficients of the model. $f(X, \boldsymbol{\beta})$ is the linear combination of gross domestic product (GDP), GDP per capita (GDPPC), infrastructure development (INFST), greenhouse gases emission (GHG), the exchange rate (EXR), economic policy uncertainty (EPU), and their lags.

The study is intended to forecast the *ITA* values. Therefore, we have to find the specification based on the equation that maximizes *R-square* and have minimum root mean square error (RMSE) and AIC values. The first step for choosing the best-fitted model is to determine the order of lag of *ITA.* The next step is to test the regression results with the fitted lag, along with other predictors and their lags. The aim is to find the best predictor with the highest R-square and lowest RMSE. Since it estimates the model's average error in predicting observations outcomes, RMSE is the square root of the mean squared error (MSE), and that is the average squared difference between the observed real outcome values and the anticipated values by the model.

$$MSE = mean((observeds - predicteds)^2)$$

$$RMSE = sqrt\ (MSE)$$

The repetition of the process will help to identify more predictors that will help in improving the forecasting of *ITA*.

Based on the above results, this study develops the country level forecasting equation. For instance, if the lag order is 1 of ITA and GDP is the only predictor, then the individual country level forecasting equation is;

$$ITA_{it} = \alpha_0 + \alpha_1 ITA_{i,t-1} + \alpha_2 GDP_{i,t} + \alpha_3 GDP_{i,t-1} + v_{it}, \quad (2)$$

where: α_0 denotes the intercept, and α_1, α_2 and α_3 are coefficients in each individual country. *ITA* is the country-specific tourist arrival and v_{it} is the error term in the model. The model equations will forecast the *ITA* until 2030.

4. Empirical Outcomes

The first step for choosing the best model is to determine the order of lag of *ITA.* Table 4 shows the results of the autoregression of *ITA* with order 1 to 6. The highest R-square values are obtained with one-period lag. However, the R-square of the regression with two periods of *lags* is almost the same as *lag 1*, and the root mean square error (RMSE) of the former is slightly lower. Similarly, AIC criteria endorse the current standings. Hence, we believe that model specification in column 2 is the optimal choice for forecasting.

Table 4

Autoregression of *ITA* with Order 1 to 6

	(1)	(2)	(3)	(4)	(5)	(6)
	ITA	ITA	ITA	ITA	ITA	ITA
L.ITA	1.023***	1.192***	1.176***	1.155***	1.251***	1.223***
	(0.0271)	(0.0883)	(0.0940)	(0.0942)	(0.0981)	(0.109)
L2. ITA		-0.198*	-0.300*	-0.372**	-0.466**	-0.437*
		(0.0921)	(0.140)	(0.142)	(0.142)	(0.168)
L3. ITA			0.126	0.242	0.300	0.278
			(0.0981)	(0.159)	(0.159)	(0.178)
L4. ITA				-0.0671	-0.194	-0.190

	(1)	(2)	(3)	(4)	(5)	(6)
				(0.112)	(0.164)	(0.179)
L5. ITA					0.119	0.105
					(0.109)	(0.173)
L6. ITA						0.0380
						(0.116)
Constant	0.372	1.590	1.403	3.654*	1.197	1.023
	(1.280)	(1.367)	(1.514)	(1.654)	(1.845)	(2.208)
r2_a	0.908	0.906	0.895	0.883	0.877	0.855
r2	0.914	0.912	0.904	0.894	0.891	0.873
rmse	2.642	2.589	2.626	2.592	2.683	2.589
AIC	7.6174	7.6154*	7.6902	7.7281	7.8271	7.8805

Note: Standard errors in parentheses. * *p < 0.05,* ** *p < 0.01,* *** *p < 0.001.*

Table 5 summarizes the results of the autoregression of ITA with order 2 and other predictors. Panel A of Table 5 only adds the original predictors, and panel B adds both the original predictors and their lags. It is easy to notice that panel B column (1), that is GDP per capita and its first lag as predictors, has the highest R-square in Table 5. Moreover, the lowest RMSE values is also observed in this case. Therefore, we continue to search for a more efficient prediction specification based on panel B column (1).

