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An Empirical Analysis on Impact of Shanghai Cooperation Organisation (SCO) on Environment in Iran

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ABSTRACT:
The main objective of this paper is to test the existing theories and examine tourism and GDP factors to moderate the relationship between economic development and CO_2 emissions in SCO members and it effect on CO_2 emission in Iran after the membership. The data is collected for the period of 2000-2015 to measure the dynamic impact of GMM method of tourism on environmental pollution. The results show that tourism and GDP are significate and have a positive impact on CO2 emission. It is suggested by this paper that more attention is required for environmental policies in Iran. And economic development is required for the improvement of the quality for the environment in future policies.

KEYWORDS: Environment, SCO member, economic development, tourism

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I. INTRODUCTION

Tourism in a country contributes exponentially to the economic development. Many developing economies are highly dependent on the earning from the tourists from all over globe, which contribute to Gross Domestic Product (GDP) of those countries (Azam, Alam et al. 2018). Although tourism is now one of the most significant sector of the economy, which contributes approximately 25 percent to GDP. Tourism has impact on poverty reduction and the environment (Lange 2015). Tourism is defined as an industry that is involved in leisure and travel and has turned into one of the fastest-growing sectors of economy for the past few years. This increase has been so much that tourism has been of great help to the economic growth of countries and economic advantages of local communities (Rasekhi and Mohammadi 2015). The nature-based tourism can contribute to economic development and create strong incentives for sustainable management and conservation of ecosystems when it generates income and employment to the local economy; Costa Rica and Mauritius are good examples (Lange 2015).

On the other side, tourism industry works as a promotor for economic development for tourism-based counties; contrary, the flip side of coin demonstrates that there are various harmful effects of rapidly increasing tourism. Few out those are economic (irregular development, income inequality, geopolitical risks, rising costs of materials); whereas, other are environmental (high weather fluctuations and climate change, emission of greenhouse gases, water and other resources scarcity, over consumption of energy) and social (child labour and bounded labour, human trafficking and sex tourism, culture and heritage protection) etc. (Azam, Alam et al. 2018). It reveals that the tourism industry can be a dangerous industry.

In addition, globalization has emerged in recent decades as the main trend in international relations and continues to deepen the intertwining of relations between countries and regions of the world. Countries have more relation after joining an organization some relations are about economic, tourism, trade. Also, the rapid development of modern technologies in basis of transport, communications, and information delivery and transmission is contributing to the creation of some Cooperation Organization (Alimov 2018). One of these Organizations is the Shanghai Cooperation Organisation. In the Eurasian area, the Shanghai Cooperation Organization is one of the greatest examples of this new linked or mixed model of interstate regional partnership. The Shanghai Five was created in 1996 when China, Russia, Kazakhstan, Kyrgyzstan and Tajikistan signed the Shanghai Agreement on building security in common border areas. This initial formation was aimed at countering tensions between the countries who shared new international borders created after the collapse of the USSR in 1991. Uzbekistan accepted an invitation to join in 2001 resulting in the *Shanghai Five* evolving to become the *Shanghai Cooperation Organisation* (Grainger 2012). After that, the organization agreed with India and Pakistan in 2015. The economies of the SCO member states influence each another due to their geographic proximity, and their regional economic agreements and joint programs within the

Organization's framework are the foundation of their progressive joint development. Also it provides strong relation on basis of economics and finance, tourism, environment and natural resources management, social development, and energy between the countries (Alimov 2018).

