



Regulating Our Way to Prosperity?

The Use and Abuse of Cost-Benefit Analysis in Regulatory Decision-Making

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Introduction

In 1997, the Environmental Protection Agency reported to Congress on the costs and benefits of the Clean Air Act from 1970 to 1990.¹ The agency concluded that for a mere half-trillion dollars in compliance costs, the act generated economy-wide benefits of between \$6 trillion and \$50 trillion. It settled on an estimate of \$22 trillion, attributable to lower levels of air pollutants. In other words, the analysis revealed a 40-fold rate of return, equal to nearly 18 percent of GDP at the time. Had Richard Nixon not had the foresight to sign the Clean Air Act, the EPA implied, not only would the air have been much dirtier, but the country would have been much poorer.²

Two years later, in 1999, the EPA published an analysis of the impact of the 1990 Clean Air Act Amendments from 1990 to 2010. “Using a sophisticated array of computer models,” the agency claimed the act generated benefits of \$110 billion at a cost of \$27 billion, a four-fold return.³ The study was updated in 2011 to estimate the benefits by 2020, which will purportedly be even higher: \$2 trillion in benefits for a mere \$65 billion in compliance costs—a 30-fold rate of return for the U.S. economy.⁴ According to the agency, the 1990 amendments generated about 8.6 percent of GDP during the current decade—more modest than its 1970 predecessor, but still an economic bonanza.

There is a major problem with these claims: Except for Ponzi schemes, it is impossible to find investments that assert to deliver such stellar returns year after year. Could an environmental statute really generate such astronomical economic benefits? It is difficult to put much confidence in these

numbers. The way cost-benefit analysis is employed by regulatory agencies today often renders it little more than a political tool to justify federal regulations. Many agency calculations add questionable “market values” to the benefits ledger of proposed rules, even in cases where no market exists for the benefits claimed. This is especially true for environmental regulations, in which generous monetary values are often assigned to benefits such as air quality improvements.

This report examines the use and abuse of cost-benefit analysis by regulatory agencies, focusing specifically on environmental regulations.⁵ It explores how cost-benefit analysis evolved to enable federal agencies to justify nearly any proposed regulation by claiming they produce widespread economic benefits. At the end, several policy recommendations are offered on how to improve regulatory analysis.

Federal agencies are required to conduct cost-benefit analysis for major rules

Under the guidance of the Office of Information and Regulatory Affairs (OIRA), an office of the executive branch of the government, presidents have long required federal agencies to conduct cost-benefit analyses for regulations deemed “economically significant.” These are rules expected to have “an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities.”⁶

The use of cost-benefit analysis in regulatory decision-making goes back decades. President Ford required agencies to produce “inflation impact statements” for proposed major rules. President Carter ordered agencies to analyze alternative approaches for major rules and to compare the cost-effectiveness of each. Today’s mandate traces its roots to the Reagan administration. It required agencies to produce detailed cost-benefit studies for major rules likely to affect the economy by more than \$100 million each year.⁷ Reagan’s executive order stated that “regulatory

action shall not be undertaken unless the potential benefits to society from the regulation outweigh the potential costs to society.”⁸

At the time, some environmental groups opposed efforts to incorporate cost-benefit analysis into regulatory decision-making. “They are trying to put into numbers something that doesn’t fit into numbers, like the value of clean air to our grandchildren,” Richard Ayers of the Natural Resources Defense Council told the *New York Times* in 1981. “It is deceptively precise and ignores ethical and moral choices.”⁹ Many environmentalists were concerned that the rule would require assigning dollar values to things that are not easily quantifiable, such as human health and environmental quality, and would frustrate their efforts to adopt environmental regulations.

