How sound is the opponents' empirical case?

The New Challenge to Cost-Benefit Analysis

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For more than two decades, both Republican and Democratic presidential administrations have supported the use of cost-benefit analysis (CBA) in the review of federal regulatory decisions. And for three decades, both Republican and Democratic White Houses have supported the use of some sort of cost analysis for such decisions. But that consensus appears to be ending. The growing partisan divide over CBA is beginning to reflect the Red Team–Blue Team battles that have become common in other aspects of government.

The history of bipartisan support for CBA is probably well known to readers of *Regulation*, but it is largely unknown to most of the rest of the population. Although there has been some debate among economists concerning the strengths and limitations of CBA for analyzing regulatory decisions, that debate has taken place largely in economic journals and gray literature. But few, if any, of the involved scholars have argued that such analyses should not be undertaken.

In the last few years, however, outright opposition has appeared to the use of CBA in reviewing or formulating environmental regulations. This has major potential implications for regulatory decision-making in future administrations, particularly Democratic ones.

Most of the opponents of CBA have been lawyers; those defending CBA have been economists. The debate originally revolved primarily around articles by John Morrall of the Office of Management and Budget and Robert Hahn of the AEI-Brookings Joint Center for Regulatory Affairs. Both scholars attempted to show that the cost-effectiveness of federal regulations varied greatly. CBA opponents have gone beyond disputing Morrall's and Hahn's analyses by making much broader arguments that CBA has inherent problems, that it is being administered with an anti-environmental bias by OMB's Office of Information and Regulatory Affairs, and that it largely helps only the regulated industries by delaying and weakening new regulations.

Most of the opponents' arguments have appeared in various law journal articles, Web sites and Web publications, and books, but not in economic journals. A recent issue of *OMB Watch* in March 2005 contains a concise summary of the opponents' arguments. The proponents have not been inactive either; Hahn's extensive 2005 monograph *In Defense of the Economic Analysis of Regulation* summarizes many of their arguments.

CHALLENGING CBA

Recently, CBA critics Frank Ackerman of Tufts University, Lisa Heinzerling of Georgetown University, and Rachel Massey of the Environmental Research Foundation have taken the argument against CBA to a new level. The three carried out their own original empirical study of several environmental decisions from the 1960s and 1970s. They conclude that CBA would have yielded results that history shows would have been undesirable. In effect, instead of attacking the supporters of CBA and their analyses, Ackerman, Heinzerling, and Massey have attempted to make a "positive" empirical case that CBA would have resulted in "adverse" environmental decisions in cases that they believe everyone would agree were "good" environmental decisions.

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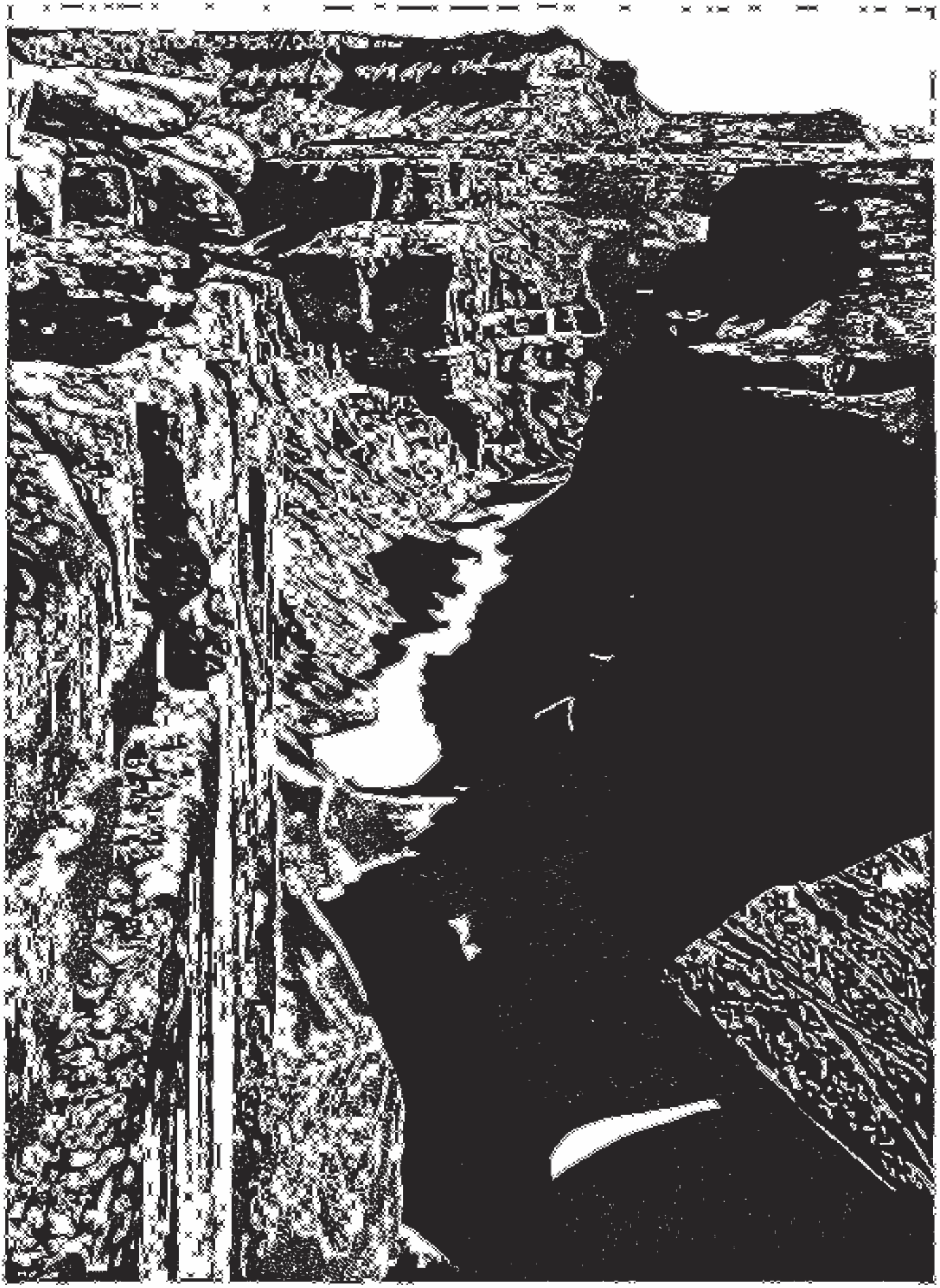

