Meritorious Journal of Social Sciences & Management
Vol. 07, No. 1 (2024)
Journal homepage:
http://journal.mgp.org.pk/index.php/MJSSM

The Effect of Income Inequality and International Relations on Environmental Degradation in 10 Selected Polluting Asian Countries

Sarah Anwar [1], Muhammad Sanaullah Khan[2]

ARTICLE DETAILS

History
Received format:
Decc, 2023
Available Online:
April, 2024

Keywords
GDP, IR, Remittances, Domestic Investment, Gross National Expenditure.

ABSTRACT

This study examines the impact of income inequality and globalization on carbon emission in ten selected Asian countries during the period 2001 to 2021. This study employed the Redundant fixed effect test and the Hausman test, results of both indicate that the Fixed Effect method is appropriate and its results shows that the GINI and POP have negative and significant impact on environmental degradation. But the GDP and IND have positive and significant impact on environmental degradation of the ten selected Asian Countries. Moreover, GLO has no effect on the Co2 in these countries. The interaction term (GLO*GINI) has positive and significant impact on environment degradation. By using an interactive term, International Relations appears to have a major detrimental impact on environmental quality, it does not appear to have a significant connection with CO2 emissions. This paper provides helpful policy recommendations for governments and policymakers to support environmental sustainability. The study suggests addressing income inequality and population growth to mitigate environmental degradation. It also suggests balancing economic growth with environmental sustainability through green technologies and renewable energy. Additionally, addressing industrial pollution through stricter regulations and cleaner production methods can help reduce the environmental footprint of industrial activities. These recommendations aim to improve overall environmental sustainability. This paper provides helpful policy recommendations for governments and policymakers to support environmental sustainability.

1- BZU, Vehari Campus (Corresponding Author)

2- PHD scholar at Muslim youth University Islamabad

Introduction

Climate change and the ongoing rise in carbon dioxide (CO_2) emissions pose a danger to the physical and emotional well-being of people worldwide. Importantly, one of the biggest issues facing people today is global warming, which was brought on by massive greenhouse gas (GHG) emissions. Researchers and decision-makers are thus paying more attention to this issue (You, Li, Guo & Guo, 2020). Many perspectives exist about how inequality impacts the environment. Some authors contend that, on the one hand, extreme income inequality

causes resource overuse, mostly because it is viewed as a last choice for survival (Ekeocha, 2021). In other words, because income inequality can pose problems for environmental policy, it may eventually lead to a decrease in environmental protection and an increase in harmful emissions (Grottera, Pereira Jr & La Rovere, 2017). According to the second viewpoint, large levels of economic inequality are linked to pollution reduction because they lead to a decline in the marginal inclination to emit (Liu, Zhang, Zhang, & Qin, 2020). The third viewpoint is mostly microeconomic and is based on personal economic choices. According to this viewpoint, some research indicates that greater income inequality causes higher levels of energy use and, consequently, higher levels of pollution (Kazemzadeh, Fuinhas & Koengkan, 2021).

International Relations makes it possible for industrialized economies to transmit modern technology to emerging ones, supports the division of labor, and boosts each country's comparative advantage. Economic growth is directly boosted by globalization, and this has an impact on the environment and energy consumption (Shahbaz, Khan, Ali & Bhattacharya, 2017). Various researchers have examined the effects of International Relations on environmental degradation using a variety of globalization measures. In this regard, (Grossman and Krueger, 1991) examined on how the North American Free Trade Agreement (NAFTA) affected the environment. They claimed that while the composition effect and the method effect were unchanged, trade openness (globalization) had an impact on degradation of the environment by the scale effect. Manufacturing industries in emerging countries have consistently expanded at a remarkable rate. These developing economies are experiencing economic progress at the expense of environmental deterioration due to the rising trend of globalization (Jahanger et al, 2022).

Literature Review

Asiedu, Effah and Aboagye (2022*)* states that the analysis identifies the critical masses (thresholds) at which the detrimental impacts of income inequality and poverty on energy consumption in Sub-Saharan Africa would diminish the positive incidence of finance and economic growth. For 41 African nations between 2005 and 2020, the two steps systems GMM estimator was used in the study. According to the study, the poverty headcount ratios in Sub-Saharan Africa need not be higher than 7.342, 28.278 and 129.332, respectively, for financial development to continue having a beneficial impact on per-capita energy consumption. The study also demonstrates the link between financial access and per-capita energy usage, with an inevitable negative impact on CO_2 emissions.

