

ADDING FUEL TO FIRE? ROLE OF SPATIAL DISPARITIES AND PEER-EFFECTS IN CLEAN COOKING FUEL USE IN INDIA

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Overview

The UN Sustainable Development Summit held in September 2015 reiterated the importance of sustainable development in the framing of targets to meet by 2030. The agenda particularly highlighted the provision of affordable and clean energy to everybody, in particular to "ensure universal access to affordable, reliable and modern energy services (by 2030)". Another key feature of these targets was the emphasis on improvement of energy efficiency. These goals are particularly binding in the context of developing countries, which are currently some of the largest emitters of carbon-dioxide.

Traditional biomass use in developing countries is one significant roadblock in the way of improving energy efficiency. Many countries in Africa and Asia are still heavily reliant on traditional biomass such as firewood, charcoal and crop residues as a source of fuel for cooking. Not only does cooking using traditional biomass lead to greenhouse gas emissions due to incomplete combustion, it also leads to a significant deterioration of health outcomes due to indoor air pollution. It is well-known that women and children are particularly vulnerable to these risks, as they spend more time indoors.

The example of India in this context is particularly glaring. Almost 800 million people in India are still using traditional biomass, especially firewood, as the primary source of cooking fuel. The majority of these households are rural, with little means to purchase cleaner cooking fuels such as liquefied petroleum gas (LPG) or kerosene, which are more expensive. This is further exacerbated by easy (and mostly free) access to sources of fuel such as firewood. The objective of this paper is to empirically evaluate whether there is urban bias in the consumption of LPG connections across areas in the country, and to measure its extent. Moreover, we also aim to evaluate whether this bias has reduced over time, as the rate of urbanization has increased. We then analyse the role of distance to urban centres as a determinant of LPG consumption at a household level in rural areas, while controlling for factors such as lack of access to (free) firewood, income, education, and status of women in the household.

Lastly, we aim to understand the role of peer effects in encouraging rural households to switch to cleaner cooking fuels. Is there a role for social learning in the rural areas, where rates of LPG adoption are high? Do individuals in rural areas learn from individuals in nearby urban areas? What factors could this social learning depend on? Lastly, we seek to evaluate whether the adoption of LPG in rural areas has led to better health outcomes for the households that switched, in particular for women and children.

Methods

The paper uses a comprehensive dataset of household-level consumption expenditure collected as a part of the National Sample Survey of India that spans from 1983 to 2012. This survey is conducted at an annual frequency, and it collects data on what households have bought in the last year/month/week, how much they spent on it, and what quantity was purchased.

The methodology adopted for the regression analysis is discrete-choice analysis, where for the first part of the study, we focus on understanding spatial effects (such as distance to the nearest urban centre) as a possible determinant of clean cooking fuel use, whereas in the second part of the study, we study the role of peer effects in encouraging rural consumers to switch to LPG use. In both estimations, we control for household characteristics, such as family size, composition, level of education of the family members, age, gender, marital status, employment status, etc.

Results

Initial results of this study suggest that there is a significant urban bias in the distribution of both LPG connections, and the subsidies on the use of LPG across areas of the country. In fact, distance to the urban centres is a determinant of the rural household's decision to adopt LPG. We also find that social learning plays a critical role, with households observing the behaviour of other households before deciding to adopt a certain fuel themselves. This learning is particularly acute for households that are closer to urban centres, and thus have the added advantage of learning from a population where a larger fraction of households would already be using LPG.

Conclusions

From a policy perspective, a pertinent question is determining which factors play a role in whether a rural household actually switches to cleaner cooking fuels. While traditional factors such as income and role of women in the households are crucial, this paper assesses the role of distance to urban centres and peer effects as determinants of adoption of new sources of energy, and finds that both factors are related, and play an important role. Through this paper, we aim to address the important externalities caused by the use of inefficient cooking fuels on both health outcomes in developing countries such as India, and on global pollution and climate change. This provides important information to policy-makers looking to provide incentives to encourage consumers to switch to cleaner fuels.

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