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In July of 2004, the three critics released a paper examining three significant historical environmental decisions to which CBA was or could have been applied. Their paper asks, "If today's methods of cost-benefit analysis had been applied in the past, would it have given its blessing to the early regulations which now look so successful in retrospect?" Ackerman, Heinzerling, and Massey answer that question negatively, claiming:

> We have compiled three case studies in coming to this conclusion: the removal of lead from gasoline in the 1970s and 1980s, the decision *not* to dam the Grand Canyon for hydroelectric power in the 1960s, and strict regulation of workplace exposure to vinyl chloride in 1974. The technique would have gotten the answer wrong in all three cases. Each case study illustrates, in a different manner, the damage that cost-benefit analysis could have done in the past, had it played the central role that is proposed for it today.

In other words, because CBA (as they conducted it) would not have yielded the "right" conclusions in those three prominent cases, Ackerman, Heinzerling, and Massey claim that it is unlikely to be useful in future cases either.

GOOD APPROACH?

But are those analyses fair ones, and is it correct to assume that Ackerman, Heinzerling, and Massey's undesirable results correctly characterize CBAs? To answer that, let us first consider the ground rules of their review. One of the characteristics of CBA is that it attempts to martial the evidence concerning economic benefits and costs at a given point in time—almost always when a decision needs to be made. The benefits and costs may or may not apply to any other time. CBA therefore has to assume the prices and information available at the time—not what may become available later. This complicates any attempt to take a retrospective approach, because the date of the assumed analysis and options available needs to be specified carefully.

Ackerman, Heinzerling, and Massey appear to use today's CBA methods, but they apply those methods in the past, presumably at the time the decisions were made. Their paper states that the review was "based on the information then available," which I assume means they made no use of more recent data. Using prices applicable to later time periods but not at the time of the decision provides no useful information concerning the economic efficiency of a decision made at the earlier date. Although CBA methodology has changed a little from the period those decisions were made to now, the benefit and cost data available have changed much more. It is unlikely that the conclusions reached by earlier CBAs would be any different if redone using current CBA methodology than when they were originally carried out—unless later data are used. Because the authors' methodology did not include using later data, it is difficult to accept their contention that a contemporary CBA would have yielded an "incorrect" answer in those cases where, in fact, an environmentally positive, credible CBA was carried out at the time the proposed action was under policy consideration.

But it may be useful to analyze what would have happened if current data were used at the time when the actual decisions were made rather than the data available at the time of the decisions. This does not reflect on Ackerman, Heinzerling, and Massey's conclusions because they say that they are using only data then available, but this may provide additional insights into what the authors say they are investigating: the usefulness of CBA for making regulatory decisions.

Current data can differ from earlier data in two legitimate ways:

- Benefits data can reflect a more complete knowledge of the positive economic impacts of the proposed action gained as a result of more recent research.
- Cost data can reflect after-the-fact information on what the real cost of the action was/would have been at the time rather than the estimates that were available at the time the CBA was/would have been prepared.

Such retrospective use of benefit and cost data can provide some information on what the economic efficiency of the decision turned out to be and can be compared with the original CBA results to suggest ways to improve future CBAs. The utilization of prices from a different time period is not a legitimate use of more recent data and will not be considered in this paper.