Table 5

Autoregression of *ITA* with Order 2 and Other Predictors

Panel A						
	(1)	(2)	(3)	(4)	(5)	(6)
	ITA	ITA	ITA	ITA	ITA	ITA
L.ITA	1.053***	1.182***	1.190***	1.194***	1.192***	1.211***
	(0.0909)	(0.0890)	(0.0898)	(0.0875)	(0.0886)	(0.078)
L2.ITA	-0.239**	-0.176	-0.198*	-0.196*	-0.199*	-0.204
	(0.0880)	(0.0949)	(0.0925)	(0.0913)	(0.0926)	(0.926)
CPI						0.613**
						(0.272)
GDPPC	0.300***					
	(0.0765)					
INFST		-0.000196				
		(0.000203)				
GHG			-0.336			
			(1.922)			
EXR				1.003		
				(0.553)		
EPU					0.000332	
					(0.00104)	
Constant	1.369	1.189	2.222	-0.279	1.611	-1.89
	(1.296)	(1.428)	(3.867)	(1.702)	(1.373)	(1.104)
r2_a	0.916	0.906	0.905	0.908	0.905	0.891
r2	0.922	0.913	0.912	0.914	0.912	0.910
rmse	2.453	2.590	2.599	2.566	2.599	2.613

Panel B						
	(1)	(2)	(3)	(4)	(5)	(6)
	ITA	ITA	ITA	ITA	ITA	ITA
L. ITA	1.015***	1.177***	1.215***	1.195***	1.191***	1.297***
	(0.0845)	(0.0880)	(0.0866)	(0.0913)	(0.0890)	(0.031)
L2. ITA	-0.186*	-0.162	-0.230*	-0.199*	-0.199*	-0.274**
	(0.0822)	(0.0941)	(0.0894)	(0.0979)	(0.0929)	(0.014)
GDP						0.113*
						(0.020)
L.GDP						-0.011
						(0.027)
GDPPC	1.490***					
	(0.264)					
L.GDPPC	-1.264***					
	(0.270)					
INFST		-0.00348*				
		(0.00168)				
L.INFST		0.00340				
		(0.00173)				
GHG			9.926**			
			(3.559)			
L. GHG			-12.30***			
			(3.647)			
EXR				1.130		
				(2.041)		
L.EXR				-0.137		
				(2.131)		
EPU					0.000321	
					(0.00104)	
L. EPU					0.000324	
					(0.00104)	
Constant	1.478	0.943	5.735	-0.234	1.633	2.148
	(1.200)	(1.418)	(3.859)	(1.845)	(1.380)	(3.053)
r2_a	0.928	0.908	0.912	0.907	0.905	0.901
r2	0.934	0.915	0.920	0.914	0.912	0.911
rmse	2.244	2.561	2.498	2.577	2.608	2.597

Note: Standard errors in parentheses. * *p < 0.05,* ** *p < 0.01,* *** *p < 0.001.*

Table 6 shows the regression results of autoregression of ITA and GDP per capita with more predictors. It can be found that none of the regressions in Table 6 improves the predictability of the regression model in column (1) of panel B, Table 5.

Table 6

Autoregression of ITA and GDP per Capita with More Predictors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ITA	ITA	ITA	ITA	ITA	ITA	ITA
L.ITA	1.014***	1.014***	1.003***	1.023***	1.021***	1.015***	1.016***
	(0.0853)	(0.0849)	(0.0854)	(0.0860)	(0.081)	(0.0848)	(0.0878)
L2.ITA	-0.187*	-0.179*	-0.183*	-0.183*	-0.178*	-0.187*	-0.194*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(0.0849)	(0.0858)	(0.0823)	(0.0826)	(0.079)	(0.0825)	(0.0873)
GDPPC	1.491***	1.489***	1.545***	1.478***	1.441***	1.493***	1.544***
	(0.265)	(0.265)	(0.270)	(0.266)	(0.263)	(0.265)	(0.274)
L.GDPPC	-1.264***	-1.268***	-1.329***	-1.270***	-1.329***	-1.268***	-1.350***
	(0.271)	(0.271)	(0.278)	(0.271)	(0.272)	(0.271)	(0.282)
GDP	0.0000076						
	(0.000151)						
INFST		-0.0000589					0.00013
		(0.000184)					(0.0003)
GHG			-1.703		1.611		-2.165
			(1.734)		(1.810)		(1.971)
EXR				0.313			0.550
				(0.534)			(0.697)
EPU						0.000321	0.00024
						(0.00091)	(0.00092)
Constant	1.497	1.362	4.691	0.908	3.124	1.500	4.840
	(1.262)	(1.257)	(3.485)	(1.546)	(2.414)	(1.206)	(3.894)
r2_a	0.927	0.927	0.928	0.927	0.926	0.927	0.926
r2	0.934	0.934	0.934	0.934	0.934	0.934	0.934
rmse	2.280	2.281	2.293	2.297	2.275	2.279	2.292

