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Article

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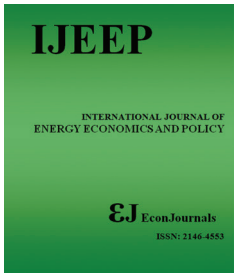

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Analyzing the Impact of Inward FDI and Economic Growth on CO_2 Emissions of Ukraine

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ABSTRACT

The study investigated the impact of foreign direct investment and economic growth, upon carbon emissions of Ukraine. The annual data for the study has been extracted from the World Bank Development Indicators for the period 1990 to 2019. The study variables are foreign direct investment, economic growth, and carbon emissions. We started our analysis based on the autoregressive distributed lag (ARDL) model as being use quite extensively in the existing literature. However, we faced the issue of multicollinearity, then we applied the Ordinary Least Square technique and system generalized method of moments as alternative estimation techniques. The main analysis is based on the Ordinary Least Square technique, whereas robustness has been carried out under the system's generalized method of moments. Both estimation techniques confirmed the significant and positive relationship between our study's variables. The results indicate that in Ukraine the inflows of foreign direct investment and economic growth have led to higher carbon emissions.

Keywords: Inward FDI, Economic Growth, CO_2 Emissions, Ukraine.
JEL Classifications: P18, F63.

1. INTRODUCTION

Over the past few decades, the world has been facing the two most critical issues namely air pollution and global warming. The root cause of these issues has been identified to be carbon dioxide (CO_2) emissions. Under the study by the "intergovernmental panel on climate change (IPCC)" in 2019, it has been reported that global warming which is above the preindustrial era i.e., around 1.5°C is a climate change problem (Arora et al., 2020). A mutual consensus has been reached by most environmental scientists globally that the mean temperature of the world should not exceed more than 2°C. since the major contributing factor to air pollution and global warming is CO_2 emissions, therefore countries now need to focus on the complicacy of these emissions. The developed countries have been focusing on this issue quite seriously and have implemented strict environmental policies. It has been reported that the developing nations are a source of approximately 77% of the greenhouse gas emissions since they are aiming to achieve an increase in their economic development and national production. Therefore, it is of great significance for policymakers to understand the reasons behind higher CO_2 emissions by developing nations (Khan and Raza, 2021).

Climate change has compromised the ability of countries, both developed and developing to achieve sustainability in their developmental process. The global community is insisting on international cooperation so that the efforts in reducing greenhouse gas emissions globally can be accelerated (Nadeem et al., 2020). It is suggested by "The Environmental Kuznets Curve (EKC)" theory that the correlation between economic development and environmental pollution is N-structured. This relation indicates that during economic development's initial stage, environmental pollution rises however it starts to decrease at the later stages of growth. The EKC theory has been used widely over the last few years to realize the nexus between GDP trajectory and carbon pollution in the energy profile literature. However, there is a

scarcity of literature that studies the sub-segment of the economy and how they have an impact on environmental pollution such as foreign trade, fiscal growth, and foreign direct investments (FDIs). Therefore, these areas are of major interest to policymakers and deserve equal attention (Khan and Raza, 2021).

In the case of the developing economies, FDI has a significant role to play since such economies are struggling as they are capital-poor countries. FDI assists the developing countries in enhancing their production efficiency through transferring knowledge, technology, and know-how regarding the modernization of the economy. Moreover, new employment opportunities are also created by FDI and promote entrepreneurship and competition which are the most essential tools for faster development of the developing nations (Nadeem et al., 2020). But it has been observed countries tend to violate environmental policies while attracting FDI. The developing nations attract FDI by ignoring the harmful impacts upon the environment in the shape of pollution which is contributing alarmingly to global warming and climate change. FDI may be contributing to the increased capital stock, job opportunities, innovative technologies, and per capita income, however at the same time is also adversely affecting the natural environment of these countries (Uddin et al., 2019). There are various contradictory ways in which CO2 emissions and environmental degradation can be affected by FDI. Some researchers have suggested that apart from having adverse environmental impacts, FDI also plays a key role in protecting the environment. For instance, FDI which is in the form of effective production technology can assist the host countries to reduce their air pollution levels.

