REGULATING THE UNKNOWN: THE CASE OF COOLING TECHNOLOGIES ACROSS AFRICA

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Overview

The impacts of climate change and the resources to adapt to it are unequally distributed. Africa, the hottest and poorest continent, is already being adversely affected by rising temperatures; a trend that will continue (Diedhiou et al., 2018; Nikulin et al., 2018). When it comes to climate adaptation, cooling technologies–including fans and air conditioners (AC)–have been shown to improve the quality of life. In rapidly urbanising and warming Africa, the widespread deployment of cooling technologies could save millions of lives in the coming decades (Basu, 2009; Barreca et al., 2016). At this point, however, AC adoption rates in Africa are only in the single digits with less than 5% (IEA, 2018).

With growing access to electricity and income, air conditioners and cooling fans are expected to double this decade (IEA, 2022). At this point, Africa imports most of its cooling technology from global firms in China, Japan, South Korea and the US. The quality these companies choose to offer in the current African market will shape the continent's equipment stock and electricity demand for years to come. There are currently only a few regulations in Africa encouraging the diffusion of energy-efficient cooling technologies. We gathered data on cooling appliances' characteristics (including energy efficiency level) from Jumia, Africa's largest ecommerce platform, in 13 African countries. As we show in this paper, there is a lack of basic information needed to introduce optimal regulations.

Methods

We built a database of cooling appliances (air conditioners, fans, refrigerator-freezers, freezers) available in a number of African online markets. We developed scraping algorithms to collect information automatically from Jumia, Africa's leading ecommerce platform, on a daily basis. The algorithm has been extracting product information (price, energy efficiency, other attributes) since 2019. The data spans 13 African countries: Algeria, Cameroon, Côte d'Ivoire, Egypt, Ghana, Kenya, Morocco, Nigeria, Senegal, South Africa, Tanzania, Tunisia, and Uganda.

We present an overview of the energy performance of the ACs in the database and we then use logistic regression to study manufacturers' strategy in disclosing energy performance information.

Results

Less than 10% of ACs (N=1382) on Jumia's platform have information on energy performance.

The average AC energy efficiency ratio (EER) in the 13 African countries is 3.2 W/W. For comparison purposes, EER values also range between 2.9 and 3.6 W/W in Europe, East Asia and North America (IEA, 2018). Although the African average is similar to other regions, we observe some notable differences at the upper-end of the distribution and detect heterogeneity across countries. In particular, the most energy-efficient ACs in Egypt and Senegal have a similar performance to world's best technology whose efficiency ratio exceeds 6.0 W/W. However, the EER values in most of the countries in our data fall significantly below this benchmark with a maximum efficiency rating between 3.0 and 4.0 W/W.

Regarding energy performance disclosure, more expensive ACs and ACs in wealthier countries, are more likely to have EER information. The presence of a regulation policy in a given country is negatively correlated with the disclosure on energy efficiency information which is likely due to a lax enforcement of the policies.

Conclusions

Our preliminary analysis shows that less than 10% of ACs (N=1382) on Jumia's ecommerce platform have information on energy performance. The disclosure of this information appears highly idiosyncratic, with no obvious strategic motives. It thus seems unlikely that the disclosure of energy information in the market would occur without

government intervention. In subsequent work, we will enhance the database with product data gathered directly from manufacturers, to study more closely the energy efficiency premium in African online markets. This work will allow us to make policy recommendations for the optimal design of energy efficiency standards.

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