

# ***Health Effects of Regulatory Costs***

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# Opportunity Costs 1

- The first and most important principle of economics is that we inevitably face trade-offs and thus everything has an “opportunity cost” - determined by the value of our second best choice.
- “According to the Clean Air Act (“the Act”), the Environmental Protection Agency (EPA) must use health-based criteria in setting the NAAQS and cannot consider estimates of compliance cost.” (OZ NAAQS RIA p1-1)

# Opportunity Costs 2

- With the Cost in Benefit Cost Analysis (BCA) prohibited, we are left with benefits analysis and in particular “health-based criteria.”
- The key insight is that “opportunity cost” includes as a subset-- health-benefits.
- A certain percentage of ones marginal income is spent on safety and health enhancing goods and services.
- A loss or slower increase in income thus results in lost health benefits.

# Health-Health Analysis 1

- HHA was developed and used at OMB to overcome the moral and legal objections to BCA.
- It was first used in 1992 to suspend review of an OSHA rulemaking on 600 workplace air contaminants.
- OSHA's position at the time was that it was not allowed to perform BCAs for health standards under a Supreme Court ruling on cotton dust.

# Health-Health Analysis 2

- We termed this analysis HHA to distinguish it from risk-risk analysis, which depends on the technical characteristics of regulations.
- The idea for using the health opportunity cost approach from outside the economics literature.
- Aaron Wildavsky (1988), Ralph Keeney (1990), and Judge Stephen Williams (1991).
- Economists prefer BCA to HHA (Portney and Stavins 1994).

# Health-Health Analysis and NAAQS

- Supreme Court Justice Stephen Breyer in *Whitman v. American Trucking Associations* (2001).
- “The statute also permits the Administrator to take account of comparative health risks. That is to say, she may consider whether a proposed rule promotes safety overall. A rule likely to cause more harm to health than it prevents is not a rule that is “requisite to protect the public health.””

# HHA in use

- HHA has been used and estimated mainly by economists (Lutter and Morrall 1994) Lutter, Morrall, Viscusi 1999) HHS, OMB, OSHA
- Australia, Sweden (Hjalte et al 2003)
- Institute of Medicine (2006, *Valuing Health for Regulatory Cost-effectiveness Analysis*)

# Law Review Articles

- Cass Sunstein: Several books and law review articles treat it favorably (2002)
- Frank B. Cross, “When Environmental Regulations Kill: The Role of Health/Health Analysis”, 22 Ecology L.Q. (1995). “While the claims for health/health analysis, like any position, may be exaggerated, I find that the theory is fundamentally sound and that costly public health regulations may indeed cause more health harm than good.”



# The Income-Health Gradient 1

- That economic deprivation is strongly related to ill health was perhaps first scientifically documented by René Villermé, who compared mortality rates and poverty across the arrondissements of Paris in the 1820s and by studies in 1840s in Great Britain
- Well known in sociology, demography, public health, epidemiology, and development economics.
- Used to argue for progressive taxation and transfers and aggressive economic stabilization policies.

# The Income-Health Gradient 2

- But was very controversial when applied to regulation in 1992. ---"inmates are running the asylum," "absolutely loony, the most crazy logic to date".
- Suddenly: Many argued causality went the other way. (GAO)
- "Controversy arises when the results are used in health/health analysis to argue against promulgation of a public health regulation." (Cross 1995)

# The Income-Health Gradient 3

- “In sum, the correlation between income and health is well-supported by a broad range of studies that all reach the same conclusion. These data are far more conclusive than the data used to justify regulation of a hazardous substance or activity.” (Cross 1995)
- Asks “What Causes The Gradient If Not Income?” -- Clear that they are mutually determined (Angus Deaton in *Heath Affairs 2002*)
- “The most extensive and robust finding(s) in epidemiology patterns...” (Harvey Brenner 2011 Senate testimony)

# Operationalizing HHA

- Need an estimate for the second H, assuming the first H is the intended health consequence of the regulation.
- Two ways to estimate this effect, which has been called different names in the literature. Willingness to spend (WTS), value of induced death (VOID) and cost-per-life saved cutoff.
- We will use “**cutoff**” (for induced mortality).

# Estimating Life Saved Cutoff 1

At least four linkages from income to health

1. Protective Expenditures
2. Psychological Stress
3. Individual Behavioral Changes
4. Social Evolutionary Changes

# Estimating Life Saved Cutoff 2

- Direct estimates of the income cutoff
- From Lutter and Morrall (1994)
- literature survey
  - Range from \$5 million to \$20 million (2011\$)
  - JEC (1984) Duleep , Graham et al (1992)
  - Keeney (1990) Chapman and Hariharan (1994)
- Lutter and Morrall direct international (\$15M)

# Estimating Life Saved Cutoff 3

- Theoretical economic model using well accepted utility maximizing behavioral assumptions, bypasses some reverse causality issues by estimating right hand side variables
- Cutoff =  $WTP$ /marginal propensity to spend on health and safety enhancing products
- Viscusi (1994) Lutter, Morrall and Viscusi (1999)

# Estimating Life Saved Cutoff 4

- Early Viscusi \$5m/0.1 (% GDP on healthcare)= \$50 million or \$85 in 2011\$
- But overestimate of cutoff because of growing share of healthcare spending and leaves out other safety enhancing spending and behavior that occurs with increasing income
- Lutter, Morrall, and Viscusi (1999) added behavioral effects using NHIS data:



# Estimating Life Saved Cutoff 5

- We estimated income elasticities for smoking, overdrinking and diet and inactivity and impact on mortality using data from McGinnis and Foege (1993) on the known causes of death in the US
- Estimated cutoff was \$25 million in 2011\$
- Still possibly an overestimate since other marginal health and safety spending not included (auto-safety, housing) and healthcare spending is now 17% of GDP.

# Implications for Ozone: An Illustrative Example of HHA

- HHA introduces uncertainty from the cost side
- A rule likely to cause more harm to health than it prevents is not a rule that is “requisite to protect the public health.”
- E.G. using Smith et al (2009) mortality estimates and \$20,000 per ton for 2025 (non CA), a \$25 million cutoff shows.....

# Implications for Ozone: An Illustrative Example of HHA

- A negative health impact for 60 ppb (-900 lives ) -- 2000 induced by income loss compared to 1,100 reduced by Ozone reduction
- A negative health impact for 65 ppb (-130 lives)
- A slightly positive health impact of 70 ppb (24 lives)

# Distributional Impacts of HHA 1

- Given the nature of the income health relationship, the distribution of the costs of regulations matters and affects the cutoff value.
- Keeney (1996) shows that if regulatory costs are borne equally rather than proportionately to income, the cutoff value falls more than  $\frac{1}{2}$  (to \$8m from \$20m in 2011\$).

# Distributional Impacts of HHA 2

- EPA is required to do an Environmental Justice analysis under EO 12898 but it focuses on geographic proximity to the pollutant and the fairness of the process -- not on net incidence.
- Cost is likely disproportionately borne by lower incomes as the standard is tightened and electricity costs increase (coal-fired EGU is a major cost factor).
- On benefit side, EPA finds that low income groups are less likely to live in controlled counties as the standard is tightened (30% from 32%).

# Final Thoughts

- Glad I am not at OMB anymore!
- Questions ?