However, other researchers argue that FDI is the major contributing factor to air pollution (Khan and Raza, 2021). They argue that economic development is stimulated through FDI inflows in the form of enhanced production efficiency which consequently results in higher utilization of energy thus emitting more CO_2 emissions. Additionally, developing nations that do not have stricter environmental policies are a place of major investments by polluting firms. Therefore, it is imperative that developing nations should implement clean and green environmental policies (Azam, 2019). The amount of CO_2 emissions tends to increase for those firms which are operating in countries that have weak environmental regulations, thus attracting foreign investors which consequently increases inward FDI. This theory has been formalized by the "Pollution Haven Hypothesis (PHH)". This hypothesis states that countries attract FDI by concentrating on economic development paired with insufficient environmental protection regulations (Destek and Okumus, 2019). The developing countries have a higher cost of pollution in comparison to the developed countries. The issue is that the developed countries find the developing countries an attractive place to shift their industries because of their weak policies and regulations concerning the protection of the environment.

Since most developing countries want to increase their FDI and mostly FDI is coming to them in for the industrial and manufacturing sectors. The developed nations on the other hand have adequate policies and have regulated their industrial sector, thus their nature and environment are protected from the adverse impacts of CO_2 emissions. The developing countries are not only attracting FDI due to their insufficient environmental policies and regulations from the multinational firms, but they also attract FDI due to the cheaper cost of labor. For financing bigger investment projects and for transferring modern technology, FDI is considered as the best possible option available (Destek and Okumus, 2019). Since these countries have relaxed their environmental regulation so that they can attract FDI but reducing air pollution has become a major issue for these countries. Ukraine is one such example of a developing economy and a member of the European Union. The economy of Ukraine has improved significantly in recent years after facing a serious financial crisis. Ukraine has a vast investment potential mainly due to a large consumer market, educated and cheap labor, and high availability of natural resources which are perquisites for attracting FDI.

Ukraine is an agricultural powerhouse and is the third-largest country being exporting grains. Since the country has a vast educated workforce, their IT and software R&D sectors have depicted significant potential. Ukraine is now working hard to attract higher FDI inflows which they want to utilize as a means of encountering their economic challenges. Recently FDI inflows in Ukraine have been less however, the net inflow of FDI was equal to only 2% of their GDP (Cieślik and Gurshev, 2020). Therefore, it seems essential to understand the correlation between inward FDI, economic growth, and pollutant levels in Ukraine. Given the attention, which is being given to the nexus of FDI, economic development, and environmental degradation, it is imperative to understand and explore the case of Ukraine so that the policymakers have the right information which will help them to achieve the targets of sustainable development. This study aims at evaluating the relationship amongst environment-economic variables i.e., FDI, economic growth, and environmental emissions for presenting a comprehensive analysis in terms of Ukraine.

2. LITERATURE REVIEW

Rapid industrialization and increased environmental awareness have drawn the attention of economists to analyze the relationship between CO2 emissions, economic growth, and foreign direct investment (FDI). This nexus is of more importance for the countries currently in the development phase such as Ukraine. As per the "Environmental Kuznets Curve" (EKC) model, during the initial phases of fiscal development, there is an inverse relationship between economic development and atmospheric pollution. However, after a certain point when the major development objectives are achieved, the correlation becomes positive. Apergis and Ozturk (2015) investigated the authenticity of the EKC model for 15 developing Asian countries over a period of 20 years from 1990 to 2010. The authors employed the panel data approach, and the findings presented an upside-down U-curved correlation between per capita GDP and CO_2 levels. However, in another similar research by Tien and Thuy (2020) aimed at analyzing the universality of the EKC hypothesis in Vietnam, a positive correlation between pollutant concentration and GDP growth rate has been reported. Thus, it can be concluded that this model may not be applied blindly to every economy.

Xie et al. (2020) analyzed the nexus shared by carbon levels, energy usage, GDP growth rate, and industrialization in a period of 40 years from 1970 to 2020 in Russia. The authors used the "unit root" test and cointegration approach for investigating this correlation and the results reported the validity of the EKC model for the country with a bi-directional negative correlation between environmental quality and economic development. Peng et al. (2016) investigated the correlation between CO_2 concentration, foreign revenue, and GDP development in China with the deployment of the "bootstrap panel causality" framework and reported the selected three variables share unidirectional and bi-directional correlation. In another similar study from China, Zhang and Zhou (2016) aimed at the hypothesis that FDI decreases CO_2 emissions. The results revealed that the hypothesis is invalid and increased FDI calls for a decrease in emissions. Sun et al. (2019) explored the influence of FDI on environmental emissions and economic growth in the manufacturing sector using the "generalized method of moments". As per the outcomes of the research, increased inward FDI in the country contributes towards reduced CO_2 levels and increased fiscal development.

