Social experiments: Why and How?

14.73 Lecture 3

Marshaling evidence

- At the end of last lecture, we concluded that whether or not there is a poverty trap or not depends on the shape of the curve that relates income today to income tomorrow.
- And we were asking ourselves: how do we know what shape this curve has in practice? We could make theoretical arguments going either one way or the other… These arguments can only be solved by looking at data to answer our specific question. But what data needs to be looked at? And how?
- Today we will look at one approach which is increasingly often used in development economics, and is the main approach in J-PAL: randomized evaluation.
- Let's start with one example: malaria

How to stop Malaria?

881,000 die each year

91% in Africa

85% under 5

The Case for Bednets

- Malaria is transmitted by mosquitoes, mainly at dusk.
- Long Lasting Insecticide Treated Bednets prevent mosquitoes to bite
  - They don't bite an un-infected person, so they are less likely to get malaria themselves (DIRECT effect)
  - They don't bite an infected person, so they are less likely to carry the parasite (INDIRECT effect, or **externality**).
  - The externality is not linear: when enough people sleep under a bednet, mosquito don't have enough to eat, and end up dying: there is a distinct advantage to get 50% coverage.

The traditional economics argument

- Traditional economics tells us that, whenever there is an externality, such that the **private incentives** are not aligned to the social benefit, tax or subsidies should be used to align private incentives

- Here, this would argue for subsidizing bednets, but only if the private benefits are not large enough that people already buy one at full price.

- Moreover, with a new good (such as LLIN nets), people need to learn how to use it, and be convinced it is worthwhile: giving nets for free may be a way to get the ball rolling.

Less conventional economics

- But there are some arguments that go in the opposite direction. They are based on less traditional economics
  - Psychological sunk cost effect. Normally, once you have purchased something, how much you paid for it should not matter. But perhaps, in fact, it does matter: how much you pay give you a sense of the value of a good.
  - Selection effect: if you give things away for free, even people who do not intend to use it will get it: again, you will waste bednets.
  - Entitlement effects: if you give things away for free, people will expect to get that thing (and perhaps everything else!) for free in the future

Heated policy debate

- Jeff Sachs, WHO: Give bed nets for free.
  - We know the science, no need to do experiment
- Easterly, Dambisa Moyo, Population Service International: don't give them for free.
  - We know the economics, no need to do experiment!
- The true question of course is the extent to which they should be subsidized...

What we need to know

- We need to know:
  - The price elasticity of the demand for bednets: if people are willing to purchase a price at the full cost, then subsidies are not needed—if they are not willing to purchase one at ANY price, then price subsidies may be needed
  - The immediate effect on use: are people who pay for bednet more likely to use one. How much do they need to pay?
  - The longer term effects—Will it wreck markets?
    - On people who get it for free: will they buy nets in the future?
    - On their friends and neighbors? Will they hold out for a free bednet?

Photo: Minakawa et al. 2008, "Unforeseen misuses of bed nets in fishing villages along Lake Victoria," Malaria Journal 7 (2008): 165
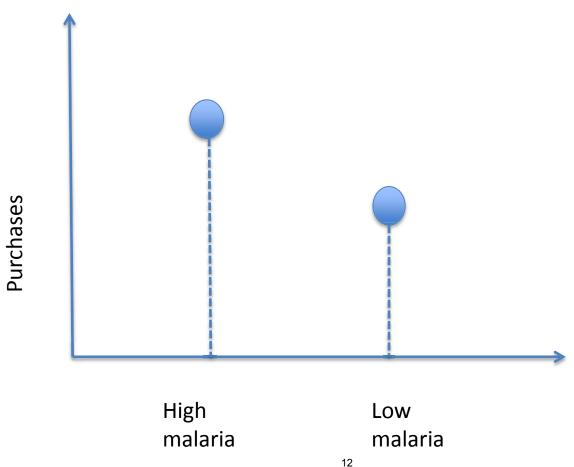
How can we find out?

