What Impedes Efficient Product Adoption? Evidence from Randomized Variation in Sales Offers for Improved Cookstoves in Uganda

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Cooking Habits

- Nearly half of the world's population cooks with solid fuels.

Problems with Burning Charcoal

- Tragic health consequences
  - 2 million premature deaths each year
- Greenhouse gas emissions
  - $PM_{4.0}$, CO, CO_2, CH_4, NMHC
- Deforestation
  - Uganda has lost 65% of its forests in last 20 years
- Monetary costs
  - In Kampala, 20% of HH income is spent on charcoal

The Question

Why don't more people purchase fuel efficient stoves?

Hypothesized Barriers

- Liquidity constraints
- Present bias
- Informational barriers/ distrust

Proposed “Novel” Sales Offer

- Free trial
- Time payments
- Right to return

i.e., a “rent-to-own” contract with a free trial.

Free Trial

- Remove risk of not saving money with new stove
- Might also:
  - Reduce present bias & liquidity constraints
  - Signal product will save fuel as promised
  - Produce an “endowment effect”
  - create “norm of reciprocity”

Time Payments

Reduce present bias & liquidity constraints

Right to Return

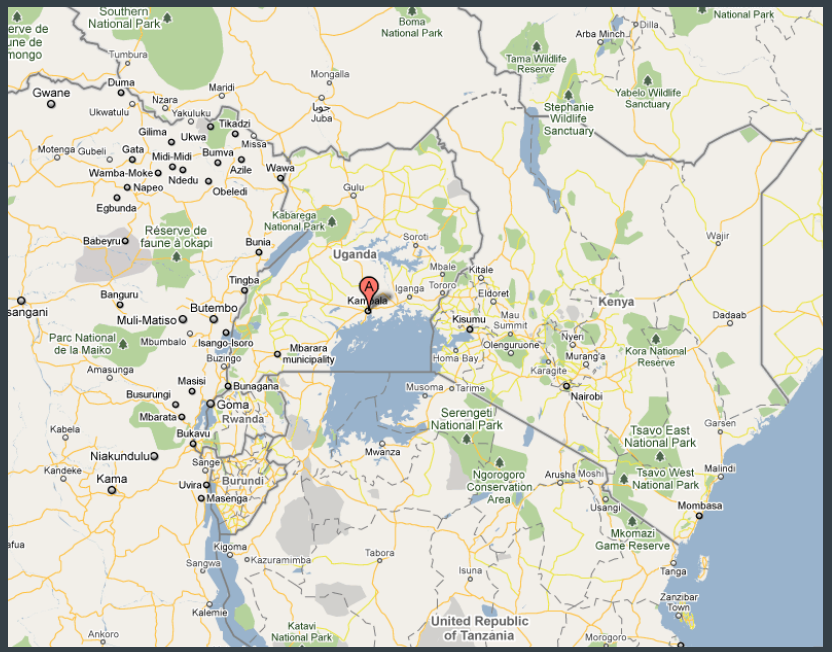
- Eliminate risk the stove breaks
- Might also signal durability

Potential Problems

- People dislike sales offer
- People dislike stove/ do not want it
- Time payments not scheduled properly (unpredictable cash flow, insufficient fuel savings)
- Difficulty locating customers?
- Customer misbehavior
- Vendor misbehavior
- High transaction costs

Fall 2010 Randomized Trial

Door-to-door sales in Kampala, Uganda



Population Sample

- Randomized sales offers across 230 neighborhoods (1,700 HHs)
- Excluded wealthiest areas where people were likely to cook with gas or electric stoves
- 95% of households in sample used unimproved charcoal-burning stoves at baseline

Ugastove

- Locally manufactured
- Evidence of fuel savings
  - ~50% fuel reduction in laboratory
  - ~33% fuel reduction in the field (KPTs)
- Functions just like a traditional stove
- Relatively inexpensive

Carbon Credits

Calculated carbon credits come to about 1 ton of charcoal per stove per year for 3 years ($15 per stove)

Stove Pricing

Offered 3 Ugastove sizes at retail prices:

