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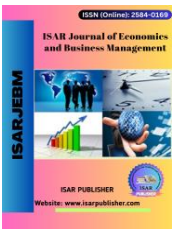

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The Continuing Connection between Tourism, Global Trade, and CO2 Emissions: Ecological Patterns

Rehman Zafar[1*], Abdullah Khan[2], Amina BiBi[3]

[1,2] School of Business, Anhui University of Technology, Ma'Anshan 243032, China

[3]School of economic and management, Chang'an University Xi'an China.

***Corresponding Author**
Rehman Zafar
School of Business, Anhui University of Technology, Ma'Anshan 243032, China.

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Abstract: The study specifically focuses on the relationships between the growth of the gross domestic product, the tourist industry, global exchange usage, and the New Direct Hypothesis (FDI). All of these relationships have an effect on CO2 emissions. Pakistan's stance on environmental degradation is a sensitive topic. The evaluation employed the FMOLS DOLS and ARDL models to perform an analysis of verified data from 1980 to 2022. The results show that the relationship between the CO2 transitions and the GDP is nonlinear and negative. In any case, a significant factor influencing carbon dioxide emissions is the increase in gross domestic product and foreign direct investment. The amount of carbon dioxide emissions and the expansion of the gross domestic product have a U-shaped connection. Survey results indicate that CO2 emissions are unaffected by the expansion of the gross domestic product or by the use of foreign exchange. Only foreign direct investment (FDI), which has a negative effect, has an effect on CO2 emissions. The Gross Domestic Product, foreign direct investment, worldwide exchange, and carbon dioxide emissions are all unidirectional in their use, according to the Granger causality test. These results clarify the nebulous link between conventional types of corruption, monetary events, and Pakistan's use of the global exchange markets. It is projected that environmentally conscious development and foreign direct investment (FDI) would boost the use of international trade and meet regular administration goals. There is also hope that financial activity in the traveler region will lower CO_2 emissions.

Keywords: CO_2 emissions, Environmental degradation, FMOLS, Nonlinear relationship, Monetary events.

1. Introduction

The correlations between the transportation industry and the rising emissions of carbon dioxide are not compelling. Moreover, Qi et al. (2020) focused on the relationship between Pakistan's GDP and CO2 emissions. A decrease in fossil fuel byproducts should be associated with an increase in financial returns. Mahrinasari et al.'s (2019) investigation found a correlation between the growing byproducts of fossil fuels and exchange action across Asian countries. As demonstrated by Katircioglu et al. (2020), Pakistan's transportation sector is a major source of adverse impacts related to petroleum products. The evaluation test economies have shown that carbon flood has an impact on the development industry. Sadorsky (2009), there are several factors that contribute to an area's predominance, but the most fundamental ones are abundant water consumption, excessive energy use, and ecological degradation (Ciacci et al. 2021). Whatever your stance, the data reveals a decline in the number of people in developed countries who need to expose themselves (Yousaf Ali Khan, 2020). According to Yu and Xu (2019), foreign direct investment (FDI) played a major role in Pakistan's reduced public CO2 outflows. Balsalobre et al. (2020) assessed the CO2 emissions from the mobility company using a variety of money-related models to illustrate ecological change. Generally speaking, the econometric models focused on the direct relationship between the growth of the mobility industry and environmental change (Agbanike et al. 2019). The impact of natural change on the tourism industry's long- and medium-term prospects is becoming more and more obvious, particularly in high-transmission zones (Lemieuxa, 2010). The body of research on the financial and environmental impacts of movement industry activities has grown recently (Croes and associates 2021), and the natural people have also been concerned about the development of an acceptable ITO (Usman et al. 2020). The effects of reasonable power and direct hypotheses on fossil fuel byproducts in Pakistan, global commerce, and the links with the travel sector will be the focus of the Structure GMM and FMOLS models. The energy study provides a wealth of information on the role that various financial activities have in CO2 outflows, making it easier to determine the impact of various financial factors on natural contamination. Furthermore, the center's comparable approach enables us to understand the

difference in natural change assistance methods across developed and rural countries.

