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Research Article

The Mediating Role of Human Development in the Relationship between Globalization and Environmental Quality: Evidence from Developing Countries

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ABSTRACT

This study investigates the relationship among globalization, human development, and environmental quality using data from hundreds of developing countries from 2000 to 2024. It specifically examines the moderating role of the Human Development Index (HDI) in the globalization–environment nexus. The results indicate that in developing countries globalization has deteriorating environmental effects the interaction between HDI and the KOF Globalization Index (KOFGI) has a significantly positive effect on ecological footprints. Marginal effects analysis further shows consistently positive impacts across the entire data range, with turning points occurring beyond the observed values, highlighting the reinforcing influence of human development on the environmental impacts of globalization. Results indicate that Globalization can lower ecological footprints and increase environmental quality in countries with human development. Globalization linearly improves environmental quality and human development index.

Key Words: Ecological Footprint, Globalization, Financial Development, Foreign Direct Investment, Human Development Index, GMM

INTRODUCTION

Globalization has been commended for stimulating economic growth, but it also has adverse effects for certain groups of individuals. Developing nations respond differently to globalization, which affects distribution of wealth, environmental protection, and social growth. Globalization often makes the economy grow faster, but it also hurts the environment and makes things less fair, which slows down long-term progress. Understanding these forces helps lawmakers get the most out of globalization's benefits while minimizing the harm it does to people and the environment. Economic expansion in poor countries typically harms the environment, and globalization makes it worse. Rapid industrialization, urbanization, and resource extraction in rising economies have caused pollution, biodiversity loss, and tree cutting. These issues make it harder for future generations to meet their demands and slow sustainable development. Globalization and economic progress affect human development, including education, health care, and well-being. Human development can help globalization and growth benefit more people and mitigate environmental damage. Globalization has meaningfully changed economies, communities, and environments all around the world, especially during the 1990s (Bergougui et al., 2024). The term "globalization" describes how commerce, investment, technology, and information have made economies more interdependent (Onuogu et al., 2024). It has been a major force behind economic expansion, particularly in developing nations, but its



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impacts have been complex, encompassing both advantages and disadvantages. Globalization has been a double-edged sword for many developing countries, contributing to both rapid economic expansion and the escalation of inequality, environmental degradation, and unsustainable consumption patterns. Although one of the main advantages of globalization has been economic expansion, concerns have been raised about its long-term viability, especially regarding human development and environmental quality. The globe is being more polluted, and the climate wants needful measurements using financial globalization support and using green innovation, these two aspects are being used in developed countries for reduction of emission. On the other hand, human Capital, financial risk, and income also affect the environmental condition towards improve. Financial risk should be taken in green innovation for achieve the sustainability and environment improvement (Chen et al., 2024).

The objective of the study is to evaluate the role of human development as an intermediary in the association between globalization and environmental quality. In addition, the Human Development Index (HDI) will be utilized as a mediating effect in conjunction with globalization and the environment. The novelty of this study lies in the fact that the mediation effect on the environment and globalization will be explored in it. This exploration will allow for an examination of the vision for developing nations in terms of their sustainability growth, improved relationships with the rest of the world through globalization, and reduction of environmental emissions and human development.

LITERATURE REVIEW

Sarwar et al., (2024) assessed how industry, GDP, urbanization, and human growth affected OECD and non-OECD ecological footprints for 1990 to 2018. The study distinguished distinct tendencies between the two groups by employing GMM and an open-access solution architecture. Results suggested that economic growth had helpful significant result on environmental quality. The moderator of human development and institutional quality were also employed to establish the said relationship between globalization and environmental quality.

Lin & Peng, (2025) examined combined effect of globalization and digitalization on environmental quality. Chinese economies were taken as a sample. Results suggested that moderating effect exist between digitalization, globalization and environmental quality. The study highlighted the importance of digitalization to establish the link between globalization and environmental quality in the cities of Chinese economy. It was justified that digitalization intensified the positive connection between globalization and environmental quality.

Yu et al., (2025) explored the association amongst globalization and environmental quality in the panel of Chinese economy. Sustainable development goals index and sustainable development goals evenness were used to capture the environmental consequences of globalization on environment. Results suggested that on the basis of Sustainable development goals index many regions of the chines economy achieved the most of the goals related with environmental quality. Both schemes of Sustainable development goals index and Sustainable development goals evenness attained in many provinces.