Khan and Yahong (2022) stated that the reduction of income inequality and environmental vulnerability are two main elements, through which we can achieve the target of Sustainable Development Goals. The past papers have investigated the nexus between income inequality and carbon emissions, however, the relationship between income inequality and carbon emissions along with ecological footprint needs to be considered. To this end, the objective of the current study is to reveal the causal association between income inequality and Environmental vulnerability by using the dataset from 2006 to 2017 for the 18 Asian developing economies. The empirical results obtained from Driscoll and Kraay standard error estimator confirmed the causal linkages between income inequality, ecological footprint, and carbon emissions. Furthermore, foreign direct investment, easy access to electricity, and population growth control income inequality, but they have a detrimental effect on both ecological footprint and carbon emissions. Lastly, based on our empirical findings, some important policy implications are recommended.

Pham (2023) stated that to attain sustainable and harmonious growth, the world urgently needs to address these

three social, economic and environmental concerns. The relationship between income inequality, global commerce and environmental quality, however, has not gotten much attention in the literature. This study examines the complementary impacts of income inequality and trade openness on carbon dioxide emissions using data from 94 countries, spanning the years 1996 to 2015. The findings provide qualified support for the reduction in carbon dioxide emissions benefits of greater income disparity and trade openness. Nevertheless, these advantages can only be attained at low levels of income inequality and trade openness, respectively. Governments should concentrate on achieving a fairer income distribution while adopting stronger environmentally friendly legislation in order to reduce their environmental damages given the high level of international commerce and a rising trend in economic inequality.

Chancel, Cogneau, Gethin, Myczkowski and Robilliard (2023) stated that the study estimates the evolution of income inequality in Africa from 1990 to 2019 by means of combining surveys, tax records and national accounts. Inequality in Africa is high: the richest 10% in the region is close to 55%, on par with areas characterized by severe inequality, such as Latin US and India. Most of the inequality across the continent comes from the intercountry component instead of the average income differences among countries. Inequality is highest in Southern Africa and lowest in Northern and Western Africa. It remained pretty stable from 1990 to 2019, apart from Southern Africa, in which it increased considerably. Among the historical determinants, this geographical sample seems to reveal the long shadow of settler colonialism, at least in Sub-Saharan Africa; the propagation of Islam stands out as every other strong correlate. The bad quality of raw information calls for huge warning, in particular when examining country-level dynamics.

Methodology

The panel data on the ten selected polluting nations during the time period 2001 to 2021 is the data that was used in this article. Data for other variables are gathered from the world development indicator, but data for institutional quality factors are gathered from the World Bank governance indicator. World Bank is the main secondary data source that are used to collect the data. Era of this study is 21 years from 2001-2021 for the investigation. Using the model below, this study will investigate how income inequality and International Relations (globalization) affects CO2 emissions.

$$CO2_{it} = \beta_0 + \beta_1 GINI_{it} + \beta_2 Glob_{it} + \beta_3 GDP_{it} + \beta_4 IND_{it} + \beta_5 POP_{it} + \beta_6 (GLO*GINI)_{it} + \varepsilon_{it}$$

Where

CO2 = Carbon Dioxide Emission
GINI = Coefficient of Income Inequality
GLO = Globalization
GDP = Gross Domestic Product
IND = Industrialization
POP = Population Growth
€ = Error term

Results & Discussion

The study's findings and analysis are presented in this section. The relevant econometric tests will be run on the data pertaining to a few Asian nations in order to analyze it.

Descriptive Statistics

Table 1 shows the descriptive statistics of the variables. The mean value of CO2 is 4.3332, the mean value of

GINI is 38.5792, the mean value of GLO is 63.7211, the mean value GDP is 4.8420, the mean value of FD is 72.0894, the mean value of IND is 34.7479 and the mean value of POP is 1.2594. The maximum value of CO2 is 12.8785, the maximum value of GINI is 47.7000, the maximum value of GLO is 83.4671, the maximum value of IND is 49.6373 and the maximum value of POP is 3.092. The minimum value of CO2 is 0.6268, the minimum value of GINI is 28.7000, the minimum value of GLO is 38.7736, the minimum value of GDP is -9.5183, the minimum value of -1.2693, the minimum value of IND is 17.5485 and the minimum value of POP is -0.1764.

