

# Nobel Symposium on Growth and Development

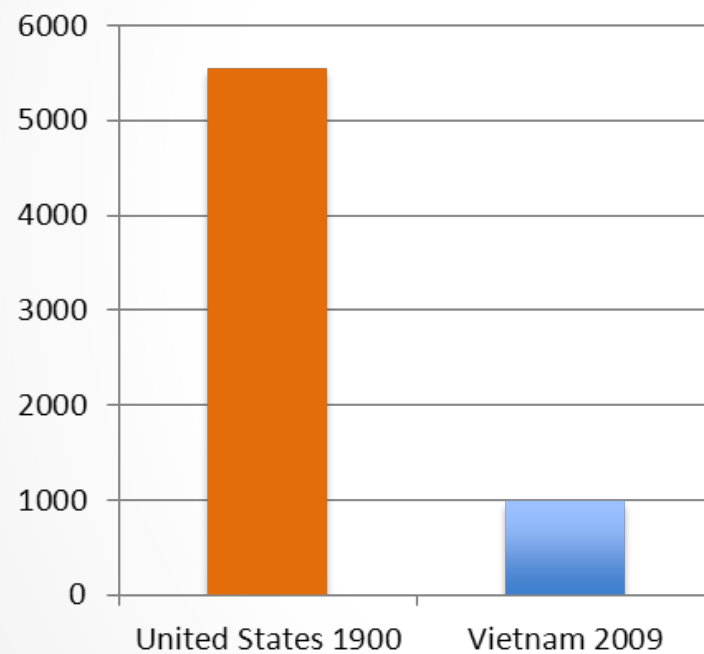
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Health

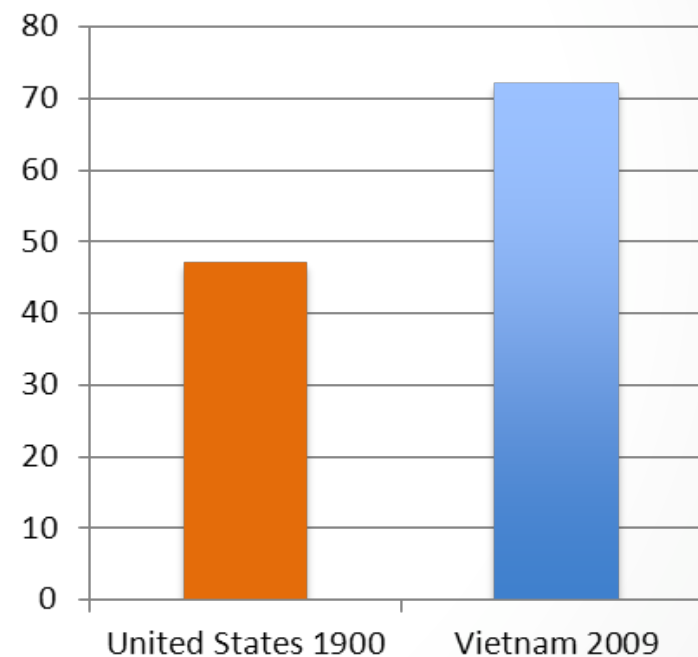
2012

Michael Kremer

### Income per Capita (2005 dollars)



### Life Expectancy



# Overview

1. Impact of health
2. Determinants of health investment
3. Health care provision

Areas for future work

Methodological developments

# Economic and Social Impact

- Gallup and Sachs (2001) argue large growth effects
- Nutrition poverty trap?  
(Das Gupta and Ray, 1986)
  - Nutritional poverty traps require  $E_{N,I} * E_{I,N} > 1$  at some point
  - Deaton and Subramanian (1996)
  - Jensen and Miller (2008)
- Behavioral poverty traps?

# Longer-run Health Traps?

- Impact of income on child health
  - Maccini & Yang (2009) – rainfall, Indonesia
  - Banerjee et al. (2010) – wine disease, 19<sup>th</sup> century France
  - Amarante et al. (2012) – government redistribution, Uruguay
- Long-run impact of child health
  - Field et al. (2009) – iodine supplements, Tanzania
  - Maluccio et al. (2009) – nutritional supplements, Guatemala
  - Bleakley (2010), Lucas (2010), Cutler et al. (2010) – malaria
  - Bleakley (2009) – deworming, US South

# Education Impact (and Multiplier)?

- Bleakley (2010) – impact of health on education depends on relative productivity impact
- Pitt, Rosenzweig and Hassan (2011) – gender and occupational sorting
- Lleras-Muney and Jayachandran (2009) – lifespan and incentives for educational investment