Note: Standard errors in parentheses. * *p < 0.05,* ** *p < 0.01,* *** *p < 0.001.*

4.1. Individual-level Forecasting

According to the previous results, the optimal country-specific forecasting model is given below.

$$ITA_{it} = \alpha_0 + \alpha_1 ITA_{i,t-1} + \alpha_2 ITA_{i,t-2} + \alpha_3 GDPPC_{i,t} + \alpha_4 GDPPC_{i,t-1} + v_{it}, \quad (3)$$

The study uses Equation 3 to forecast the values of ITA until 2030. However, we have to forecast GDP per capita (*GDPPC*) first, and the model for forecasting GDP per capita is AR (2). We forecast *ITA* by two time series of GDP per capita, with and without the COVID-19 shock. For the out-of-sample prediction, since we do not have the realized data of GDP, we have to give the forecast values of GDP a yearly deduction. We assume that the impact of COVID-19 on the economy will not totally disappear until the end of 2021, and visa restrictions will continue as well. We penalize the forecasted value of GDP per capita for each country with a deduction and deduction rate decay year by year. Germany's economy will shrink by 6% due to COVID-19 shock, whereas French, Italian, Spanish, and Turkish economies will contract by 8.4%, 5.4%, 8%, and 5%, respectively (IMF, 2020). In terms of the real data, we assume a 5% reduction in GDP per capita to each country in 2020's forecasted value, and the reduction rate will decrease by 1% annually. The country-wise estimations are covered in the following section.

4.1.1. Germany

The German economy is heavily dependent on the tourism industry, with 10.7 % of the GDP share that is worth $43 billion. The country's total output shrunk by 1% from 2018 to 2019, and *BREXIT* pressure in the form of tourist arrival was expected in the summer of 2020. The icing on the cake, the COVID-19 pandemic, severely affected this industry due to the lockdown and travel restrictions imposed around the world. Figure A illustrates that

pandemic will cost a 6.9% decline in international arrival and will put 1.088 million jobs at risk during 2020. This decline is other than the *BREXIT* shock, as 2.8 million tourists from the United Kingdom visited last year. The tourism trends in Europe, and especially Germany, show that travel patterns differ among countries (Khurshid *et al.,* 2022a). Most of the European tourists travel from July to September, these two months accounting for 1/4th of total arrivals. The main annually recurring events such as Oktoberfest, Cannstatter Volksfest, fair on the Rhine, and Libori host major portion of tourism are held in August and September. However, tourist arrival is dependent on the economic and pandemic situation in the country of origin. The declining trends will continue in 2021 due to the fear and economic downfall of domestic and foreign travelers. The number will match the current trend in 2024 as per forecasting values. The outcomes are dependent on the economic recovery of other countries and on the timely policy decisions by the government.

The epidemic shock put the country on quarantine, and that affected all sectors of the economy and diminished real outputs as well. Figure 2 highlights the fact that GDP per capita would decline by 6.55 % in 2020 due to the COVID-19 pandemic. The declining trend of German GDP will add fuel to the fire. The declining GDP per capita trend will continue in the next four years, and an estimated decline in the GDP per capita is recorded as -4.34%, -3.00%, -2.16%, and 0.01% from 2021 to 2024, respectively.

