

Impact of Financial Development and Industrialization on Environmental Degradation: Evidence from South Asian Countries

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ABSTRACT

CO₂ emissions may affect economic growth and development. It has been observed that emissions are the result of increased energy use, industrialization, and urbanization in Asian countries. Emissions are rising faster than natural rates. Considering the effects of financial inclusion on CO₂ emissions, we have examined how industrialization, urbanization, and income inequality affect the emissions in South Asian economies by using data from 2005 to 2020. Fixed effect results show that financial development is the key driver of CO₂ emissions. Findings also point out that industrialization and urban population also enhance the CO₂ emissions. Finally, income inequality also seems to be affecting the emissions in developing countries. The study suggests that there should be more provision of a clean environment. Energy policies should focus on the supply of better-quality energy by using other sources. Rapid industrialization must contribute to environmental degradation. And finally, there is a dire need to control the urban population for low environmental degradation.

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INTRODUCTION

Human development, which comprises education, health, and, on the whole, welfare, is a basic support of sustainable economic change. For developing countries, making an effort to release themselves from poverty and underdevelopment, investment in human capital indicates a very important opportunity for economic advancement (Djuraev et al., 2025). CO₂ emission and climate change are receiving considerable attention in the interrelated literature because of their influences on the worldwide setting and economic actions (Cucchiella et al., 2020; Arioli et al., 2020). Financial development, which involves decreasing information asymmetries and making better capital distribution, plays a serious role in economic development. In addition, a bulky corpus of practical work assumes that financial development is a vital cause influencing environmental excellence (Khan et al., 2018; Boutabba, 2014; Zhang, 2011; Charfeddine & Kahia, 2019). Financial development permits firms to finance their research and development actions or novel amenities, which will affect the environment. Even though a lot of authors made an attempt for finding link between financial development and pollution, there is still no agreement about the significance and scale of the outcome.

In spite of a lot of work on the consequences of financial development on CO₂ emissions, a small number of studies have given details on how upgrading financial systems can have an effect on environmental excellence. The majority of the preceding work merely gives attention to the direct outcome. Financial development simplifies the right of entry of the deprived and further susceptible managers to a variety of financial facilities, giving them improved financial organization alternatives (Ravallion et al., 2000). Environmental sustainability emphasizes protecting natural resources for future generations. At the same time, green growth provides a planned move toward plummeting greenhouse gas emissions and reducing energy use, thus mitigating ecological degradation (Sandberg et al., 2019; Marc et al., 2024). FDI is an essential factor in determining the international economy and directly affects environmental sustainability, mainly concerning carbon dioxide emissions. As countries struggle to secure foreign

direct investment, they have to concomitantly uphold equilibrium between growth and ecological protection (Bashir & Rashid, 2019; Opoku et al., 2022).

A lot of studies have been made showing factors that influence the ecological degradation. However, we have reviewed the studies focusing on industrialization, financial development, and other factors influencing environmental degradation. Ang (2007) focused on the association of emissions, energy usage, and output by using data from 1960 to 2000. VAR model was used by the authors. It was found that energy use caused for environmental degradation. Moreover, causality results explained that growth put forth a causal influence on energy use growth and pollution growth. However, Lin et al. (2009) emphasized the role of the population in affecting the environment. The STIRPAT model showed that population affected the environment negatively. Urbanization level tended to decrease the ecological degradation. However, the industrialization level influenced the environment negatively in China.

Shahbaz and Lean (2012) focused on how economic growth is affected by financial inclusion in Tunisia. It was found between financial development and growth in the Tunisian economy. Al-Mulali et al. (2015) analyzed the role of financial development on environmental quality in 23 Asian countries. The study findings highlighted that financial development tended to increase high emissions in the economies. Shahbaz et al. (2015) emphasized the role of financial development on pollution by using data from 1895Q1 to 2014Q4. The result showed the positive association of both in Pakistan. Bokpin (2017) focused on the role of foreign direct investment on growth and CO₂ emission by using data from 1990 to 2013 in Africa. Result showed that FDI has increased environmental degradation in Africa. The study recommended effective governance.

Ahmad et al. (2019) examined how financial development affected energy consumption and CO₂ emissions. The result revealed that the development of the stock market led to a decrease in energy consumption and reduced CO₂ emissions. Odhiambo (2020) focused on the association of financial development, income inequality, and carbon dioxide by using data from 2004 to 2014 in African countries. Findings showed that financial development and income inequality led to a reduction in CO₂ emissions. Moreover, financial development negatively affected CO₂ emissions. Bui (2020) analyzed how financial development affected CO₂ emissions in 100 countries by using data from 1990 to 2012. The 2SLS and 3SLS were employed by the authors. It was found that financial development resulted in increased environmental degradation. Moreover, financial development reduced income disparity. Singh et al. (2025) investigated the influence of financial development, human development, urbanization, and industrial employment on environmental quality in E-7 economies. The results showed that increased human development and employment or urbanization in China have increased environmental pollution. The study recommended for environmental quality on a country-by-country basis.

Nambie et al. (2025) focused on the role of financial literacy on CO₂ emissions by using data from 2003 to 2024 in Africa. The findings showed that financial literacy has enhanced individuals' ability to make informed decisions, thereby enlarging the advantages of economic growth. The study focused on the need of incorporating financial literacy into educational curricula. Khalid and Abdul (2025) focused on the role of green growth, FDI, human capital, and broader financial expansion in carbon releases in Bangladesh by using data from 1980 to 2022. The ARDL result showed that growth tremendously fostered ecological sustainability by boosting eco-friendly methods and funding progressive innovations specifically aimed at cutting carbon discharge. Moreover, the study also showed the positive role of literate labour. The study suggested for financial development and economic planning in Bangladesh.

