
Reducing Financial Burden and Financial Risk: Example of Tuberculosis Treatment in India

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Plan for this Talk

- Conceptual background
- Universal public finance of TB treatment of India



TB Treatment in India

Joint work with Stéphane Verguet and
Ramanan Laxminarayan

From Cost-Effectiveness Analysis (CEA) to Extended Cost- Effectiveness Analysis (ECEA)

- **Traditional economic evaluation focus (CEA)**
Cost-effectiveness of technical health interventions
(e.g. antiretroviral therapy for HIV/AIDS)
- **Policymaking focus (ECEA)**
Resources allocated across different options
 - 1) Health interventions
 - 2) Health service delivery platforms
 - 3) **Health policy levers** (e.g. universal public finance)

Specific Consequences of universal public finance (UPF)

- Health gains (burden of disease averted)
- Financial consequences for household expenditures
UPF “crowds out” medical expenses privately financed
- Financial protection benefits
UPF provides “insurance” to households from medical impoverishment
- Distributional consequences (across income groups)

ECEA Measures of UPF

UPF for an intervention (e.g. TB treatment)



Health
gains

(e.g. TB deaths
averted)



Household
expenditures

(e.g. TB-related costs
averted)



“Insurance”
benefits

(e.g. financial
protection from
TB-related costs)