A rundown of what is still available is as follows: In Segment 2, there is a particular survey that focuses on writing. Section 4 is responsible for depicting the findings and conversations, whereas Part 3 is responsible for displaying the system and the data. In conclusion, Part 5 brings this examination to a close by providing recommendations for how to continue.

2. Literature Review

Advance the movement business's big impact on the climate, improve sightseers' regular experience via guiding, and reduce the cause of environmental damage (Jing Zhao, 2018). Natural effect variables including environmentally friendly power and transportation companies, farming, officer administration, and fisheries (AFF), and total national output advancement affect global travel (Khan, 2021). Reasonable travel industry growth requires an integrated approach that prioritizes future neighborly planning with social, financial, and biological considerations by balancing individual needs with the best possible legitimacy of typical resources, including travel business complaints (Lasisi et al. 2020). Policymakers face challenges from the movement business's financial growth and its leaders (Okumus and Erdogan 2021). Financial growth allows the country to use biological viability and demonstrate that regular actions are eco-friendly (Nguyen and Su 2021). The economy, environment, energy, and the movement business is crucial to creating a profitable travel industry (Lasisi et al. 2020). A global shift to renewable power sources like wind and solar is underway to reduce ozone-depleting GHG emissions (An et al. 2021). Using vacationers' and dealers' pledges, expenditures, and obligations, notably from outside Pakistan, Li et al. (2021) estimates financial improvement. High GDP growth also boosts the outbound tourism business. Sarpong et al. (2020) examined eight South African nations' everyday solace assumptions after 20 years of data. Despite passenger protests, using green power sources might make the travel sector more affordable (Nguyen et al. 2020; Nguyen & Su, 2021; Gössling et al., 2012)). The transportation business directly impacts four of the already mentioned financial categories (Buckley 2011). Petroleum derivative waste is the mobility industry's biggest challenge for environmental and climatic protection (Nguyen and Su, 2021; Peeters and Dubois, 2010). The tourism sector has been a source of frequent pollution (Işk et al. 2019; Udi et al., 2020). Unlike study on the movement business' general development nexus, travel area energy nexus research is scarce and related to different activities, including transportation. Some observational studies have linked energy, water, and waste management due to explorers' interests (Dwyer et al. 2010). Solarin (2014) examines Malaysia's travel business and energy consumption. A separate study found that mobility industry energy usage increases CO2 emissions from construction and transportation. According to Koçak et al. (2020), travel and CO2 emissions may co-create. Land use by the mobility business is another issue for natural deficiency. An eco-friendly travel framework requires green mobility, innovation, and electricity use (Paramati et al. 2017). Environmental pollution, high water usage, and increased energy use restrict the movement area's sustainability (Skillet et al. 2018). The transportation industry affects tainting and CO2 discharges (2019). The movement and travel sector uses a lot of energy for transportation, comfort, and education (Tsagarakis 2011). The survey's new findings explain travel area advancement and energy-environment nexuses (Işk et al. 2019). Eluwole et al. (2019) found a non-basic link between the travel sector and biological viability in 10 polluted discharge nations, whereas other studies found a critical link between movement and toxic discharges (Lasisi et al. 2020). Zhang and Zhang (2020) investigate Pakistan's tourism sector and petroleum product commerce to find a link. Travel influenced eastern Pakistan's CO2 releases (Zhang and Gao, 2016). According to Tang et al. (2017), the moving area consumes a lot of energy and promotes ozone-damaging emissions. They link petroleum waste to movement area size. Tian et al., (2020) utilize CO2 outflows as a percentage of GDP development and reasonable power use in the movement company and the environment to measure environmental quality. Some associated factors affect the movement area. Calderón-Vargas et al. (2019) examine the possibility for breeze/sun-put together energy-based spatial-common explorer stream advancement in another plausible movement business research. Dogru et al. (2020) found that while transportation industry enhancements influence CO2 emissions in Turkey and Canada, they also effect emissions from Italy, Slovakia, and Luxembourg. Butowski (2021) calls travel industry events, visitors, and networks the movement business, regardless of whether they have an equal stake in safeguarding it. Khan et al. (2019) is also studying Covid's impact on the travel business, which has collapsed. The paper by Moreno et al. (2021) examines how Covid affects the Spanish travel sector. The Spanish travel sector is vital, but the Covid flare-up has devastated it. Calderón, et al. (2019) examine how wind energy projects and the travel sector affect Amazon development. Its biodiversity makes it ideal for the travel sector. Skillet et al. (2018) believe that sustainable travel requires green progressions and transportation that are harmless to the ecology. Hafeez et al. (2020) found a high association between globalization and CO2 emissions. Paramati et al. (2017) found that expanding the mobility area temporarily reduces CO2 outputs but helps in the long run. Lopez and Bhaktikul (2018) found that a large part of Thailand's tourist business begins with steep mountain climbs, followed by trips to real places and safe havens. Relative methods should focus on included organization, a healthy lifestyle, and an economical green travel sector enterprise. Finally, the tourism sector should not be considered unimportant to development (Razzaq et al. 2021). Asadzadeh (2017) found a perfect link between monetary change and movement area improvement.

