Analysis of IR

PS 1599 | Week 6: Demand failures

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Administration

- Office hours

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- Updated schedule

- Slides

- Readings

What did we talk about last time?

Demand-side failures

- Puzzle: why doesn't new+better tech replace old+bad tech?
- So far: supply-side explanations
    - Innovation failures
    - Diffusion failures
- Hidden assumption: people want new+better tech
- Is this true? Demand-side failures

- Demand-side prob: issues with demand for 'good' tech
- Happens at three (four) levels:
  - Individual, household, social/community, (firms)
- The calculus of demand
  - Benefits
  - Costs
  - Misc.

Benefits

- Two types of goods/services:
    - Consumption goods
    - Investment goods
    - Some goods are both (eg internet)
- Key Q: what is the utility of acquiring a given tech?
    - At indiv level: benefits are about taste, cultural pref
    - At social level: B conditioned by collective action issues

Problem

- Perfect market: supply responds to demand for new tech

- But we are interested in cases w/ market failures

- Prob for goods w/ positive externalities (not captured)

- Private benefits < social benefits

- Example: should I use an electric car or gasoline car?

- Right now: electric car ~$10k more than gasoline

Costs

- Need to include the cons side

- Natural starting point: pecunary cost

- Other costs (symbolic, etc)

- Problem: negative externalities are not included!

- Thus: good tech might be overpriced and bad tech underpriced

How would you solve the pricing problem of 'good' tech being overpriced… and 'bad' tech being underpriced?

- Increase private cost of negative externalities
    - Pigouvian taxes
    - Trading systems. Eg EU ETS
    - Symbolic cost (eg fur)
- Increase private benefit of positive externalities
    - Subsidies. Eg tax credits
    - Symbolic gains (eg make green cool)
- Which ones are politically more likely to work?

Misc

- Decision are never just a matter of money
  - Signaling, branding, etc
- Tech-specific issue: new products are unknown
  - Unawareness
  - Uncertainty regarding quality
- Example: solar technology in India

Household dynamics

- So far: discussion focused on individuals

- But what about households?

Can you think of reasons why moving from individuals to households could change the decision calculus?

- Individuals: cost-benefit
- Decision-maker is not an individual 'rational' actor
- Instead: intra-household bargaining+externalities
- Includes biases derived from econ and cultural factors
  - Who earns the money?
  - Who makes decisions about what?
  - Whose views carry more weight?

Example: benefits of electricity access

- Context: India, >1b inhabitants, GDP/cap $2k

- But until ~2010: 700m w/o electricity

- Successful electrification programs (RGGVY, Saubhagya)

- Questions: who benefits from electrification?

- Study conducted in rural northern India

- Ownership and use of appliances

	More male-used appliances														
	Appliance access						Appliance usage								
	Has appliance			Average points of use			Female usage			Male usage		
	TV	Non-kitchen fan	Mobile	TV	Non-kitchen fan	Mobile	TV	Non-kitchen fan	Mobile	TV	Non-kitchen fan	Mobile
Payment problems (*n* = 22)	82%	100%	95%	0.86	3.73	2.55	72%	91%	62%	100%	100%	100%
No payment problems (*n* = 8)	75%	88%	88%	0.75	2.63	1.25	33%	63%	43%	100%	100%	100%
Land owner (*n* = 8)	100%	100%	100%	1.00	4.75	3.38	88%	88%	75%	100%	100%	100%
Not a land owner (*n* = 23)	70%	91%	91%	0.74	2.83	1.74	50%	82%	52%	100%	100%	100%
Kids (*n* = 19)	79%	95%	89%	0.84	3.21	2.16	73%	89%	59%	100%	100%	100%
No kids (*n* = 12)	75%	92%	100%	0.75	3.50	2.17	44%	73%	58%	100%	100%	100%
High caste (*n* = 7)	100%	100%	100%	1.00	4.43	2.86	71%	71%	71%	100%	100%	100%
Not high caste (*n* = 24)	71%	92%	92%	0.75	3.00	1.96	59%	87%	55%	100%	100%	100%
All households (n = 31)	*77%*	*94%*	*94%*	*0.81*	*3.32*	*2.16*	*83%*	*90%*	*66%*	*100%*	*100%*	*100%*

Source: Rosenberg et al. (2019)

