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Impact of Green Growth Factors on Foreign Direct Investment: Evidence from Central Asia

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ABSTRACT

One of the pressing issues in developing countries with abundant mineral resources is the impact of foreign investment on economic development without harming the environment. The purpose of this research is to assess the impact of CO_2 emissions from Industrial Processes, electricity production oil, gas and coal sources, and Oil price indicators, among the green growth factors, on foreign direct investment in Central Asian countries (Kazakhstan, the Kyrgyz Republic, and Uzbekistan). For this purpose, statistical data for the period 1998-2023 were obtained from the World Data Bank database. The pooled mean group-autoregressive distributed lag (PMG-ARDL) methodology was applied. The model results showed the cumulative impact of these factors for Central Asia. When testing the model for each country separately, a statistically significant impact of the factors was revealed. Since all three countries are sufficiently rich in natural resources, priority should be given not only to effectively develop mineral resources, but also to minimize damage to nature and protect it. In this regard, the authors shared a number of recommendations in the concluding section.

Keywords: CO_2 Emissions, Electricity Production, Foreign Direct Investment, Oil Price, Central Asia
JEL Classifications: F21, Q01, Q57

1. INTRODUCTION

FDI has a causal effect on one another and is one of the indicators and drivers behind the globalization process (Pekarskiene and Susniene, 2015; Sarbu, 2015; Aluko et al., 2020). In theory, FDI brings technologies, increases employment, increases competition in the domestic market, improves the quality of human capital (Satybaldin et al., 2020), and brings many other benefits, however the immorality of investors and the irresponsibility of governments., can lead to social and environmental problems (Lokesha and Leelavathy, 2012; Mahbub, 2023; Long, 2024; Singh and Thalore, 2024; Dunning, 1980) identified 4 types of investors: Market seekers, resource seekers, efficiency seekers and asset seekers. Yet, FDI should not just be seen in a good light; it can also have negative repercussions, such as environmental neglect, the exclusion of local small producers from the market, the development or escalation of technological and economic reliance, and the exploitation of natural resources. Here, the effectiveness of the legal system in the nation receiving FDI, the lack of corruption, and the capacity of the government to carry out its duties to the populace are crucial.

Investors consider a number of factors when deciding which market to invest in. For example, countries with abundant mineral resources (Poelhekke and Van der Ploeg, 2013; Kamal et al., 2019; Kemmanang et al., 2021), countries with cheap labor (Bellak et al., 2008; Lai and Sarkar, 2011; Bayraktar-Sağlam and Sayek Böke, 2017; Lei et al., 2021), supportive policies by states (Chunlai, 2012; Nguyen et al., 2018), incentives provided to investors (Kiptoo, 2024; Thakkar, 2024), etc. Aside from what has already been mentioned, another crucial point is being made, which is that eco-friendly policies, green growth, and sustainable environmental development are all very vital because human activity is causing the environment to deteriorate annually. Teaching the next generation, the value of the green economy will also demonstrate its efficacy in the long run (Ketenci and Nurmukhanova, 2024). It's critical to keep an eye on whether foreign investment improves or degrades a nation's environment, as well as which industries are most interested in receiving these investments. Most of the time, investments have a detrimental effect on green growth even though they are drawn in for economic expansion (Wang et al., 2021; Friedt and Toner-Rodgers, 2022). Both the investor's and the host nation's values will determine this. The world is becoming more and more persuaded that ignoring climate change and concentrating solely on economic development is not the best course of action. The best circumstances for guiding FDI toward a green economy must be established in order to reduce environmental harm (Tleppayev and Zeinolla, 2020; Vu, 2025).

Thus, our paper aimed to analyze impact of CO_2 emissions from Industrial Processes, electricity production oil, gas and coal sources, Oil price on Foreign direct investment in Kazakhstan, Kyrgyz Republic and Uzbekistan countries.

The paper consists of Introduction, Literature review, Methodology and materials, Empirical results and discussion.