Thus, it can be inferred from the literature that there has been a mixed trend regarding how environmental emissions and economic growth are influenced by inward FDI. Sustainability experts have reported that the nexus is considerably based on the economic profile of the country. Abban et al. (2020) used panel data from three different categories of countries i.e., low-income, intermediate income, and high-income countries over a period of two decades (1995-2015). The authors explored that there exists a bidirectional cause and effect relation between FDI, environmental emissions, and economic development. The comparative scenario of three different country types revealed that in high-income countries, an increase in FDI decreases CO_2 emissions while increasing economic growth however, in low- and middle-income countries there is an inverse relationship. Pazienza (2019) investigated the correlation between economy, environment, and FDI in selected OECD states and reported that in countries with rapidly expanding foreign revenue sectors and poor environmental legislation, inward FDI leads to a higher rate of industrial and economic growth which results in degraded environmental quality.

Researchers are also exploring this nexus in emerging economies of Asia. Rajpurohit and Sharma (2020) investigated the relationship between primary energy usage, inward FDI, economic stability, and the extent of environmental degradation by deploying the simultaneous equation approach. As per the findings, a long-term correlation exists between the selected indicators with FDI increase negatively impacting energy consumption and environmental quality. In India, Adamu et al. (2019) determined the interrelationship between energy, export volume, FDI, and pollution with reference to the EKC hypothesis by using the cointegration test. The findings reported that the former three variables negatively impact environmental pollution in India. In another study, Shahbaz et al. (2020) analyzed this nexus in the UAE which has recently become the hub of worldwide investments due to the increasing tourist flow. The authors reported a positive impact of FDI on pollution in the past decade as the country is spending more on regulating the environmental quality of being a tourist destination. Therefore, high inward FDI and economic growth are not impacting the country's environmental profile.

Azam (2019) investigated the enviro-economic correlation in economically growing four BRICS countries. The primary focus was on renewable energy's inter-relationship with CO_2 emissions and economic development. The results concluded that energy usage leads to increased economic growth while environmental degradation tends to negatively impact economic growth. This nexus is very rarely researched in Ukraine as there is limited literature available. However, there are some studies with a broader scope that have studied this correlation in Ukraine such as the one by Jamel and Maktouf (2017). It has been reported that a casual correlation is shared by economic growth, FDI, and CO_2 in EU members validating the existence of the EKC mode. (Saud et al., 2019) conducted panel research encompassing 18 European countries including Ukraine. The major implications included that energy usage negatively impacts emission levels, improved economic index leads to higher CO_2 emissions, environmental quality is improved by increased trade and urban development due to the mitigation of pollution and the EKC hypothesis is rational in these selected countries. For a better analysis of this enviro-economic nexus, the variables are split into different sets and relevant literature has been discussed in the following sections. Various models have been employed by researchers to explore the relationship dynamics between FDI and carbon emissions. However, it has been inferred that much of this literature is focused on developed countries.

Mukhtarov et al. (2021), explored the correlation between FDI and CO_2 levels by deploying the "Structuring Time-Series Modelling" (STSM) approach in Azerbaijan from 1996 to 2013. The findings suggested FDI is positively correlated with emissions before 2006 however after that the relationship changed from positive to negative. After 2006, most of the inward FDI (80%) was attracted by the oil and gas sector of the country. In Kuwait, Salahuddin et al. (2018) explored the influence of FDI on atmospheric CO_2 levels from 1980 to 2013 and reported that increased inward FDI is associated with deteriorated environmental quality in the country. Bakhsh et al. (2017) conducted similar research in Pakistan from 1980 to 2014 employing the 3SLS framework and unveiled that FDI negatively impacts the CO2 emission levels in the country. On contrary, Hille et al. (2019) reported that high FDI inflow in Korea has led to reduced environmental emissions from 2000 to 2011. Jiang et al. (2018) explored the relationship between inward FDI and environmental performance in 150 countries in China by using spatial econometric frameworks. The results reported the existence of an inverse correlation suggesting an improvement in environmental quality with increasing FDI inflows which is in accordance with the "pollution halo hypothesis." While investigating the influence of FDI on environmental pollution in more than 100 Chinese cities over a period of 13 years Liu et al. (2018) revealed that FDI has a considerable adverse influence on emission levels.