Figure 1: ITA and COVID-19 Shock

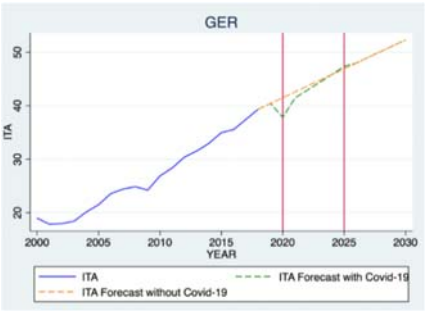
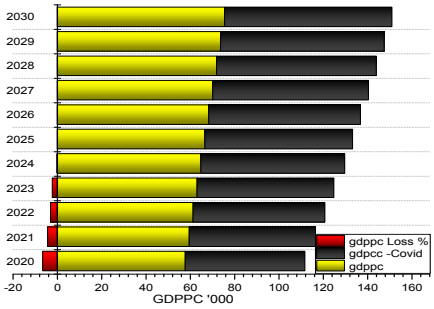


Figure 2: Pandemic Impact on GDP per Capita



4.1.2. France

France is the fifth most affected by COVID-19 country in Europe, with 126,835 cases and 23,660 deaths to date. The country extended the lockdown period until May 11. The pandemic situation freezes country operations, and travel bans severely affect the tourism sector. The tourism industry adds 65.5 billion to the national GDP, which is 9% of the total GDP. Figure 3 highlights that there would be a 9.63% decline in the tourist arrivals in France. The pandemic will cripple this industry in the coming years, and the country will get back to original trends in 2025. The expected decline in tourist numbers from 2021 to 2024 is estimated as 7.4%, 5.2%, 1.91%, and 0.69%, respectively.

The epidemic shock will suppress the economic outcomes and the GDP of France. The GDP per capita will drop by 6.73% in 2020. This will reduce income, affect the consumption pattern, lower the aggregate demand, and put pressure on the GDP growth of next years (Khurshid *et al*., 2022c). Therefore, it causes a GDP per capita fall of 5.33% in 2021, and the figure will decline to 1.21% in 2024. Figure 4 shows that the economy will be back on track in 2025; however, results will be different based on the timely response.

Figure 3: ITA and COVID-19 Shock

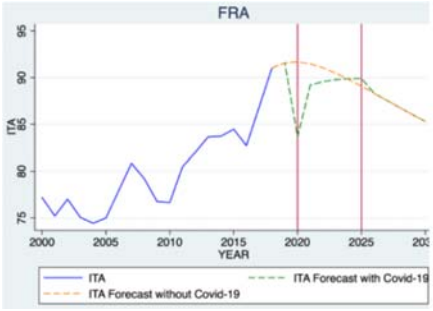
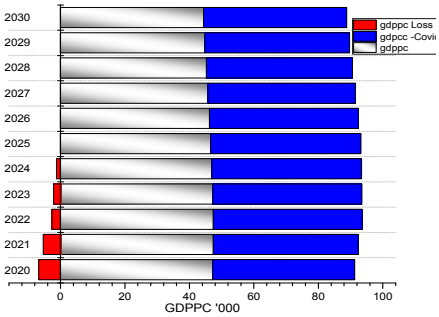


Figure 4: Pandemic Impact on GDP per Capita



4.1.3. Spain

Tourism is the lifeblood for the Spanish economy, with 14.9% of the GDP that translates into annual revenue of $81.5 billion. After the US, Spain is the 2nd largest foreign exchange earner from the tourism sector. The spread of the coronavirus froze economic operations, and the traveling ban will have a denting effect on the hospitality industry and per capita growth. Figure 5 exhibits that the epidemic will reduce the tourism industry by 9.35% during 2020 and 289 thousand people will be unemployed. The negative effect of the pandemic will hurt the industry from 2021 to 2023 by 2.56%, 1.68%, and 0.81%, correspondingly. COVID-19 will distress the tourism and production sector that reduces the national output and hurts the GDP capita of Spain. Figure 6 shows that per capita income will decline during the epidemic by 7.31%, and the economy will go back to the original rate in 2025. The shock will decrease the per capita income by 4% in 2021; however, the gap will reduce to 0.9% in 2024.