Table: Results of Descriptive Statistics

	CO2	GINI	GLO	GDP	IND	POP
Mean	4.3332	38.5792	63.7211	4.8420	34.7479	1.2594
Median	3.5235	39.5500	63.3640	5.0783	34.7387	1.2984
Maximum	12.8785	47.7000	83.4671	14.2309	49.6373	3.0921
Minimum	0.6268	28.7000	38.7736	-9.5183	17.5485	-0.1764
Std. Dev.	3.3207	5.1789	9.1702	3.3760	8.3417	0.6129
Skewness	0.7511	-0.2023	-0.0362	-1.0213	-0.2196	0.2345
Kurtosis	2.5872	1.9096	2.5958	5.6062	2.2468	2.6379
Jarque-Bera	22.2478	12.3986	1.5459	100.5098	6.9692	3.2176
Probability	0.0000	0.0020	0.4617	0.0000	0.0307	0.2001
Sum	953.3096	8487.4220	14018.6400	1065.2490	7644.5290	277.0617
Sum Sq. Dev	2414.9620	5873.8600	18416.2400	2496.0320	15238.9100	82.2666
Observations	220	220	220	220	220	220 1.2594

Source: Software E-Views 9

Correlation Matrix

	CO2	GINI	GLO	GDP	IND	POP
CO2	1.000000					
GINI	-0.02443	1.000000				
GLO	0.487647	0.143961	1.000000			
GDP	-0.09953	0.111862	-0.08769	1.000000		
IND	0.352076	0.483487	0.145778	0.167981	1.000000	
POP	-0.47775	0.203388	-0.305	-0.03424	-0.26497	1.000000

There is no value larger than 0.9 in this table so there is no multicollinearity among the variables. To check out the multicollinearity used the correlation matrix.

Variance Inflation Factor

Variables	VIF
GLO	3.814859
GDP	1.053504

IND	1.841526
POP	1.795157
IND	3.814859

Variance Inflation factors are also to check the multicollinearity, and the rule of thumb is that no value of VIF should be greater than 10.

Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	3.43013	Prob. F (2,208)	0.0842
Obs*R-squared	6.99243	Prob. Chi-Square (2)	0.0603

The result shows that F-statistic is 3.43013. The P-value of the LM Test is 0.0842, which is greater than 0.05. That show auto correlation is not exist in the data.

Heteroskedasticity Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	4.944782	Prob. F (8,210)	0.0
Obs*R-squared	34.71437	Prob. Chi-Square (8)	0.0
Scaled explained SS	367.9828	Prob. Chi-Square (8)	0.0

There is heteroskedasticity exist in this data of study because it's less than 5%. This is the problem of the data which negative impact on analysis.

Redundant Fixed Effects Test

Effects Test	Statistic	d.f	Prob
Cross Section F	5.216556	-9,192	0.0000

Redundant fixed effect is the test to select the criteria between the two methodologies, first is common constant method and second is fixed effect method. If the probability value is less than 5% than used fixed effect method.

Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob
Period Random	50.76198	8	0.0000

If the Hausman test value is less than 0.05 then move towards fixed effect.

Fixed Effect Regression

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GINI	-0.00679	0.003263	-2.08026	0.0388
GLO	0.002792	0.002758	1.012521	0.3126
GDP	0.012103	0.001468	8.246755	0.0
IND	0.007381	0.00232	3.181007	0.0017

POP	-0.04132	0.016815	-2.457	0.0149
GLO*GINI	0.00081	0.000371	2.182697	0.0303
R-squared	0.99798	**Adjusted R-squared**		0.997801
S.E. of regression	0.982494	**F-statistic**		5579.668
Prob(F-statistic)	0.0	**Durbin-Watson stat**		2.018302

Table shows that the Fixed effect method, the coefficient value of GINI is -0.0679 and the probability value is 0.0388. The probability value is less than 5% means that one-unit change in income inequality will make -0.0679 units change in CO2 emission. There is negative and significant impact of income inequality on environmental degradation. The coefficient value of GLO is 0.002792 and the probability value is 0.3126. If the probability value is greater than 5% then the results are insignificant. There is positive and insignificant impact of International Relations (globalization) on environment degradation. The coefficient value of GDP is 0.012103 and the probability value is less than 5% means that the one-unit change in GDP will make 0.012103 units change in CO2 emission. There is positive and significant impact on environmental degradation. The coefficient value of IND is 0.007381 and the probability value is less than 5% means that one-unit change in industrialization will make 0.007381 units change in CO2 emission. Increase in value of industrialization will destroy the environment. There is positive and significant impact of industry on environmental degradation. The coefficient value of POP is -0.04132 and the probability value is 0.0149. The probability value is less than 5% then there is negative and significant impact of urbanization on environmental degradation. Increase in the value of population will decrease the CO2 emission because of better quality management. The coefficient value of the interaction term (GLO*GINI) is 0.00081 and the probability value is 0.0303. If the probability value is less than 5% then the results are significant. There is positive and significant impact of interaction term (GLO*GINI) on environment degradation.

