

## DOES CARBON DIOXIDE EMISSIONS FOLLOW AN ENVIRONMENTAL KUZNETS CURVE ?

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Ambient air pollution caused by sulphur dioxide and suspended particulate matter has been shown to increase with increasing per capita income eventually reaching a maximum, and then to decline as per capita income continues to increase. Such an inverse U-shaped pattern is known as the Environmental Kuznets Curve (EKC). As with the pollutant carbon dioxide, some researchers have reported the existence of a log-linear relationship between per capita CO<sub>2</sub> emissions and per capita income, not an EKC pattern. Some researchers, on the other hand, have proved the existence of the EKC pattern, which is in fact a log-quadratic relationship, between per capita CO<sub>2</sub> emissions and per capita income.

Regression analyses carried out in this study with country data for the year 1996 show that the relationship between per capita emissions and per capita income is statistically significant in cases of the following three models: log-linear model, log-quadratic model, and log-saturation model which is a novel feature reported in this study. Figure 1 shows the predictions of the three models developed, along with the actual data represented by circles. For per capita incomes up to about 13,000 constant 1995 US\$, the predictions of all three models are nearly the same. As the per capita income increases above 13,000 constant 1995 US\$, the predictions of the three models begin to exhibit remarkably large deviations from each other.

A comparative study of the three models carried out in this study, along with a detailed investigation into the carbon dioxide emissions history of some of the top-most countries in the per capita income spectrum and the effect of time upon the models, show that the log-saturation model, in which per capita emissions increases and reaches a saturation value with increasing per capita income, is the one that best explains the cross-country emissions data. This study, therefore, shows beyond doubt that the carbon dioxide emissions does not follow an EKC pattern with increasing income.

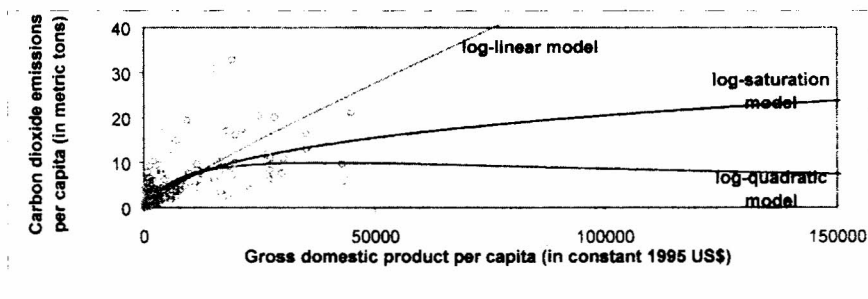


Figure 1: Predictions by the three regression models, log-linear, log-quadratic, and log-saturation models, developed with the cross-country data for the year 1996 containing 171 countries. Circles represent the actual values used for developing the models.