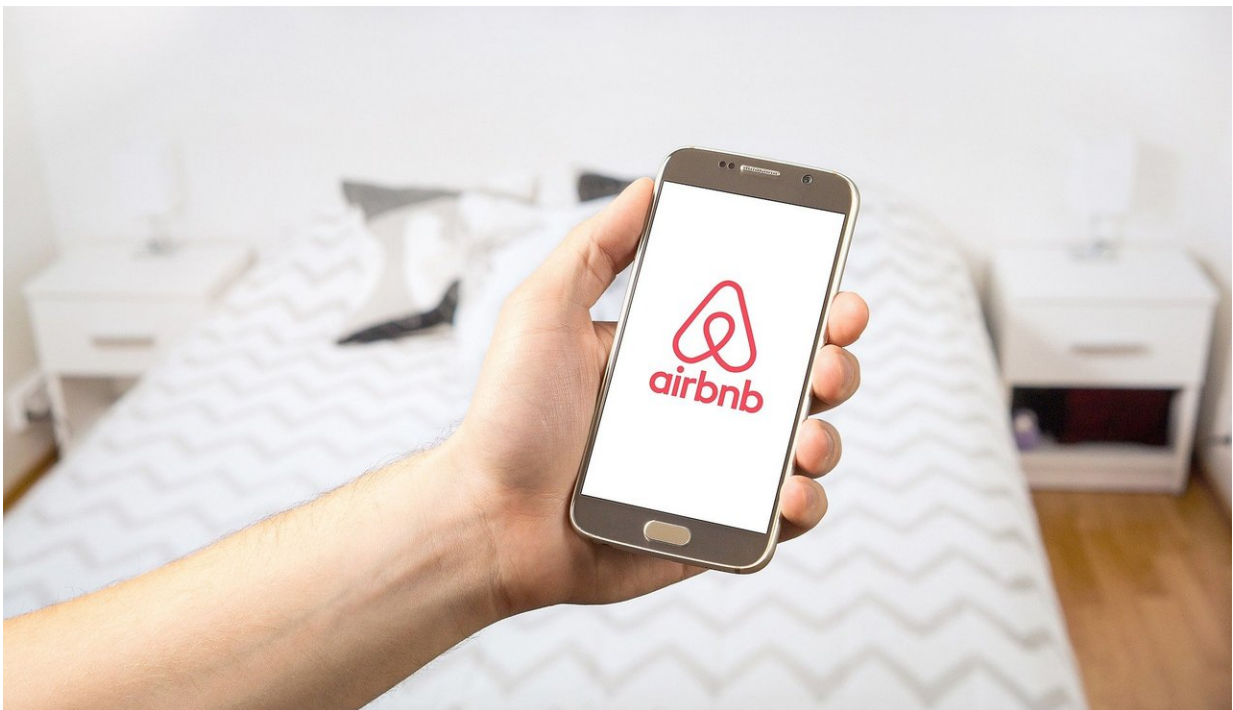# Racial revenue gap narrowed with AirBnb pricing algorithm, but only for those who adopt it: new research

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Credit: CC0 Public Domain

A voluntary AirBnb pricing algorithm substantially narrowed a pre-existing revenue gap between white and Black hosts, a new study has found—but only when Black hosts adopted it.

The Smart Pricing tool, introduced by the sharing economy platform in 2015, uses a [machine-learning algorithm](#) to help AirBnb hosts optimize prices for their properties according to fluctuations in guest demand. Hosts can choose whether to use the free tool by switching it on and having it automatically adjust their nightly rates within price parameters that they set.

A group of researchers found that hosts who adopted Smart Pricing saw a subsequent drop in their average nightly rates but also an increase in their monthly occupancy stats and nearly 9% rise in overall revenue.

Black hosts benefited the most. That's because they started out with 20% lower demand for equivalent properties compared to white hosts, representing a $12.16 gap in average daily revenue. After adopting Smart Pricing, Black hosts made an additional $13.92 a night compared to $5.22 for white hosts.

That closed the revenue gap by 71%, but it did not eliminate it. And since Black hosts were 41% less likely to adopt Smart Pricing than white hosts, they ended up even more disadvantaged than before Smart Pricing was introduced, overall.

"The algorithm does a good job of reducing the [revenue](#) gap but it's not foolproof," said Nitin Mehta, a professor of marketing at the University of Toronto's Rotman School of Management. He co-authored the study with his former graduate student, Shunyuan Zhang, now at Harvard Business School, and Param Vir Singh and Kannan Srinivasan of Carnegie Mellon University.

It is illegal in the U.S. for machine-learning algorithms to make racial distinctions in their design. The researchers argue that this race-blindness, intended to limit racial discrimination, in practice can leave marginalized races further behind by failing to consider unique

circumstances that start them off at the low end of an unlevel playing field.

"Because the algorithm is race-blind, it produces prices that are closer to white hosts' optimal price than Black hosts' optimal price. It's blind but it's not fair," says Prof. Mehta who nevertheless cautions that the study's results implicate AirBnb guests for racial discrimination against Black-hosted properties rather than AirBnb or its algorithm.

Algorithm developers could work around the limits of the law by incorporating socio-economic information that is correlated with race, the researchers suggest. And AirBnb could take steps to encourage Black hosts to use Smart Pricing.

As well, "the law should be amended in some special cases where it can be shown that that will help," adds Prof. Mehta.

The researchers worked with data available through AirBnb as well as AirDNA, a third party analytics platform. They focused on just over 9000 Airbnb properties across some 400 neighbourhoods in seven large U.S. cities. Identification of a host's race was made using a deep learning model applied to profile photos on each host's online property page.

The study appears in *Marketing Science.*

More information: Shunyuan Zhang et al, Frontiers: Can an Artificial Intelligence Algorithm Mitigate Racial Economic Inequality? An Analysis in the Context of Airbnb, *Marketing Science* (2021). DOI: 10.1287/mksc.2021.1295

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