- Anecdotes...
  - There are certainly plenty. But usually they cut both ways.
- Compare purchase/use at various prices
  - Some clinic may give them for free, other villages may not have that system, so any bednets are more likely to be obtained in the market
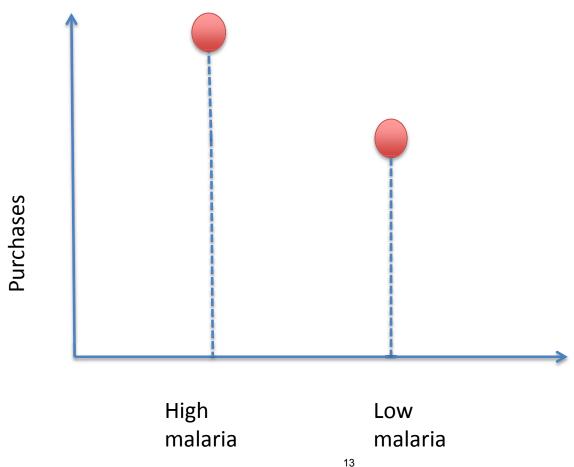 - Do we see fewer in those villages?
  - Do we see that the few we see are used differently?

But the problem is…

- What is the right *counterfactual*: what would have happen in the other situation?

- For example

  – Bednets may be distributed for free in area where malaria is a huge problem.

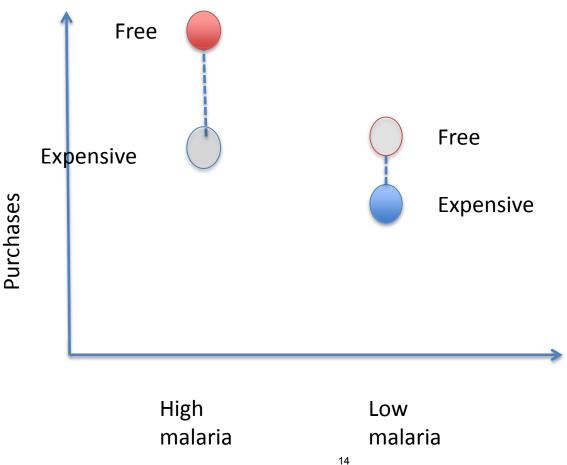 – So even if people had to pay for them, they would have been more likely to get them

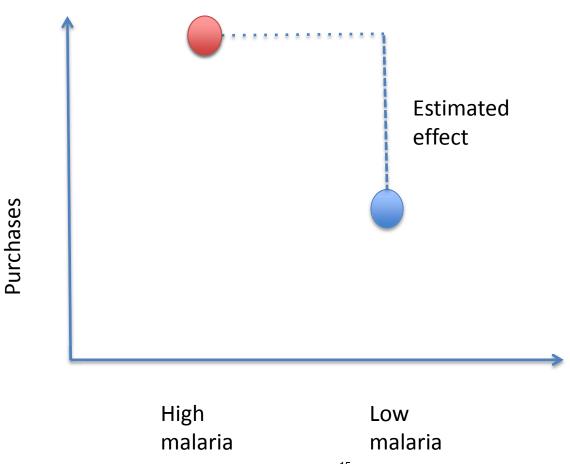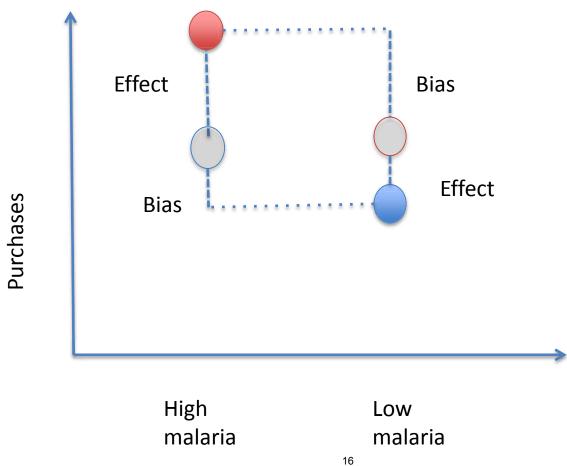# Purchase when bednets are expensive