3. Research Methods

The study used fixed, lively, and long-term assessors to uncover strong relationships with the selected parameters. We produced complete World Bank human development measure data. The review uses metric ton-per-capita CO2 emissions. Unknown direct venture (FDI) net inflows as a percent of GDP, per capita, are free factors. GDP, RE as the absolute last energy, and Visit as the global tourism industry receipt. In static and dynamic models, urban population, public consumption, exchange receptiveness, and workforce are control elements. Following Dong and Jiang (2020), CO2 and informational parameters have a direct helpful relationship is written as in regression equation:

$$C0_{2pq} = \alpha_0 + \alpha_1 IT_{pq} + \alpha_2 RE_{pq} + \alpha_3 GDPPC_{pq} + \alpha_4 TOUR_{pq} + \alpha_5 FDI_{pq} + X_{pq}$$

4. Results and Discussions

The results of four conducted unit root tests on the selected factors at both the level and first differences for the period from 1980 to 2019 are presented in Table-1.

Table.1. Panel Unit Root Tests

Variables	Levin Linchu		Pearson		bruiting		Hadri	
	Level	**1st diff.**	**level**	**1st diff.**	**Level**	**1st diff.**	**Level**	**1st diff.**
CO3	0.29	-28.96	2.64	-36.36	8.08	-38.818	30.69	-6.578
	(0.00001)***	(0.00001)**	(0.00001) ***	(0.00001) **	-2	(0.00001) **	(0.00001) ***	(0.00001) **
FDI	-8.64	-69.38	-6.92	-60.82	-8.69	-16.97	20.62	6.38
	(0.00001) ***	(0.00001)**	(0.00001) ***	(0.00001) **	(0.00001) ***	(0.00001) **	(0.00001) ***	(0.00001) **
RE	-3.69	-34.62	-0.08	-18.63	3.38	-8.69	18.18	20.64
	(0.006) ***	(0.00001)**	-0.48	(0.00001) **	-0.57	(0.00001) **	(0.00001) ***	(0.00001) **
TOUR	-0.45	-20.48	3.57	-20.08	6.38	-2.36	16.98	36.03
	-0.32	(0.00001)**	-0.57	(0.00001) **	-2	(0.00001) **	(0.00001) ***	(0.00001) **
GDP	-3.57	-30.69	-3.63	-36.98	-3.38	-16.97	16.97	20.63
	(0.000012) ***	(0.00001)**	(0.00001) ***	(0.00001) **	(0.0003) ***	(0.00001) **	(0.00001) ***	(0.00001) **
Urba	-18.6	-30.2	-32.69	-62.57	-28.69	-16.98	28.08	30.64
	(0.00001) ***	(0.00001)**	(0.00001)***	(0.00001) **	(0.00001) ***	(0.00001) **	(0.00001) ***	(0.00001) **