Nonetheless, the use of cost-benefit analysis expanded. In 1993, President Clinton issued Executive Order 12866, which requires agencies to quantify costs and benefits and also take into account “qualitative measures that are difficult to quantify.”¹⁰

In 2011, the Obama administration reinforced Clinton’s order by issuing E.O. 13563. It instructs regulators to adopt rules for which the benefits justify the costs and to select approaches that maximize net benefits. The order requires agencies “use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible” and, where appropriate, to “consider (and discuss qualitatively) values that are difficult or impossible to quantify, including equity, human dignity, fairness, and distributive impacts.”¹¹

Cost-benefit analysis could be a useful tool, but there are serious questions about its use today by regulatory agencies

Cost-benefit analysis can be an effective tool to help decision-makers take into account alternatives to proposed actions, essentially forcing them to justify their actions. In theory, as several presidents have ordered, it can help ensure that federal agencies generate the greatest net value possible from new rules.

The usefulness of cost-benefit analysis is evident in the private sector. Such projections are essential in business—“run the numbers” is a frequent mantra. Innovators proposing a new venture must estimate expected returns under assumptions that are convincing to senior managers and investors. Critics pour over the assumptions. Costs can be priced out fairly well. Estimating demand and revenues for a new product is difficult but private companies, with profits on the line and investors watching, have incentives to get the numbers right.

Government bureaus are not subject to such market discipline. An agency does not risk its own future in the same way a business does. It is taxpayer money—not the agency’s budget—that is on the line. If the agency makes a mistake, it will not bear the cost, and the bureaucrats involved are unlikely to be held accountable. In many cases, they are executing political orders not based on concerns about accuracy or trying to generate the most bang for the buck.

Nevertheless, if those interested in a proposed rule can look to reasonable cost-benefit analysis, it is easier to come to consensus about the potential effects of the rule. Nobel laureate economist Gary Becker argued that, in principle, cost-benefit analysis is a means to combat “misleading information spread by self-interested political pressure groups” that lobby for economically destructive activities or try to limit actions that could benefit society.¹²

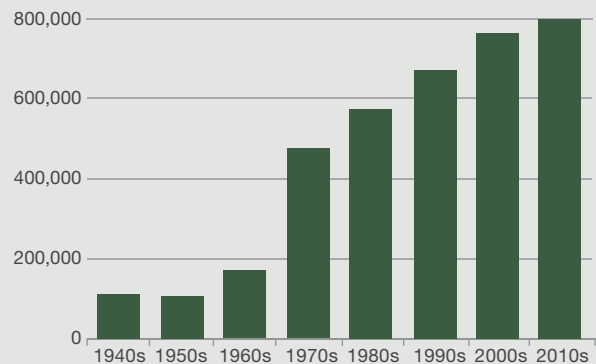
In recent years, however, regulatory agencies have increasingly taken into account values not traditionally employed in cost-benefit analysis.¹³ As a result, regulators can claim that the benefits of proposed regulations vastly exceed their costs. According to OIRA, the net benefits from new regulations adopted over the past decade were substantially higher than for regulations adopted in years prior, when agencies often found that costs and benefits were nearly equal. It is unlikely, however, that regulators left the lowest hanging fruit on the tree in earlier years, suggesting that OIRA’s recent estimates of benefits deserve a careful look.

In 2015, OIRA asserted that the average annual cost of complying with major federal regulations over the previous decade was in the range of \$57 billion

BOX 1

Federal regulations have increased steadily in recent decades

Number of new pages in the federal register by decade



Source: Federal Register.

Note: 2010s is a projection based on 2010-2015 average.

Despite requirements for cost-benefit analysis, the number of federal regulations has increased dramatically over the last several decades. The federal government adds approximately 80,000 pages of regulations each year.¹⁴ During the Obama administration, more than 80 major rules (each costing more than \$100 million) were issued annually, considerably more than previous administrations.¹⁵ In 2015, 60 federal agencies, commissions, and departments had 3,297 regulations in development, 218 of which were deemed “economically significant.”¹⁶ Environmental regulations, in particular, are among the most economically significant.

to \$85 billion. The alleged benefits were many times greater, ranging from \$216 billion to \$812 billion per year—between four and 14 times higher than the costs.¹⁷ This would imply that regulations contributed about 5 percent to GDP.