Purchases

High
malaria

Low
malaria

Purchase when bednets are free

Purchases

High malaria

Low malaria

True effect of price on purchase

Our estimate of effect if we compare low and high malaria regions

Purchases

Estimated effect
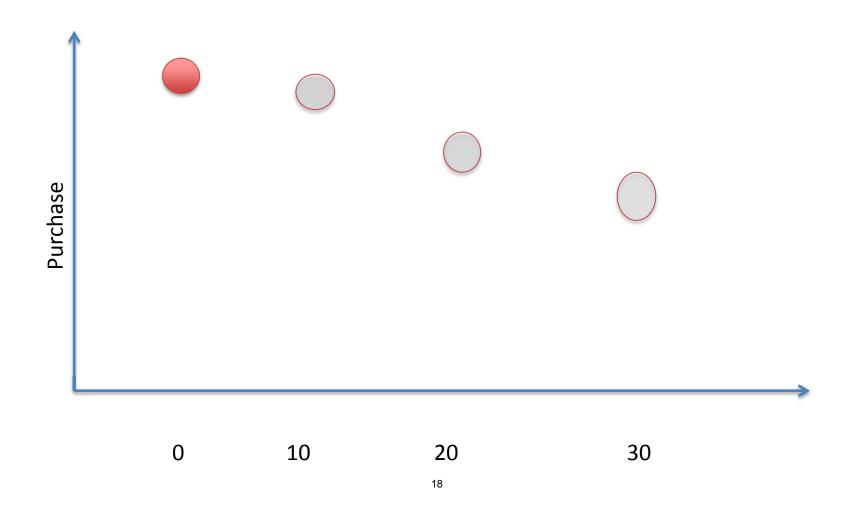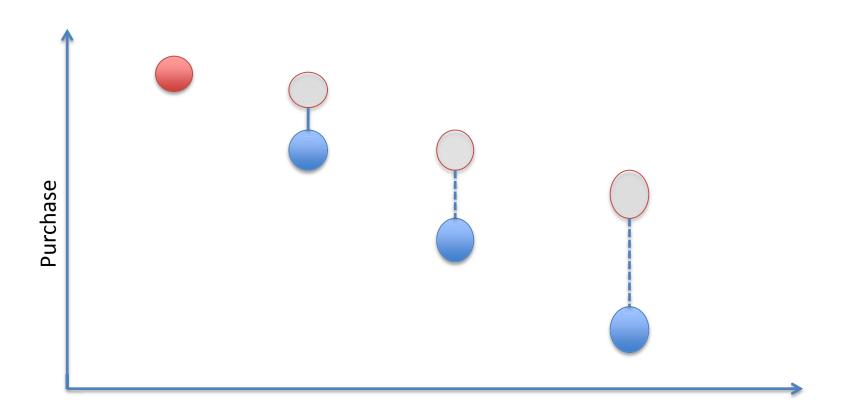
High malaria

Low malaria

The bias

Effect

Bias

Bias

Effect

Purchases

High malaria

Low malaria

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Observed demand at various prices