There is a wide availability of literature that addresses the link between FDI and economic development. Bermejo Carbonell

and Werner (2018) highlighted that inward FDI, and economic development is not only strongly linked in industrial nations but also in developing countries. Sun et al. (2019) concluded a strong relation between FDI and economic development in the SAARC member countries. Furthermore, a study by Wang and Li (2019) on how economic development is influenced by FDI was studied in Korea and the results concluded that FDI has a significantly positive impact on Korea's economic growth. Similarly, Malik et al. (2020) studied the relation between FDI and economic development in Pakistan and reported a positive correlation. Additionally, Abdouli and Hammami (2017) investigated 17 countries to evaluate the correlation between FDI and economic growth and reported that both factors have a two-way causal link. Economists and environmentalists have evaluated an inverse relationship between carbon emissions and economic growth in the case of developing economies.

However, in the case of developed countries, there is a positive relationship between these variables. Acheampong (2018) explored the nexus between energy usage, emissions, and fiscal profile in selected MENA countries and reported a negative relationship between CO_2 levels and economic stability. On contrary, Azam (2019) inferred a positive correlation between GDP rate and CO_2 emissions in the USA, Japan, and China as these countries have surpassed the developing phases. Bilan et al. (2019) explored this nexus in Ukraine and other European countries and revealed that financial development contributes to higher energy usage and higher CO_2 emissions in these countries. The authors recommended policymakers concentrate on the sustainability of the renewable sector to reverse this relationship.

3. METHODOLOGY

We tested the relationship between Inward FDI, Economic Growth and CO_2 Emissions in the case of a Ukraine country. The country which is surviving the war. This study is based on previous research that utilized FDI, GDP, and CO_2 as the main variable of the study. These variables are in line with previous studies (Can and Korkmaz, 2019; Dogan et al., 2020; Kayani, 2021). The study time is 1990-2019. The annual data has been accessed from the World bank website by using the world bank indicators. The GDP is based on the capita with regular values of 2010 in US $.

Before strolling any type of baseline regression evaluation it's essential to run primary diagnostic exams on the data set (Kayani et al., 2021) for assessing whether the basic assumptions of the Classical Linear Regression Model are fulfilled or no longer (Gujarati et al., 2012; Kayani, 2018; Kayani et al., 2020; Mills and Birks, 2014; Wintoki et al., 2012). These fundamental information checks at the records set consist of the unit root test for stationarity, Pearson correlation check for multicollinearity, Bruesch-Pagan/Cook-Weisberg for heteroscedasticity, and the Wooldridge check for autocorrelation. This has a look at aims to have a look at a protracted-term dating of a few of the variables. For inspecting the problem of stationarity inside the regression numerous unit root checks are available from the literature (Kayani et al., 2019). The ranges or variations of the variables that are stationary are investigated by using augmented Dickey-Fuller (ADF), Philips– Perron (PP), and KPSS unit root tests openness. In mild with previous research, this study also carries out an ARDL sure test developed with the aid of Pesaran et al. (2001) for testing co-integration even as analyzing the long-time period dating between variables (Can and Korkmaz, 2019; Kayani and Kayani, 2017). The following ARDL model is applied for estimating the connection:

$$^{p}\Delta LGDPt = \alpha_1 + ^{q}\alpha_T T + \alpha_{GDP} LGDP_{t-1} + \alpha_{RE} LFDI_{t-1} + \alpha_{TR} LCO_2 + \ldots + \varepsilon_{1t} \quad (1)$$

Whereas, LGDP is the natural logarithm of the gross domestic product; LFDI is the natural logarithm of foreign direct investment, and CO_2 is the natural logarithm of carbon emissions. The time period is denoted by means of T. It is believed that the residuals are generally dispensed and white noise. The relationship is tested by using testing following speculation (H0: d 1 = d 2 = d three = zero) for measuring whether or not there is a long-run relationship between variables or no longer and for this motive the F value (Wald Test) is measured (Balcılar et al., 2014). For making use of the causality evaluation (Toda and Yamamoto, 1995), it is important to identify the most excellent length of lags. The surest range of lags is determined based totally on Akaike Information Criteria (AIC) and Schwatz Information Criteria (SIC). These criteria are relevant after walking unit root take a look at (ADF and PP). Finally, for measuring the causality courting and the direction, the vector error correction version (VECM) model needs to be applied however in the case of ARDL multicollinearity, we implemented Ordinary Least Square (OLS) regression.