Environmental regulations in particular are said to produce benefits that significantly exceed costs, allowing regulators to easily justify environmental rules. In its latest report to Congress, OIRA claimed that EPA rules issued during the previous decade accounted for as much as 80 percent of the hundreds of billions of dollars of alleged benefits generated by all major regulations.¹⁸ Rules that aim to improve air quality account for most of the EPA’s alleged regulatory benefits.¹⁹

In recent years, agencies have incorporated values that are difficult or impossible to quantify

Why are regulations said to produce such large economic benefits? One reason is that federal agencies now include a variety of values not traditionally used in regulatory cost-benefit analysis, or values that are difficult if not impossible to quantify. In the 2011 executive order, 13563, the Obama administration instructed federal agencies to take into account nearly every imaginable value when doing cost-benefit analysis, including “values that are difficult or impossible to quantify” such as “equity, human dignity, fairness, and distributive impacts.” This opens the barn door to throw in any value, real or imagined, that can be asserted as a cost or benefit of a proposed regulation.

Although values asserted to promote “environmental justice” do not have specific price tags, the EPA now considers emission impacts for minority populations as part of bolstering the value of proposed rules. In its analysis of proposed rules to limit mercury emissions, the agency looked at the effect that reduced emissions could have on Laotian-American fishermen, Chippewa Indians, and other minority groups.²⁰ The EPA claimed that, rather than merely being a technical regulation, such cases represent “a strategy to help integrate environmental justice into EPA’s day to day activities.”²¹

While such concerns cannot be quantified, other costs are and can be important to generate the needed benefits from environmental regulations. Most prominently, the “social cost” of carbon (SCC) has evolved as a major source of measured benefits that agencies use to justify assorted regulatory actions. By assigning a value to the SCC, agencies claim that reducing carbon emissions can be accurately counted in the benefits ledger of a proposed rule due to the reduction in the presumed costs of global climate change decades in the future. Such calculations are not based on real market values; the values come from the imaginations of researchers.

To calculate the SCC, the Department of Energy (and other agencies) estimates “the monetized damages associated with an incremental increase in carbon emissions in a given year.” The estimates take into account factors such as “changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services.”²² The problem with estimating an SCC is that there is neither a real market nor a price for non-emissions of carbon dioxide. The global “value” of emitting less is determined only through speculation by researchers about, for instance, the potential impacts of climate change on agricultural production in Bangladesh in 2050.

The primary place where something resembling a market for carbon dioxide exists is in the European Union, where carbon emission credits are traded. The carbon price in the E.U. is low, despite political pressure to keep the price high to discourage emissions.²³ In September 2016, the price was about \$4.30 (€4.00) a ton.²⁴ Yet the prices used in regulatory analysis in the United States are often much higher. For instance, in its analysis of the Obama administration’s Clean Power Plan, the EPA estimated monetary benefits from reducing CO2 emissions by limiting coal use. The EPA used economic, population, and emissions trajectories, plus several discount rates, to come up with four possible “prices” for each hypothetical ton of carbon emitted in 2020: \$12, \$40, \$60, or \$120.²⁵ By basing regulatory analysis on artificial prices, policy goals are often given a gloss of scientific legitimacy, even if the figures used exist only in the minds of those forecasting years into the future.

Cost-benefit analyses fail to consider the environmental costs of regulations that push production offshore

Besides the issue of artificial prices, there is another problem with how federal agencies calculate the relevant costs and benefits of domestic environmental regulations. In the case of carbon, agencies estimate *global* benefits of reducing emissions, but they only count costs on a national scale. For example, in its 2009 fuel-efficiency regulations, the Department of Transportation used a carbon “price” of \$33 per metric ton as the estimate of the global benefit of reduced emissions, although it noted that the value of carbon emission reductions for the United States was \$2 per ton. Nonetheless, the agency used the global value to calculate the benefits of the rule.²⁶

This practice has the obvious effect of inflating the benefits of proposed rules relative to the costs. Consider the Department of Energy’s 2013 analysis of microwave efficiency standards (see Box 2). By counting benefits of carbon-emission reductions globally but counting costs only on a national scale, projected benefits of the rule reach as high as \$3.4 billion.

