Ads to Agriculture

Welfare effects of digital marketing to smallholder farmers

Advertising Intelligence for Economic Development

with Michael Kremer, Matt Lowes, Giulia Zane
65% of the world's poor working adults are in agriculture.

Food productivity very low in some regions of the world.
Context: One Acre Fund

Provides financing and delivery for fertilizer, seed, other agricultural inputs, and household goods to over 400K smallholder farmers in East Africa.

Challenge:
- Soils in regions of operation in Kenya and Rwanda are known to be acidic.
- High acidity causes phototoxicity and inhibits plant absorption of nutrients.
- Agricultural lime decreases acidity and increases yield between 10-40%.
- Lime has been marketed for several seasons but uptake is low.
Proposition

Lets try advertising!

Jambo <Name>,
Udongo wako una asidi.
Tumia lime kupunguza asidi upate mavuno
bora. Piga
0800723355
Field Experiment

Kenya
Randomized 4,664 farmers into general and targeted treatment groups and a control group.
Almost all farmers had phones.
Outcome: purchase of agriculture lime.

Rwanda
Randomized 209,475 farmers into several different message contents and framings.
Additional group randomization to encourage spillover onto 50% farmers who don't have phones.
Outcome: purchase of agriculture lime.
<table>
<thead>
<tr>
<th>Country</th>
<th>Lime Adoption Change</th>
<th>Additional Findings</th>
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</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>Increased by 30-40%</td>
<td>Estimate returns of $95-$138 increase in farmer incomes for every $1 spent on SMS messages. Scaled up A/B experiment country-wide (~350K+ farmers)</td>
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<tr>
<td>Rwanda</td>
<td>Increase between 12-22%</td>
<td>Increase lime adoption for phoneless farmers between 13-30% Large enough sample to look at heterogeneity...</td>
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</tbody>
</table>
Heterogeneity (human)

Predict (ML!) lime adoption using available (200+) covariates from previous season.

Interact with treatments to look at heterogeneity in how different treatments respond to different prior propensities to buy lime. (Like a nudge).

We find some message contents interact while others tend to work independent of prior propensity.
Heterogeneity (intelligent)

Causal Tree (Athey, Imbens)
Heterogeneity (artificially intelligent)

Causal Forests (Wager, Athey 2017)

Heterogeneous effects estimated by causal forests
Heterogeneity (artificially intelligent)

Causal Forests (Wager, Athey 2017)

Statistically significant ($p < 0.05$) heterogeneous effects
Thanks

Questions? roberton@gmail.com