4. EMPIRICAL RESULTS AND DISCUSSION

Table 1 explains the results of the descriptive statistics. The statistics are based on the mean, standard deviation, minimum, maximum, skewness, and kurtosis value. In order to normalize the data, we used a natural logarithm as a proxy for addressing the data issues (Gujarati et al., 2012).

After the descriptive statistics, any other basic look at is unit root check for measuring the stationarity problem in the data set. For measuring whether data is stationary or not we applied Augmented Dickey-Fuller, Phillips, and Perron and Dickey-Fuller, Generalised Least Squares unit root assessments. The Table 2 reports the results for the unit root test.

After establishing a desk-bound courting between variables, the subsequent phase is to find the existence of a long-term relationship between unbiased and dependent variables. But for examining the long run courting between variables it's miles important to decide the most appropriate lag duration and for this Schwartz and Akaike Information Criteria are carried out. The un-tabulated outcomes affirm that the most desirable lag period for this look is '2". For assessing the long-run relationship ARDL certain version is implemented. However, its pertinent to mention we implemented the ARDL regression technique. The results in Table 3 runs the vector errors correction version- Granger-causality method for

examining the route of causality between variables. As this is relevant and most effective when a longtime long-run relationship using ARDL regression is confirmed. But nonetheless, we applied to discover what would be the effects of the VECM. The VECM uses all series endogenously, the results for short-run and long-term Granger-causality. The outcomes suggest a positive and a longrun relationship between FDI, economic growth and carbon emissions. This approach that the relationship between FDI, GDP, and CO_2 exists for long run. The consequences are in line with those (Can and Korkmaz, 2019)

We want to search for an alternative approach for trying out the relationship (Nahar and Arshad, 2017). As an opportunity approach based totally on Nahar and Arshad (2017), we applied the regular least rectangular (OLS) regression method for examining the connection between renewable power intake and financial increase. The effects are reproduced in Tables 4 as underneath.

The results in Table 4 and 5 indicate that FDI and economic growth has significant impact on carbon emissions. For running the results, we applied ordinary least square regression and system-generalized method of moments. The system-generalized method of moments has been applied for addressing the endogeneity issue and for robustness of the results. The column 1 represents the results obtained through ordinary least square regression and column 2 represents the results obtained through system-generalized method of moments. The results confirm a significant and positive relationship between FDI, economic growth and carbon emissions in case of the Ukraine.

Table 1: Descriptive statistics

Variable	Mean	SD	Minimum	Maximum	Skewness	Kurtosis
LNFDI	2.748	2.192	−0.218	8.75	0.668	0.001
CO_2	6.8	2.232	3.9	13.27	0.001	0.023
GDP	−0.751	8.583	−22.517	12.647	0.124	0.998

SD: Standard deviation

Table 2: Unit root test

Variable	Levels			First difference		
	ADF	PP	DF-GLS	ADF	PP	DF-GLS
LGDP	−3.124	−1.824	−1.998	−1.304***	−4.314***	−2.301**
LFDI	−0.634	−0.721	−1.824	−2.314*	−3.647**	−0.647***
LCO_2	−1.820	−1.534	0.914	−1.372***	−4.661***	−1.827*