And the Islamic republic of Iran is willing to become a full member of the SCO. If Iran becomes the member of the SCO, this country will be effected from the relation between other countries in the organization (Mayor and Tol 2010). It investigates long term effects of tourism on environmental pollution. The results revealed that tourism expansion would lead to increased transportation requiring greater fuel consumption resulting in increased CO_2 emissions (Rasekhi and Mohammadi 2015). The foremost aim of their work is to examine the relationship between tourism and environmental performance in the Caspian Sea national during the period of 2002-2013. A panel data vector autoregressive (P-VAR) model has been executed to estimate the model. The result also reveals the responses of environmental performance on human capital index, the degree of trade openness and the square of GDP per capita shocks are positive (Zaman et. al, 2016). Their study focused on the relationship between economic growth, carbon dioxide emissions, tourism development, energy demand, domestic investment and health expenditures with an aim to test the validity of the Environmental Kuznets Curve (EKC) hypothesis in the panel of three diversified World's region including East Asia & Pacific, European Union and high-income OECD and Non-OECD countries. The study covers the period of last nine years, 2005-2013. The study applied the principal component analysis (PCA) to construct tourism development index which is the amalgamation of number of tourists' arrivals, tourism receipts and international tourism expenditures. Findings of their study validate the inverted U-shaped relationship between carbon emissions and per capita income in the region. The results further substantiate the following causal relationships: i) tourism-induced carbon emissions, ii) energy-induced emissions, iii) investment-induced emissions, iv) growth led tourism, v) investment led tourism and vi) health led tourism development in the region (Paramati, Alam et al. 2017). It examined the role of tourism investment on tourism development and CO_2 emissions in panel for Barbados, Bahamas, Belize, Cabo Verde, Fiji, Maldives, Malta, Seychelles, St. Lucia, and Vanuatu. The data is used for1995-2013 period and applied Causality Test. At last results indicate that tourism development Granger causes CO_2 emissions and tourism investment in the short-run, implying that investment in tourism enhances environmental quality by reducing CO_2 emissions (Chaabouni and Saidi 2017). Their study investigated the causal relationship between carbon dioxide (CO_2) emissions, health spending and GDP growth for 51 countries (divided into three groups of countries: low-income countries; lower and upper middle income; middle income countries) covering the period of 1995–2013. Dynamic simultaneous-equations models and generalized method of moments (GMM) are used to investigate this relationship. Results reveal evidence of a causal relationship among three variables. The empirical results show that there is a bidirectional causality between CO_2 emissions and GDP per capita, between health spending and economic growth for three groups of estimates. The results also indicate that there is a unidirectional causality from CO_2 emissions to health spending, except low-income group countries. It was found that health plays an important role in GDP per capita; it limits its eff ect on a growing deterioration in the quality of the environment. The empirical results of robust panel econometric methods of analysed the effect of tourism on CO_2 emissions (Paramati, Alam et al. 2017). The results show tourism shrinking substantially in developed countries as compared to the developing economies (Azam, Alam et al. 2018).Their study focused to examine the effect of tourists' arrivals on environmental pollution caused by Carbon Dioxide emissions in Malaysia, Thailand and Singapore over the period of 1990-2014. Some other regresses namely energy consumption and income are also used in the multivariate model. The empirical results reveal that tourism has a significant positive effect on environmental pollution in Malaysia. However, an inverse relationship between tourism and environmental pollution is observed in Thailand and Singapore. The aim of this paper is to test and examine the existing theories. This paper is an attempt to answer, '*Do tourism and GDP factors moderate the relationship between economic development and CO_2 emissions?*' Therefore, this study has several steps. At the first step is to mention summary of experimental studies on the relationship between tourism and environment, after that discusses empirical results, second section present about a conclusion, lastly policy implications and recommendations for future research.