# GDP Impact

- Aggregating micro estimates:
  - Weil (2007)
- GE effects?
  - Acemoglu and Johnson (2007) find Malthusian effect
  - Some caveats
    - Specification: Aghion et al. (2009)
    - Morbidity vs. mortality (Bleakley, 2010)
    - Malthusian effects may be less relevant now
- Fertility role in growth theory, empirics (Barro, today)

# Welfare Impact

- Jones & Klenow (2011): 1980-2000 income growth – 1.8%; welfare growth – 2.54%
- Becker et al. (2005) - 1965-1995 convergence in welfare



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# Grossman Model

## Health as Human Capital

- Consumers invest if expected private benefit exceeds costs
- Evidence that health behavior responds to benefits:
  - Jensen (2010) - providing assistance in obtaining call center jobs increases health and education investment for girls.

# Market Failures

- Wedges between private and social benefit generate market failure
- Standard public finance analysis suggests optimal subsidy depends on:
  - Externality, public good benefit
  - Deadweight loss of taxation
  - Response of take-up to price :  $f(x)/(1-F(x))$
- Implementation issues: government failures

# Example: Deworming in Kenya

- Disease externalities on neighboring schools, untreated in school (Miguel and Kremer, 2004)
  - Disease prevalence
  - School attendance
- Price response (Kremer and Miguel, 2007)
  - 75% take-up when free, 18% with small user fee
  - No difference in take-up with family size despite per family fee structure
  - Sicker students not more likely to pay for drugs
- Deadweight loss
  - Long-run increase in labor supply suggests negative social cost of funds (Baird et al., 2012)
  - NPV of extra taxes > cost of program