***,**,*1%, 5% and 10% significance levels, respectively .

Table 3: Vector error-correction model

Variables	Coefficient	SE	t	P	95% CI (significant)
L._ce1	−0.988	0.165	−6.00	0	−1.311-−0.666***
LD.lnfdi	−0.03	0.138	−0.22	0.829	−0.301-0.241
LD.co2	0.18	0.948	0.19	0.849	−1.679-2.039
LD.gdp	0.026	0.129	0.20	0.841	−0.226-0.278
Constant	−0.083	0.935	−0.09	0.929	−1.916-1.75
L._ce1	0.031	0.037	0.85	0.394	−0.041-0.103
LD.lnfdi	−0.041	0.031	−1.34	0.18	−0.102-0.019
LD.co2	−0.028	0.211	−0.14	0.893	−0.442-0.385
LD.gdp	0.01	0.029	0.34	0.735	−0.046-0.066
Constant	−0.39	0.208	−1.87	0.061	−0.798-0.018*
L._ce1	−0.116	0.281	−0.41	0.679	−0.667-0.435
LD.lnfdi	−0.181	0.236	−0.77	0.443	−0.644-0.282
LD.co2	0.664	1.619	0.41	0.682	−2.509-3.838
LD.gdp	−0.186	0.22	−0.85	0.398	−0.616-0.245
Constant	0.602	1.597	0.38	0.706	−2.528-3.731
Mean dependent variable	−0.271		SD dependent variable		8.667
Number of observation	29.000		AIC		

***P<0.01, **P<0.05, *P<0.1. AIC: Akaike information criteria, SE: Standard error, CI: Confidence interval

Table 4: Linear regression

lnfdi	Coefficient	SE	t	P	95% CI (significant)
CO_2	−1.149	0.385	−2.98	0.006	−1.937-−0.362***
Constant	26.462	2.661	9.95	0	21.02-31.903***
Mean dependent variable	19.153		SD dependent variable		6.506
R^2	0.235		Number of observation		31.000
F-test	8.905		Probability > F		0.006
AIC	198.764		BIC		201.632

***P<0.01, **P<0.05, *P<0.1. BIC: Bayesian information criterion, SE: Standard error, CI: Confidence interval, AIC: Akaike information criteria (Schwarz & Gideon, 1978).

Table 5: Linear regression

GDP	Coefficient	SE	t	P	95% CI (significant)
co2	−1.027	0.549	−1.87	0.071	−2.149-0.095*
Constant	5.782	3.791	1.53	0.138	−1.971-13.534
Mean dependent variable	−0.751		SD dependent variable		8.583
R2	0.108		Number of observation		31.000
F-test	3.506		Probability > F		0.071
AIC	220.705		BIC		223.573

***P<0.01, **P<0.05, *P<0.1, **P<0.05. The column 1 indicates the results obtained through the ordinary least square regression and column 2 represents the results obtained through the system-generalized method of moments Robust standard errors are used in parentheses. SE: Standard error, CI: Confidence interval, AIC: Akaike information criteria, BIC: Bayesian information criterion (Schwarz & Gideon, 1978).

5. CONCLUSION

In this paper we attempted to exmaine the impact of FDI and economic growth on the carbon emissions of Ukraine for the period 1990-2019. We ran ordinary least square regression for our main analysis and in case of robustness, we applied system generalized method of moments. The results confirm a positive and significant realtionship between FDI, economic growth and carbon emissions. This indicates that higher the inflows of FDI and increase in economic growth leads to higher carbon ommisisons in Ukraine. As a matter of fact the carbon emisisons are increasing with 8.03% on yearly basis in Ukraine. The results are based on the ordinary least square regression and system generalized method of moments.

REFERENCES

Abban, O.J., Wu, J., Mensah, I.A. (2020), Analysis on the nexus amid CO_2 emissions, energy intensity, economic growth, and foreign direct investment in belt and road economies: Does the level of income matter? Environmental Science and Pollution Research, 27(10), 11387-11402.

Abdouli, M., Hammami, S. (2017), Exploring links between fdi inflows, energy consumption, and economic growth: Further evidence from mena countries. Journal of Economic Development, 42(1), 95-117.

Acheampong, A.O. (2018), Economic growth, CO_2 emissions and energy consumption: What causes what and where? Energy Economics, 74, 677-692.

Adamu, T.M., Haq, I.U., Shafiq, M. (2019), Analyzing the impact of energy, export variety, and FDI on environmental degradation in the context of environmental kuznets curve hypothesis: A case study of India. Energies, 12(6), 1076.

Apergis, N., Ozturk, I. (2015), Testing environmental Kuznets curve hypothesis in Asian countries. Ecological Indicators, 52, 16-22.

Arora, A., Belenzon, S., Patacconi, A., Suh, J. (2020), The changing structure of American innovation: Some cautionary remarks for economic growth. Innovation Policy and the Economy, 20(1), 39-93.