Uzar & Eyuboglu, (2024) examined the link between globalization and environmental quality. They were taken the group of Asian countries. They have estimated both linear and nonlinear form relationship between globalization and environmental quality. KOF globalization was taken to measure the effect of globalization. A unique measure of environmental quality that captures both demand and supply side effects of environment were employed. The results of system generalized method of moment confirmed the existence of long-standing relationships amongst financial globalization and environmental quality.

Tong, (2024) examined the association amongst energy consumption, greenhouse gas emissions, socioeconomic characteristics, and human well-being in China between 2000 and 2019, highlighting the moderating influence of urbanization. The Human Development Index (HDI) showed a decreasing return with time from energy use, encompassing primary energy extraction and end energy use. HDI, GDP per capita, and family income seemed strongly correlated. This example shows how economic growth benefits people. Two energy-GDP pathways were found: high energy consumption with low GDP and low energy use with high GDP. This helps explain why the link between HDI, energy use, and greenhouse gas emissions has been going down over time.

Nuta et al., (2025) analyzed the combined impact of globalization and human development on environment in European countries. Based on the nature of data instrumental variables methods like GMM and Driscoll-Kraay techniques were employed to check the joint effect of globalization and human development on environmental quality. Financial development effect combined with human development was checked to check the joint effect on environmental quality. examined the relationship between globalization and environment by using computer experiment. The study utilized the regional aggregation's method bias (Ali et al., 2021).

DATA AND METHODOLOGY

Model Specification

The model of the study is to evaluate the role of human development as an intermediary in the relationship between globalization and environmental quality. Mediating effect models of the impact of joint effect of globalization and HDI on environment are presented in equation 1.

$$ECFP_{it} = \rho_1 ECFP_{it-1} + \rho_2 GLOZ_{it} + \rho_3 GDP_{it} + \rho_4 FDI_{it} + \rho_5 FD_{it} + \rho_6 (HDI)_{it} + \rho_7 (GLOZ * HDI)_{it} \pi_t + \mu_{it} \quad (1)$$

Where,

HDI → Human development index that will operate as mediator in this model

Description of all variables used in all four models their definitions; sources of data collection are presented in table.

Table1. Description of Variables Used

Proxy	Definition	Data Source
ECFP	Ecological footprints measure of environmental quality of a country	1Global Footprint network
GLOZ	Globalization and to measure it KOFF globalization index used	2Swiss Economic Institute
FDI	Foreign direct investment (Net inflow)	World Development Indicators (WDI)
GDP	Growth rate of GDP per capita	WDI
FD	Financial development measured using domestic credit to private sector	WDI
HDI	Human development Indicator Index	United Nation Development Program (UNDP)

1<https://www.footprintnetwork.org/>

2<https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html>

RESULTS AND DISCUSSION

In this section, to check the combining effect of HDI and globalization on environment of developing countries, different econometric tests such as endogeneity, autocorrelation, heteroscedasticity, and cross-sectional dependence were used. GMM is used for estimating the relationship between globalization and environmental quality for developing countries.

Role of HDI in Determining the Effect of Globalization on Environment

This section is designed to determine the role of human development index in determining the effect of globalization on environment in developing countries.

Cross – Section Dependence (CSD)

The cross-sectional dependence is used to find cross sectional among selected countries. The results of the CSD test are displayed in Table.

Table 2. Cross Sectional Independence

Test	Statistics	Results
Pesaran	14.05*	Cross-Sectional Dependence
Friedman	147.35*	Cross-Sectional Dependence
Frees	13.63*	Cross-Sectional Dependence

*** p<0.01, ** p<0.05, * p<0.1 Null Hypothesis: Cross-Sectional Independence

2nd Generation Unit Root Test

The findings of Pesaran, Friedman, and Frees indicated the presence of cross-sectional dependence among the chosen panels. we have selected two second-generation unit root tests: the CSD-based I'm, Pesaran, and Shin (CIPS) test and the CSD-based augmented Dickey-Fuller (CADF) test to assess the stationarity of the included variables. Table presents the outcomes of the CIPS and CADF examinations.