- $6 (cooking for 5)
- $8 (cooking for 6 – 10)
- $10 (cooking for 11 – 15)

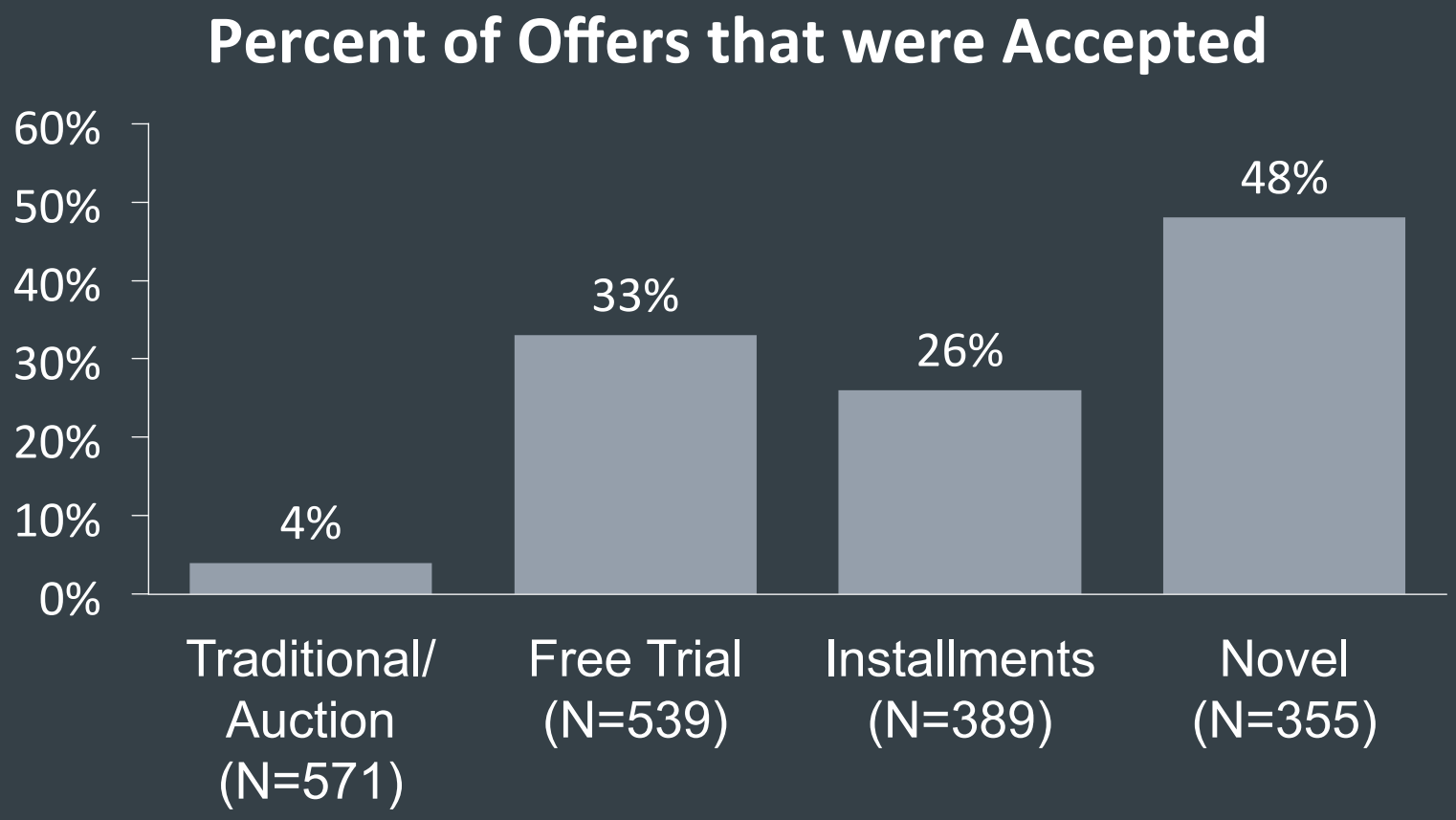
(In contrast, traditional stoves cost $1 - $3)

Sales Offers

- Traditional (or auction)
- Free Trial (only)
- Time Payments (only)
- Novel (free trial and time payments)

Time payments consisted of 4 weekly installments

HEADLINE #1: Novel Contract Radically Increased Stove Acceptance



Payment rates? (Back to our list of potential problems….)