II. DATA

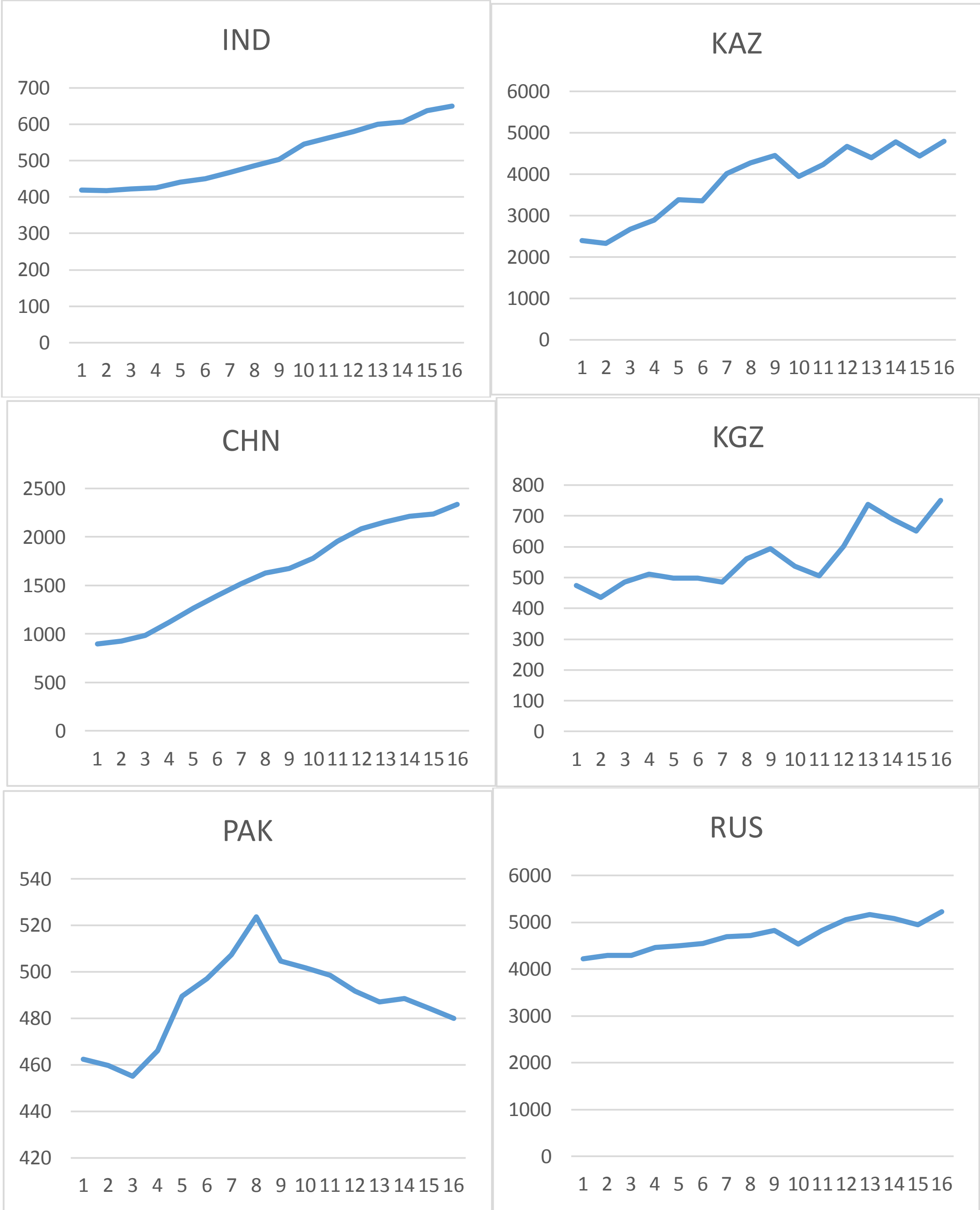
The data is collected for countries, China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, India, Pakistan, Uzbekistan and Iran for the period of 2000-2015 to measure the dynamic impact of tourism on environmental pollution. For the environmental pollution proxy, this paper has considered CO_2 emissions per capita in metric tons. Tourism is the concerned variable, which is the total number of arrivals in the host country per year. And the other explanatory variables of the study include GDP per capita (constant 2010). Also, Openness index used for Degree of economic openness (the overall export and import of GDP) that derived from world bank data. Moreover, Human Development Index is also considered that derived from United Nations Development Programme. In addition, the character of data studied is shown in Table-1.

Table No. 1: description of data studied the period of 2000-2015

Sr. No.	**Country**	**CO2 Emission**		**Tourism**		**GDP**		**Openness**		**HDI**	
		Average	Std error	Average	Std error	Average	Std error	Average	Std error	Average	Std error
1	China	5.259	0.461	48153750	2429281	7951.86	823.73	396.32	51.487		
2	Russia	11.528	0.1730	24725063	1038175	21034.41	1003.78	147.38	6.1581		
3	Kazakhstan	12.585	0.6877	4587813	363328	17881.36	1110.65	194.86	13.316		
4	Kyrgyzstan	1.2526	0.0765	1345750	279152.8	2636.9	95.876	131.58	7.649		
5	Tajikistan	0.3781	0.0207	127003.8	33532.71	1916.06	112.49	87.656	3.0577		
6	Uzbekistan	4.331	0.1529	888814.5	146185.1	3788.53	263.66	137.25	7.514		
7	India	1.2570	0.0682	5604625	828543.1	3852.78	266.062	260.31	29.604		
8	Pakistan	0.88845	0.0191	839827.3	61541.2	4104.91	99.541	159.33	6.957		
9	Iran	7.0486	0.226	2726625	332151.5	16014.18	400.51	86.685	5.349		

Source: Authors' calculation

The chart of CO2 emission of country member in SCO have been show in Figure 1.