Poorest



2nd Poorest



Middle



2nd Richest

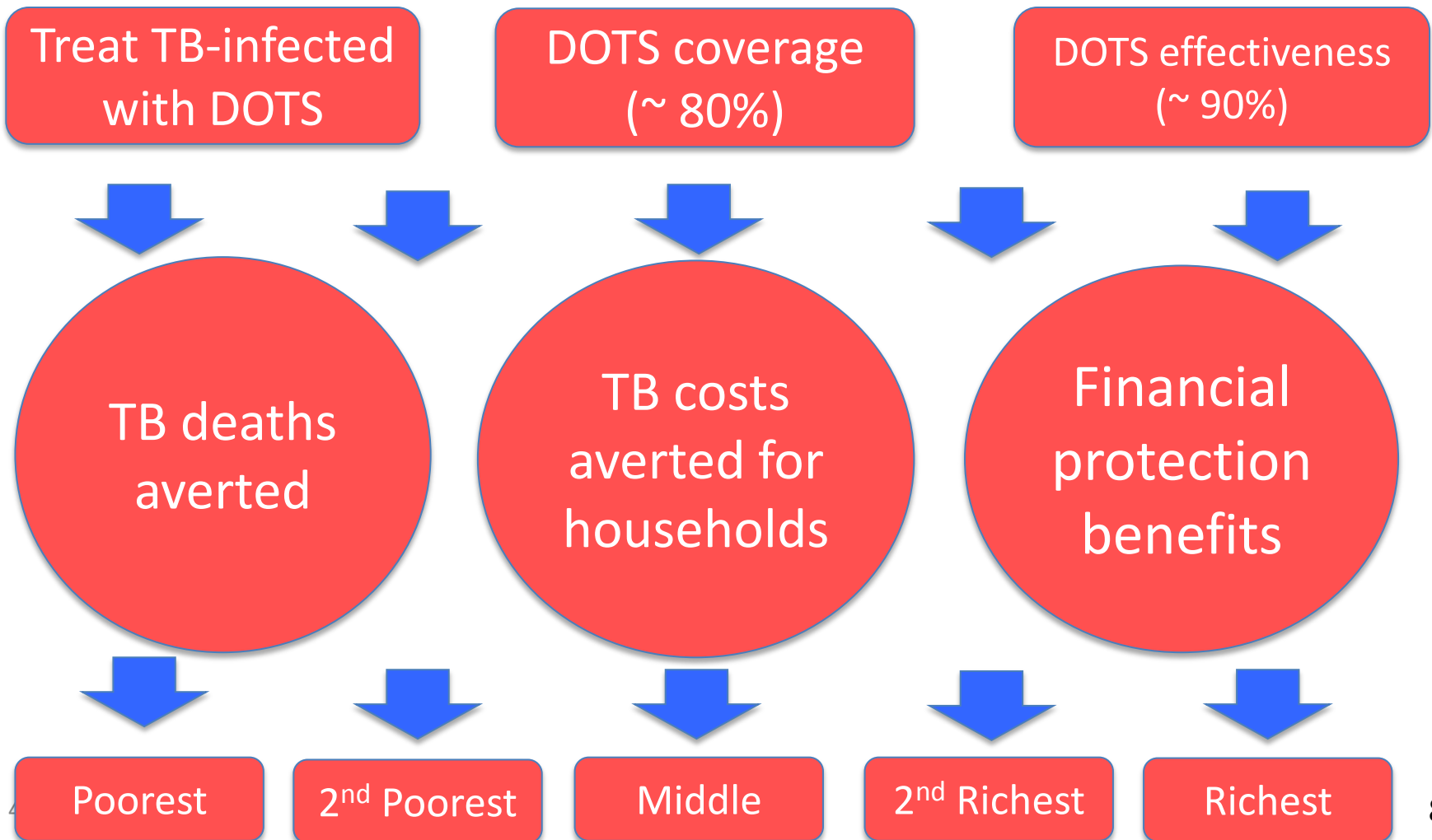


Richest

Tuberculosis in India

- TB epidemiology
 - Annual incidence of 170 per 100,000 (WHO 2010)
 - 4 times higher incidence among the poor (Muniyandi et al. 2007)
 - Case fatality rate of 0.25 (Corbett et al. 2003)
- TB treatment (DOTS)
 - Cost of \$80 per patient
 - Effective at 90% (WHO 2010)
- TB treatment demand
 - Individuals with:
 - low income do not buy DOTS
 - higher income purchase DOTS (80%)

UPF for TB Treatment Over 1 Year for 1 Million Indians



Financial Protection Benefits Due to UPF (1)

- Risk aversion

Individuals value protection from the risk of uncertain adverse events

y = individual income

r = coefficient of relative risk aversion

- Approach consistent with recent work

McClellan & Skinner. The incidence of Medicare.

