Climate Impact on China's Residential Electricity Consumption

Does the Level of Income Matter?

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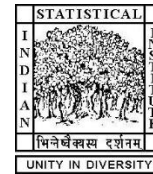
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Abstract

It is widely accepted that energy use contributes to climate change, but, in turn, climate change can also affect energy demand. Plenty of literature proves the existence of this feedback mechanism, but there is still no consensus on its exact operation. This needs to be studied in detail in China, which is the largest electricity consumer in the world. One particularly interesting question is how the increasing income of China's residents affects the climate sensitivity of electricity demand. By using a panel dataset including 278 cities in China over the period 2005-2015, this paper attempts to fill some gaps in this context. To this end, a newly developed model is employed: a partially linear functional-coefficient panel data model. We find that climate change significantly stimulates residential electricity consumption in hot weather rather than in cold weather. In addition, the level of income has an impact on climate sensitivity. More specifically, an increase in income initially increases the marginal effect of cooling degree days (days on which building cooling is desired) on electricity consumption, but the curve of the marginal increment becomes flatter as income growth increases further.

Keywords: Residential electricity consumption; climate impact; income heteroscedasticity; partially linear functional-coefficient model

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