EPA's Reports to Congress on the Benefits and Costs of the Clean Air Act

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CAA90 Section 812

- "comprehensive analysis of the impact of this act on the public health, economy, and environment of the united states"
  "consider[ing] the costs, benefits and other effects associated with compliance"
- "a default assumption of zero value shall not be assigned to [benefits] unless supported by specific data"

EPA's Conclusions

- CAA 1970-90
  - $2 trillion annual net benefits ("best estimate")
  - No support for this estimate among economists independent of EPA
- CAA 1990 ->
  - $83 billion annual net benefits ("central estimate")
  - Ours is first independent examination

Costs Are Understated

- Direct costs
  - SAB assumed EPA estimates were valid
  - EPA estimates include $10k/Mg ceiling on cost of achieving O_3 standards
- Indirect costs ignored
  - ≈25-35% of direct costs
- Significant costs excluded
  - Section 181 mandatory deadlines
  - EPA estimate thus reflects *partial* compliance

Modeling Excluded Costs

- Consider linear extrapolation for cancer
  - Ignorance about risks in range of concern
  - Extrapolation from data down to zero
- Apply same method to compliance costs
  - Ignorance about costs in range of concern
  - Extrapolation from data up to compliance level of control
  - ≈$53 billion, excluding Houston and Galveston
- Annual cost closer to $100B than $27B

Overvaluation of Risk Reduction

- Small actual reductions in life expectancy
  - ≈14 years *if* PM claims lives randomly
  - Random effects imply that healthy and infirm face same risk
- VSL factors used by EPA
  - Derived from cases where loss ≈ 40 life-years
  - Applied to the aged and infirm

Exaggerated Risk Reductions

- Where do benefits come from?
  - 90%: reduction in PM-induced mortality
  - 10%: other factors
- Where does PM-induced mortality come from?
  - Relative risk = 1.19 from Pope et al. (1995), comparing cities with highest and lowest PM
  - Exposure is annual median ambient outdoor PM
  - Statistical significance claim assumed valid
  - Observed association assumed to be causal

Reasons for Skepticism

- Linear extrapolation implies no thresholds
- Plausible threshold reduces risk by 2-6x
- Dubious model validity
  - Self-reported data from a convenience sample
  - Statistical significance assumes representativeness in sample
  - Specification robustness given variables
  - Omitted variables (e.g., indoor air)

A Possible Explanation for the Observed Results

- Indoor air and weather
  - Indoor/outdoor air exchange rates
  - Wind
  - Indoor/outdoor activity patterns
  - Results confounded if cities with lower average outdoor PM and mortality also have more wind
- Not tested by HEI

Revised Costs and Benefits of Clean Air Act

- Costs
  - EPA: $27 billion/year
  - B/C ratio: 4.1
  - Revised: $100 billion/year
  - Revised B/C ratio: 1.1
- Benefits
  - EPA: $110 billion/year
  - 6% reduction in benefits makes NB < 0