Conclusion

This article examines the effects of wealth inequality and International Relations on environmental deterioration in ten Asian nations that pollute from 2001 to 2021. The quality of institutions, industrialization, urbanization, and financial growth are additional significant factors that we also include. According to the findings, only GINI and POP have a negative impact on carbon emission, whereas GDP, GLO and IND have a positive impact. Our findings suggest that environmental deterioration is primarily responsible for the majority of income disparity and other characteristics we examined in this study. Our research primarily shows that governments need to raise the caliber of institutions that can combat income inequality by defending the rights of the poor, as well as institutions that can safeguard environmental quality together with the management of income disparity.

The current study then used several econometric methodologies as descriptive statistics, pair-wise correlation, Variance Inflation Factors, Serial Correlation LM Test, Breusch-Pagan-Godfrey Test The present study then uses the Hausman test to determine whether we used the fixed effect method or the random effect method, and the Hausman test recommends the fixed effect method be used in this research. And then the research used the fixed effect method, which shows about the impacts of variables. Findings of the Fixed effect method show that the GINI and POP have negative and significant impact on environmental degradation. But the GDP and IND have positive and significant impact on environmental degradation of the ten selected Asian Countries. Moreover, GLO has no effect on the Co2 in these countries. The interaction term (GLO*GINI) has positive and significant impact on environment degradation. By using an interactive term, International Relations appears to have a major detrimental impact on environmental quality, it does not appear to have a significant connection with CO2

emissions. This paper provides helpful policy recommendations for governments and policymakers to support environmental sustainability. The study suggests addressing income inequality and population growth to mitigate environmental degradation. It also suggests balancing economic growth with environmental sustainability through green technologies and renewable energy. Additionally, addressing industrial pollution through stricter regulations and cleaner production methods can help reduce the environmental footprint of industrial activities. These recommendations aim to improve overall environmental sustainability.

References

Asiedu, M., Effah, N. A. A., & Aboagye, E. M. (2022). Finance, poverty-income inequality, energy consumption and the CO2 emissions nexus in Africa. Journal of Business and Socio-economic Development.

Chancel, L., Cogneau, D., Gethin, A., Myczkowski, A., & Robilliard, A. S. (2023). Income inequality in Africa, 1990–2019: Measurement, patterns, determinants. World Development, 163, 106162.

Ekeocha, D. O. (2021). Urbanization, inequality, economic development and ecological footprint: Searching for turning points and regional homogeneity in Africa. Journal of Cleaner Production, 291, 125244.

Grossman, G. M., & Krueger, A. B. (1991). Environmental impacts of a North American free trade agreement.

Grottera, C., Pereira Jr, A. O., & La Rovere, E. L. (2017). Impacts of carbon pricing on income inequality in Brazil. Climate and Development, 9(1), 80-93.

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.

Kazemzadeh, E., Fuinhas, J. A., & Koengkan, M. (2022). The impact of income inequality and economic complexity on ecological footprint: an analysis covering a long-time span. Journal of Environmental Economics and Policy, 11(2), 133-153.

Khan, S., & Yahong, W. (2022). Income inequality, ecological footprint, and carbon dioxide emissions in Asian developing economies: what effects what and how?. Environmental Science and Pollution Research, 29(17), 24660-24671.

Liu, Z., Zhang, H., Zhang, Y. J., & Qin, C. X. (2020). How does income inequality affect energy efficiency? Empirical evidence from 33 Belt and Road Initiative countries. Journal of cleaner production, 269, 122421.

Pham, H. (2023). Linking Income Inequality, Trade Openness, and Carbon Dioxide Emissions. Trade Openness, and Carbon Dioxide Emissions.

Ravallion, M., Heil, M., & Jalan, J. (2000). Carbon emissions and income inequality. Oxford Economic Papers, 52(4), 651-669.

Shahbaz, M., Khan, S., Ali, A., & Bhattacharya, M. (2017). The impact of globalization on CO2 emissions in China. The Singapore Economic Review, 62(04), 929-957.

You, W., Ekeocha, Y. (2020). Income inequality and CO 2 emissions in belt and road initiative countries: the role of democracy. Environmental Science and Pollution Research, 27, 6278-6299.