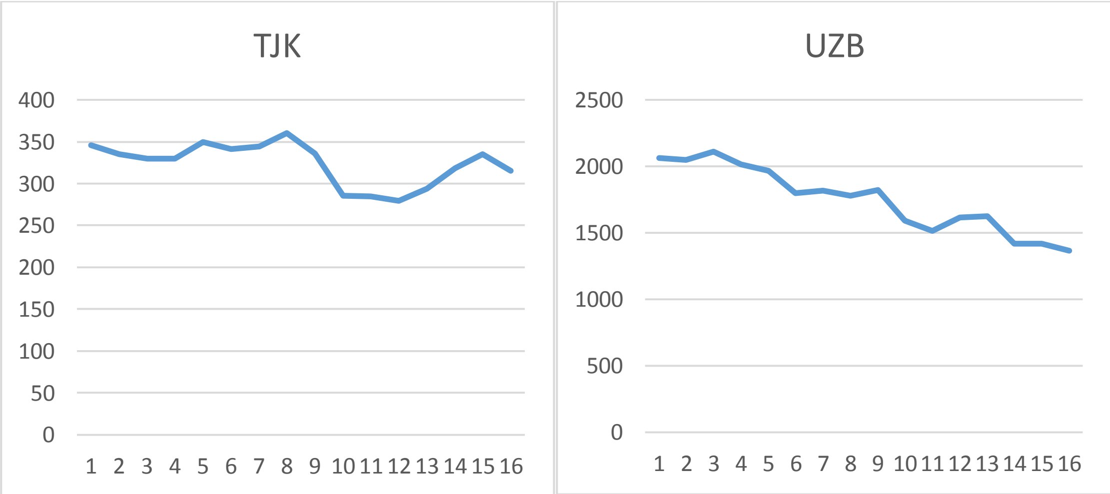


Figure (1): CO2 emission trend of country member in SCO in 2000-2015

As shown in Table-1, all country except Pakistan, CO2 emission has ascending and Uzbekistan has a descending trend in the last 15 years.

III. MODEL ESTIMATION

GMM approach[1]

To analyses the properties of estimators of the parameters in linear dynamic panel data models we consider an autoregressive panel data model of the form

$$y_{it} = \beta' \mathbf{x}_{it} + \lambda_i' \gamma_t + v_{it}\,, \quad (i = 1, \dots , N;\ t = 1, \dots , T) \qquad (1)$$

where β is a $k \times 1$ vector of unknown parameters, and $\mathbf{x}_{it}$ is a $k \times 1$ vector of regressors that can be correlated with λ_i. The regressors can be either strictly or weakly exogenous with regard to v_{it}. Hence, we allow $\mathbf{x}_{it}$ to include a lagged dependent variable $y_{i,\,t-1}$. An $m \times 1$ vector $\lambda_i = (\lambda_{1i}, \dots, \lambda_{mi})'$ denotes the factor loadings and $\gamma_t = (\gamma_{1t}, \dots, \gamma_{mt})'$ denotes the factors. We consider a panel with small T and large N and assume that γ_t are non-random parameters to be estimated, while λ_i are unobserved random variables that can be correlated with $\mathbf{x}_{it}$. Stacking model (1) over time, we have

$$\mathbf{y}_i = \mathbf{X}_i\beta + 0\lambda_i + \mathbf{v}_i. \qquad (2)$$

If individual and time effects are additively included in the model, we can wipe out individual effects by a simple within-group transformation. However, if both effects are in the product form $\lambda'_i\gamma_t$ as in our case, we need to use an alternative method to address the problems associated with this term. Three approaches have been proposed in the literature – namely, the quasi-difference approach by Holtz-Eakin et al. (1988) and Ahn et al. (2001, 2013), the projection approach by Hayakawa (2012), and the approach in Robertson and Sarafidis (2015) – where new parameters associated with the instruments and individual effects are introduced. In this paper, the quasi-difference approach is considered, which is now reviewed, the problem encountered and discussed below applies to the other two approaches as well.