Purchase

0   10   20   30

Demand we would observe in region with free bed net, if bednet were not free

Purchase

0   10   20   30

Bias in elasticity
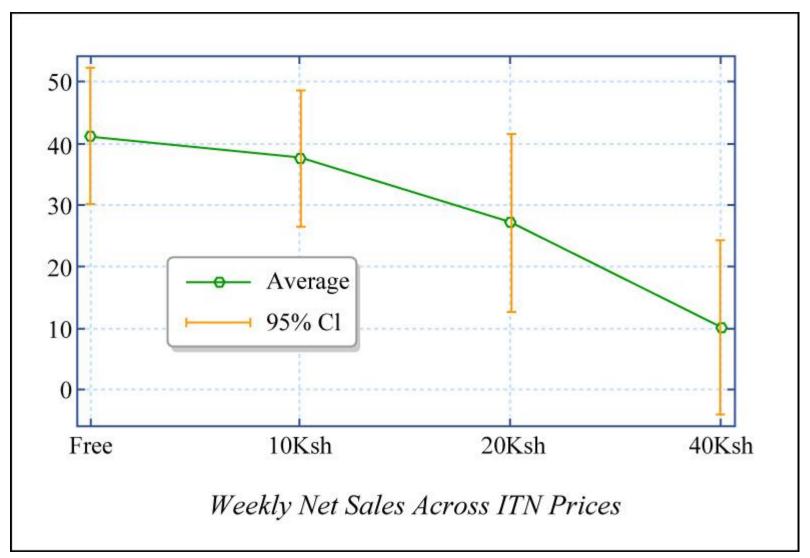
Purchase

Problem and solution

- Problem:
  - What we observe in the world reflect:
    - Selection bias: behavior of people would be different in different places, EVEN IF THE PRICES WERE THE SAME
    - The actual treatment effect.
  - And we don't know how to separate those two effects: we do not observe how people would have behaved with a low price in the high price region (and vice-versa)
- Solution:
  - *Randomly* assign different prices in the same region
  - Now, there is no *systematic* difference between people who face a high price and people who face a low price.
  - Of course there is still the usual random noise: the sample must be large enough, and there will be some uncertainty around our estimates of the mean effects.

Dupas' experiments

- First experiment (with Jessica Cohen)
  - Randomly chose clinics, and offer bednets at different prices.
  - Track purchase, and usage, in those clinic
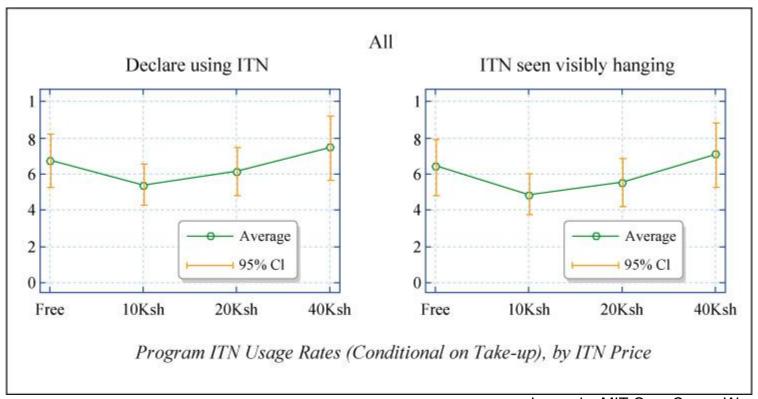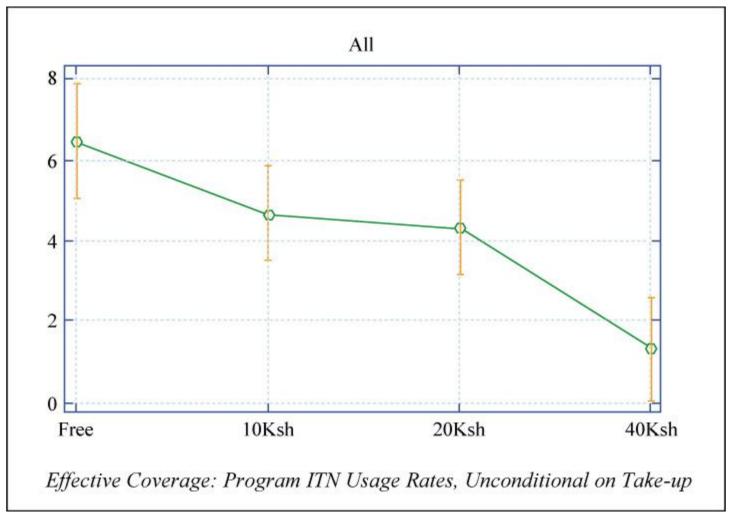- Findings: Compare purchase and usage at each price