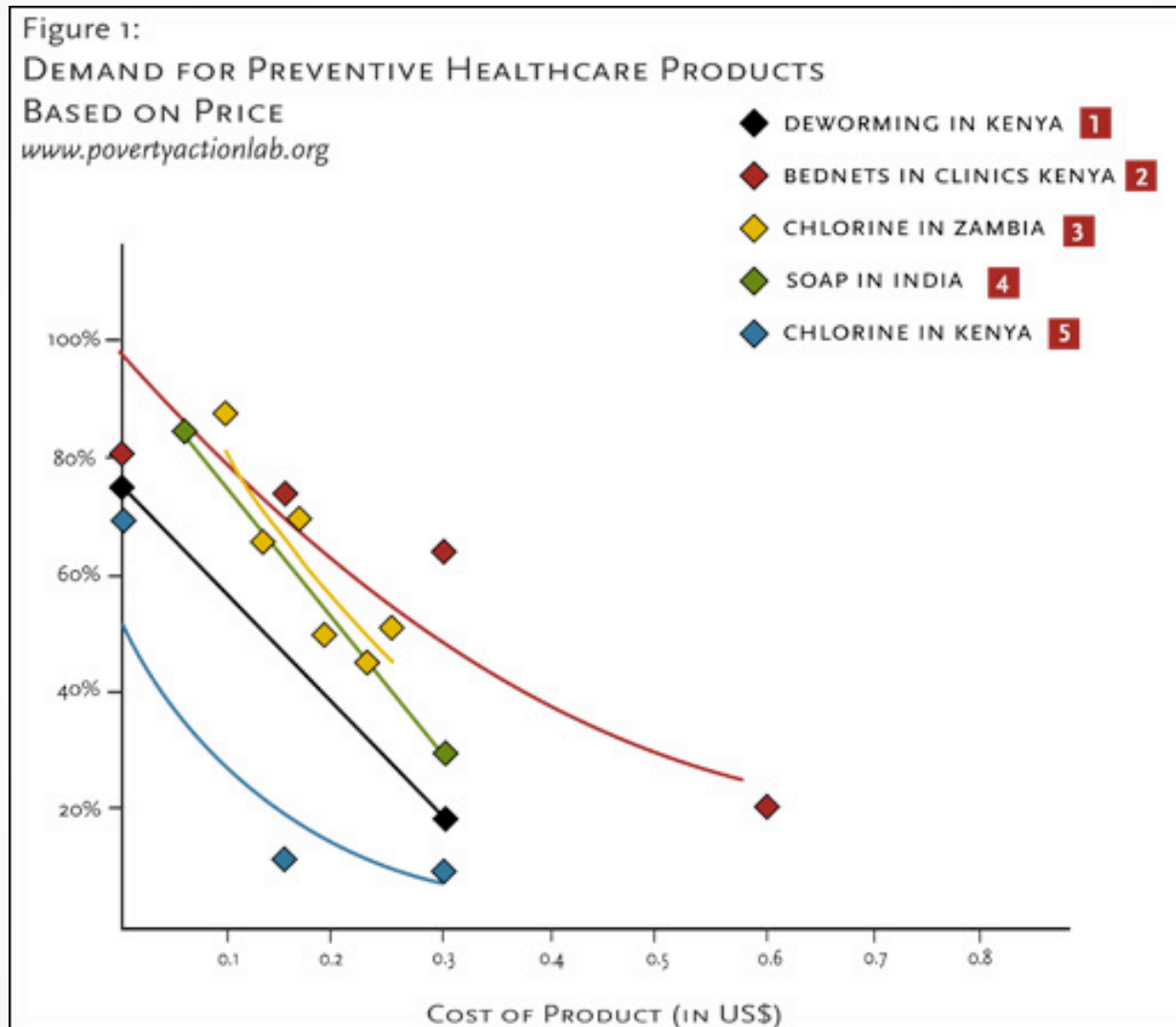


# Public Goods: Spring Protection (Kremer et al. 2011)

- \$1K capital cost, negligible marginal cost
- Randomized trial suggests 25% reduction in diarrhea, switching to protected springs
- Structural model to estimate social planner allocation, private property, current free access norm
  - Estimate consumer valuation using travel cost model
  - Solve for equilibrium pricing, investment by landowners competing with each other
- Estimate that full private property would create large static losses, little dynamic benefit
- This might be different at higher income levels



# Impact of Price: Prevention





# Impact of Other Costs and Benefits

- Similar results for distance/convenience
- Little effect of medical need, number of beneficiaries

# Does Paying Makes People More Likely to Use Health Goods?

- Widely believed by practitioners
- Could arise due to sunk cost fallacy
- No evidence
  - Cohen and Dupas (2010)
  - Hoffman (2008)
  - Ashraf, Berry and Shapiro (2010)
    - Those more likely to use are more willing to pay





# Negative Prices

- Large negative prices in conditional cash transfer programs increase uptake of health and education
  - Gertler and Boyce (2001); Gertler (2004); Schultz (2004)
- Small incentives also have remarkable impact
  - Thornton (2008) – HIV test results (Malawi)
  - Banerjee et al. (2010) – immunization in rural India
  - Baird et al. (2011) – conditional transfer *amount* does not affect outcomes
  - Implications for CCT design? For human capital model?
- Education subsidy and income can affect reproductive health, fertility
  - Dupas et al. (2012)
  - Baird et al. (2011)

# Information

- Often, little impact of health education
  - E.g. – worms
- But in some cases, dramatic impacts
  - Dupas (2011) – information on HIV prevalence by age
- Some puzzles for Bayesian model
  - Fade out of education campaign effect
  - Benneer et al. (2011) – greater responsiveness to coarse information
  - Non-reaction to info that don't have malaria (Dupas, 2012), water is clean

# Acute Treatment and Insurance

- Substantial expenditure on health treatment of doubtful utility (Das and Hammer, 2005; Banerjee et al., 2004)
- Consumers bear substantial health risk - e.g. Gertler & Gruber (2002)
- Low take-up of voluntary health insurance - e.g. Thornton et al. (2010)
- Limited and mixed evidence on effect of price of clinic visits on take-up, health
  - Dow et al. (2003) - exogenous increase in fees at clinics in Indonesia
  - Cohen and Dupas (2011) - subsidized anti-malaria in Kenya
  - King et al. (2009) – Mexican Seguro Popular health insurance program had no effect on healthcare utilization in short term

# Enriching the Model

- Household bargaining
  - Thomas (1990) – Source of income affects expenditure
  - Duflo (2003)
  - Ashraf, Field and Lee (2010) - Providing women information on contraception without spouse increases use of concealable contraception, reduced undesired fertility
- Liquidity constraints
  - Dupas (2009) – Mosquito nets
- Present bias
  - Sensitivity of take up to small short-run costs and benefits, convenience
  - Apparent underinvestment in prevention vs. treatment
  - Limited response to magnitude of future benefits
- Decision costs, optimization failures

# Applying the Lessons: Program Design and Testing

- Water infrastructure often expensive, recontamination frequent
- Chlorination safe, effective, low-cost, but single-digit take-up under social marketing
- Design for free distribution, convenience, habit formation, norm formation