While global benefits from emissions reductions are often taken into account, regulatory agencies fail to consider costs from “emissions leakage” to other countries. When U.S. regulations cause a shift in production to other countries, emissions may increase in—or “leak” into—those countries. In many cases, emissions leakage likely swamps the reductions of emissions in the United States. Few would argue that producers in India, China, or Mexico, for instance, emit less than producers in the United States, yet today’s regulatory cost-benefit analysis largely ignores this possibility (see Box 3).²⁷

Agencies can cherry pick numbers to justify nearly any regulation using cost-benefit analysis

By counting benefits on a global scale but costs on a national level and incorporating various artificial prices as benefits, agencies use cost-benefit analysis to inflate the benefits of proposed regulations. This veneer of

BOX 2

How a microwave oven rule purportedly produces benefits 35 times higher than its costs

In 2013, the Department of Energy issued a seemingly simple rule: “Energy Conservation Standards for Standby Mode and Off Mode for Microwave Ovens.”²⁸ The DOE asserted that over the 30-year lifespan of the rule, it would produce benefits of up to \$3.4 billion by mandating higher energy efficiency standards for microwave ovens. The cost to the microwave industry, on the other hand, would be only \$96.6 million.

The cost estimate is fairly straightforward. Microwave ovens will be more expensive as they are retooled to use less power while not in use. The DOE estimated that oven makers would lose about 7 percent of the industry’s net present value due to higher costs and lost sales from more costly ovens.

The increase in costs to the industry and consumers is swamped by the rule’s benefits, DOE asserts. Over three decades, microwave users will use less electricity, resulting in 38.1 million fewer metric tons of carbon dioxide being emitted. Using the SCC, the DOE could easily justify the regulation. Note, however, that the vast majority of the claimed benefit is global. The domestic benefit is a small fraction of the asserted value of reduced carbon emissions.

The cement industry and foreign pollution leakage

In 2010, the EPA issued a new maximum achievable control technology (MACT) standard for cement manufacturing facilities in the United States. Under the rule, new facilities would have to meet more stringent standards to reduce emissions associated with cement production.

As a consequence of more costly regulation that applies to U.S. cement production, unregulated foreign producers gain a larger share of the American cement market. Americans buy more cement from international suppliers that have worse impacts on air quality than if the cement were domestically produced.

In its analysis of the rule, the agency estimated costs of \$605 million, two-thirds of which would be borne by cement users due to higher prices, and one-third from losses suffered by domestic producers. Unsurprisingly, the agency estimated that the benefits of the rule would more than off-

set the losses. Once the rule was implemented, the EPA said, benefits from decreased mortality due to a reduction in fine particulate matter and sulfur dioxide emissions would be between \$4.4 billion and \$11 billion, yielding a net benefit of between \$3.7 and \$11 billion.²⁹

But the EPA's analysis failed to include the environmental costs of increasing production in countries such as China, which supplies more than half of global cement production. Cement manufactured in China and shipped to the United States is estimated to produce at least 25 percent more carbon emissions than the same quantity of cement produced in the United States.³⁰ The agency's failure to include SCC costs from Chinese cement in its cost-benefit analysis is especially peculiar given its global focus when it comes to estimating the benefits of reducing carbon emissions.

“science-based” evidence often provides the cover needed to make regulations politically palatable. But upon closer inspection, it exaggerates the economic benefits of regulations to levels that are hardly believable.