Table 3. 2nd Generation Unit Root Test

Variable	Test	At Level	At First Difference	Conclusion
ECFP	CIPS	-1.42	-2.17*	I (1)
	CADF	-1.75	-2.07*	
KOFGI	CIPS	-1.41	-3.72**	I (1)
	CADF	-1.39	-2.87*	
PCIG	CIPS	-2.070	-3.62*	I (1)

FDI	CADF	-2.01	-3.59 ***	
	CIPS	-1.65	-5.93*	I (1)
FD	CADF	-2.61	-7.19*	
	CIPS	-1.93	-6.03*	I (1)
HDI	CADF	-2.71	-4.53***	
	CIPS	-1.54	-8.28*	I (1)
KOFGI_HDI	CADF	-3.54	-7.21**	
	CIPS	-1.92	-4.17*	I (1)
	CADF	-1.61	- 5.17*	

*** p<0.01, ** p<0.05, * p<0.1

The outcomes of the CIPS and CADF unit root tests indicated that all variables are non-stationary at their levels, although they attain stationarity upon taking the first difference. Proposing the application of cointegration tests for further progress.

Wald Test for Group-wise Heteroscedasticity

The Wald test for groupwise heteroscedasticity was employed to examine the issue of heteroscedasticity in the collected data. The test results are displayed in Table. The F-statistics in this model are significant, indicating the rejection of the null hypothesis of no heteroscedasticity.

Table 4. Wald Test for Group-wise Heteroscedasticity

ECFP	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
KOFGI	2.03	41.77	0.049	0.000	1.22	2.85	***
PCIG	1.68	32.43	5.17	0.000	1.04	2.31	***
FDI	-0.02	0.07	-3.54	0.000	-0.03	-0.01	***
FD	0.44	5.86	7.59	0.000	3.29	5.59	*
HDI	0.22	4.34	5.11	0.000	1.37	3.07	*
KOFGI_HDI	-0.38	8.49	-5.16	0.000	-6.05	-2.72	***
Constant	-8.07	2.19	-3.68	0.000	-1.24	-3.77	***

*** p<.01, ** p<.05, * p<.1

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model

H0: $\sigma(i)^2 = \sigma^2$ for all i

chi2 (100) = 2.0e+07 Prob>chi2 = 0.0000

Wooldridge Test for Autocorrelation

The Wooldridge test was employed to ascertain the presence of autocorrelation. The outcomes of the chosen test are presented in table. The null hypothesis for the test posits the absence of autocorrelation. The results indicated the rejection of the null hypothesis, so demonstrating the presence of autocorrelation.

Table5. Wooldridge Test for Autocorrelation

D. ECFP	Coef.	Std. Err.	T	P> t	[95% Conf.	Interval]
KOFGI D1.	2.71	1.92	1.43	0.21	-5.24	6.16
PCIG D1.	4.71	3.97	1.81	1.37	-5.27	13.69
HDID1.	3.50	2.46	1.62	1.36	-2.83	4.61
FDvD1.	-4.74	4.68	-2.42	0.27	-7.25	2.61
FDID1.	-1.21	1.26	-1.50	2.42	-2.90	1.02
KOFGI_HDID1.	3.61	2.73	2.62	0.22	7.37	-5.38

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1,99) = 761.647 Prob > F = 0.0000

Westerlund ECM panel cointegration

The second generation of the cointegration test was applied by Westerlund (2007) to determine whether there was cointegration between the variables. The null hypothesis that there was no cointegration was rejected by three out of the four tests examined. Indicating that there is a cointegration occurring between the variables that were chosen.

Table 6. Westerlund ECM panel cointegration

Statistic	Value	Z-value	P-value
Gt	-1.81	6.76	0.001
Ga	-12.07	-0.09	0.003
Pt	-8.24	14.72	1.000
Pa	-0.91	13.08	0.000

Results for H0: no cointegration, With 100 series and 1 covariate Average AIC selected lag length: 3

Average AIC selected lead length: 3

Tests of endogeneity

Durbin Chie Square and Wu Hausman F-Statistics are the two tests that have been devised to check for the problem. The assumption that the variables are exogenous acts as the test null hypothesis. The results of the endogeneity test are provided in table. Both tests confirmed that the null hypothesis should not be accepted and raised the possibility that endogenous factors are present. This indicates that we are required to use the instrumental variables approach to measure the relationship between the variables that have been specified for the model.

