

Retrospective Analysis of Regulation

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Resources for the Future

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Topics

- Importance of issue
- Scope/Definitions
- Literature
- Rationales for ex ante-ex post differences
- Complexities of retrospective comparisons

Importance of Issue (1)

- Over- (under-) estimation of benefit-cost ratios could lead to regulations that are too stringent (insufficiently protective)
- Such errors can mis-inform the public, undermine integrity of regulatory system
- Such errors can also increase skepticism about using economics in regulatory decisionmaking

Importance of Issue (2)

- Could possibly point to reforms in RIA methods
- Could possibly identify targets for reform of existing regulations

Scope and Definitions

- Costs or benefits?
- Ex post only or ex post vs ex ante?
- Breadth of benefits/costs considered
- Types of discrepancies
- Defining 'accurate'

Table 1: A Taxonomy of Costs of Environmental Regulation

Cost category	Counted in RIA?
DIRECT COSTS	
Private Sector Compliance Expenditures	
Capital	Yes
Operating and maintenance	Yes
Public Sector Compliance Expenditures	
Capital	Yes
Operating and maintenance	Yes
Government Administration of Environmental Statutes and Regulations	
Monitoring	Rarely
Enforcement	Rarely
Other Direct Costs (including negative costs)	
Legal and Other Transactional	Sometimes
Shifted Management Focus	No
Disrupted Production	No
Waiting time	Sometimes
Intermedia pollutant effects	Sometimes
Other Natural resource effects	Sometimes
Changes in maintenance requirements of other equipment	Sometimes
Worker Health	Sometimes
Stimulation of innovation in clean technologies	No
INDIRECT COSTS	
General Equilibrium Effects	
Product Substitution	No
Discouraged Investment	No
Retarded Innovation	No
Transition Costs	
Unemployment	Sometimes
Plant closures	Sometimes

Source: Adapted from Jaffe et al. (1995).

Table 2. Cost estimation: Some hypothetical cases

	<i>Ex ante Estimate</i>	<i>Alternative ex post outcomes</i>				
		1	2	3	4	5
Number of plants	100	100	150	100	100	200
Emissions, pre-reg.	100	100	100	50	100	50
Emissions, Post-reg.	25	25	25	25	50	25
Cost per plant	\$200k	\$100k	\$200k	\$200k	\$200k	\$100k
Aggregate cost	\$20M	\$10M	\$30M	\$20M	\$20M	\$20M
Emission reductions	7500	7500	11250	2500	5000	5000
Cost per emission unit	\$2666	\$1333	\$2666	\$8000	\$4000	\$4000

Source: Harrington, Morgenstern, Nelson, 2000.

Government Ex Post Studies

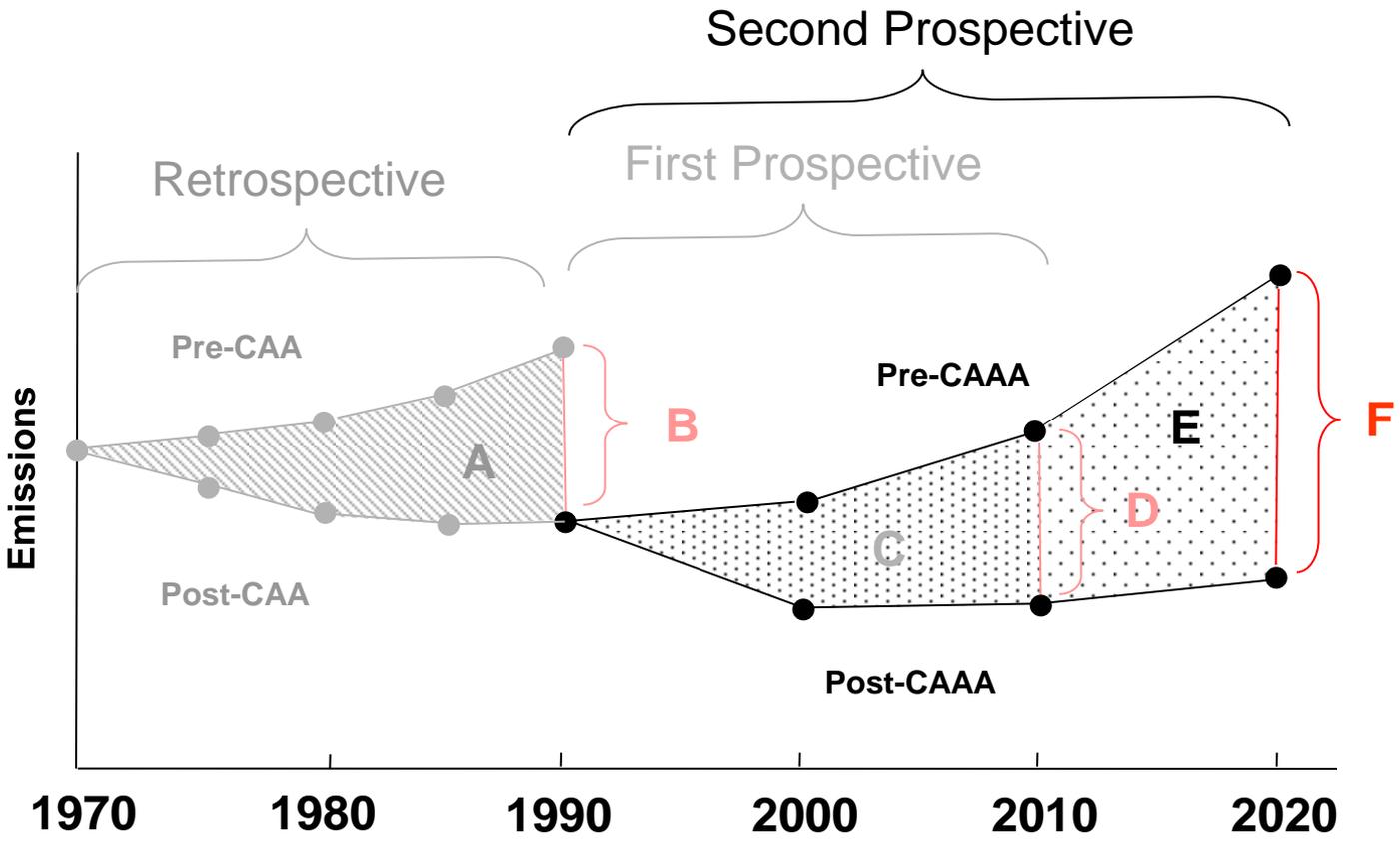
- In the beginning...
- More recent actions
 - 812 studies: (1997-) highly aggregated rather than rule specific; results heavily model dependent
 - GPRA (1993): often focus on inspections, audits vs economically relevant metrics
 - OMB calls for more validation studies since at least 2004
 - E.O.s 13563 (2011), 13610 (2012): jury still out
 - EPA/NCEE studies (2012-)