Figure 5: ITA and COVID-19 Shock

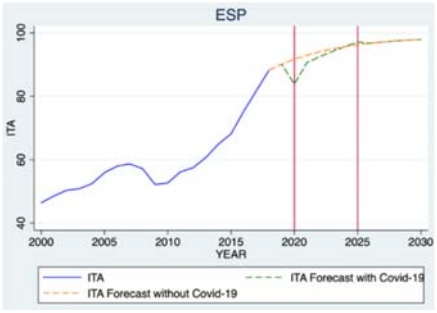
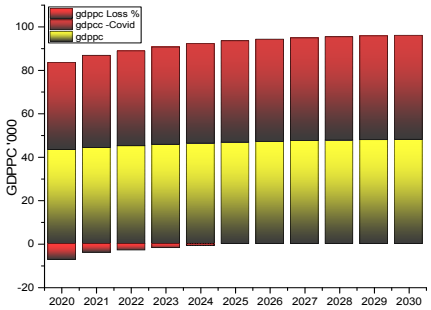


Figure 6: Pandemic Impact on GDP per Capita



The tourism sector is the highest contributor to GDP, followed by clothing, agriculture, and the engineering sector (Duan *et al.*, 2021b). The top 6 countries that contribute in the form of visitors are United Kingdom, Germany, France, Italy, Netherlands, and the United States. The said countries are the current epicenter of coronavirus that badly affected their economies. In 2018, 18.5 million visitors were from the United Kingdom, but the *BREXIT*

shock will have added pressure on the tourism industry of Spain that would affect 2.87 million jobs in the country (Khan *et al*., 2022).

4.1.4. Italy

The Italian economy is mainly standing on the pillars of tourism and manufacturing industries. The SME's are playing their parts to fulfill the local demand and earn foreign exchange through exports (Khurshid *et al*., 2018). The tourism sector added $39.4 billion during 2018, which is 13% of the national output that provides 1.55 million jobs in the country. Italy was the first epicenter of the pandemic in Europe, with the second-highest number of cases and reported the highest number of deaths (27682) in Europe. The first lockdown began on February 21, and the government put the whole country on quarantine since March 9, 2020.

The results in Figure 7 illustrate that during 2020 the pandemic shock hurts the tourism industry by 9.34%, by 2.63% in 2021, 1.74% in 2022, and 0.086% during 2023. The tourism industry will be back on track in 2024, depending on the economic and epidemic situation in Germany, the United States, France, and the United Kingdom, as the highest number of visitors come from these countries.

Figure 7: ITA and COVID-19 Shock

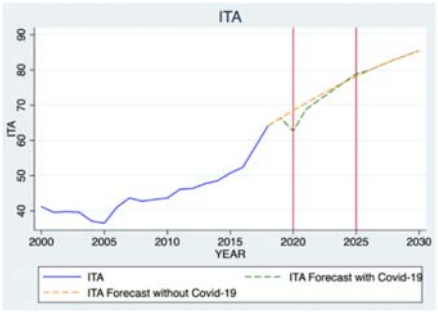
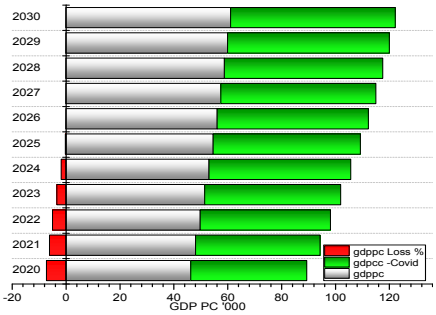


Figure 8: Pandemic Impact on GDP per Capita



The pandemic breaks the international supply chain that hurts the SME's and production sector of the economy. The unexpected epidemic shock and quarantine situation diverted developmental expenditure towards health emergencies, which will affect real output and suppress the GDP per capita. Figure 8 shows a reduction in the per capita income by 7.2% during 2020. The negative effects of the pandemic will continue until 2025, with an annual average decline of 3.28% from 2021 till 2025.