Table 7. Tests of Endogeneity

Test	Statistics	Probability
Durbin (score) chi2(1)	58.10	0.0000
Wu-Hausman F(1,2495)	59.36	0.0000

Ho: Variables are exogenous

Dynamic Panel-Data Estimation, Two-Step System GMM

Results in table, indicate that lag value of dependent variable coefficient has positive significant relationship with its current value. These results indicated and supported the inertia effect that suggested that current value of any variable is dependent on its preceding value. The same results are observed in this case. The existence of inertia effects is justified based on previous research (M. A. Khan et al., 2024; Nuta et al., 2025; Shams et al., 2024; Ze et al., 2023). Next questioned variable globalization coefficient is reported positive and significant. These results suggest that in developing countries globalization has deteriorating environmental effects. The possible link can be as the more globalization means more production to export the excess products to other countries that may require the more energy intensive goods that will leads towards environmental degradation. Globalization can also affect environment through foreign direct investment as more globalizations require the foreign direct investment inflow in the country. As developing countries have no strict allegation regarding the use of green technology that is why developed countries or multinational corporations utilize technology that is cheap and adversely affects the environment of home country. Results are supported by the previous studies (Andrew et al., 2024; Awad & Saadaoui Mallek, 2023; Latif, Rafeeq, Safdar, Liaquat, et al., 2023; Law et al., 2018; Shahabadi & Heidarian, 2024; Chunhong Zhang et al., 2022).

The financial development and economic growths coefficient have shown positive significant relationship with the ecological footprints. Financial development can affect the environment through three indicators. One more financial development means more economic growth that requires the more production of goods and services. More production requires increasing the demand for energy intensive goods that will adversely affect the environment. Secondly, more financial development means more circulation of money that will increase the demand for goods and services. To meet this increase demand for goods requires more production and production requires more energy intensive goods, that is why it hampers the environment adversely. These results are justified based on previously presented studies (Ding et al., 2022; Khan et al., 2022.; Law et al., 2018; Xue & Zhang, 2022; Zhang, 2011; Zhou et al., 2022). Foreign direct investment coefficient is positive significant relationship with ecological footprints. These results are based on pollution-haven hypothesis suggesting that foreign direct investment attracts capital from advanced countries and due to lax environmental regulations leads towards the environmentally unfriendly technology adoption. Eventually negatively affects the environmental degradation in developing countries. Results are justified on the basis of previous studies (Adebayo et al., 2024; Jahanger et al., 2022; Murshed et al., 2022; Opeyemi et al., 2024; Wang et al., 2024).

Human development indicators show that the negative significant effect on ecological footprints suggesting that one percent change in HDI brings 0.17 decrease in ecological footprints. Investment in humans by educating them or improving their health and life expectancy may have an improvement on environment. As investment in human

creating a responsible human that will know how they can save their environment that will positively affect the environment. Results are supported by the studies that suggest that in later stages of growth human development creates the awareness among the individuals that will save their environment. In this way human development can positively affect the environment. Results are justified on the basis of previous studies (Fakher, 2019; Onwe et al., 2024; Suchi et al., 2024). The interaction of HDI and globalization coefficients show the existence of negative significant association with ecological footprints. Results suggest that in the presence of human development globalization can reduce the ecological footprints and improve the environmental quality of the country. In its linear form globalization positively affects the environmental quality and human development index improving the environmental quality. Meaning that in their interaction the effect of HDI dominates the effect of globalization. This interaction effect suggests that globalization should increase within the increase in investment in human capital by educating, improving their health proving better water and sanitation facilities can lead to improve the environmental quality. These results are supported by the previous studies (& 2025, n.d.; Asif et al., 2024; Asongu & Odhiambo, 2020; N. H. Khan et al., 2025; Kuram & 2024, n.d.; Phore et al., 2024; Shahabadi & Heidarian, 2024; Struckell et al., 2022; Ur-Rahman et al., 2024).

