Barriers to Benefit-Cost Analysis in Health and Social Policy

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Overview

- Comprehensiveness: Desirability and difficulty
- Health Policy: Why more BCA and less CE needed
- Some specific issues for social and health applications
  - Dealing with uncertainty
  - Conceptual issues (related to behavioral perspective)
    - Addiction
    - Opportunity cost of volunteer time
  - More and better shadow prices to make BCA of social policies more feasible
Comprehensiveness

- Desirable broad social perspective
  - Give standing to all who bear impacts
  - Take account of all effects, including spillovers to other domains of social policy
  - Facilitate meaningful comparison

- Difficulty
  - Predicting multiple effects: multiple sources
  - Monetizing: missing or very uncertain shadow prices
Too Little BCA, Too Much CE in Health?

- Preponderance of cost-effectiveness (CE)
  Neumann (2005): CEs “vastly outpace” BCAs

- BCA or CE ethically challenged?
  - “Immoral to put dollar value on life” so stop at QALYs
  - But, ...sneak it in the back door by setting thresholds
    - Cameron’s (2010) semantic solution: WTS(wap) micromorts

- Discourages comprehensiveness
  - If comprehensive, then one shadow price from BCA
  - But,...benefits beyond effect must be netted from costs
Too Much CE, Too Little BCA (Continued)

- **Practical issues**
  - Inherent problems with ratios (CE and B/C)
    - Scale effects; need to eliminate dominated alternatives
  - Handling uncertainty (CE Acceptability Curves)
    - Use Monte Carlos but throw away distribution (probability of dominance over alternative)
      - Used in about a third of medical CEs (Meckley et al. 2010)
      - Reintroduces value of health effect
  - Collapsing effect often ignores discounting
Dealing with Uncertainty in Social BCA: Monte Carlo Simulation Essential

- Many uncertain parameters (predictions and shadow prices) go into stew
- Estimation of net benefit (and its uncertainty) demands Monte Carlo Analysis
  - Net benefit based on mean values of parameters does not necessarily equal mean net benefit
  - Distributions difficult to work out when dividing and multiplying random variables
  - Monte Carlo distributions convey information about both mean and variance of net benefits
Appropriate Hypothesis: Is NB Positive?

- Difficult to be comprehensive: must often piece together estimates from many sources
- Should we use parameter estimates that are statistically insignificant?
  - Correct hypothesis is about NB
  - Should have some prior (from theory) about effect
  - Using zero instead of estimated parameter biases our estimate of NB and underestimates our level of uncertainty
Demonstration (Set Up)

- Assume four equations each providing estimates of benefits for two groups, A and B
  - Starting point true values:
    - EQ1: BenA=2, BenB=6
    - EQ2: BenA=5, BenB=3
    - EQ3: BenA=2, BenB=1
    - EQ4: BenA=1, BenB=0
  - Assume equal numbers from two groups: Benefits=10
  - Reduce benefits proportionally to bet lower benefits
Demonstration (Decision Rules)

- **Ben_all**
  - Use all parameter estimates

- **Ben_0**
  - Use statistically significant parameters

- **Ben_Bon**
  - Use Bonferroni correction

- **Ben_shrink**
  - Shrink parameter estimates
    - Shrinkage factor: $t^2 / (1 + t^2)$
Publishing Bias (Experiment-Wise)

- Mean Square Error
- True Benefits (Sigma=4)

Lines represent different error models:
- Ben_all_MSE
- Ben_0_MSE
- Ben_shrink_MSE
- Ben_Bon_MSE
Unresolved Conceptual Issues Relevant to BCA of Social Policies: Addiction

- Clear that predictions of behavior should take account of addiction

- Implications of addiction for valuation less clear
  - Is market demand curve correct marginal valuation curve?
  - Or is “unaddicted” demand correct marginal valuation curve?

- Use contingent valuation to position unaddicted curve?
Australian Productivity Commission Approach: $D_A$ Addicted Demand; $D_R$ Unaddicted Demand

Social Surplus at Price $P_C$: $P_R a P_C - abc$
Unresolved Conceptual Issues Relevant to BCA of Social Policies: Volunteer Time

- Traditional view
  - Value at opportunity cost of time (wage rate)

- Alternative view
  - Revealed preference: benefit of volunteering outweighs opportunity cost of time (or wouldn’t volunteer!)

- Complication
  - “Conscience goods” (Freeman 1997)
Missing Shadow Prices: Many!

- **Four categories**
  - 1. Available but more and better estimates desirable
  - 2. Incorporation of externalities into commonly estimated effects (horizontal linkage)
  - 3. Develop chains linking immediately measurable effect to future impacts (vertical linkage)
  - 4. Estimate Zerbe’s “moral sentiments” such as willingness to pay for redistribution
Important Available Shadow Prices that Need Updating and Improving

- Marginal excess tax burden
  - Should be routinely used but is not
  - More contemporary estimates needed

- Costs of crime
  - Crime reduction benefit in many social policy areas
  - Need updated estimates of direct harm
  - More estimates of indirect effects
Horizontal Linkage: Finding Factors to Incorporate Externalities

- Example: Haveman and Wolfe (1984) household utility approach
  - Estimate non-labor market benefits of schooling (reductions in crime, efficiency of consumption)
- Wolfe and Haveman (2001)
  - Additional affects: for example, fertility choices of daughters
- Rule-of-thumb: non-labor market gains approximately equal to labor market gains
Vertical linkage: WSIIPP Child Abuse BCAs

- WSIIPP did meta analysis to estimate impact of intervention programs on child abuse
- WSIIPP did meta analysis of studies linking child abuse to reductions in probability of high school graduation (and other effects)
- Product of these impacts gives the predicted effect of the program on high school graduation
- The present value of increased earnings from high school degree, $175,000, was used as a shadow price for the predicted number of additional graduations resulting from the program
Estimate Moral Sentiments for Incorporation into BCA

- Example: What is the social value within the BCA framework of moving a child from poverty?
  - Estimate willingness to pay through contingent valuation studies (Dale Whittington, UNC)
  - The resulting estimate is a shadow price that moves what we usually think of as an equity or moral concern to a component of efficiency
Conclusion

- BCA of social policies is desirable
- It requires some creativity (and bravery)
- It inevitably involves many uncertainties and should be done through Monte Carlo Simulation
- We can facilitate it by helping resolve conceptual issues and providing better and fresher estimates of shadow prices to reduce the cost of doing BCA