2. LITERATURE REVIEW

Foreign direct investment (FDI) inflows have the potential to jeopardize the continent's climate despite their promises of wealth creation, increased productivity, and better living conditions. This is especially true given the energy intensity and related emissions linked to their growth (Ali et al., 2024). The hypothesis that return potentials are the primary determinant of FDI placement decisions is slightly supported by the sensitivity of FDI inflows to a region's degree of climate risk vulnerability (Fagbemi and Oke, 2024). There are some evidences (Wani et al., 2024; Ketchoua et al., 2024) that green energy and FDI positively contribute to green growth. One of the first sectors to see widespread international foreign direct investment (FDI) was the energy sector. As a result, the industry was among the first to adopt legislation governing foreign direct investment (GCR, 2024). However, there is a big gap on literature related to study of access to energy and FDI (Nguea et al., 2022; Aluko et al., 2023; Rath et al., 2024) studied relationship between energy use and FDI in emerging economies and found it to be positive. Khatun and Ahamad (2015) examined the connection between foreign direct investment (FDI) in the energy and power industry and Bangladesh's economic expansion between 1972 and 2010. Hlongwane et al. (2023) examined link between electricity consumption and FDI in south Africa. Based on results, authors suggest the policymakers to revise the energy policy to attract more foreign investment. Barteková and Ziesemer (2019) studied the impact of electricity prices on FDI on 27 EU countries and revealed high electricity prices reduce the attractiveness of the country to FDI. Odongo (2024) studied causal relationship between electricity consumption and FDI inflows for period of 1978-2018.

Based on the results of the study, author recommends FDI toward to manufacturing sector should be increased. Swart and Van Noije (2024) investigated electricity poverty in Brazil and ways of solving it with help of FDI. Results showed that private investment had positive impact on electricity consumption. Demand for electrification is unavoidable since it is a necessary component of urbanization, yet it is not uniformly spread in this country. The authors suggest that the government should have strong supervision over investments pertaining to the energy sector. Study results of Xia et al. (2025) demonstrated that FDI increases energy production from renewable sources in medium and long run. Using GMM model, Sha (2023) analysed the relationship between globalisation, foreign direct investment, and natural resource rent on economic recovery for the G7 nations between 2000 and 2020 and found that green economic growth was positively impacted by FDI. Wai Mun et al. (2024) have investigated the relationship between FDI and economic growth in Malaysia for the period 1970-2005 using Ordinary least square (OLS) regressions and revealed positive relationship between the FDI and economic growth. Zhang et al. (2024) showed that in Chinese provinces, inflows and outflows of FDI are positively correlated with economic growth. They examined 29 provinces of the country over the period 2003-2021, applying panel data. Since developing nations are viewed as pollution havens because of their lax environmental restrictions, FDI flows from developed to developing nations may result in a rise in carbon emissions in those nations (Apergis et al., 2023).

Using econometric research and comparative case studies, El Atmani et al. (2025) examined the comparatively different environmental consequences of Green Foreign Direct Investment (Green FDI) and Traditional FDI in Morocco. They analyzed CO_2 emissions, water use, and trash in 14 Moroccan economic sectors using data from panels from 2010 to 2024. In order to integrate FDI with the Sustainable Development Goals, authors make policy recommendations for Morocco's FDI framework, focusing on improved monitoring technology, unique incentives, and governance reforms. In their study Gök et al. (2024) have proven that increases in CO_2 emissions reduce foreign direct investment in nations with strict environmental restrictions. Having studied relationship between FDI, CO_2 emissions and economic growth in south Asian countries, Bekun et al. (2024) concluded that to prevent dirty growth, governments should proactively direct FDI to green initiatives. Using balanced panel data from the BRICS, Lee et al. (2021) empirically examined the sustainable relationships between CO_2 emissions, the R&D expenditure ratio, inbound FDI, and outward FDI. Results demonstrated that FDI inflows increase CO_2 emissions.

3. METHODS

We will examine and explain the relationship between FDI and the energy factors that affect them, drawing on the research review presented in the previous section. In this instance, the following formula determines FDI:

$$FDI_t = \beta_0 + \beta_1 \cdot CO2EIP_t + \beta_2 \cdot EPOGCS_t + \beta_3 \cdot BCOP_t + \varepsilon_t, \quad (1)$$

Where all their definitions and dimensions are shown in Table 1 below.

