

# How Accurate Are Regulatory Cost Estimates?

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Anecdotal information often drives the perception that environmental regulation is responsible for significant economic damage to regulated industries, including reduced productivity and lost jobs. Thus, opponents often claim that rules will be catastrophically costly. Proponents argue the contrary. In a study we conducted several years ago, we examined how well government agencies estimate the costs of pending regulations. We compared the U.S. Environmental Protection Agency's (EPA) pre-regulatory estimates of the direct costs of individual regulations to the actual costs when the regulations went into effect. Did cost estimates calculated before regulations were implemented accurately predict the realized economic burden of regulation?

When we first reviewed the literature (2000)<sup>1</sup> we found only about two dozen rules for which ex post cost estimates were available, primarily those issued by EPA and the U.S. Occupational Safety and Health Administration (OSHA). Subsequent reviews<sup>2</sup> by the Office of Management and Budget (OMB; 2005) and Harrington (2006) updated our earlier review and expanded the list to include studies completed after 1999, adding some that were not represented in the original sample from other federal agencies, such as the Department of Energy, the National Highway Traffic Safety Administration, and the Nuclear Regulatory Commission, thereby doubling the sample size.

Overall, we found that EPA and other regulatory agencies tend to overestimate the total costs of regulations; their estimations of the cost per-unit of pollution eliminated by regulations tend to be more accurate, however. Calculations of the total cost of regulation include not only the "unit costs" multiplied by the number of units of pollution avoided, but also estimates of the basic adjustment process and costs of change itself. Of the rules initially examined, 14 projected inflated total costs, while pre-regulation estimates were too low for only 3 rules. These exaggerated adjustment costs are often attributable to underestimates of the potential that technological change could minimize pollution abatement costs.

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<sup>1</sup> Harrington, Winston, Richard D. Morgenstern, and Peter Nelson. 2000. On the accuracy of regulatory cost estimates. *Journal of Policy Analysis and Management* 19(2): 297–322.

<sup>2</sup> OMB. 2005. *Validating Regulatory Analysis: 2005 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities*. Available at [http://www.whitehouse.gov/omb/inforeg/regpol-reports\\_congress.html](http://www.whitehouse.gov/omb/inforeg/regpol-reports_congress.html);

Harrington, Winston. 2006. *Grading Estimates of the Benefits and Costs of Federal Regulation: A Review of Reviews*. Discussion paper 06-39. Washington, DC: Resources for the Future.

Why have EPA's estimates (calculated pursuant to requirements of Executive Order 12291) of the costs of its own regulations tended to be on the higher side? Case studies, other analyses, and discussions with regulatory experts provided the following explanations.

- Projecting technological innovation is extremely difficult. Economists can only say with confidence that the cost of compliance will likely decline over time, based on historical experience, but no one can say at what rate. In fact, for the acid rain (SO<sub>2</sub>) program (on which most climate change cap-and-trade proposals are modeled), scrubbing turned out to be more efficient and more reliable than expected. Estimates before regulation assumed that scrubbers operate at 85 percent reliability and remove 80 to 85 percent of the sulfur. In fact, scrubbers typically run in excess of 95 percent reliability, removing 95 percent of the sulfur. The original estimate of opportunities to blend low- and high-sulfur coal in older boilers was a 5/95 mixture. In fact, industry was able to achieve a much more efficient 40/60 mixture.
- Timing, particularly delays, can affect the costs of compliance. For example, industry vigorously protested a proposed regulation of ozone-depleting chlorofluorocarbons (CFCs), claiming that implementation would cause widespread economic harm. Delays in promulgating the rule gave industry two years to identify and develop technological alternatives. Some observers said industry was crying wolf; others thought that if the regulation had been promulgated immediately the costs would have been higher than initially estimated. In this case, delay worked in favor of lowered compliance costs.
- A key determinant of overall cost is the amount of pollution reduction that results from a regulation. In many cases, prospective analyses have misestimated the emissions reductions resulting from a rule. As a result, total costs are different than expected, even though the per-unit cost was forecasted accurately. Frequently, regulations that have produced lower pollution reductions than were expected are cited as examples of ex ante cost overestimation. However, in these cases, total benefits are smaller as well. Society pays less, and it gets less.
- In some instances, EPA underestimated the emissions reductions the rule could achieve, thereby increasing estimated costs per unit of emissions eliminated. In others, it inaccurately predicted emissions reductions because it misestimated baseline emissions that would exist without the regulation. In the case of SO<sub>2</sub>, analysts did not foresee an estimated two million tons of reductions from railroad deregulation and other factors unrelated to the EPA interventions, and thus overstated the impact of the agency's actions.
- Besides misestimating baseline emissions, ex ante analysis can inaccurately predict the regulation's effectiveness in achieving the desired pollution reduction. In the case of OSHA's 1976 coke oven standard, a retrospective analysis found that industry expenditures had been far below expectations, but this was mainly due to incomplete compliance. Similarly, the ban on the pesticide dinoseb resulted in a net savings after EPA granted an exemption allowing farmers to use an alternative, paraquat, on their crops. OSHA's occupational lead standard was met primarily through the use of protective gear for workers rather than the engineering approach envisioned by the ex ante cost analysis. Although workers were protected, air lead levels in plants remained extremely high several years after the regulation's promulgation. In these cases, looking only at total costs is misleading, because