# Chlorine Dispenser System

- Majority of households test positive for chlorine, use sustained over time
  - Kremer et al. (2011)
- Very low cost



# Overview

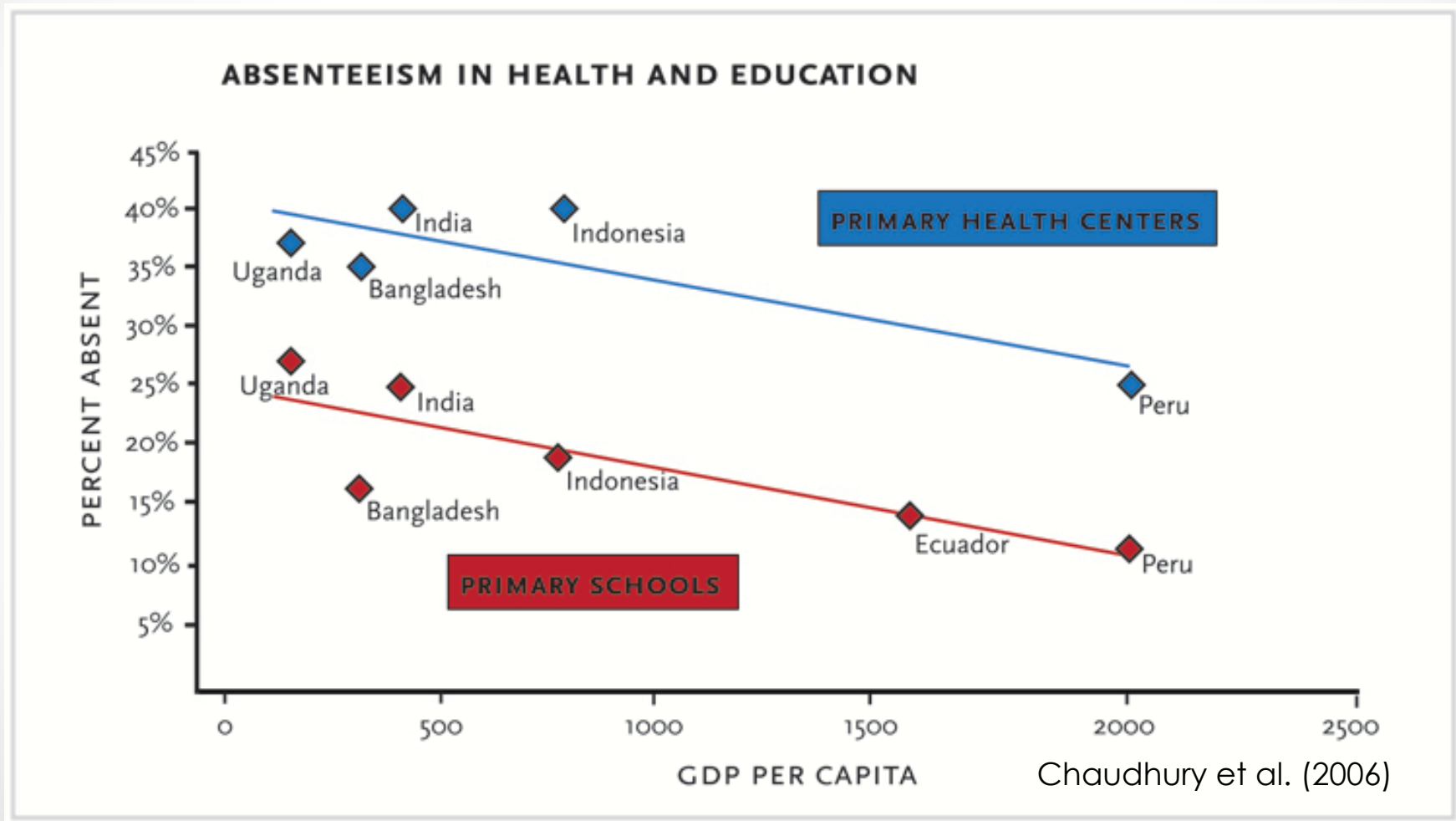
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Areas for future work

Methodological developments



# Weak Incentives of Public Providers





# Poor Quality

- In north Indian hospitals, physicians spent 3.8 min per patient, asked 3.2 questions, prescribed 2.63 medications (Das and Hammer, 2007)
- Frequent use of unqualified providers in some countries (Banerjee et al., 2004, Das and Hammer, 2005)

# Approaches to Addressing Government Failure in Service Delivery

- Community mobilization for accountability
- Provider Incentives
- Paying for results
- Contracting for health

# Community Mobilization and Accountability

- Björkman & Svensson (2009) - community monitoring of health services in Uganda
  - Provider absence 14% lower in treatment facilities
  - Vaccination rates increased 46%
  - 46% more children received vitamin A supplements
- Contrasting results in India education



# Provider Incentives

- Banerjee et al. (2008) - monitoring program linking pay to nurse attendance in India
  - Initial attendance boost; disappears after 6 months (program undermined)
- Basinga et al. (2010) - Rwanda pay for performance program
- Ashraf et al. (2012) “No margin, no mission?”