Table 1: Model variables and data sources

Variables	Definitions	Sources
FDI	Foreign direct investment, net inflows (% of GDP)	World Development Indicators (WDI) (2025)
CO_2EIP	Carbon dioxide (CO_2) emissions from Industrial Processes (Mt CO_2e)	World Development Indicators (WDI) (2025)
EPOGCS	Electricity production from oil, gas and coal sources (% of total)	World Development Indicators (WDI) (2025)
BCOP	Average annual Brent crude oil price, U.S. dollars per barrel	Statista (2025) https://www.statista.com/statistics

Source: Compiled by authors

During the study, the results of the ADF test show that the studied variables are stationary at the level I(0) or first differences I(1) (Table 4). Therefore, the pooled mean group-autoregressive distributed lag (PMG-ARDL) model was used for the methodology to study the linear relationship using data from selected countries of Central Asia. The main advantage of the linear ARDL model is its ability to isolate positive and negative shocks. In addition, linear autoregressive distributed lag (ARDL) is used to analyze asymmetric relationships between dependent and independent variables in long and short periods.

The linear panel form of long-term and short-term asymmetries between the considered variables is expressed in equation 2:

$$FDI_t = \beta_0 + \sum_{k=1}^{m} \beta_1 \; CO2EIP_{t-k} + \sum_{k=0}^{n} \beta_2 EPOGCS_{t-k} + \sum_{k=0}^{p} \beta_3 BCOP_{t-k} + \gamma_1 CO2EIP_{t-i} + \gamma_2 EPOGCS_{t-i} + \gamma_3 BCOP_{t-i} + \varepsilon_t \quad (2)$$

4. DATA AND FINDINGS

4.1. Data

The impact of the primary energy determinants on net foreign direct investment (FDI) inflows to Central Asia is taken into account in this study. The sample group for the study's analytical section includes Kyrgyz Republic, Uzbekistan, and Kazakhstan. Turkmenistan and Tajikistan were not included in the analysis since some statistical data were unavailable for them. Using World Bank data (WDI), www.statista.com, panel data for three nations from 1992 to 2023 were gathered. The study's explanatory variables include the average yearly price of Brent crude oil, electricity generated from coal, gas, and oil sources, and carbon dioxide (CO_2) emissions from industrial processes.

All of indicator's definitions and measurements are given in the Table 1 below.

Dynamics of changes of all considered indicators, presented in the table, for the period 1992-2023. presented in the following graph:

Graph 1 shows the dynamics of indicators in 3 countries. Changes in the stock of FDI for these countries and BCOP show significant fluctuations. The information obtained from the trend in the figure is that the share of net inflows of foreign direct investment in Kazakhstan until 2010 was higher than in other countries. During the period of the COVID-19 pandemic, all countries experienced a significant decrease in FDI. It is obvious that Uzbekistan experienced negative net FDI practically during the entire period of the global pandemic. It is understood that during the COVID-19 pandemic, there is a greater outflow of FDI than inflow of FDI into the economy of Uzbekistan. Average annual Brent crude oil price also fell during the pandemic.

Table 2: Values of descriptive statistics of the displayed series

Values	FDI	CO_2EIP	EPOGCS	BCOP
Mean	3.964502	5.113879	63.62248	53.98875
Median	2.900226	4.676750	87.18972	53.28500
Maximum	17.13123	15.40110	92.96134	111.6300
Minimum	−4.854847	0.176500	6.520306	12.80000
Standard deviation	3.862701	4.227283	35.61578	32.04229
Skewness	1.047187	0.609513	−0.723726	0.379311
Kurtosis	3.910966	2.530470	1.570250	1.855538
Jarque-Bera	20.86504	6.825931	16.55720	7.541202
Probability	0.000029	0.032943	0.000254	0.023038
Sum	380.5922	490.9324	6107.758	5182.920
Sum square deviation	1417.443	1697.643	120506.0	97537.28
Observations	96	96	96	96

Source: Author's calculation

Table 3: Correlation matrix of variables

	FDI	CO_2EIP	EPOGCS	BCOP
FDI	1	0.0157581	−0.0406237	0.1182594
CO_2EIP	0.0157581	1	0.7767996	0.2999631
EPOGCS	−0.0406237	0.7767996	1	−0.0155291
BCOP	0.1182594	0.2999631	−0.0155291	1

