

Revisiting the Environmental Kuznets Curve

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Abstract

Carbon dioxide emissions are one of the main causes of anthropogenic global warming. The effects of climate change on the global ecosystem and the world economy will be severe. There is theoretical support for the environmental Kuznets curve, but empirical evidence is far from robust, and often contradicts theoretical propositions. We test for the existence of an inverted U-shaped relationship between carbon dioxide emissions and real income for a panel of 78 individuals (66 countries and 12 composite regions) for the years 1997, 2001, 2004 and 2007. We contribute to the literature in two ways. Firstly, we use multi-region input output (MRIO) methodology and the GTAP database to develop comparable CO₂ production- and consumption-based inventories. Secondly, we estimate a threshold model alongside conventional linear models, taking into account potential sources of endogeneity. Our results show a significant differential between the income-elasticities of consumption and production CO₂ emissions inventories. We confirm the results of previous literature and find endogeneity bias from Kyoto ratification. Our threshold specifications favour evidence for a piecewise environmental Kuznets curve. All in all, our results point out that consumption patterns seem to be less constrained by environmental regulation. Environmental policies should target more sustainable consumption in developed countries. A major problem of international environmental agreements concerns the distribution of responsibility of pollution across countries. Consumption-based emission information can supplement the production-based emission inventory criteria in the adoption and implementation of international environmental regulation. The increasing contribution of trade-embodied to total emissions, mainly connected to trade in intermediates, opens the door to other forms of environmental regulation enforcement aside from multilateral agreements, by affecting consumption patterns.

Keywords: CO₂ emissions, Environmental Kuznets Curve, GTAP, multiregion input-output analysis.

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