# Paying for Results?

- Olken et al. (2011) – block grants to communities tied to results
  - Regular weight checks for children and iron tablets for pregnant women increased
  - Malnutrition fell by 2.2 percentage points



# Contracting for Health in Cambodia

- Bhushan et al. (2006) – Cambodia contracted out the management of healthcare to NGOs in some districts
- Targeted health outcomes increased one standard deviation
  - 42% increase in vitamin A and 36% increase in prenatal care coverage
  - Decreased absence rates among providers
- No change in non-targeted health outcomes
- Increased government spending in contract districts offset by decrease in private health spending



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Methodological developments

# Areas for Future Work

- Optimization failure and normative analysis in its presence
- Social norms in health, role of media (La Ferrara et al., 2008; Jensen and Oster, 2009)
- Health care issues once low-hanging fruit is picked: aging, curative care, social insurance
- Intersection of IO and health
  - Pharmaceutical markets (Goldberg, 2006; Yanagizawa-Drott, 2012; AMCs)
  - Private and public providers (Das et al. 2007)
- Political economy of health (Miller, 2008; Fujiwara, 2010; Duflo and Chattopadhyay, 2004)



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**Methodological developments**

# Development of Methods

- Biggest change is growth of field trials since 1994
  - Natural extension of revolution in empirical methods in labor
  - Now feeding back from development economics to other fields
  - Previous trials measured impact of large-scale, often multi-faceted government programs – JTPA, headstart
  - In new approach, academics help design programs as well as test them, often incorporate multiple arms, iterative elements
    - Allows testing ideas from economic theory – e.g. separation of selection and treatment effects,, estimation of parameters of structural models
      - Health behavior is one example of how this is reshaping our understanding of determinants of behavior
    - Allows development and testing of ideas for policy (information on relative HIV risk by age, lentils for vaccines, chlorine dispensers)

# Why Did Field Trials Take Off?

- Demonstration of feasibility
- Enabled by a host of practical innovations
  - Academics engaging with, and proposing ideas to, NGOs
  - Building organizations to conduct trials (within ICS, JPAL, IPA)
    - Iterative trials
    - Maximizing power with limited budgets – from cutting transport costs to well-crafted factorial designs

# Stream of Technical Innovations

- Objective outcome measures to address reporting bias (client and provider presence, chlorine in water)
- New approaches to randomization, stratification procedures (Bruhn and McKenzie, 2009)
- Capturing and measuring spillovers
- Tests of larger-scale government programs and incorporation of additional variants into those programs (From PROGRESA to Baird et al., 2011, etc.)
- Integration of randomized trials with structural modeling
- Approaches for improving long-run follow up
- Measuring and addressing survey effects (Zwane et al., 2011)
- Analysis plans (Casey et al., 2012)

# Field Trials and Economics

- New approach has radically changed day to day life of many economists
- Broadened conception of what economists do
- Some costs. Not for everyone. Important to remember to think like economists
- New insights for economics and for world from combining
  - Immersion in the social context
  - Empirical discipline of randomized trials
  - Analytical discipline of economics

# END

# Scrap Section



- 1. Impact of health  
4. Methodological Issues

- 2. Health Investment  
5. Areas for future work

### 3. Health care provision

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# Political economy of health

● A. Impact of Health  
D. Government Failures

B. Market Failures  
E. Health Provisions

C. Human Capital and Health Investment  
**F. Future Work**  
**G. Methodology**

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- Model implies:
  - People make the same calculation of expected health benefit against cost of treatment and prevention
  - If people decide to vaccinate, they will do it at once, without delaying
- Many people take up health prevention products at zero price, but not at small positive prices
- Assume people are present-biased, quasi-hyperbolic discounting where  $\beta < 1$ 
  - Implies even small short-run costs can have big effect on consumer's behavior
  - Sophisticated present-biased may commit to vaccinate or treat chronic disease