Source: Author's calculation

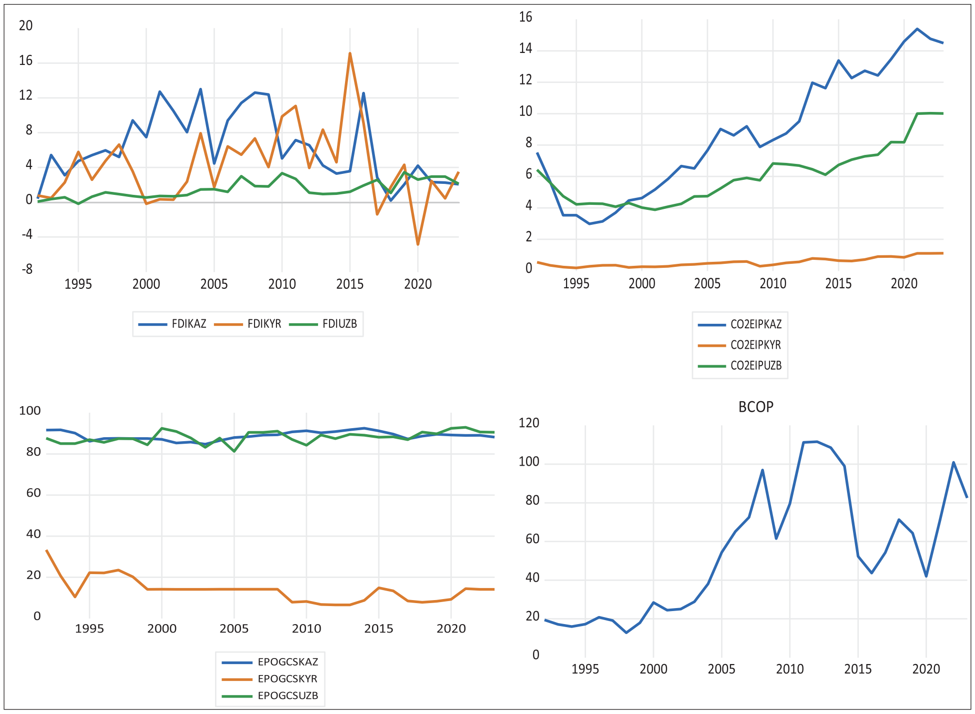
As for Carbon dioxide (CO_2) emissions, there is significant heterogeneity between countries. In addition, the data show that high CO_2EIP is observed in Kazakhstan, while minimal emissions are stable in Uzbekistan. However, countries such as Kazakhstan and Kyrgyz Republic have significantly increased their emissions. Graph 1 illustrates Electricity production from oil, gas and coal sources (% of total) in Central countries. Analysis of trends shows significant differences in electricity production between the countries of Kazakhstan and Kyrgyz Republic, which is due to different levels of economic development, structural industry and availability of energy resources. A % of total Electricity production differs greatly from Kazakhstan and Uzbekistan.

From the analysis of the graph shown in Graph 1, it is clear that the studied variables are suitable for analysis. The graph shows obvious, consistent and stable temporal regularities, which indicates that changes in variables are suitable for further study.

4.2. Descriptive Statistics

Table 2 shows some descriptive statistics of variables, including mean, maximum and minimum values, asymmetry and excess,

Graph 1: Evolution of all variables in central Asia (1992-2023)



Source: Compiled by authors

Table 4: ADF unit root tests

Variables	Intercept			Trend and intercept			None		
	Level	First difference	Order of integration	Level	First difference	Order of integration	Level	First difference	Order of integration
FDI	10.70* (0.098)	62.483 (0.000)	I(0)	9.443 (0.150)	51.72*** (0.000)	I(1)	8.249 (0.220)	86.905 (0.000)	I(1)
CO_2EIP	0.348 (0.999)	35.68*** (0.000)	I(1)	19.04*** (0.004)	26.124 (0.000)	I(0)	0.377 (0.999)	43.842*** (0.000)	I(1)
EPOGCS	14.1** (0.029)	53.25*** (0.000)	I(0)	15.12** (0.019)	41.97*** (0.000)	I(0)	4.761 (0.575)	79.334*** (0.000)	I(1)
BCOP	5.455 (0.487)	49.6*** (0.000)	I(1)	5.385 (0.495)	38.00*** (0.000)	I(1)	3.371 (0.761)	68.82*** (0.000)	I(1)

1) *, **, *** denote statistically significant at the 10%, 5% and 1% levels, respectively P-value is inside brackets
Source: Author's calculation

Table 5: Selection order criteria

PMG ARDL (3, 3, 3, 3)						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	−207.5427	NA	20.29916	5.848408	5.943270	5.886173
1	−193.9350	25.70337	14.30248	5.498195	5.624677	5.548548
2	−191.3060	4.892912*	13.67120	5.452945	5.611047*	5.515886
3	−189.3819	3.527471	13.32692*	5.427276*	5.616998	5.502805*

Source: Author's calculation

and, finally, to check the normality of the statistical distribution of variables, the Jarque-Bera statistic.