the high cost of the regulations resulted in compliance strategies that did not produce the desired benefits. Paradoxically, the underestimation of per-unit costs can lead to the overestimation of total costs.

Cost estimates may be inflated because they were calculated at the proposal stage of rulemaking, not on the final rule. The purpose of notice and comment rulemaking is to solicit information on the assumptions underpinning the proposed rule. The final rule is often adjusted to reduce its economic impacts, based on comments received from industry and others. The final result reflects greater agency understanding of the regulated industry's constraints. These changes in the rule can occur at the very end of the rulemaking process and for a variety of reasons are not captured in the final cost estimates. The failure to capture such changes, especially because they tend to involve cost savings, almost guarantees that the agency's estimate will overstate the true costs of a rule.

- There is a tendency, sometimes inadvertent and sometimes deliberate, for a regulatory agency to estimate the maximum cost to industry rather than the mean—in other words, emphasizing the worst rather than the average impact. Use of the maximum figure may result because the agency's understanding of installed pollution control equipment is out-of-date.
- Industry is frequently the source of cost estimates. For example, in the multimedia rulemaking for the pulp and paper industry, EPA sought the cooperation of the main trade association; the association obtained information from its members or served as a conduit for an EPA-designed questionnaire. Industry typically also submits cost estimates as part of the rulemaking process. For example, trade associations sometimes hire contractors to conduct their own cost studies, as when the auto industry retained Sierra Research to estimate the cost of meeting the low-emitting vehicle (LEV) and ultra low-emitting vehicle (ULEV) standards. Even if regulators are skeptical of industry's estimates, the estimates establish a standard that must be addressed in the rulemaking process. The agency must justify its actions if it rejects the industry numbers; a simple suspicion will not do legally. Thus, the mere existence of industry studies may exert upward pressure on regulators' cost estimates. An industry's cost submissions may be motivated by strategic considerations, but they may also result from firms' unwillingness to devote resources to figuring out the best way to comply with a proposal that may or may not end up as a final rule. Asked "what will it cost?" a firm's analyst may respond with the cost of an "off-the shelf" compliance technology, when in fact a more considered approach may reveal that compliance cost can be cut substantially through an innovative process change. In the latter case, firms are not necessarily employing strategic behavior, but just choosing not to expend resources to determine how compliance could be achieved at minimum cost in advance of final regulation.

In sum, our analysis indicates that a variety of factors contribute to initial government agency cost estimates that may differ from the realized results, although in some cases this is coincident with differences in benefits produced by regulations.

## Background

Federal agencies are required by Executive Order 12291 to assess the benefits and costs of any major proposed regulation and alternatives to it; economic impacts include the effect of the regulation on the inflation, employment, and profits of affected industries. The Office of Management and Budget's Office of Information and Regulatory Affairs is required to provide centralized review of regulations and the accompanying regulatory impact assessment (RIA).

A separate law, The *Regulatory Right-to-Know Act of 1999* requires OMB to prepare and report to Congress an annual accounting statement that include benefits and costs in total, by agency, and by major rule plus an assessment of the impacts of federal regulations on local and state governments, the private sector, small business, wages, and economic growth; the statute also requires recommendations for reform of ineffective or inefficient regulations.