

Exploring the direct rebound effects for residential electricity demand in urban environments: evidence from Nice

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Overview

Despite the increasing relevance of urban energy programs targeting energy savings in the residential sector, studies exploring rebounds in domestic electricity demand at the urban scale remain limited. This paper provides the first attempt to derive magnitudes of the direct rebound effects for residential electricity demand utilizing district-level data from the 146 districts of the French city of Nice for the year 2016.

Methods

For the analysis, we employ both non-spatial and spatial specifications, by which we control simultaneously for both spatial dependence and spatial heterogeneity. Our complementary spatial approach is motivated by an increasing strand of literature highlighting the importance of considering the spatial dimension when analyzing household electricity consumption.

Results

From our findings, heterogeneous magnitudes for the direct rebound effect emerge at the district level. Particularly, higher-energy efficiency districts do not register necessarily lower magnitudes of rebound effects compared to lower-energy efficiency districts. Per contrary, the districts of Nice endowed with the most efficient energy-saving technologies denote among the highest rebound effects (around 55%) for energy efficiency. At the same time, the relationship between the rebound effect and household income remains blurry.

Conclusions

Our estimates for the localized direct rebound effects in the city of Nice cast some doubt on the effectiveness of local urban policies enacted by city authorities to lead to energy optimization. In this regard, a policy shift from purely technically oriented efficiency programs towards a mix of technological and behavioral change campaigns could represent a valuable alternative strategy. In line with other recent contributions, we also believe that targeting heterogeneous groups of households to observe their different capacity for changing behavior may additionally contribute to this purpose. At the same time, while pursuing energy efficiency goals, authorities shall also ensure that optimization in electricity usage does not decrease the welfare level of citizens. Particularly, those households for which electricity results to be a necessity good, may experience a decrease in their well-being following schemes of excessive energy optimization.

References

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