	Gender-neutral appliances (both female and male usage)											
	Appliance access						Appliance usage					
	Has appliance			Average points of use			Female usage			Male usage		
	Non-kitchen bulb	Water pump	Refrigerator	Non-kitchen bulb	Water pump	Refrigerator	Non-kitchen bulb	Water pump	Refrigerator	Non-kitchen bulb	Water pump	Refrigerator
Payment problems (*n* = 22)	100%	64%	64%	4.91	0.64	0.64	100%	93%	100%	100%	100%	100%
No payment problems (*n* = 8)	100%	25%	25%	3.13	0.25	0.25	100%	100%	100%	100%	100%	100%
Land owner (*n* = 8)	100%	88%	75%	5.88	0.88	0.75	100%	86%	100%	100%	100%	100%
Not a land owner (*n* = 23)	96%	39%	43%	3.74	0.39	0.43	100%	100%	100%	100%	100%	100%
kids (*n* = 19)	100%	53%	53%	3.84	0.53	0.53	100%	90%	100%	100%	100%	100%
No kids (*n* = 12)	92%	50%	50%	5.00	0.50	0.50	100%	100%	100%	100%	100%	100%
High caste (*n* = 7)	100%	86%	71%	6.00	0.86	0.71	100%	83%	100%	100%	100%	100%
Not high caste (*n* = 24)	96%	42%	46%	3.79	0.42	0.46	100%	100%	100%	100%	100%	100%
All households (n = 31)	*97%*	*52%*	*52%*	*4.29*	*0.52*	*0.52*	*100%*	*94%*	*100%*	*100%*	*100%*	*100%*

Source: Rosenberg et al. (2019)

	More female-used appliances																	
	Appliance access						Appliance usage											
	Average points of use						Female usage						Male usage					
	Iron	Kitchen light	Kitchen fan	Mixer	Sewing machine	Grinder	Iron	Kitchen light	Kitchen fan	Mixer	Sewing machine	Grinder	Iron	Kitchen light	Kitchen fan	Mixer	Sewing machine	Grinder
Payment problems (*n* = 22)	0.50	0.64	0.18	0.59	0.27	0.23	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	17%	0%
No payment problems (*n* = 8)	0.38	0.13	0.00	0.00	0.00	0.00	100%	100%	NA	NA	NA	NA	0%	0%	NA	NA	NA	NA
Land owner (*n* = 8)	1.00	1.00	0.25	0.88	0.63	0.38	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	20%	0%
Not a land owner (*n* = 23)	0.26	0.30	0.09	0.30	0.04	0.09	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%
kids (*n* = 19)	0.53	0.58	0.05	0.47	0.26	0.21	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	20%	0%
No kids (*n* = 12)	0.33	0.33	0.25	0.42	0.08	0.08	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%
High caste (*n* = 7)	0.86	0.86	0.29	0.71	0.43	0.14	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	33%	0%
Not high caste (*n* = 24)	0.33	0.38	0.08	0.38	0.13	0.17	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%
All households (n = 31)	*0.45*	*0.48*	*0.13*	*0.45*	*0.19*	*0.13*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*0%*	*0%*	*0%*	*0%*	*17%*	*0%*

Source: Rosenberg et al. (2019)

- Electrification is great!

- But uneven benefits…

- Technology is not neutral: interacts with local politics, culture, economics

- Here: gendered dimension of technology

Example (2): clean cook stoves

- Modern economies: use non-solid fuel (elec, gas)

- Poorer economies (~2.4b): solid fuel (wood, kerosene, charcoal, dung)

- Impact: indoor air pollution. Who will be affected?

- WHO: 3.2m deaths per year (2020); 237k children under 5

- Pulmonary diseases, lung cancer, breathing issues

~Source: GNESD

Example (continued)

- Solution: clean (or at least improved) cookstoves

- Diagnostic: problem of cost (externalities) for HH and for countries

- Solution: global funding effect led by Global Alliance for Clean Cookstoves (2010, Clinton)

- Goal: replace solid-fuel cookstoves w/ clean ones (~100m units)

- In practice: distribution of 28m, seldom used

Example (continued)

- Many problems…

- Benefits: air pollution is not seen as a threat: awareness + intra-hh bargaining

- Costs: good clean stoves are expensive

- Study by Alem, Hassen, and Köhlin (2023):

    - Experiment on clean cookstoves in Ethiopia, 2013

    - Randomize offer to buy to spouse, men, women

    - Evaluate willingnes to pay and usage

We use a field experiment to identify how differences in preferences and spousal influence result in low willingness to pay (WTP) for technologies that can benefit all household members. We create income-earning opportunities to empower households and conduct an actual stove purchase experiment to elicit their WTP for fuel, time, and indoor air pollution-reducing improved cookstoves. The decision to buy the stove was randomly assigned to either wives, husbands, or couples using either individually or jointly earned income. Experimental results suggest that wives, who often are responsible for cooking and collecting fuelwood, are willing to pay 57% more than husbands and 39% more than couples. Wives who made the stove purchase decision alone using the income they earned alone are willing to pay 67% more than husbands who made the purchase decision alone. We also find that couples' WTP is similar to that of husbands, implying that husbands dominate joint decisions. A follow-up survey

Source: Alem, Hassen, and Köhlin (2023)

Based on what you now know...

How would you improve sales+use of clean cookstoves?

Conclusion

- 'Good' tech is often disadvantaged

- Problem of positive/negative externalities

- Good tech must be affordable!

- But not just about money: beliefs about problems, cultural values, etc.

- Importance of social component in tech adoption

Questions?

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References

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