Demographic factors and the environmental Kuznets curve: global plastic pollution by 2050 could be 2 to 4 times worse than projected

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Abstract

Since 2015, the detrimental effects of plastic pollution have attracted media, public, and governmental attention. Considering that economic growth is inevitable and a key driver of plastic contamination, it is worthwhile to analyze the environmental Kuznets curve (EKC) relationship between economic development and plastic pollution. To this end, we contribute by being the first to (i) use the stochastic impacts by regression on population, affluence, and technology model as the theoretical and analytical framework to investigate this EKC relationship; (ii) provide a comprehensive analysis of how demographic factors affect plastic pollution; and (iii) use certain panel model techniques to examine the drivers of plastic pollution. Our empirical results support an inverted U-shaped relationship between plastic pollution and income. The implied turning point, beyond which plastic pollution starts to fall as income rises, is relatively stable and not very sensitive to variations in model specifications. Our results reveal possible environmental benefits of economic growth and a meaningful response of demographic factors to plastic pollution. At current trends, global plastic pollution (that is, annual discard of inadequately managed plastic waste) is expected to grow from 52 million tons per year in 2020 to 257 million tons per year in 2050.

Keywords: Plastic pollution, environmental Kuznets curve, demographic changes, economic growth, urbanization, STIRPAT model

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