Note: *P < 0.01.*

The sheet co-participant is consistent after verifying element stationarity using board unit root tests. We utilized Pedroni (2004) to examine the components' co-ordination. Table-2 shows Asia Pacific and European board co-integrations test.

Table 2 Represents results of the panel statistics

	Statistics	Probability	Statistics	Probability
Panel v-Statistics	6.369382	0.00001***	4.134134	0.00001***
Panel rho-Statistics	-4.384641	0.00001***	-4.136664	0. 000***
Panel PP-Statistics	-8.628469	0.00001***	-23.82369	0.00001***
Panel a DF-Statistics	-8.662363	0.00001***	-23.34346	0. 000***
Alternating hypothesis: Ordinary a R coefficients. (Inside Constituent)				
	Statistic	Pro**.		
Group rho- Statistics	-0.357418	0.00001***		
Group PP- Statistics	-16.34346	0.00001***		
Group ADF- Statistics	-18.14346	0.00001***		

Note: P < 0.01

4.2. Findings for Long Run Estimations

Table 3 shows dependable impact model and strategy GMM assessment to examine the association between CO2, generally speaking exchange and OLS, benign to biological system power consumption, new direct hypothesis, and the chosen nation's board's development company. The OLS, set impact model, and construction GMM results also showed that the coefficient of new direct undertaking on carbon dioxide discharges is huge for European countries.

Table 3. Presents the estimated models results in long-run

Variables	OLS	FE	(SGMM)
CO_{2pq-1}			-2.630***
			-8.08
Renewable energy	-0.648***	-0.646***	-0.329***
	-0.034	-0.034	-0.0001
FDI	-0.002	0.0034**	-0.064***
	-0.037	-0.0000	-0.0000
TOUR	-0.00001***	0.048***	0.066***
	0.0000	-0.0003	-0.0001
RE	0.424***	0.248***	0.428***
	-0.04	-0.0000	-0.02
Urba	0.542***	-2.055**	0.389***
	-0.042	-3.678	-0.006
GDP	0.649***	0.578***	0.315***
	-0.028	-0.034	-0.0003
TI	1.630***	4.420***	2.280***
	-2.662	-2.82	-6.034
Con.	-32.07***	-2.484***	-19.80***
			-0.063
Obs.	3,446	3,446	2,450
Number of ID		344	344
R^2	0.696	0.648	
AR(1)			-2.48(0.002)
AR(2)			-0.63(0.463)
Sargan test			34666.8(0.202)

Note: P < 0.01

The study shows that Asia Pacific industrialization affects carbon dioxide emissions. In-structure generalized method of moments (GMM) shows a positive link between industrial expansion and carbon dioxide emissions in the durable outcome model. The Ordinary Least Squares (OLS) and system Generalized Method of Moments (GMM) models show that industrial development significantly affects carbon dioxide emissions. A 1% rise in industrial growth increases emissions. All models reveal that Pakistan's trade responsiveness coefficient is statistically significant, demonstrating that trade variations affect carbon dioxide emissions. Asia Pacific nations that have achieved minimal progress in decreasing carbon dioxide emissions are anticipated to see a surge in emissions, underscoring the importance of even small changes.