The existing study shows the role of financial development, industrialization, urban population, and income disparity on environmental degradation in South Asian countries. It tries to highlight how these variables deteriorate the environment in the concerned economies.

Significance of the Study

Many variables, such as population growth, poverty, inflation, and unemployment, seem to affect the environment in countries of the world. However, we have analysed the role of financial development, industrialization, urban population, and income disparity seemed to be influencing the economic growth of developing and developed countries. Though we have found that how does the digitalization, financial development, urbanization, and income disparity affect the environment in developing countries.

Research Hypothesis

The Major hypotheses are given in the following:

H1: Financial development and environmental degradation are positively associated.

H 2: The higher the industrialization, the higher the environmental degradation.

H 3: A positive link exists between urban population and environmental degradation in South Asian countries.

H 4: Income disparity and environmental degradation are positively associated.

METHODOLOGY

It has been observed that many of the major economic factors may affect the environment. Considering this, we have checked the influence of factors on environmental degradation in Asian countries. The ecological footprint consumption was used as the dependent variable. However, financial development, industrialization, income inequality, urban population were used as independent variables. We have used fixed effect methods for the analysis. We have utilized the data from 2005 to 2020. We have included countries such as Bangladesh, Indonesia, India, Pakistan, Malaysia, Iran, Jordan, and Philippine. Data were taken from World Development Indicators.

The econometric model may be stated as:

$$LEFPCPC = \beta_0 + \beta_1FDVPM_{it} + \beta_2 INDST_{it} + \beta_3 URBNP_{it} + \beta_4GINIIN_{it} + u_{it} \tag{1}$$

LEFPCPC= Ecological footprint consumption per capita

FDVPM = Financial development indicated by domestic credit to the private sector (% of GDP)

LINDST= Industrialization indicated by value-added manufacturing

LURBNP= Urban population (Log of urban population total)

GINIIN= Gini index showing income inequality

it = (time trend)

u_{it} = (error term)

RESULTS AND DISCUSSION

We have shown descriptive statistics of vital factors in Tables 1 and 2, pointing out fixed effects. It is found that, on average, ecological footprint consumption is 1.8288 percent in South Asian countries. However, the range of EFPCPC found from 0.5986 to 4.4762 percent. The value of the standard deviation is less than the mean value. It shows the data stability. Results also point out that financial development is 52.0587 percent on average. Industrialization is 9.20e +10 percent in this analysis. Although the urban population is 9.52e+07 percent. Finally, on average, the Gini index (GINIIN) is 0.6651 percent, and it ranges from 0.5 percent to 0.81 percent.

Table 1: Descriptive statistics

Factors	Observations	Mean	Standard deviation	Minimum	Maximum
EFPCPC	112	1.8288	1.1340	0.5986	4.47762
FDVPM	112	52.0587	28.5613	15.3861	125.0618
INDST	112	9.20E+10	1.07E+11	4.04E+09	4.91E+11
URBNP	112	9.52E+07	1.20E+08	0.4582	4.60E+08
GINIIN	112	0.6651	0.0935	0.5	0.81

Table 2: Fixed effects results

Variables	Coefficients, Standard Errors and t-values
FDVPM	0.0009** * 0.0005 (1.63)
LINDST	0.3460 * 0.1112 (3.11)
LURBNP	0.4143* 0.1042

	(3.90)
GINI	0.1357 0.3541 (0.30)
C	0.4498 0.7812 (0.59)
F Statistics	17.25
Probability	0.0000
R2 within	0.45
R2 between	0.80
R2Overall	0.79

t-values are in parentheses; ** p<0.05, * p<0.1 and *** p< 0.01

Financial development is an important factor affecting the environmental degradation of Asian economies. The private sector provides more credit facilities to the general public. They resultantly utilize that credit facility in investing, consumption and economic actions. This results in more degradation of the environment. The result shows that a one percent increase in domestic credit to the private sector causes more ecological degradation in Asian economies by 0.0009 percent. The reason may be more usage of credits and money. The result is favored by Shahbaz et al. (2015). With health, the role of education cannot be ignored. More school enrolment resulted in more participation of highly educated human capital in the production processes and growth. So, due to it, human development increases. The study result indicates that one unit increase in education resulted in high development by 0.0023 percent. The result is supported by Khalid and Abdul (2025).

The urban population also influences the environment. More urban population, along with rural to urban migrants, seems to be involved in so many economic activities. People are also investing more for more profit, earnings, and exports. This results in more deterioration of the environment. The study result also shows that a one percent increase in urban population has resulted in 0.4143 percent environmental degradation in South Asian countries. The finding is supported by Singh et al. (2025). Income disparity also affects the environment. People with money also indulge in economic actions and businesses. This results in environmental degradation. The study found a positive relationship between income inequality and environmental degradation.

CONCLUSIONS

In the existing work, we have tried to point out some important factors that may result in environmental degradation in South Asian countries by using data from 2005 to 2020. Here, we have checked how financial development, industrialization, and urban population affect the environmental degradation in these economies. Moreover, it is also found that income disparity also affects the environment positively. The fixed effect results show that financial development positively affects environmental degradation. Findings also point out that industrialization and urban population have also enhanced environmental degradation in Asian countries. Finally, income disparity also results in more ecological degradation. Finally, study has concluded that more availability of finances, industrialization, and people involved in economic actions are the causes of more environmental deterioration. On the basis of the results, it is recommended that there should be more focus on the usage of clean energy for a clean and safe environment in these economies. People should invest more in safe investments or businesses which may not harm society or the environment. Finally, there should be an equal distribution of income.

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