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Dislike stove?

- After the free trial, almost everyone said they would recommend stove to a friend
- Most customers reported fuel savings
- Of those who took the novel offer:
  - only 6% returned the stove
  - Of those who paid for the stove, about 1/3 finished their payments *early*

Time payments scheduled properly?

- Almost 10% of those who got the novel contract finished paying late (we gave a 2 week grace period)
- Calculated weekly fuel savings were higher than weekly installment amount for 38% of households

(More details on fuel savings)

- 31% did not know how much they spent on charcoal each week because they purchase charcoal in a large sack
  - 90% of these people think they are saving charcoal
- Of those who reported charcoal amounts during initial and follow-up visit (233 HHs):
  - 12% report negative charcoal savings
  - 65% report positive savings
  - 23% report no change in charcoal expenditures

Difficulty locating customers?

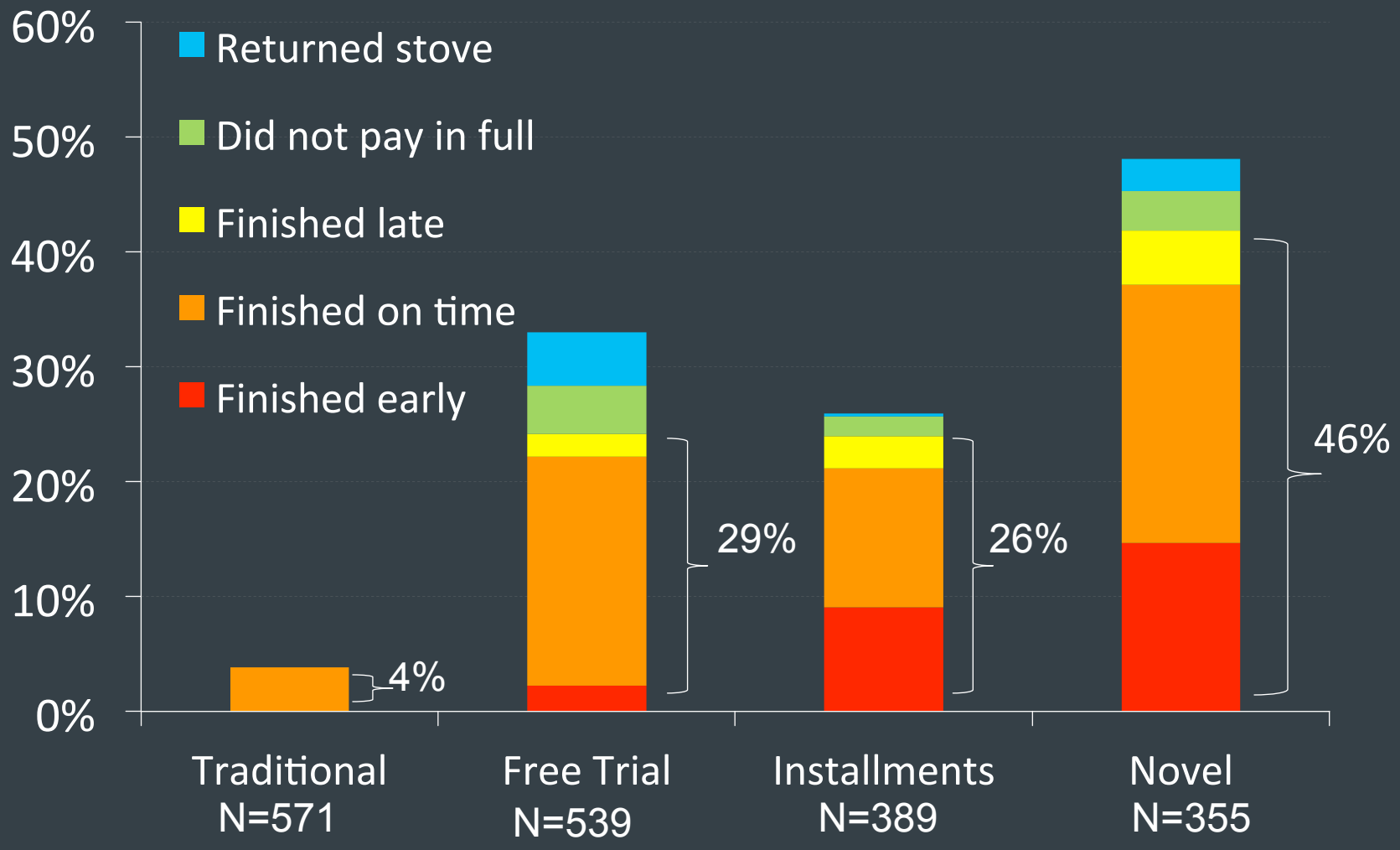
- We used maps to assist human memories
- Only a few consumers known to have moved away