1990 Clean Air Act, Section 812

- EPA “... shall conduct a comprehensive analysis of the impact of this Act on the public health, economy, and environment of the United States.”
- Retrospective + biennial Prospectives
- Review by outside experts
 - Advisory Council on Clean Air Compliance Analysis



812 Scenarios -- Schematic



Recent Studies (1)

- 2000: Harrington, Morgenstern, Nelson examined costs of EPA, OSHA + other rules
- Broad search for academic, gov't analyses... "plenty of studies out there..."
- EI rules relatively more common
- 'Accurate' defined as +/- 25% ('demanding' per OMB)
 - Total costs overestimated 14/28
 - Total costs underestimated 3/28
 - Total costs 'accurate' 11/28
 - Total costs uniformly overestimated for EI rules
 - **Importantly, overestimates = underestimates for unit costs**

Recent Studies (2)

- 2005: OMB expanded HMN sample by including rules from NHTSA, DOE, NRC (still l.t. 10% of total))
- Adopted same 'accuracy' metrics
 - Total costs overestimated 16/40
 - Total costs underestimated 12/40
 - Total costs 'accurate' 12/40
 - NHTSA most accurate, EPA second
- Also estimated physical or monetary benefits...found B/C ratio overestimated 50% more often than underestimated

Recent Studies (3)

- 2006: Harrington re-examined OMB results
- Found 27 other cases, including 16 add'l pesticide rules, plus 11 others from EPA (4), DOE (5), OSHA (2)
- With or without pesticide rules, the new cases were mostly accurate or underestimates of B/C ratios
- Overall, Harrington sees no bias in B/C

Recent Studies (4)

- 2012 EPA conducts five new retrospective case studies
- Not seeking look back at specific rules *per se*, rather trying to “...examine key drivers of compliance costs to see if informed judgments (weighing the evidence) can be made about whether ex post costs are higher or lower than estimates of ex ante costs.”

Recent Studies (5)

- Different methods in five EPA studies
- Interim findings: “While a number of case studies are suggestive of overestimation of costs ex ante, we do not consider the current evidence to be conclusive”
 - ‘Ex post analysis more challenging than anticipated’

Recent Studies (6)

- SAB recommendations:
 - EPA to develop conceptual framework to use consistently in case studies
 - EPA to consider ways to build routine effort to organize ex post data collection
 - EPA to do more, but shorter qualitative analyses of randomly selected regs, focusing more on qualitative factors
 - EPA to focus on drivers influencing accuracy of ex ante, rather than magnitude of differences ex ante v ex post

Potential Reasons for Ex Ante-Ex Post Differences (SAB)

- Inherent uncertainties
- Asymmetric information and strategic (mis-) reporting
- Firm responses to regulation
- Exogenous shocks
- Inconsistent assumptions about implementation timeline, compliance rate, and form/rate of technological innovation
- Inability to perfectly forecast all types of costs that may be incurred

New RFF Research (1)

- Goals:
 - To expand literature, engage academic community
 - Employ rigorous metrics, using range of approaches
 - Avoid selection bias in rules studied
 - Focus on both costs and (physical) benefits

New RFF Research (2)

- Strategy
 - Conduct in-house studies on food safety, industrial and municipal water pollution, air toxics
 - Consider broad universe of rules, not convenience sample
 - Use publicly available micro-level data to measure both costs and benefits
 - Support non-RFF researchers via competitive process

Issues in Making Ex Ante-Ex Post Comparisons (1)

- For EI rules, both P and Q readily observed ex post. Baseline hypothetical
- For non EI rules, only Q readily observed ex post. Measuring P can be challenging. Baseline hypothetical
- Even more hypotheticals for ex ante analyses... 'informed guesses' per OMB
- For all rules, absence of relevant control groups seen as major barrier to developing credible baseline.

Issues in Making Ex Ante-Ex Post Comparisons (2)

- Business confidential information
- Joint costs
- Paperwork Reduction Act
- Limited funding for independent researchers
- Limited incentives for agencies to self-evaluate

Thank you

Early Literature

- 1980: PHB, K expenditures for EPA rules based on sectoral data
 - 4/5 overestimates (vs industry data)
 - 3/5 overestimates (vs GPA data)
- 1995: OTA, ‘total costs’ of OSHA rules
 - 8/8 overestimated (industry and EPA data)
- 1997: Hodges, total costs of EPA and OSHA rules
 - 12/12 overestimated, (industry and EPA data) 11 of them more than double