5. Discussion and Policy Implications

The main purpose of the study is to assess the response of the tourism industry to the COVID 19 shocks. The countries under study are among the largest tourist destinations, which contribute substantially to employment, infrastructure development, foreign investment, and GDP. Moreover, the tourism industry plays a critical role in the development of subsidiary industry growth (Pablo-Romero and Molina, 2013). Tourism is a smokeless industry that flourishes with the environment of certainty and stability (Khan *et al*., 2020). However, it is extremely vulnerable to political and economic uncertainty. COVID-19 has generated uncertainty and fear around the world, which can have severe consequences for the tourism

industry in these countries. These countries already experienced a decline in the tourist arrival due to BREXIT in 2018-2019. It increased visa restrictions and raised fears about future relations between the countries, which hurt the tourism industry. The situation turned from bad to worst with the emergence of COVID-19 pandemic, due to the lockdown and travel restrictions imposed around the world. The tourism industry has to come to a complete halt, and that trend would continue in 2021 due to fear and economic downfall. The GDP will decline by an average of 5% in all these countries due to the COVID-19 shock (IMF, 2020). Similarly, there is a projection of a 5% reduction in GDP per capita in 2020 in these countries. The falling economic activities will decline the income per capita, and unemployment will increase and suppress the economic outcomes and the GDP. It is forecasted that the GDP of all of these countries will contract until 2024, and the tourism industry will continue on a declining trend. The revival is dependent on the economic recovery of the other countries and timely policy decisions by the government. However, the projected values indicate that restoration of the tourism industry is very difficult because the impact of COVID-19 on the economy will not totally disappear until the end of 2021, and the visa restrictions may continue as well.

5.1. Policy Implications

The following policy implications can help in reducing possible losses and their resurgence in the coming years. The public and private sectors have to cooperate to empower the industry to deal with the impact of pandemic shock and get it ready for responsible tourism after the travel bans are lifted. The following suggestions can help the smokeless industry during and after the pandemic.

1. Improving the visa application process or outright waiving them conditional on health certificate to reduce the chances of imported COVID cases.
2. Develop, advertise and implement SOP's for workers linked to industry, businesses, and travelers.
3. Provide financial assistance to SME's, micro-enterprises, and operators linked with the tourism value chain (Zhang *et al.,* 2021).
4. Prepare and communicate guidelines, support major players of the industry such as hotels, restaurants, homestays, and transportation sectors to upgrade and disinfect facilities. In addition, bring the maximum occupancy in hotels up to 60 %.
5. Train officials and firms to endorse and execute post-pandemic revised health safety and hygiene practices.
6. Usage of technology for virtual tours of heritage sites and museums can be a substitute for actual visits and also can be an alternative source of revenue.
7. Planning and execution of onsite actions aimed for destination management, *i.e*., waste management and social distancing.

On the other hand, the government should take measures to maintain the per capita incomes in order to support domestic travelers. For this, the financial liquidity should increase, which can be done by providing financial assistance, subsidies, and the tax cut. It will help individuals to retain their personal savings during the pandemic and later use it for excursions. Governments should back the SME's and small businesses by all means. Ongoing projects should start in less affected areas with tight SOP's. It will ease the unemployment pressure and increase real outputs in the economy.

6. Conclusion

The COVID-19 pandemic put the world on quarantine, affected the tourism industry, reduced outputs, and diminished GDP per capita. This study tested the effect of determinants of the tourism industry, adds the pandemic shock, and forecasted the values until 2030 by using a dynamic distribution lag model. The COVID-19 shock will negatively affect the international tourist arrivals in Germany, France, Spain, and Italy, negatively affecting the GDP per capita. The outcomes reveal that Germany's smokeless industry will drop by 6.9% and put 1.09 million jobs at risk in 2020. The declining trends will continue until 2023; however, they will line up to current trends in 2024. The fall in business activities and tourism will suppress per capita income by 6.55% in 2020. The estimated recede in per capita during 2021 to 2024 is recorded as -4.34%, -3.00%, -2.16% and 0.01%, respectively. The pandemic will dampen the Italian tourism sector by 9.34% throughout 2020, while by 2.63%, 1.74%, and 0.086% from 2021 to 2023, correspondingly. The break-in supply chain and tourism shock would shrink the economy by 7.2% during 2020. Similarly, French, Spanish, and Turkish tourism industries will bear 9.63%, 9.35%, and 8.87% market losses during the lockdown. The national isolation, disruption of industries, and economic uncertainty cause a fall in the per capita GDP of France and Spain by 6.73% and 7.31% in 2020, respectively. The most severe effect of pandemic shock on the smokeless industry will be in France, and the highest per capita losses will occur in Spain.

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