Based on interaction effect between globalization and HDI we have partially differentiated the model with respect to globalization and HDI separately. To derive the marginal effect, we have incorporated the mean, maximum and minimum values of HDI and Globalization. Marginal effects of globalization show that at all levels of HDI globalization has positive significant effect on ecological footprints. But the effect decreases as human development increases. These results suggested that globalization deteriorates the environment in the countries with lower HDI as HDI increases its affect shrinks on environment. The marginal effect of HDI indicated that for all mean, maximum, and minimum values its effect is negative. This result indicated that human development improves the environment quality at all levels of globalization. At its minimum value the HDI effect is small and become stronger at mean value of globalization. At maximum value of globalization, the negative effect reduces in its strength. The turning point of HDI is 3.4 that is not in the data range.

Table 8. Dynamic Panel-Data Estimation, Two-Step System GMM

ECFP	Coef.	St. Err.	t-value	p-value	Sig
ECP_LAG1	0.97	0.01	1.03	0.000	***
HDI	-0.17	0.38	-4.32	0.000	**
KOFGI	0.22	3.54	6.44	0.000	***
PCIG	0.02	2.432	10.971	0.000	***
FD	0.04	3.63	1.157	0.000	***
FDI	0.07	0.02	1.53	0.000	***
KOFGI_HDI	-0.05	6.68	-8.17	0.000	***
Constant	-7.99	3.07	-2.6	0.000	***
Marginal Effects of KOFGI at HDI	Minimum		0.21		
	Mean		0.19		
	Maximum		0.16		
KOFGI Turning Point	Effect = 0		4.4		
Marginal Effects of HDI at KOFGI	Minimum		-0.58		
	Mean		-4.39		
	Maximum		-2.38		
HDI Turning Point	Effect = 0		3.4		
Arellano-Bond test for AR (1) in first differences: $z = -3.89$ $Pr > z = 0.000$					
Arellano-Bond test for AR (2) in first differences: $z = -0.04$ $Pr > z = 0.968$					
Sargan test of overid. restrictions: $\chi^2(137) = 1098.32$ $Prob > \chi^2 = 0.723$					
Hansen test of overid. restrictions: $\chi^2(137) = 98.46$ $Prob > \chi^2 = 0.995$					
*** $p < .01$, ** $p < .05$, * $p < .1$					

RESULTS AND POLICY RECOMMENDATIONS

The objective of the study is to check the combining effect of globalization and HDI on environmental quality. The interplay of HDI and Globalization coefficients shows a negative ecological footprint connection. Results indicate that Globalization can lower ecological footprints and increase environmental quality in countries with human development. Globalization linearly improves environmental quality and human development index. Thus, HDI

dominates Globalization in their relationship. This interaction effect says that Globalization should increase when human capital is educated, improved health, and water and sanitation facilities are improved to improve environmental quality. && 2025, n.d.; Asif et al., 2024; Asongu & Odhiambo, 2020; N. H. Khan et al., 2025; Kuram & 2024, n.d.; Phore, 2024; Shahabadi & Heidarian, 2024; Struckell, 2022; Ur-Rahman, 2024).

POLICY RECOMMENDATIONS

Based on the study findings, the study recommends some policy recommendations for developing countries.

- As globalization is found to increase the environmental degradation, then government should design policies to channel globalization towards environmentally friendly outcomes. This can be done through environmental clauses in trade and foreign direct investment agreements by restricting multinational corporations to adopt environmentally friendly technology and sustainable development procedures.
- Human development has reported the mitigating negative effect on environmental degradation and strengthening the constructive effect on economic growth. Policymakers should focus on investment in education, healthcare and developing skills that will help in empowering the workforce to demand and implement green technology.
- Financial development adversely affects environmental quality. Policy makers should strengthen green bonds and green finance and give incentives to promote renewable energy, eco efficiency and eco innovation projects.
- Foreign direct investment mitigating the environmental quality. Developing countries should restrict foreign investors for investing foreign investment in clean industries.
- Economic growth adversely affects the environmental quality. Developing countries should restructure development policies through implementation of renewable energy, low-carbon industries and green innovations.