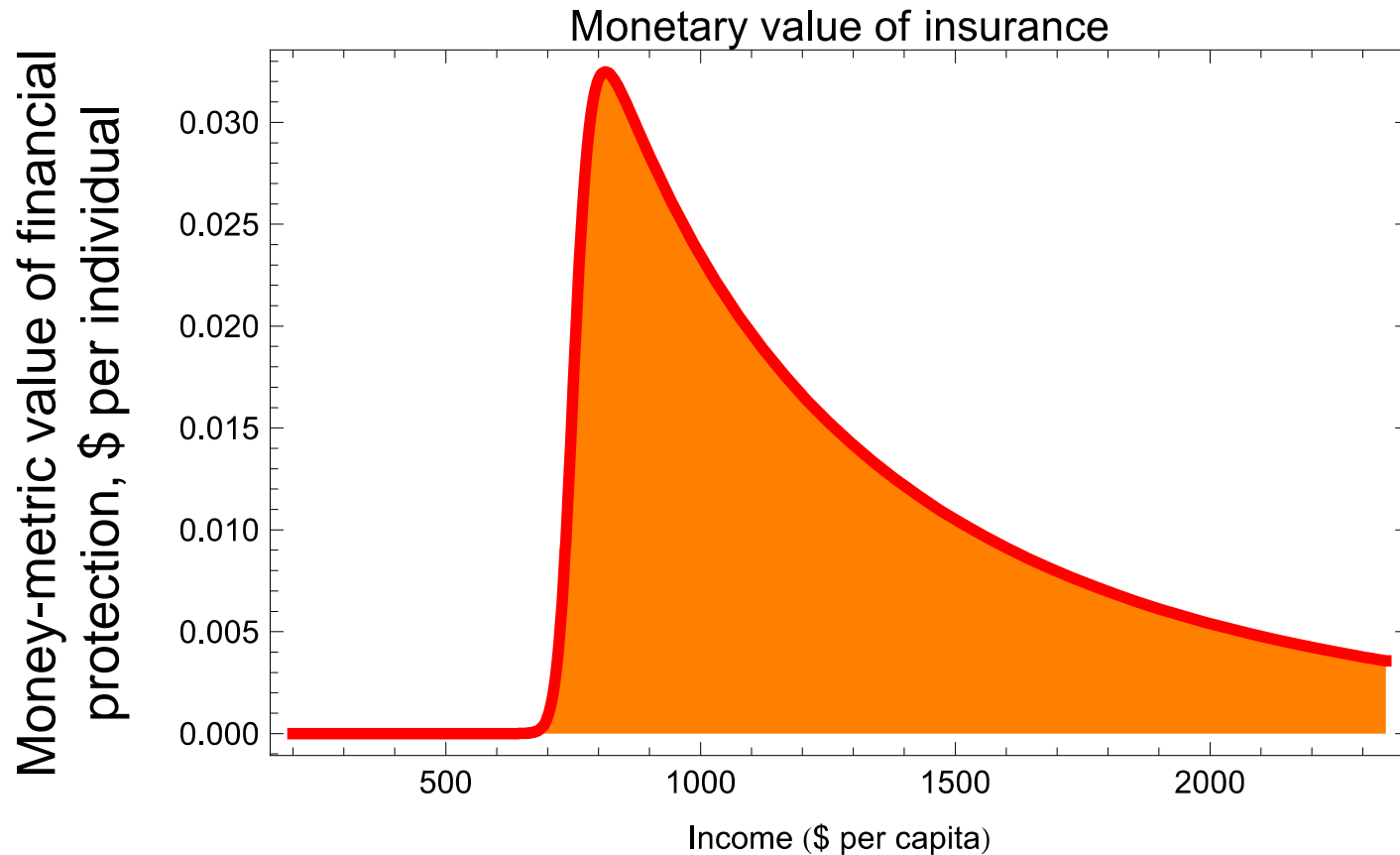
Journal of Public Economics 2006

Smith. Incorporating financial protection into the economic evaluation of health technologies. Health Economics 2012

Financial Protection Benefits Due to UPF (2)

- Money-metric value of insurance provided
 - Gamble with:
 - disease occurs at incidence p (depending on income)
 - has treatment cost c
- **For 1 individual**, money-metric value of insurance = expected value - certainty equivalent of gamble

Financial Protection Benefits with UPF for TB Treatment over 1 Year for 1 Million Indians