To obtain a consistent estimator of β, Ahn et al. (2013) remove the interactive fixed effects term $\lambda'_i\gamma_t$ by quasi-difference. For the general multiple-factor case, we need to impose m^2 restrictions to identify the factor structure, since $\lambda'_i\gamma_t = (\lambda'_i\mathbf{C})\,(\mathbf{C}^{-1}\gamma_t) = \lambda^{*\prime}_i\gamma^*_t$ for any invertible $m \times m$ matrix $\mathbf{C}$. By assuming that the bottom $m \times m$ matrix of 0 is invertible, Ahn et al. (2013) consider the following restriction:

$$\boldsymbol{\Gamma} = \begin{bmatrix} \boldsymbol{\Psi} \\ \mathbf{I}_m \end{bmatrix}, \qquad (3)$$

Where ψ is a (T-m) * m matrix. In this case the assumption that the bottom M*M matrix is I_m imposes m^2 restrictions that are required for identification. Let us define

$$\boldsymbol{\Xi} = \begin{bmatrix} \mathbf{I}_{T-m} \\ -\boldsymbol{\Psi}' \end{bmatrix}, \qquad \boldsymbol{\Psi}' = [\boldsymbol{\psi}_1, \dots, \boldsymbol{\psi}_{T-m}].$$

Multiplying $\boldsymbol{\Xi}'$ to (2), we have

[1] Blundell and et all

$$\Xi'\mathbf{y}_i = \Xi'\mathbf{X}_i\beta + \Xi'\mathbf{v}_i,$$

Where we used $\Xi'\Gamma = \mathbf{0}$, letting

$$\dot{\mathbf{y}}_i = (y_{i1}, \ldots, y_{i,T-m})', \ \ddot{\mathbf{y}}_i = (y_{i,T-m+1}, \ldots, y_{iT})', \ \mathbf{X} = (\mathbf{x}_{i1}, \ldots, \mathbf{x}_{i,T-m})', \ \mathbf{X} = (\mathbf{x}_{i,T-m+1}, \ldots, \mathbf{x}_{iT})', \dot{\mathbf{v}}_i = (v_{i1}, \ldots, v_{i,T-m})', \text{ and } \ddot{\mathbf{v}}_i = (v_{i,T-m+1}, \ldots, v_{iT})', \tag{4}$$

can be written as

$$\dot{\mathbf{y}}_i = \dot{\mathbf{X}}_i\beta + \Psi\ddot{\mathbf{y}}_i - \Psi\ddot{\mathbf{X}}_i\beta + \dot{\mathbf{v}}_i - \Psi\ddot{\mathbf{v}}_i \ = \dot{\mathbf{X}}_i\beta + (\mathbf{I}_{T-m} \otimes \ddot{\mathbf{y}}_i')\psi - \left(\mathrm{vec}(\ddot{\mathbf{X}}_i)' \otimes \mathbf{I}_{T-m}\right)\mathrm{vec}(\beta' \otimes \Psi) + \dot{\mathbf{v}}_i - \Psi\ddot{\mathbf{v}}_i, \tag{5}$$

Where $\psi = \mathrm{vec}(\Psi')$, the t the equation is given by

$$y_{it} = \beta'\mathbf{x}_{it} + \psi_t'\ddot{\mathbf{y}}_i - \psi_t'\ddot{\mathbf{X}}_i\beta + u_{it}^{qd} \quad (i = 1, \ldots, N; \ t = 1, \ldots, T-m) \tag{6}$$

where $u^{qd}_{it} = v_{it} - \psi'_t \ddot{\mathbf{v}}_i$. Let $\mathbf{z}^{qd}_{it}$ be an $L^{qd}_t \times 1$ vector of instruments satisfying $E(\mathbf{z}^{qd}_{it}v_{it}) = \mathbf{0}$. When $\mathbf{x}_{it}$ is weakly exogenous, $\mathbf{z}^{qd}_{it}$ is composed of current and past values of $\mathbf{x}_{it}$, and when $\mathbf{x}_{it}$ is strictly exogenous, $\mathbf{z}^{qd}_{it}$ is composed of $(\mathbf{x}_{i1}, \ldots, \mathbf{x}_{iT})$. Then, we have the following moment conditions:

$E[\mathbf{z}^{qd}_{it}u^{qd}_{it}] = \mathbf{0}, \quad (t = 1, \ldots, T-m)$

or in a matrix form,

$$E[\mathbf{Z}_i^{qd'}\mathbf{u}_i^{qd}] = \mathbf{0}, \tag{7}$$

Where $\mathbf{Z}_i^{qd} = \mathrm{diag}(\mathbf{z}_{i1}^{qd\prime}, \ldots, \mathbf{z}_{i,T-m}^{qd\prime})$ and $\mathbf{u}_i = (u_{i1}^{qd}, \ldots, u_{i,T-m}^{qd})'$.