REFERENCES

- Ali, S., Ali, H., & Raza, K. (2021). Environmental Implications of Deforestation: A Time Series Study of Pakistan. *Pakistan Journal of Humanities and Social Sciences*, 9(2), 174-186.
- Chen, Y., Zhou, Y., Raza, S. A., & Sarwar, S. (2024). What we learn from nexus between greener growth and energy-related emissions: Sustainability perspective evidence in context of financial globalization. *Geological Journal*, 59(2), 595–611. <https://doi.org/10.1002/gj.4883>
- Delessa, K., Alemu, T., & Bane, J. (2024). Remittances inflow and economic growth nexus in Sub-Saharan Africa: Do institutional quality and macroeconomic stability matter? *Heliyon*, 10(3), e25690. <https://doi.org/10.1016/J.HELIYON.2024.E25690>
- Eltayeb Elfaki, K., & Musa Ahmed, E. (2024). Globalization and financial development contributions toward economic growth in Sudan. *Research in Globalization*, 9, 100246. <https://doi.org/10.1016/J.RESGLO.2024.100246>
- Hye, Q. M. A., Ul-Haq, J., Visas, H., & Rehan, R. (2023). The role of eco-innovation, renewable energy consumption, economic risks, globalization, and economic growth in achieving sustainable environment in emerging market economies. *Environmental Science and Pollution Research*, 30(40), 92469–92481. <https://doi.org/10.1007/S11356-023-28945-4/TABLES/6>
- Islam, M. Z., Rahaman, S. H., & Chen, F. (2024). How do R&D and remittances affect economic growth? Evidence from middle-income countries. *Heliyon*, 10(9), e30160. <https://doi.org/10.1016/J.HELIYON.2024.E30160>
- Jahanger, A., Usman, M., Murshed, M., Mahmood, H., & Balsalobre-Lorente, D. (2022). The linkages between natural resources, human capital, globalization, economic growth, financial development, and ecological footprint: The moderating role of technological innovations. *Resources policy*, 76, 102569.
- Jie, Y., & Lan, J. (2024). Dynamic linkages between human capital, natural resources, and economic growth – Impact on achieving sustainable development goals. *Heliyon*, 10(14), e33536. <https://doi.org/10.1016/J.HELIYON.2024.E33536>
- Kumar, N. (2024). Natural resources and economic growth: Examining the role of globalization, financial development, and digitalization in India. *Resources Policy*, 97, 105260. <https://doi.org/10.1016/J.RESOURPOL.2024.105260>
- Kuziboev, B., Zografou, Z., Saidmamatov, O., & Chupanov, S. (2024). The Nexus Between Remittances, Natural Resources, Economic Growth, Healthcare and Environmental Sustainability In CIS Countries. *International Journal of Energy Economics and Policy*, 14(2), 419–425. <https://doi.org/10.32479/ijeep.15491>
- Li, Z., & Alharthi, S. (2024). Oil revenue and production cost disconnect and its impact on the environment: Economic globalization in Asia-Pacific economic cooperation countries. *Geoscience Frontiers*, 15(3), 101772. <https://doi.org/10.1016/J.GSF.2023.101772>
- Lin, H., & Peng, P. (2025). Impacts of Digital Inclusive Finance, Human Capital and Digital Economy on Rural Development in Developing Countries. *Finance Research Letters*, 73, 106654. <https://doi.org/10.1016/J.FRL.2024.106654>