In 2012, the EPA finalized a rule to limit emissions of certain pollutants from power plants.³¹ Coal-fired electric plants would have to meet levels set by the rule, known as Utility MATS (Mercury and Air Toxics Standards). The agency estimated that it would cost about \$10 billion per year and result in coal plants shutting down 23,000 megawatts of electricity production.³² The EPA reported that the annual benefits from the rule would be between \$37 billion and \$90 billion. Utility companies would incur higher costs and have lower profits, but the economy at large would benefit. The rule would generate an annual return of 370 to

900 percent, according to the EPA—adding about a half a percentage point of national economic growth each year. By summing the potential costs of the rule (which are not much disputed) and assigning monetary values to a variety of potential benefits, especially from reduced particulate matter, the agency posits that the regulation generates massive economic benefits.

In the case of cement, the regulations provide an example of a common EPA practice—hyping the health benefits of a limit on emissions. The new rules aim to reduce fine particulate matter and sulfur dioxide from cement production. The benefits are claimed to equal billions of dollars annually (ignoring the cost of moving such emissions to other nations that may capture more of the cement market). The multi-billion-dollar gain asserted is based on an extrapolation from just two

studies: a nine-page article in a medical journal from 2002 and a five-page paper in a 2006 publication.

Louis Anthony Cox, Jr., an experienced risk-analysis practitioner, notes that EPA's analysis makes implausible assumptions about risk and health relations to run up massive benefit claims.³³ For example, in the \$2 trillion per year benefit claimed by the 1990 Clean Air Act Amendments, the value imputed to extending the life of an 80-year-old person by one month is \$80,000.³⁴ If one assumes all lives are valued at \$80,000 per month, or almost \$1 million per year, we run into a significant shortfall as U.S. GDP per capita is about \$54,000 per year. Cox also explains that the life-savings benefits of small reductions in particulate matter are grossly overstated.

Susan Dudley, a former director of OIRA during the George W. Bush administration, summarizes what has evolved. The agency often greatly exaggerates alleged benefits of rules while also understating regulatory impacts. The reports issued by OIRA may "perpetuate the puffery" the agencies have made when promoting their latest regulations.³⁵ The process by no means provides an objective overview.

Opportunities for reform

Cass Sunstein, a Harvard law professor and a former head of OIRA in the Obama administration, argues that detailed cost-benefit analysis is an idea that every citizen and bureaucrat should get behind.³⁶ In his book, *Simpler: The Future of Government*, Sunstein contends that cost-benefit practitioners can become more like Billy Beane of the Oakland Athletics and *Moneyball* fame. By considering the subtle information that can be revealed through scientific cost-benefit analysis, Sunstein claims that policymakers can become uber-informed and enlightened when weighing potential regulations (see Box 4).

Cost-benefit projections that do not pass basic economic logic or even common-sense tests are abuses of the regulatory system. Nonetheless, the use of cost-benefit analysis in regulatory decision-making is likely to continue. In a 2015 decision, the U.S. Supreme Court affirmed that the EPA was required

to conduct cost-benefit analysis before it could enact the MATS rule.³⁷ Sunstein lauded the ruling, calling it "a ringing endorsement of cost-benefit analysis by government agencies." His conclusion: "The cost-benefit state has arrived."³⁸

If the cost-benefit state has indeed arrived and is here to stay, there are several reforms that could improve the process:

1. Make cost-benefit analyses subject to blind peer review. Academic journals routinely require blind peer review. Qualified members of a given field provide some assurance of the quality of the work submitted for publication. Reviews are anonymous. Because reviews of cost and benefit estimates of proposed regulations have little career value to academic analysts, there should be a payment for federal cost-benefit review work. All results should be posted for public review.
2. If the global benefits of a regulation are counted, the global costs should be estimated also. Agencies should take into account the hidden costs of regulations, such as the possibility of "emissions leakage" and the costs of shifting production elsewhere.
3. Repeal the portions of Executive Orders 12866 and 13563 requiring agencies to take into account values of justice and equity. Those are real values, but price tags should not be placed on them and they should not be the basis of vague support for a regulation.
4. Only count costs and benefits for which there are real market values. In many cases, cost measurements of regulations tend to be quite accurate—for instance, how much it costs to build new natural gas power plants or solar farms to replace coal-fired power plants. Benefit measurements, however, are often much too speculative, such as in the case of the social cost of carbon, even if only domestic issues are considered.
5. Do not allow cherry picking of studies to bolster the value of possible impacts. When health benefits are counted, estimates should be based on a consensus from the relevant literature, not one or two studies that allow massive extrapolation of possible benefits.