Weekly Net Sales Across ITN Prices

Image by MIT OpenCourseWare

All

Declare using ITN

ITN seen visibly hanging

Program ITN Usage Rates (Conditional on Take-up), by ITN Price

Image by MIT OpenCourseWare

Effective Coverage: Program ITN Usage Rates, Unconditional on Take-up

Dupas' experiments

- First experiment (with Jessica Cohen)
  - Randomly chose clinics, and offer bednets at different prices.
  - Track purchase, and usage, in those clinic
- Findings: Compare purchase and usage at each price
  - Number of sales falls quickly with price
  - Usage, conditional on getting a net, does not fall
  - So effective take up indeed declines quickly with price

Policy Implications

- What is the best price at which to charge for bednets?
- One possible way to ask the question: price that will minimize the cost per malaria death averted
- Trade off:
  - Free bednets: more coverage
  - But it cost you money…
- It turns out that in this case, the CHEAPEST way to avert malaria from the policy perspective is free bednet. Why?

The controversy

- When Dani Rodrik posted these findings on his website some people objected. Their main objections were:
  - Pregnant women: all of them really need the bednets
  - Product was well known in Kenya
  - Long term effect may differ from short term effect
- This questions are all about *external validity:* Is the experiment valid outside of a specific context
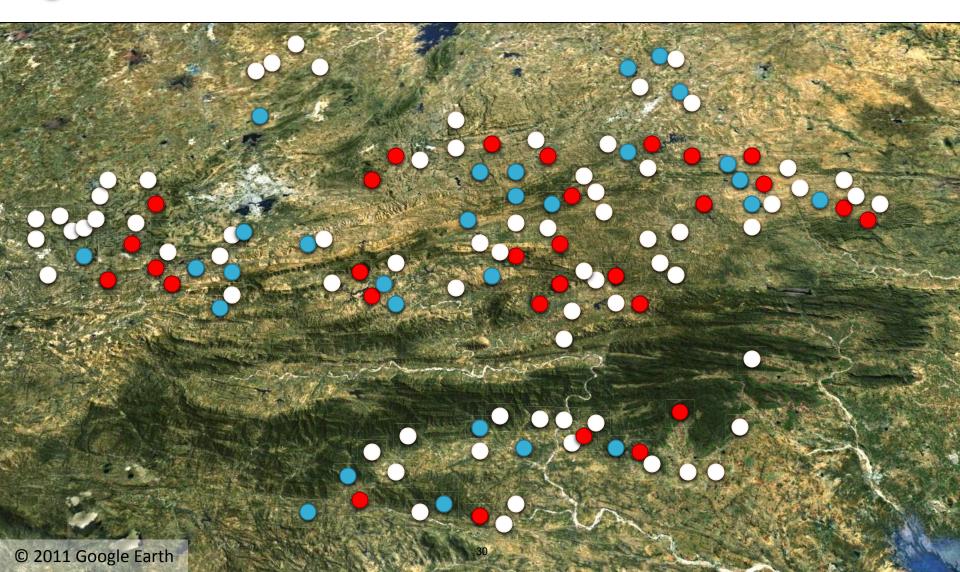
Next step

- What is the next step needed to check these objections:
  - A different country: Uganda, Madagascar
  - Kenya, but not pregnant women
  - A new kind of bednet
  - An experiment for the long term effects:
    - Entitlement effect
    - Social effects