- Latif, N., Rafeeq, R., Safdar, N., Younas, K., Gardezi, M. A., Ahmad, S., & Multan, P. (2023). Unraveling the Nexus: The impact of economic globalization on the environment in Asian economies. *Research in Globalization*, 2023, 2590–051. <https://doi.org/10.1016/j.resglo.2023.100169>
- Nuta, A. C., Abban, O. J., Ayad, H., & Nuta, F. M. (2025). Role of financial development and inclusivity in moderating the environmental effects of human development. *Research in International Business and Finance*, 73, 102623. <https://doi.org/10.1016/J.RIBAF.2024.102623>
- Oluwagbade, E. O., & Ibidapo, C. O. K. (2024). Impact of Globalization on the Economic Development of Nigeria. <https://ejournals.org/ejcsit/>
- Onwe, J. C., Ojide, M. G., Subhan, M., & Forgenie, D. (2024). Food security in Nigeria amidst globalization, economic expansion, and population growth: A wavelet coherence and QARDL analysis. *Journal of Agriculture and Food Research*, 18, 101413. <https://doi.org/10.1016/J.JAFR.2024.101413>
- Onuogu, I. C., Hassan, A., Akadiri, S. Saint, Bello, A. A., & Riti, J. S. (2024). Impacts of ICT diffusion, foreign direct investment, trade openness, and globalization on growth in Sub-Saharan Africa. *Natural Resources Forum*, September, 1–28. <https://doi.org/10.1111/1477-8947.12569>
- Sarwar, N., Bibi, F. un N., Junaid, A., & Alvi, S. (2024). Impact of urbanization and human development on ecological footprints in OECD and non-OECD countries. *Heliyon*, 10(19), e38058. <https://doi.org/10.1016/j.heliyon.2024.e38058>
- Sharif, A., Bashir, U., Mehmood, S., Cheong, C. W. H., & Bashir, M. F. (2024). Exploring the impact of green technology, renewable energy and globalization towards environmental sustainability in the top ecological impacted countries. *Geoscience Frontiers*, 15(6), 101895. <https://doi.org/10.1016/J.GSF.2024.101895>
- Sun, C., Abbas, H. S. M., Xu, X., Gillani, S., Ullah, S., & Raza, M. A. A. (2023). Role of capital investment, investment risks, and globalization in economic growth. *International Journal of Finance & Economics*, 28(2), 1883–1898. <https://doi.org/10.1002/IJFE.2514>
- Uddin, I., Ahmad, M., Ismailov, D., Balbaa, M. E., Akhmedov, A., Khasanov, S., & Haq, M. U. (2023). Enhancing institutional quality to boost economic development in developing nations: New insights from CS-ARDL approach. *Research in Globalization*, 7, 100137.
- Suchi, P. D., Shaikh, M. A. A., Saha, B., Moniruzzaman, M., Hossain, M. K., Parvin, A., & Parvin, A. (2024). Comprehensive index analysis approach for ecological and human health risk assessment of a tributary river in Bangladesh. *Heliyon*, 10(13), e32542. <https://doi.org/10.1016/J.HELİYON.2024.E32542>
- Uzar, U., & Eyuboglu, K. (2024). Testing the asymmetric impacts of income inequality, financial development and human development on ecological footprint in Türkiye: A NARDL approach. *Journal of Cleaner Production*, 461, 142652. <https://doi.org/10.1016/J.JCLEPRO.2024.142652>
- Wang, Z., & Sibte-Ali, M. (2024). Financial globalization and economic growth amid geopolitical risk: A study on China-Russia far East federal district. *Heliyon*, 10(10), e31098. <https://doi.org/10.1016/J.HELİYON.2024.E31098>
- Yasin, S., Damra, Y., Albaity, M., Ozturk, I., & Awad, A. (2024). Unleashing sustainability in uncertain times: Can we leverage economic complexity, uncertainty, and remittances to combat environmental degradation? *Journal of Environmental Management*, 359, 121094. <https://doi.org/10.1016/J.JENVMAN.2024.121094>
- Yasir Mehboob, M., Ma, B., Sadiq, M., & Mehboob, M. B. (2024). How do nuclear energy consumption, environmental taxes, and trade globalization impact ecological footprints? Novel policy insight from nuclear power countries. *Energy*, 313, 133661. <https://doi.org/10.1016/J.ENERGY.2024.133661>
- Yu, C., Shen, W., & Zhang, Z. (2025). Assessing progress toward sustainable development in China and its impact on human well-being. *Environmental Impact Assessment Review*, 110, 107729. <https://doi.org/10.1016/J.EIAR.2024.107729>
- Ze, F., Yu, W., Ali, A., Hishan, S. S., Muda, I., & Khudoykulov, K. (2023). Influence of natural resources, ICT, and financial globalization on economic growth: Evidence from G10 countries. *Resources Policy*, 81, 103254. <https://doi.org/10.1016/J.RESOURPOL.2022.103254>
- Zouine, M., el adnani, M. J., & salhi, S. eddine. (2024). Does higher education matter in mitigating chronic disease Mortality? evidence from MENA countries with consideration of Globalization, economic Growth, and environmental pollution. *Research in Globalization*, 9, 100236. <https://doi.org/10.1016/J.RESGLO.2024.100236>