Customer misbehavior?

Of those given the novel offer:

- 7% did not finish paying
  - Mostly not at home during final visits
  - Only a few consumers (1%) refused to complete their payments (e.g., claimed they had paid 100% -- perhaps need better receipts)
- All made at least some payment
- Collected 97% of scheduled funds

Headline #2: Most Customers Kept and Paid for the Stove



Do hypothesized barriers exist?

√ Informational Barriers/ Distrust

- Distrust people in general?
  - Only 4% said “most people can be trusted”
  - vs. 96% who said, “you cannot be too careful when dealing with people”
- Distrust salespeople, specifically?
  - Fewer than 2% of respondents “completely trust” door-to-door salespeople
  - vs. 80% said some or all salespeople over-promise
- Distrust products in general?
  - About 20% of the interviewed consumers report that either most or all of the products that they buy break soon after they purchase them
- Distrust the Ugastove, specifically?
  - Slightly less than half (45%) were sure the stove would save ½ fuel, while most had at least some doubts

Do hypothesized barriers exist?

✗ Liquidity Constraints

- Only about 4% of consumers report that they were either denied a loan or did not ask for a loan in fear of being denied over the last 3 months.

√ Present Bias (!!!!!!)

- 30% of consumers say they prefer 36,000 UGX in 4 months over 6,000 UGX in 3 months, yet prefer a 6,000 immediate payout over 36,000 in 6 months.

Evidence that the novel sales offer addresses these barriers?

Does the contract provision	matter most when consumers
Free trial	think most salespeople cannot be trusted?
Time payment	say that most products break?
Free trial and time payment	are present biased?

Does the novel sales offer address these barriers?