Total financial protection value of \$10,000

Benefits over 1 Year for 1 Million Indians with UPF for TB Treatment

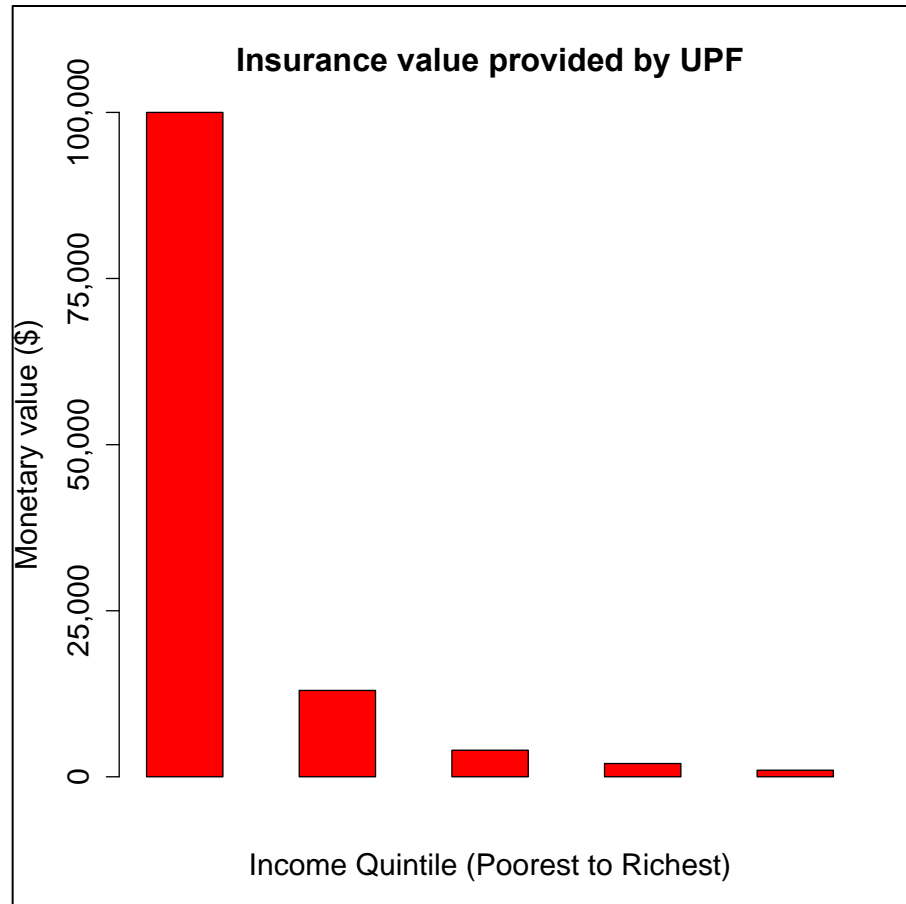
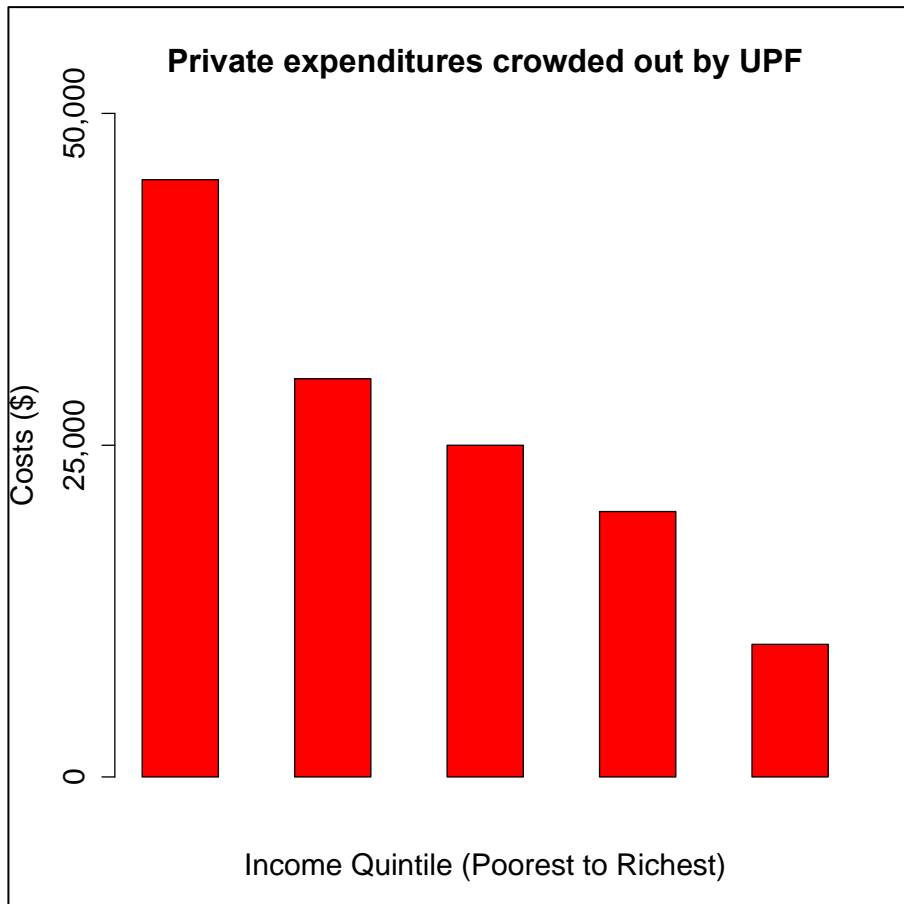
	Outcome	Total	Income Quintile I (Poorest)	Income Quintile II (Poorer)	Income Quintile III (Middle)	Income Quintile IV (Richer)	Income Quintile V (Richest)
1	TB deaths averted	150	100	50	0	0	0
2	Private expenditures crowded out	\$70,000	0	15,000	25,000	20,000	10,000
3	Money-metric value of insurance	\$10,000	0	3,000	4,000	2,000	1,000

Total cost of public program of \$130,000

Coping Mechanisms: Borrowing

- Without UPF, when faced with costly treatment, the poor borrow from peers or sell assets
- 50% of poor households in India borrow money/sell assets at high interest rates (Kruk et al. 2009)
- Assume the poor take a loan over 10 years at annual interest rate of 20% to subsidize TB treatment

Benefits Over 1 Year for 1 Million Indians with UPF for TB Treatment (with borrowing)



Borrowing: A Substitute to UPF?