Note that $\mathbf{u}^{qd}_i$ depends on unknown parameters $\theta = (\beta', \psi')'$. The one-step nonlinear GMM estimator is defined as

$$\widehat{\theta} = \underset{\theta}{\mathrm{argmin}}\, Q(\theta) \tag{8}$$

$$Q(\theta) = \left(\sum_{i=1}^{N} \mathbf{u}_i^{qd\prime}\mathbf{Z}_i^{qd}\right)\left(\sum_{i=1}^{N} \mathbf{Z}_i^{qd\prime}\mathbf{Z}_i^{qd}\right)^{-1}\left(\sum_{i=1}^{N} \mathbf{Z}_i^{qd\prime}\mathbf{u}_i^{qd}\right) \tag{9}$$

This is the nonlinear GMM estimator proposed by ALS. In practice, we need to use a numerical optimization procedure to obtain θ, which also requires us to choose the starting value. ALS suggest trying several sets of random starting values and choosing the one with a minimized value of the objective function. Specifically, their suggested algorithm is given as follows:

Step1: Generate H starting values $\theta^{(1)}, \ldots, \theta^{(H)}$ from $U(-B, B)$.

Step 2: for each h, (h=1,.., H) using the starting value $\theta^{(h)}$ compute the GMM estimation $\widehat{\theta}^{(h)}$ and the value of object function $Q(\widehat{\theta}^{(h)})$.

Step 3: choose the estimate such that $\widehat{\theta}_{GMM} = \underset{h=1,\ldots,H}{\mathrm{argmin}}\, Q(\widehat{\theta}^{(h)})$.

In practice, large values of *B* and *H* should be used to avoid the local minima. However, this might be cumbersome, especially when the number of parameters is large.

IV. RESULT AND DISCUSSION

Poolability Test

First step for panel model is investigation of poolability test, F-limer and Hausman test is applied, and reported in table2.

Table No. 2: Investigation Poolability test and Hasman test

Test	Test Statistics	P-value	Result
F-Limer	94.39	0.0000	Pooled data
Hausman	16.89	0.0047	Random Effect

Source: Authors' calculation

The F-Limer test rejects null hypothesis and confirmation the pooled data, so Hausman test accepted H1 hypothesis and random effect, too.

Cross Sectional independence

Consider the standard panel-data model according to (De Hoyos and Sarafidis 2006) is:

$$y_{it} = \alpha_i + \beta \, x_{it} + u_{it}, \;\; i = 1, \ldots, N \;\text{ and }\; t = 1, \ldots T \qquad (10)$$

where x_{it} is a $K \times 1$ vector of regressors, β is a $K \times 1$ vector of parameters to be estimated, and α_i represents time-invariant individual nuisance parameters. Under the null hypothesis, u_{it} is assumed to be independent and identically distributed (i.i.d.) over periods and across cross-sectional units. Under the alternative, u_{it} may be correlated across cross sections, but the assumption of no serial correlation remains.
Thus the hypothesis of interest is

$$H_0: \rho_{ij} = \rho_{ji} = \text{cor}\,(u_{it}, u_{jt}) = 0 \qquad \text{for } \; i = j \qquad (11)$$

Versus

$$H_1: \rho_{ij} = \rho_{ji} = 0 \;\text{ for some } \quad i=j$$

where ρ_{ij} is the product-moment correlation coefficient of the disturbances and is given by

$$\rho_{ij} = \rho_{ji} = \frac{\sum_{t=1}^{T} u_{it} u_{jt}}{\left(\sum_{t=1}^{T} u_{it}^2\right)^{1/2} \left(\sum_{t=1}^{T} u_{jt}^2\right)^{1/2}}$$

The number of possible pairings (u_{it}, u_{jt}) rises with N.

Pesaran's CD test

In the context of seemingly unrelated regression estimation, proposed an LM statistic, which is valid for fixed N as $T \to \infty$ and is given by

$$\text{LM} = T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \widehat{\rho}_{ij}^2$$

where ρ_{ij} is the sample estimate of the pairwise correlation of the residuals

$$\widehat{\rho}_{ij} = \widehat{\rho}_{ji} = \frac{\sum_{t=1}^{T} \widehat{u}_{it} \widehat{u}_{jt}}{\left(\sum_{t=1}^{T} \widehat{u}_{it}^2\right)^{1/2} \left(\sum_{t=1}^{T} \widehat{u}_{jt}^2\right)^{1/2}}$$