Azam, M. (2019), Relationship between energy, investment, human capital, environment, and economic growth in four BRICS countries. Environmental Science and Pollution Research, 26(33), 34388-34400.

Bakhsh, K., Rose, S., Ali, M.F., Ahmad, N., Shahbaz, M. (2017), Economic growth, CO2 emissions, renewable waste and FDI relation in Pakistan: New evidences from 3SLS. Journal of Environmental Management, 196, 627-632.

Balcılar, M., Bal, H., Algan, N., Demiral, M. (2014), Türkiye'nin ihracat performansı: ihracat hacminin temel belirleyicilerinin incelenmesi (1995-2012). Ege Akademik Bakış, 14(3), 451-462.

Bilan, Y., Streimikiene, D., Vasylieva, T., Lyulyov, O., Pimonenko, T., Pavlyk, A. (2019), Linking between renewable energy, CO_2 emissions, and economic growth: Challenges for candidates and potential candidates for the EU membership. Sustainability, 11(6), 1528.

Can, H., Korkmaz, Ö. (2019), The relationship between renewable energy consumption and economic growth: The case of Bulgaria. International Journal of Energy Sector Management, 13(3), 573-589.

Carbonell, J.B., Werner, R.A. (2018), Does foreign direct investment generate economic growth? A new empirical approach applied to Spain. Economic Geography, 94(4), 425-456.

Cieślik, A., Gurshev, O. (2020), Determinants of inward FDI in Ukraine: Does political stability matter? International Journal of Management and Economics, 56(3), 243-254.

Destek, M.A., Okumus, I. (2019), Does pollution haven hypothesis hold in newly industrialized countries? Evidence from ecological footprint. Environmental Science and Pollution Research, 26(23), 23689-23695.

Dogan, E., Altinoz, B., Madaleno, M., Taskin, D. (2020), The impact of renewable energy consumption to economic growth: A replication and extension of. Energy Economics, 90, 104866.

Gujarati, D.N., Porter, D.C., Gunasekar, S. (2012), Basic Econometrics. New York: Tata McGraw-Hill Education.

Hille, E., Shahbaz, M., Moosa, I. (2019), The impact of FDI on regional air pollution in the Republic of Korea: A way ahead to achieve the green growth strategy? Energy Economics, 81, 308-326.

Jamel, L., Maktouf, S. (2017), The nexus between economic growth, financial development, trade openness, and CO_2 emissions in European countries. Cogent Economics and Finance, 5(1), 1341456.

Jiang, L., Zhou, H.f., Bai, L., Zhou, P. (2018), Does foreign direct investment drive environmental degradation in China? An empirical study based on air quality index from a spatial perspective. Journal of Cleaner Production, 176, 864-872.

Kayani, F.N. (2021), Renewable energy and economic growth nexus: A case of United Arab emirates. International Journal of Energy Economics and Policy, 11(5), 504-509.

Kayani, F.N., Kayani, U. (2017), Inward foreign direct investment, resident patents, and economic growth: Cointegration, error correction model, and causality analyses for China. Journal of Economic and Management Perspectives, 11(4), 381-389.

Kayani, U. (2018), Working Capital Management and Corporate Governance: A New Pathway for Assessing Firm Performance in Developed Markets Lincoln University.

Kayani, U.N., De Silva, T.A., Gan, C. (2019), Working capital management and corporate governance: A new pathway for assessing firm performance. Applied Economics Letters, 26(11), 938-942.

Kayani, U.N., De Silva, T.A., Gan, C. (2020), Working capital management and firm performance relationship: An empirical investigation of Australasian firms. Review of Pacific Basin Financial Markets and Policies, 23(3), 2050026.

Kayani, U.N., De Silva, T.A., Gan, C. (2021), Corporate governance and working capital management-inclusive approach for measuring the firm performance. Review of Pacific Basin Financial Markets and Policies, 24(2), 2150015.

Khan, M.A., Raza, A. (2021), Modelling the Nexus in Foreign Capital Flows and Environmental Degradation: Fresh Evidence From Global Data.

Liu, Q., Wang, S., Zhang, W., Zhan, D., Li, J. (2018), Does foreign direct investment affect environmental pollution in China's cities? A spatial econometric perspective. Science of the Total Environment, 613, 521-529.