- Financial protection could be provided through mechanisms reducing cost of borrowing
e.g. institutional arrangements to allow improved borrowing interest rate



- Effective substitute for UPF in averting TB deaths
- Lowers costs to the public sector

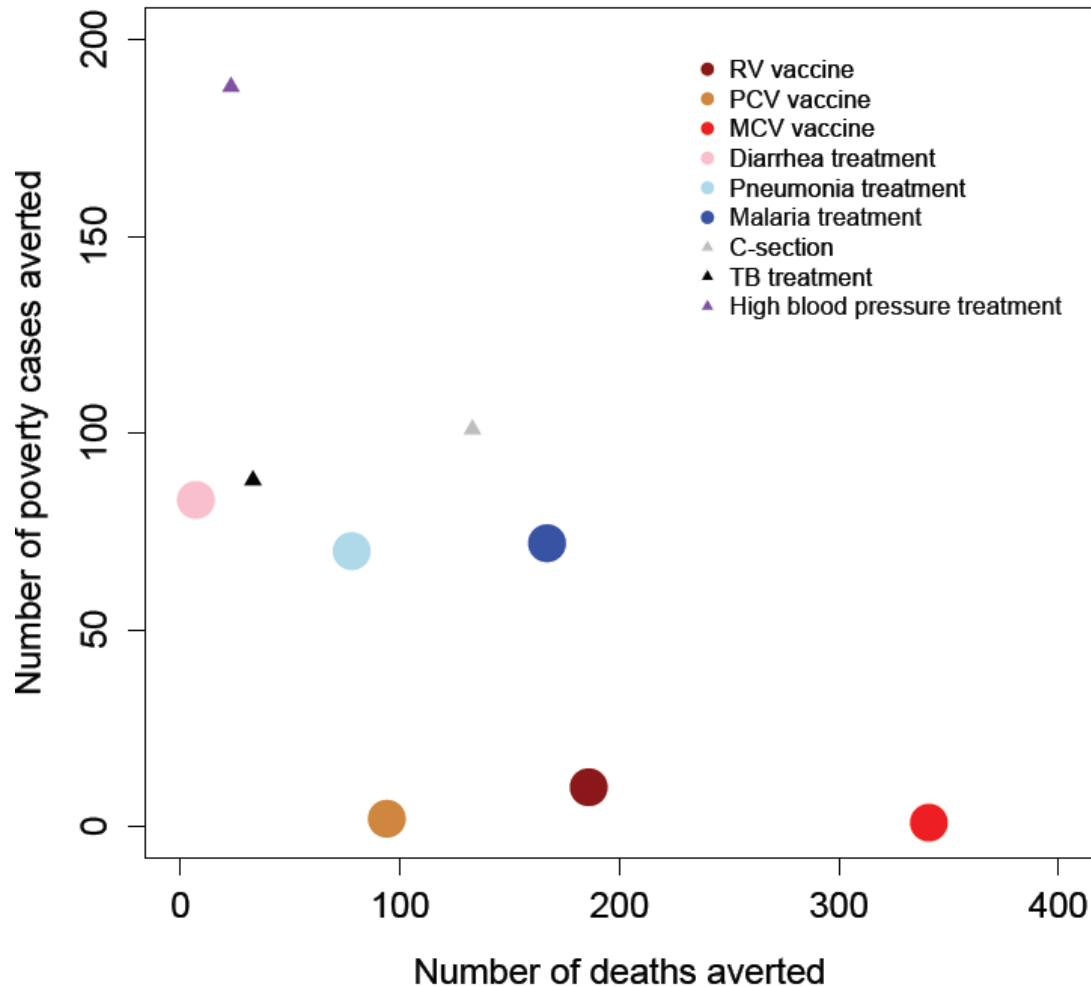
But burdens the poor with heavy debt

Conclusions (1)

- ECEAs
 - incorporate equity & financial protection, two important objectives of health systems (Murray & Frenk 2000)
- Case study: UPF of TB treatment in India
 - health gains concentrated among poor
 - financial protection benefits concentrated among poor, effectively replacing coping mechanisms
 - crowding out of bad treatment options = enhances quality

Conclusions (2): ECEA Output

Health & financial risk protection benefits afforded, per \$100,000 spent





Thank you

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