According to the descriptive statistics, the mean FDI and CO_2EIP are 2.900226% of GDP and 4.676750 Mt CO_2e, respectively, and the standard deviations are 3.862701 and 4.227283. Jarque-Bera statistics are 20.86504 and 6.825931 respectively, the probability of connection is 0.000029 and 0.032943. Median EPOGCS and BCOP are 87.18972% of total production and 53.28500 U.S. respectively. Dollars per barrel. Table 2 shows that for all considered indicators, except for EPOGCS, the coefficient of Skewness of time series is >0, that is, they have the correct asymmetry. From the point of view of the standard deviation, the most pronounced volatility is observed in the EPOGCS variable, which indicates a higher degree of variability, while FDI shows the lowest volatility. Standard deviations of all variables are below their respective mean values. This indicates that they are suitable for evaluation purposes.

4.3. Correlation Matrix

Multicollinearity is a frequent defect in econometric modeling that compromises the robustness of findings derived from appropriate estimations.

Table 3 was created in order to test for multicollinearity. The explanatory variables' correlation coefficients are found to be less than 0.9. With a coefficient of 0.7767996, the relationship between EPOGCS and CO2EIP has the highest level. This indicates that the two variables have a somewhat positive association. When estimating the model, the coefficients typically offer significant relief from multicollinearity problems.

4.4. Unit Root Test

A test for the stability condition of the data series contained in the model is the first step in the empirical assessments for this project. The unit root tests of ADF are employed. Some of the variables employed in the model analysis appear to be stationary at levels, while others are at first difference, according to the unit root test results. I(0) and I(1) variable combinations make up the variables.

Table 4 presents the results of the Augmented Dickey-Fuller (ADF) unit root test for the level and first-differenced series. ADF tests the non-stationary null hypothesis, which is rejected if prob is greater than the absolute critical values of 1%, 5%, and 10%. The unit root results are consistent with the initial assumptions, which

Table 6: Pedroni cointegration test

Test	Statistic	Probability
Within-dimension		
Panel v-statistic	0.464244	0.3212
Panel rho-statistic	−2.918905***	0.0018
Panel PP-statistic	−3.151955***	0.0008
Panel ADF-statistic	−1.592310*	0.0557
Between-dimension		
Group rho-statistic	−2.685800***	0.0036
Group PP-statistic	−4.013114***	0.0000
Group ADF-statistic	−1.585628*	0.0564

1) Coefficients which null hypothesis is rejected at ***1%, **5%, *10% level of significance.
2) Compiled by the authors

Table 7: Johansen cointegration

Hypothesized No. of CE(s)	Fisher statistic* (from trace test)	Probability	Fisher statistic* (from max-eigen test)	Probability
None	43.95***	0.0000	28.52***	0.0001
At most 1	22.31***	0.0011	13.03**	0.0425
At most 2	15.52**	0.0166	12.37*	0.0543
At most 3	10.56*	0.0930	10.56*	0.0930

1) Coefficients which null hypothesis is rejected at ***1%, **5%, *10% level of significance.
2) Compiled by the authors

Table 8: PMG-ARDL(3, 3, 3, 3) estimation FDI (1992-2023)