A New Experiment

- New experimental design by Pascaline Dupas to try to address most of these questions
- Randomization done in the general population (men and women)
  - Phase 1: Different discount vouchers are randomly distributed to individuals, for buying a new kind of bednets available in shops, at various price-
    - Check purchase, use, and purchase by neighbors
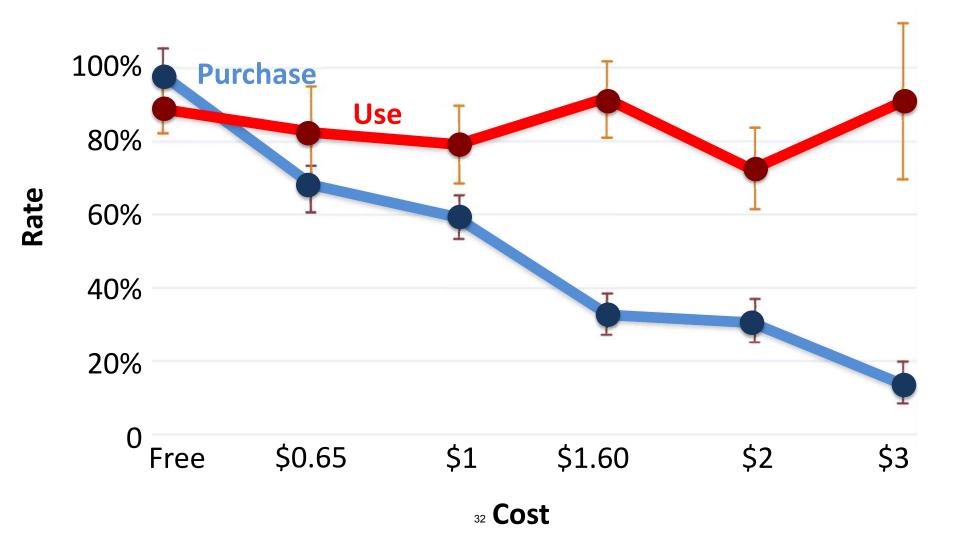 - Phase 2: After a few months, the new bednet is available for the same price for every one
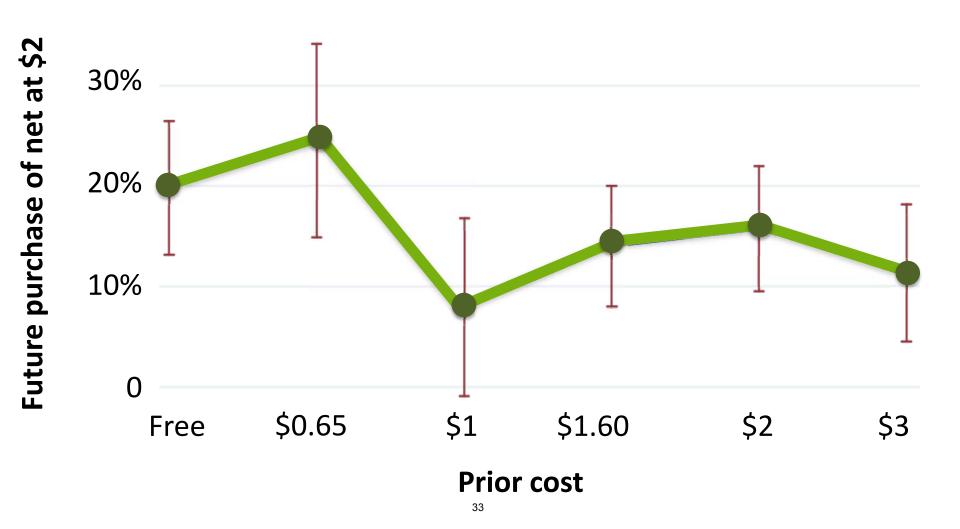
Full price
Partial subsidy
Full subsidy

© 2011 Google Earth

If people must pay for bednets, will they **purchase** them?

When people get bednets for free, will they use it?

Purchase

Use

Rate

Cost

Free · $0.65 · $1 · $1.60 · $2 · $3

Do free nets discourage **future** purchases?

Do **neighbors** buy nets if other got it for free?

purchase of net

50%
Average (33% receive free)

66%
If All receive free

Conclusion

- When we have a policy question, e.g. "what is the optimal price to charge for a bednet", we need to start by unpacking the question:
  - What do we need to know to answer the question properly? Let's not *assume* any answer, or replace real answers by anecdotes, or observations that may be very misleading
- We can then design an experiment that will get us the answer to these questions.
- This is what J-PAL (poverty action lab) does…
- Examine critically whether this first experiment is enough: perhaps we need more data to conclude…
- Other than the answer to the policy question, what are the lessons from the experiments: in particular, what is the key puzzle here that we will need to answer in our section on health?

14.73 The Challenge of World Poverty

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