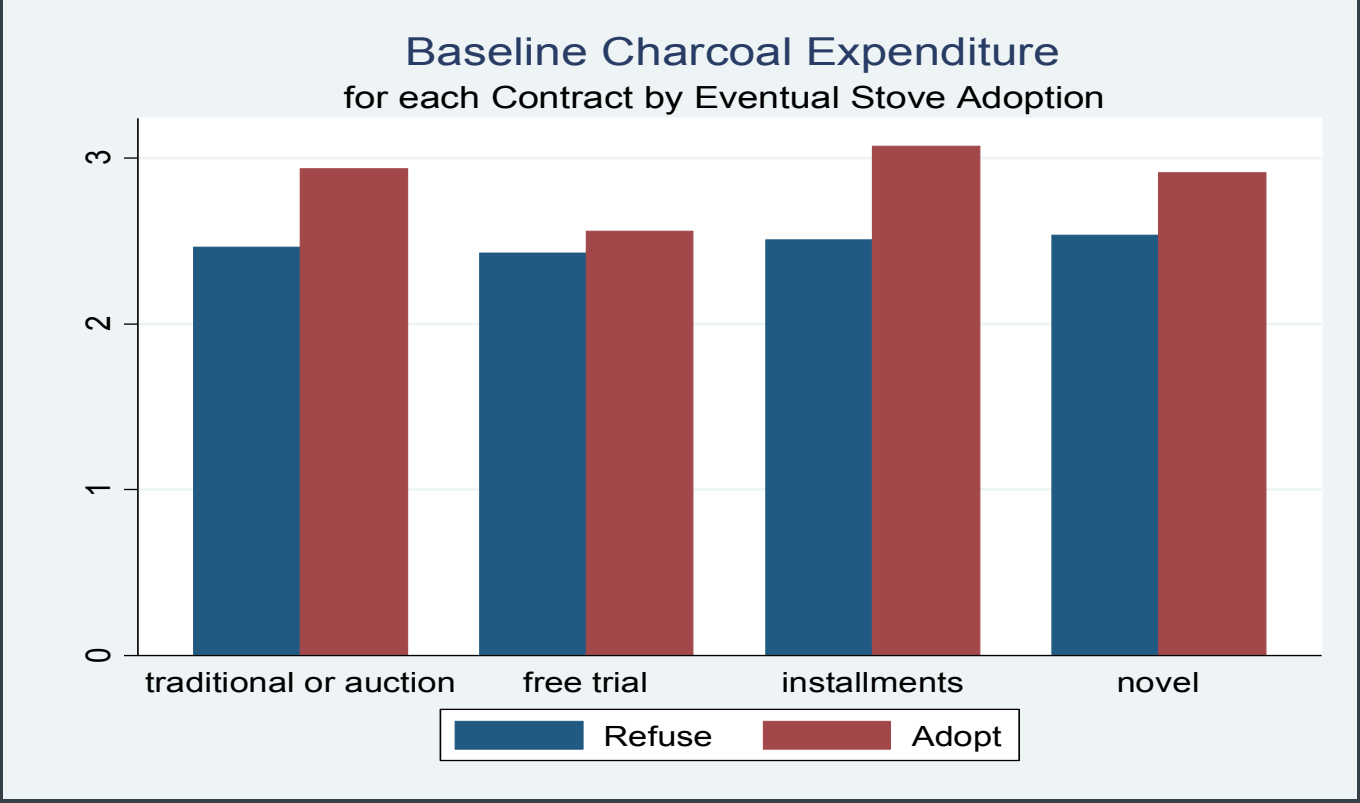
- ✗ Consumers who report concerns about salesperson honesty increase adoption more when they are offered a free trial than do consumers who do not report such concerns.
- ✗ Consumers who report concerns about product durability increase adoption more when they are offered time payments than do consumers who do not report such concerns.
- √ Consumers who are present bias increase adoption more when they are offered a free trial or time payments than do consumers who are not present bias.

Signaling? (Does sales offer affect consumer's initial trust in stove?)

	Traditional	Free Trial	Installments	Novel
X Trust that Ugastove will save fuel (Do you believe this stove will save you half of your current charcoal expenditures? Fraction of consumers who answered "definitely yes" or "maybe yes")	94% [78]	90% [433]	91% [299]	91% [215]
X Trust in Ugastove's durability (Do you agree or disagree that that this stove will probably last 3 years or more? Fraction of consumers who answered	83% [78]	73% [431]	79% [299]	75% [213]

Does expected fuel savings influence adoption?

√ Adoption is higher for those with higher baseline fuel expenditures and for those with larger families.