Dependent variable: Δ FDI				
Variable	Coefficient	Standard error	t-statistic	Probability
Long run				
CO_2EIP	−12.05868***	3.340963	−3.609344	0.0006
EPOGCS	0.261984***	0.065976	3.970888	0.0002
BCOP	0.141593***	0.024040	5.889833	0.0000
Short run				
COINTEQ01	−0.454503	0.235712	−1.928208	0.0573
Δ(FDI[−1])	−0.318884	0.191912	−1.661611	0.1021
Δ(FDI[−2])	−0.311086**	0.093005	−3.344835	0.0015
Δ(CO_2EIP)	2.684588	2.468292	1.087630	0.2813
Δ(CO_2EIP[−1])	−0.101024	1.373940	−0.073529	0.9416
Δ(CO_2EIP[−2])	4.727518	4.880224	0.968709	0.3368
Δ(EPOGCS)	−0.483213	0.578229	−0.835678	0.4068
Δ(EPOGCS[−1])	−0.130307	0.180378	−0.722410	0.4730
Δ(EPOGCS(−2))	0.039010	0.054724	0.712854	0.4788
Δ(BCOP)	−0.045845	0.038631	−1.186747	0.2403
Δ(BCOP[−1])	−0.031182	0.033824	−0.921898	0.3605
Δ(BCOP[−2])	−0.017921	0.057583	−0.311214	0.7568

1) Coefficients are statistically significant at ***1%, **5%, *10% level of significance.
2) Compiled by the authors

Table 9: Cross-country short-run estimates for net inflows of Foreign direct investment

Variables	Country		
	Kazakhstan	Kyrgyz republic	Uzbekistan
ECT	−0.558377*** (0.0002)	−0.800797*** (0.0001)	−0.004333*** (0.0008)
CO_2EIP	−0.307513 (0.4823)	0.810175 (0.9916)	0.693424*** (0.0023)
EPOGCS	−0.066716 (0.7784)	0.221014** (0.0046)	−0.052768*** (0.0001)
BCOP	−0.042859*** (0.0000)	−0.053208*** (0.0002)	−0.004792*** (0.0000)

1) Coefficients are statistically significant at ***1%, **5%, *10% level of significance.
2) Compiled by the authors

requires the use of the ARDL model test to confirm the existence of long-run relationships between FDI in Central Asia and the explanatory economic factors proposed in the study.

4.5. Selection Order Criteria

The long-term link between the chosen variables and FDI for Central Asia is investigated in this study using the ARDL bounds testing approach. Determining the lag duration requirement is crucial before doing the cointegration test. To investigate the long-term relationship between the variables, the ARDL method was selected. LR, FPE, AIC, SC, and HQ are used to determine the lag duration criterion. Table 5 shows that because it had more stars and was utilized throughout the study, the lag duration of 3 was selected.

4.6. Panel Co-Integration Test

Table 6's Pedroni cointegration test determines whether cointegration exists by evaluating whether the variables show a consistent long-term connection. The findings offer a thorough evaluation of the panel's long-term equilibrium characteristics and are shown for both within-dimension and between-dimension statistics. According to the within-dimension analysis, the null hypothesis that there is no cointegration cannot be rejected at standard significance levels, as indicated by the panel v-Statistic of 0.464244 and the corresponding probability of 0.3212. However, the null hypothesis is rejected and the presence of cointegration is assumed for the panel rho-Statistic −2.918905, which has a probability of 0.0018; the panel PP-statistic (−3.151955); and the panel ADF-statistic (1.592310), which has a corresponding probability of 0.0008 and 0.0557.

In the between-dimension analysis the group rho-Statistic −2.685800 with a probability of 0.0036, the group PP-Statistic (−4.013114) and the group ADF-Statistic (−1.585628) are significant, which confirms the rejection of the null hypothesis. Overall, the significance of the group ADF-Statistic, the group PP-Statistic and the group rho-Statistic provides strong evidence that the variables share a long-run equilibrium relationship, confirming that they are cointegrated. This means that despite potential short-run fluctuations, CO_2EIP, EPOGCS, BCOP and FDI move together over time, strengthening the validity of long-run economic relationships between these variables.

The Johansen cointegration test assesses whether there is a long-run equilibrium relationship between the variables by assessing multiple cointegration ranks. This test uses two key statistics: The trace test and the maximum eigenvalue test, which successively test the number of cointegrating relationships in the data set. Table 7 presents the results of Johansen's cointegration analysis. The null hypothesis of no cointegration is rejected because both the trace test (43.95) and the maximum eigenvalue test (28.52) give significant results at the 1% level.

