

Optimal Environmental Targeting in the Amazon Rainforest

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TARGETED MONITORING IN BRAZIL REDUCED AMAZON DEFORESTATION BY 43% AT EXCEPTIONALLY HIGH SOCIAL BENEFIT; SMARTER TARGETING COULD HAVE DONE EVEN MORE

RESTUD PAPER October 2022



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Summary

This paper investigates Brazil's 2008 Priority List, a federal policy that mandated increased monitoring and enforcement for municipalities with high deforestation. Using satellite and administrative data, the authors estimate the policy's impact on forest loss and carbon emissions. They find that the Priority List reduced deforestation by 43%, avoided 49 million tons of carbon emissions, and generated over \$3.6 billion in social benefits. The analysis also shows that a data-driven targeting strategy could have achieved at least 10-12% additional emissions reductions with the same resources.

Objective

Assess the effectiveness of Brazil's targeted anti-deforestation policy and evaluate how environmental enforcement could be optimally targeted under real-world constraints.

Methodology

A changes-in-changes causal framework proposed by Athey and Imbens (2006) is used to estimate heterogeneous treatment effects of the Priority List and construct counterfactual optimal targeting rules that minimize deforestation and carbon emissions under fixed monitoring capacity.

Results

- Deforestation in targeted municipalities fell by 43%, preserving over 3,000 km² of forest through 2009 and 2010
- Spillover effects reduced deforestation in nearby untreated municipalities, accounting for roughly one quarter of total forest preserved
- The policy avoided 49 million tons of carbon emissions, indicating that the Priority List had meaningful climate impacts, equivalent to \$3.6 billion in social benefits
- Targeting matters. An optimally targeted policy could have reduced emissions by an additional 10-12%, yielding at least \$1.29 billion in extra benefits

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