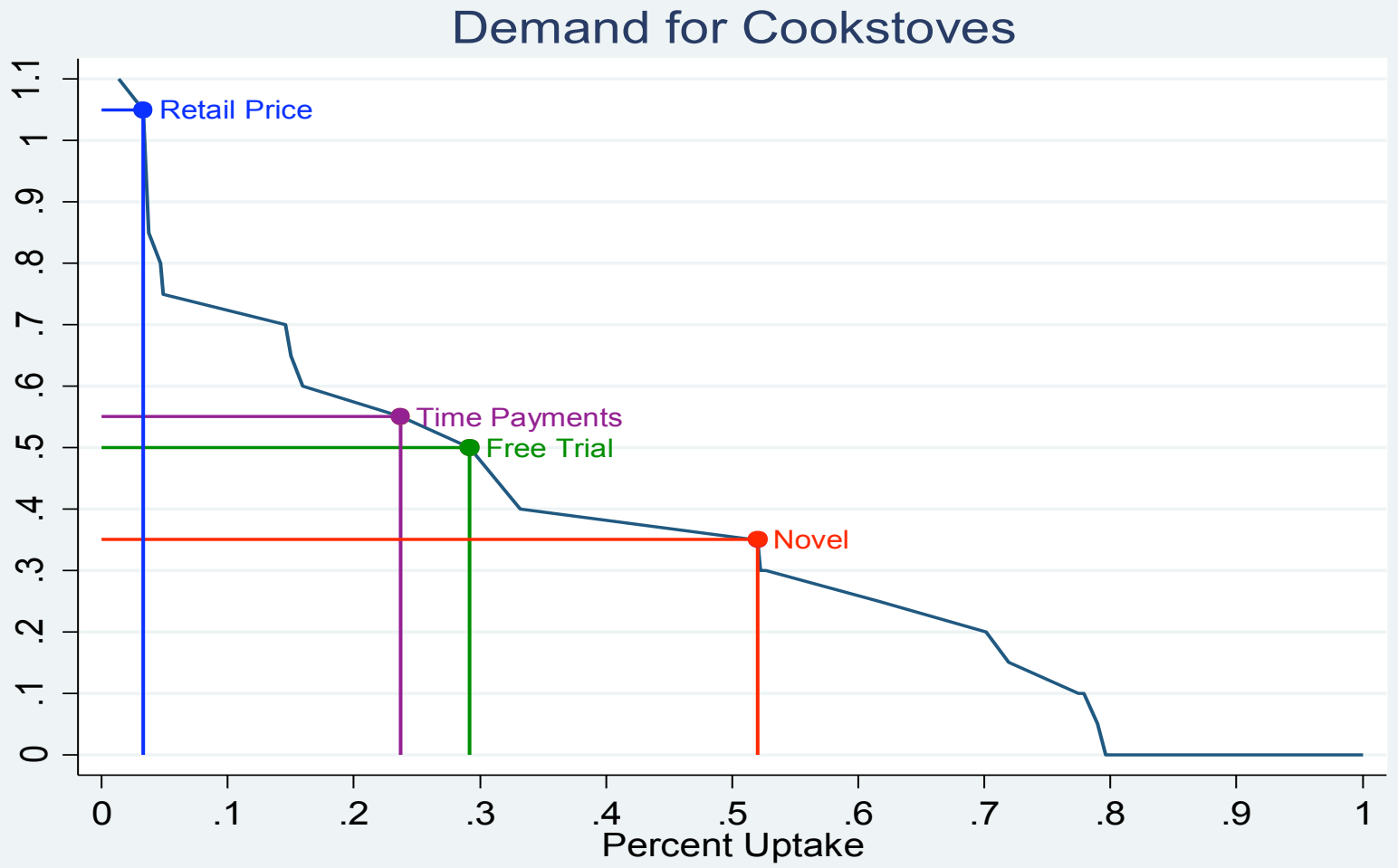


Next Steps: Additional Outcome Measures

- Stove usage (e.g., using monitors)
- Fuel use
- Smoke exposure
- Health outcomes

(Use different stove design if larger projected benefits are attainable.)

Next Steps: Is novel contract sensible from a business standpoint?



Next Steps: Can we take this to scale?

Partnering with an NGO or microfinance group

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Using stove vendors

- Can distributors recruit vendors by bearing risk of returns and theft?
- Distributor offers:
  - Free trial to vendor
  - Time payments from vendor (shared)
  - Distributor pays for theft and returns

Next Steps: Can we take this to scale?

Targeting communities that cook with wood

- With gathered fuel , households will save time rather than money

Next Steps: Other products

- Other products that should “pay for themselves”
  - Fertilizer
  - Solar lanterns
  - Water filter that reduces health care costs
- None have as rapid feedback as stoves

Comments, questions, and suggestions invited!