4.3 Findings of Long Run Measurement Models

Table 4 shows the combined effects of all assessment elements for Asia Pacific and European nations using FMOLS and DOLS, two burden up co-joining assessment structures from a long time ago. The results demonstrate that all normal coefficients are quantifiably basic. If there is an event in Asia Pacific, FMOLS has long shown that FDI and actual power usage are the main drivers of CO2 evacuation. Our findings show that expansion in the development industry reduces CO2 emissions and is green because it adds to the zone by keeping a healthy number of explorers who transport royal bio blend and cleanliness. Our exposures reveal that Asia Pacific nations' real money movement decreases carbon dioxide launch, contrary to (Ben Jebli, 2015)'s depiction of Tunisia's financial improvement decay carbon dioxide opportunity. DOLS model results reveal that movement industry business, trade, and FDI cause carbon dioxide emissions. FDI lowers Kuwait's carbon dioxide emissions. By replacing harmless power, even with leftover, and increasing practical impact rather than energy, DOLS of the power evaluation on probable power consumption and 1% expansion in biologically benign power use decrease CO2 emissions (Zhu et al., 2016; Salahudin et al., 2018)). Table-5 shows European nations' FMOLS and DOLS results. FDI, development business, and legitimate power use drive carbon dioxide removal in Europe, while acceptable power use, monetary new development, and exchange receptiveness reduce it.

Table.4. Long-run Valuation of DOLS & FMOLS Models

Variables	**FMOLS**			**DOLS**		
	Co-efficient	t-Statistics	P-value	Co-efficient	t-statistics	Probability
FDI	34.402	451682	0.00001***	0.2454	32.568	0.00001***
RE	48.529	632256.54	0.00001***	-0.254	-8.2529	0.00001***
TOUR	-56.632	-2543592	0.00001***	2.518	32.454	0.00001***
GDP	-33.42	-34783074	0.00001***	-0.0000	-6.566	0.00001***
URB	-32.54	-2483074	0.00001***	0.529	8.628	0.00001***

Note: P < 1%.

The results reveal that while different from challenge that plan changes in FDI increase discharges, as shown in our FDI disclosures (Zhu et al., 2016; Salahuddin et al., 2018). FMOLS and DOLS models reduce CO2 outflows by 0.15 percent and 1.50 percent, respectively, with a 1% realistic power usage increase. FMOLS and DOLS power utilization figures support this. Ben Jebli and Ben Youssef (2015) discovered that Tunisia's GDP growth reduced CO2 emissions.

5. Conclusions

This study investigates the influence of foreign direct investment (FDI) inflows and tourism on carbon dioxide emissions in Pakistan through the use of OLS, fixed effect, and system GMM models. The study used FMOLS and DOLS models to examine the enduring correlation between these factors. The integrated FMOLS and DOLS models provide a thorough correlation between the variables being studied and the magnitude of carbon dioxide emissions in Pakistan. The report finds key factors that contribute to the rise in carbon dioxide emissions, such as the Chinese government's handling of the FMOLS brand, undeclared foreign direct investment (FDI), tourism, and the use of ecologically sustainable energy. In addition, this study examines the influence of urban growth in Pakistan by employing system GMM, FMOLS, and DOLS models. The primary focus is on the repercussions it has on carbon dioxide emissions, sustainable energy use, and FDI. A negative association was demonstrated between direct interventions and the transportation industry, as well as emissions resulting from the combustion of fossil fuels. According to the DOLS model for Pakistan, they are seen as advantageous for encouraging sustainable energy usage, attracting foreign direct investment (FDI), supporting tourist initiatives, and fostering trade openness in order to tackle future FDI and tourism-related carbon dioxide emissions. Pakistan's carbon dioxide emissions have grown as a result of its rapid economic expansion and rising power usage. Pakistan actively promotes more foreign direct investment (FDI) in infrastructure development, hence fostering the expansion of the transportation industry. To effectively tackle the pressing problem of climate change, it is imperative to implement policies that foster the expansion of the building sector and theories pertaining to it.

5.1 Future Research Suggestions

In order to promote environmentally friendly practices, it may be beneficial to explore the implementation of strategies associated with the mobility industry sector. Enhancing trade transparency between the two countries is necessary due to a significant limitation in terms of natural degradation.

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