- Puzzle: many existing technologies for prevention of communicable disease are highly effective, low cost, but incomplete use
  - Childhood immunization
    - 27 million children don't receive basic immunization package each year
  - Insecticide- Treated Nets (ITNs)
    - Reduce all-cause child mortality by 38% where malaria is endemic
    - Low coverage of ITNs in Africa
  - Deworming drugs
  - Water chlorination

# Markets in health

**B?**

# Within-household distribution

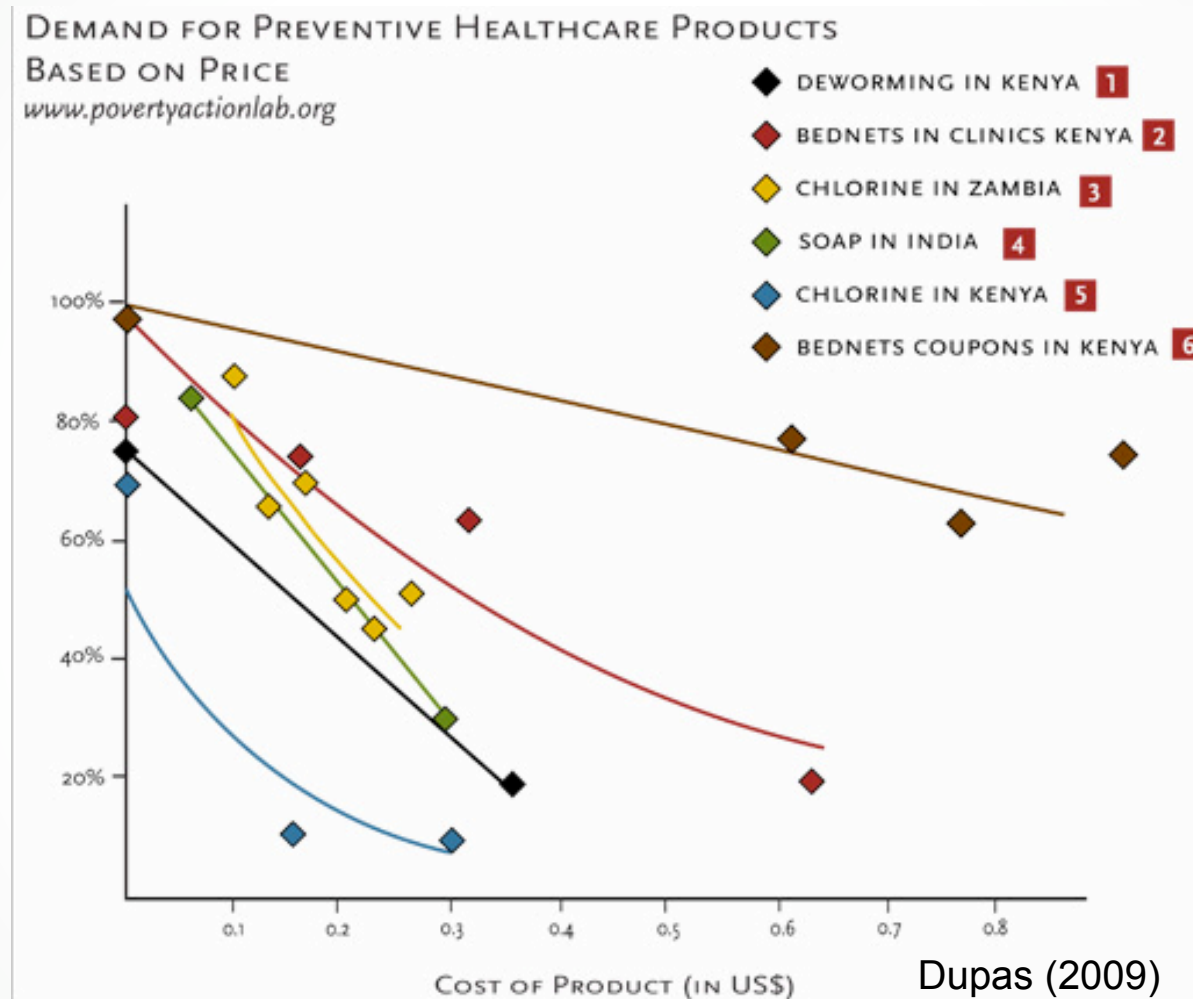
- Women
- Children
- Elderly

# END

everything after this will not  
be in presentation



# Liquidity constraints



- low hanging fruit
- Curative care requiring diagnosis is challenge for future