Malik, M.Y., Latif, K., Khan, Z., Butt, H.D., Hussain, M., Nadeem, M.A. (2020), Symmetric and asymmetric impact of oil price, FDI and economic growth on carbon emission in Pakistan: Evidence from ARDL and non-linear ARDL approach. Science of the Total Environment, 726, 138421.

Mills, J., Birks, M. (2014), Qualitative Methodology: A Practical Guide. California: Sage.

Mukhtarov, S., Aliyev, S., Mikayilov, J.I., Ismayilov, A., Rzayev, A. (2021), The FDI-CO_2 nexus from the sustainable development perspective: The case of Azerbaijan. International Journal of Sustainable Development and World Ecology, 28(3), 246-254.

Nadeem, A.M., Ali, T., Khan, M.T., Guo, Z. (2020), Relationship between inward FDI and environmental degradation for Pakistan: An exploration of pollution haven hypothesis through ARDL approach. Environmental Science and Pollution Research, 27(13), 15407-15425.

Nahar, F.H., Arshad, M.N.M. (2017), Effects of remittances on poverty reduction: The case of Indonesia. Journal of Indonesian Economy and Business, 32(3), 163-177.

Pazienza, P. (2019), The impact of FDI in the OECD manufacturing sector on CO2 emission: Evidence and policy issues. Environmental Impact Assessment Review, 77, 60-68.

Peng, H., Tan, X., Li, Y., Hu, L. (2016), Economic growth, foreign direct investment and CO_2 emissions in China: A panel granger causality analysis. Sustainability, 8(3), 233.

Pesaran, M.H., Shin, Y., Smith, R.J. (2001), Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289-326.

Rajpurohit, S.S., Sharma, R. (2020), Impact of economic and financial development on carbon emissions: Evidence from emerging Asian economies. Management of Environmental Quality, 32(2), 145-159.

Salahuddin, M., Alam, K., Ozturk, I., Sohag, K. (2018), The effects of electricity consumption, economic growth, financial development and foreign direct investment on CO_2 emissions in Kuwait. Renewable and Sustainable Energy Reviews, 81, 2002-2010.

Saud, S., Chen, S., Haseeb, A., Khan, K., Imran, M. (2019), The nexus between financial development, income level, and environment in central and Eastern European Countries: a perspective on belt and road initiative. Environmental Science and Pollution Research, 26(16), 16053-16075.

Shahbaz, M., Haouas, I., Sohag, K., Ozturk, I. (2020), The financial development-environmental degradation nexus in the United Arab Emirates: The importance of growth, globalization and structural breaks. Environmental Science and Pollution Research, 27(10), 10685-10699.

Sun, H.P., Tariq, G., Haris, M., Mohsin, M. (2019), Evaluating the environmental effects of economic openness: Evidence from SAARC countries. Environmental Science and Pollution Research International, 26(24), 24542-24551.

Tien, N.N., Thuy, N.T.T. (2020), Impact of FDI on economic growth from the sustainable development perspective: A case study from the assessment in the middle of Vietnam. Kasetsart Journal of Social Sciences, 41(3), 647-652.

Toda, H.Y., Yamamoto, T. (1995), Statistical inference in vector autoregressions with possibly integrated processes. Journal of econometrics, 66(1-2), 225-250.

Uddin, M., Chowdhury, A., Zafar, S., Shafique, S., Liu, J. (2019), Institutional determinants of inward FDI: Evidence from Pakistan. International Business Review, 28(2), 344-358.

Wang, D., Li, Y. (2019), The development of foreign capital insurance market, FDI and economic growth in China. Modern Economy, 10(3), 872-885.

Wintoki, M.B., Linck, J.S., Netter, J.M. (2012), Endogeneity and the dynamics of internal corporate governance. Journal of Financial Economics, 105(3), 581-606.

Xie, Q., Wang, X., Cong, X. (2020), How does foreign direct investment affect CO2 emissions in emerging countries? New findings from a nonlinear panel analysis. Journal of Cleaner Production, 249, 119422.

Zhang, C., Zhou, X. (2016), Does foreign direct investment lead to lower CO2 emissions? Evidence from a regional analysis in China. Renewable and Sustainable Energy Reviews, 58, 943-951.