Primatene Mist, the ozone, and brute-force regulation

In Simpler: The Future of Government, Professor Sunstein explains how an application of behavioral economics allows for the development of more sophisticated regulations that avoid the pitfalls of traditional, brute-force regulations that may have good intentions but are poorly executed. This includes the use of more detailed impact analyses to estimate a host of values not traditionally employed in cost-benefit analysis.

Some examples Sunstein cites seem curious. In 2008, the Food and Drug Administration banned Primatene Mist, an inhaler used to treat asthma symptoms. The issue was Primatene's propellant: It was a chemical banned under the Montreal Protocol, a 1989 treaty designed to protect the ozone layer. Although the Primatene ban was announced in 2008, it would not become effective until 2011. The government presumed that a substitute propellant would be developed by then, so asthma sufferers would have an alternative. But none came into being. So in 2011 the FDA had to decide whether to extend an exception to the ban.

Regulators had to wrestle with a trade-off: environmental damage caused by the chemical emitted by Primatene weighed against health benefits to asthma sufferers. It was a big decision, because Primatene was the only such over-the-counter product available, and it was much cheaper than alternatives requiring prescriptions. For people who did not have regular access to health care, Primatene alternatives were difficult to get, and costly.³⁹

The FDA considered the costs and benefits. Banning the product would help protect the ozone but would result in more hospitalizations for people with asthma and could lead to significant costs. The administration decided not to extend the life of the product. It justified the decision by saying that "asthma sufferers would do better to find doctors and to use the prescription medicine that really was right for them."⁴⁰

How this helped asthma sufferers who lost access to a beneficial product is not clear. In reality, the Primatene Mist case was no different from old-school, brute-force regulation. Despite the supposed enlightenment of cost-benefit analysis, the government still chose to cram this regulation down asthma sufferers' clogged airways.

Conclusion

When running for president, Donald Trump noted the drag that excessive regulations create on the economy.⁴¹ To address a piece of that issue, a revision of OIRA's cost-benefit analysis can be expected from the Trump administration. Regulations impose significant costs on the economy when they force a reallocation of scarce resources to less productive uses. If regulations increased GDP by measurable percentage points, as claimed by the EPA, the costs would matter little. But years of a moribund economy indicate that regulatory red tape is a profound economic problem and that the alleged benefits of regulations are often overstated.

When a company makes projections about the future, it must comply with Securities and Exchange Commission regulations about reasonable projections. Regulatory agencies face no such constraints. They can inflate benefit estimates by bloating estimates of improved health and of possible damage if there is an increase in climate change decades hence. Such speculative claims in the private sector would bring down the wrath of securities regulators and investors.

Regulators' cost-benefit analysis should be viewed with skepticism. Agencies have strong incentives to demonstrate that regulations pass the cost-benefit test. As such, they are prone to quantify and exaggerate every conceivable benefit while counting only direct costs. If done correctly, it can be a useful tool for understanding the effects of regulation. But economists are not capable of credibly predicting the state of the economy a month out, let alone measuring the economic impact of a change in the climate of Miami in 2050.

President Obama was right when he said justice and dignity are important values. But they are not values we can put price tags on to justify technical regulations. Humility and discipline in estimating costs and benefits of regulations would produce more credible results to help guide public policy under the new administration and beyond.

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PERC—the Property and Environment Research Center—is a nonprofit research institute dedicated to improving environmental quality through markets and property rights. Located in Bozeman, Montana, PERC pioneered the approach known as free market environmentalism. PERC's staff and associated scholars conduct original research that applies market principles to resolving environmental problems.

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