And $\widehat{u}_{it}$ is the estimate of u_{it} in (10). LM is asymptotically distributed as x^2 with N ($N - 1$). 2 degrees of freedom under the null hypothesis of interest. However, this test is likely to exhibit substantial size distortions when N is large and T is finite—a situation that is commonly encountered in empirical applications, primarily because the LM statistic is not correctly centered for finite T and the bias is likely to get worse with N large.
Pesaran (2004) has proposed the following alternative,

$$\text{CD} = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \widehat{\rho}_{ij} \right)$$

and showed that under the null hypothesis of no cross-sectional dependence CD $\to N\,(0, 1)$ for $N \to \infty$ and T sufficiently large. Unlike the LM statistic, the CD statistic has mean at exactly zero for fixed values of T and N, under a wide range of panel-data models, including homogeneous, heterogeneous dynamic models and nonstationary models. For homogeneous and heterogeneous dynamic models, the standard FE and RE estimators are biased. However, the CD test is still valid because, despite the small-sample bias of the parameter estimates, the FE.RE residuals will have exactly mean zero even for fixed T, provided that the disturbances are symmetrically distributed.
For unbalanced panels, Pesaran (2004) proposes a slightly modified version of above, which is given by

$$\text{CD} = \sqrt{\frac{2}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \sqrt{T_{ij}}\, \widehat{\rho}_{ij} \right)$$

where $T_{ij} = \#(T_i \cap T_j)$ (i.e., the number of common time-series observations between units *i* and *j*),

$$\widehat{\rho}_{ij} = \widehat{\rho}_{ji} = \frac{\sum_{t\in T_i\cap T_j}\left(\widehat{u}_{it} - \overline{\overline{u}}_i\right)\left(\widehat{u}_{jt} - \overline{\overline{u}}_j\right)}{\left\{\sum_{t\in T_i\cap T_j}\left(\widehat{u}_{it} - \overline{\overline{u}}_i\right)^2\right\}^{1/2}\left\{\sum_{t\in T_i\cap T_j}\left(\widehat{u}_{jt} - \overline{\overline{u}}_j\right)^2\right\}^{1/2}}$$

And

$$\overline{\overline{u}}_i = \frac{\sum_{t\in T_i\cap T_j}\widehat{u}_{it}}{\#(T_i\cap T_j)}$$

The modified statistic accounts for the fact that the residuals for subsets of *t* are not necessarily mean zero.
The result of Pesaran’s is shown in table (3).

Table No. 3: Result of pesaran's test of cross sectional independence

Test	Test Statistics	P-value
Pesaran	-0.411	0.6809

Source: Authors' calculation

It is evident that the CD test strongly accept the null hypothesis of cross-sectional dependence.

Unit Root

In statistics, a unit root test tests whether a time series variable is non-stationary and possesses a unit root. The null hypothesis is generally defined as the presence of a unit root and the alternative hypothesis is either stationarity, trend stationarity or explosive root depending on the test used. Unit roots including of IPS[2], Breitung[3] and LLC[4] reported in table 4.

Table No. 4 Result of unit root tests from countries in SCO for 2000-2015

Variable	IPS		Breitung		LLC	
	level	First dif	level	First dif	level	First dif
Co2 Emission	-1.6257 [0.0520]	-6.5605 [0.0000]	0.76369 [0.7775]	-4.8334 [0.0000]	-2.5557 [0.0053]	-4.1877 [0.0000]
GDP	-2.1477 [0.0159]	-7.0785 [0.0000]	1.06584 [0.8568]	-5.1026 [0.0000]	-2.3678 [0.0089]	-5.0987 [0.0000]
Tourism	1.3047 [0.9040]	-4.9131 [0.0000]	2.4056 [0.9919]	-5.1516 [0.0000]	-1.5304 [0.0630]	-6.9418 [0.0000]
HDI	0.0906 [0.5361]	-3.0633 [0.0011]	7.4137 [1.0000]	-2.4089 [0.0080]	-4.0181 [0.0000]	____
Openness	-2.6631 [0.0039]	____	2.2822 [0.9888]	-5.3081 [0.0000]	-7.0157 [0.0000]	____

Source: Authors' calculation

Here we find overwhelming evidence the null hypothesis of a unit root and therefore conclude that all variable (except HDI in LLC test and Openness in IPS test) are non-stationary. Variables be stationary with the first difference.

Cointegration Test

The use of cointegration techniques to test for the presence of long-run relationships among integrated variables has enjoyed a growing popularity in the empirical literature.