This suggests the presence of at least one cointegrating relationship between the variables. When testing at most one cointegrating relationship, the trace test (22.31) remains significant at the 1% level, while the maximum eigenvalue test (13.03) shows a weaker significance level, at approximately 5%. This provides moderate evidence for the presence of a second cointegrating vector. Similarly, for at most two cointegrating relationships, the trace test (15.52) is significant at the 5% level, while the maximum eigenvalue test (12.37) remains marginally significant at the 10% level. This suggests the possible existence of a third long-run relationship. Finally, when testing a maximum of three cointegrating relationships, both the trace test (10.56) and the maximum eigenvalue test yield highly significant results ($P < 10\%$), supporting the rejection of the null hypothesis.

These findings offer compelling proof of several long-term equilibrium linkages between the variables under study.

4.7. Results of PMG-ARDL

Following the initial research, the FDI model's empirical findings are shown. Both EPOGCS and BCOP have a long-term favorable effect on net inflows of foreign direct investment in Central Asia, as Table 8 demonstrates. While both factors raise FDI, EPOGCS (0.261984) has a stronger effect than BCOP (0.141593). Additionally, the variable CO_2EIP (−12.05868) helps to lower FDI.

FDI in Central Asia has a negligible and unfavorable short-term association with the explanatory factors. The absence of a noticeable short-term impact, however, indicates that these investments require time to yield quantifiable financial gains. Since investments are required for sustainable economic growth but do not necessarily result in immediate financial advantages, the significance of FDI(−2) and the coefficient of −0.311086 further demonstrate that it will take time. The cointegration coefficient, which represents the error correction term, shows a substantial negative value of −0.454503, indicating that there is a long-term association between FDI and the explanatory factors.

The PMG-ARDL (3, 3, 3, 3) model's coefficients are shown for each nation in Table 9, providing insight into the unique impacts that are suited to each nation's circumstances. The long-term equilibrium relationship between all explanatory variables is shown in this table by ECT, which likewise has substantial negative coefficients of −0.558377, −0.800797, and −0.004333, respectively. FDI is significantly impacted negatively by BCOP for Kazakhstan (−0.042859); Kyrgyz Republic and Uzbekistan also have large negative BCOP coefficients (−0.053208 and −0.004792, respectively). There is a contrasting effect for another variable, EPOGCS; in Kyrgyz Republic, it significantly increases FDI (0.221014), but in Uzbekistan, the link between EPOGCS and FDI is negative (−0.052768).

The coefficient for CO_2EIP is significant only in Uzbekistan (0.693424), and has a positive impact on FDI.

5. CONCLUSION

This article assesses the impact of key factors for green growth, i.e. the impact of CO_2 emissions from Industrial Processes, electricity production, oil, gas and coal sources, and oil price variables on foreign direct investment in Central Asian countries, namely Kazakhstan, the Kyrgyz Republic and Uzbekistan. The indicators of these parameters for the years 1998-2023 were taken out of the database for this purpose. The Pooled Mean Group-Autoregressive Distributed Lag (PMG-ARDL) approach was employed for this aim. The model's findings indicate that CO_2 emissions from industrial processes have a detrimental long-term effect on foreign direct investment in Central Asia when considered as a whole. Electricity production from oil, gas, and coal sources, as well as the price of oil, have a long-term positive influence on the production of power. Oil price has a negative short-term influence on FDI in Kazakhstan, according to a calculation of the factors' short-term effects on foreign direct investment by nation. However, while Oil prices have a short-term negative impact on Kyrgyz Republic's foreign direct investment inflows, Electricity output from oil, gas, and coal sources has a short-term beneficial influence. However, Uzbekistan's foreign direct investment inflows are positively impacted in the short run by CO_2 emissions from industrial processes, while the short-term effects of electricity production from oil, gas, and coal sources, as well as oil prices, are negatively impacted.

5.1. Some Policy Implications

Central Asia is a vast landmass, rich in natural resources. In addition, the beauty of its nature has captivated many. All three countries of Kazakhstan, the Kyrgyz Republic, and Uzbekistan should tighten laws and regulations in this area in order to preserve ecological integrity and minimize environmental damage. In addition, stimulating domestic production will also significantly reduce the economy's dependence on foreign investment. Although it is clear that developing countries with abundant mineral resources are interested in attracting foreign investment, we believe that by thoroughly analyzing the damage to the environment and tightening the requirements for foreign investors in this regard, we can support green growth, preserve the nature of our homeland, and protect the health of the population to some extent.

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