Table No. 5: Result of cointegration test from countries in SCO for 2000-2015

Pedroni Test	Test Statistics	P-value
Modified Philiips-perron t	2.6679	0.0038
Phillips-Perron t	-3.5600	0.0002
Augment Dickey-Fuller t	-3.3787	0.0004

Source: Authors' calculation

2. Im–Pesaran–Shin test
3. Breitung and Das test
4. Levin–Lin–Chu test

The null hypothesis of no cointegration is rejected. This is true for the three statistical tests reported in the table and provides strong evidence that all panels in the data are cointegrated.

GMM Model
In this section, the results of GMM method of Shanghai cooperation Organisation's member are shown.

Table No. 6: Result of estimation Generalized Method of Moments (GMM)

Variable	Coefficient	Std. Err
CO2 emission(-1)*	0.6352	0.0668
Cons**	-14.149	9.0522
GDP*	0.0614	0.0302
Tourism*	0.0559	0.0151
Openness**	-0.0265	0.0391
HDI*	40.700	16.118
Sargan Test	Chi2=87.41 [0.3489]	
Wald Chi2=397.39	prob= 0.000**0**	

Source: Authors' calculation. * and ** indicate 5% & 20% significance level respectively

The coefficients are reported in table 6, GDP is significant and has a positive impact on CO_2 emission, this means that, with increase GDP variable, CO_2 emission will increase, too. Tourism has the positive effect and is significant. With increase in a unit of tourism, dependent variable increased by 0.05 percent. Openness isn't significant. HDI is significant and has a positive effect. When HDI index increased by a unit, there 40.7 percent increase dependent variable. The Wald test can be used to test the true value of the parameter based on the sample estimate. In the above table, the Wald test is significant, so the model is acceptable. The Sargan test is based on the assumption that model parameters are identified via a priori restrictions on the coefficients and tests the validity of over-identifying restrictions. The null hypothesis, which indicates the reliability of the instrument variables in this estimate, is confirmed.

V. THE EFFECT OF SCO ON IRAN VARIABLES AFTER MEMBERSHIP

In the last section, the average value of the variables of Iran's economy are entered in SCO's GMM equation. As shown in table 7, Iran after membership; GDP, tourism, and openness have negative impact. But, HDI index is increased by 39.7 percent.

Ta**ble No. 7:** The Effect of variable studied after joining the Shanghai Cooperation Organisation in Iran

variable	Average	Value	Description
GDP	15308.4	939.936	-93.85%
Tourism	2726625	152418.34	-94.41%
Openness	86.6855	2.29716	-97.35%
HDI	0.72212	29.3904	+39.70%

Source: Authors' calculation

VI. CONCLUSION AND SUGGESTION

The aim of this paper is to test existing theories and examine that do tourism and GDP factors moderate the relationship between economic development and CO_2 emissions in SCO member and effect those on CO_2 emission in Iran after membership. Shanghai Cooperation Organization includes eight countries such as China, Russia, Pakistan, India, Kazakhstan, Kyrgyzstan, Uzbekistan and Tajikistan. This paper has used data for the period of 2000-2015 to measure the dynamic impact of GMM method of tourism on environmental pollution. The variables are CO_2 Emissions, Tourism, GDP, and Openness Index that derived from World Bank data base. Moreover, this paper has considered Human Development index, which is been derived from United Nations Development Programme data base.

The results show that GDP is significant and has positive impact on CO_2 emission, it means that, with increase in GDP, CO_2 emission will increase. Tourism also has positive impact and is significant. With increase in one unit of tourism, dependent variable increased by 0.05 percent. Openness isn't significate, as most of countries are developing countries in Shanghai Cooperation and can't export good or service to other countries. But Russia and China have strong economies and trade flow is higher from China and Russia to another country of SCO. Most of this trade is kind of humanitarian help. HDI is significant and has positive impact. With one unit increase in HDI index, there is 40.7 percent increase in dependent variable. One section of HDI index is a decent standard of living (GNI per capita). It is evident that when production increases then CO_2 emission is also increasing. It is also evident that HDI index causes CO_2 emission to increase. As discussed, there are abundant studies about environmental pollution, but there is need of comprehensive study that presents some path to control environmental pollution and focuses on other factors such as tourism, GDP and etc. Within the framework of the findings of this study, Iran should pay more attention to environmental policies and must focus on economic development with the improvement in the quality of the environment in future policies.

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