DAMMING THE GRAND CANYON

One of the decisions that Ackerman, Heinzerling, and Massey analyzed involved a proposal to build a series of dams in the Grand Canyon to generate hydroelectric power. In the mid-1960s, I coauthored a nongovernmental CBA of the idea. The CBA concluded that the dams would not have been economically justified (presumably the "right" outcome from Ackerman, Heinzerling, and Massey's viewpoint). Interestingly, a Ralph Nader–sponsored study at the time credited the use of CBA with stopping the proposed Grand Canyon dams.

Ackerman, Heinzerling, and Massey argue that if a CBA had been done using nuclear plant costs based on the higher prices prevalent in the mid-1970s and later, it would have reached the opposite conclusion. The resulting hypothetical CBA would thus have come to the "wrong" conclusion, they claim. But there is an epistemic problem with this criticism. Ackerman, Heinzerling, and Massey's reasoning implies that the authors of the 1960s CBA should have somehow predicted the increase in nuclear plant costs and should have used those higher costs in their CBA. In essence, they are claiming that CBAs can be carried out independent of the prices prevailing at the time the CBAs are done. Obviously, prices vary continually and the best available information needs to be reflected in CBAs. But for a CBA to speculate as to how prices might change and then base its conclusions on those speculations is surely not useful.

The authors of the mid-1960s Grand Canyon CBA did not examine the possible influence of changes in nuclear power costs except to reflect such changes in revised CBAs as the changes occurred during the decision-making process. But the 1966 CBA estimates were based on actual "turn-key" prices offered by nuclear plant suppliers at the time, which if accept-

ed would have obligated the suppliers to build the complete plants at the prices offered, regardless of future price changes. The later 1967 CBA did not use turn-key prices because they were no longer being offered, but attempted to present the most accurate information then available on nuclear plant component prices. CBA is by its nature a snapshot based on prices available at the time it is done. But if prices are "locked in" through turn-key contracts, the conclusions hold regardless of subsequent price changes during construction for items not initially ordered and not foreseen. For the CBA authors to have speculated on future price changes and to have correctly guessed that prices would greatly increase would not have been either prudent or reasonable on their part.

If the dams had been re-proposed later, the type of analysis done in the 1960s would probably have shown positive net benefits from building the dams if the nuclear comparisons had again been used. But they were not re-proposed, and no later CBA analyses were done (because there was no decision to be made).

But the possible outcome of such hypothetical later CBA analyses says nothing about whether CBA can play a useful role in environmental decision-making. Ackerman, Heinzerling, and Massey believe that the 1960s CBA did play such a role in this case and even agree with the direction of the influence that it exercised. To argue that the same CBA would not have applied at a later period after nuclear prices had increased says nothing about whether the earlier CBA reached the "wrong" conclusion in the context of the paper's claimed use of earlier data. It only means that prices changed in the meantime. The use of current data as defined above would not change the conclusions reached in the 1960s CBA because the same prices should be used and more modern benefit estimates would be higher.

VINYL CHLORIDE IN THE WORKPLACE

Ackerman, Heinzerling, and Massey argue that if the Occupational Safety and Health Administration had done a CBA in 1974 when it regulated vinyl chloride in the workplace, it would have concluded that regulating vinyl chloride in the manner that was ultimately adopted would not have been economically efficient. But the three authors also state that they believe that a retrospective CBA using current data would be positive. In other words, they argue that OSHA would have overestimated costs, underestimated benefits, and reached the "wrong" conclusion. Therefore, CBAs should not be trusted as an analytical tool.

Although Ackerman, Heinzerling, and Massey make a number of dubious assumptions in trying to make their case (like the use of an excessive 12 percent discount rate for costs and the use of different discount rates for benefits and costs), it appears reasonable (but not certain) given the widespread initial overestimation of control costs by industries and regulators and the limited knowledge of the benefits that OSHA might have reached such a conclusion if it had carried out a CBA (which was not required) at the time. This conclusion is supported by a retrospective study of the CBA for another OSHA regulation (cotton dust), which found that both benefits and costs were under/overestimated by a factor of 10 or so.

But even if it is true that OSHA would have written a negative CBA for vinyl chloride had it been required, does that condemn CBA as an analytical tool? What Ackerman, Heinzerling, and Massey are saying is that they do not think that OSHA would have seen through what turned out to be the industry's and consultants' excessive cost estimates and had not accumulated enough scientific evidence on the benefits of vinyl chloride control to fully characterize them. The authors are effectively arguing that OSHA should have done what it apparently did in writing the regulation—make an economic leap of faith on the side of environmental caution—and that a requirement for a CBA would have prevented them from doing so.

But is a blind leap preferable to knowing that an agency is making an economic leap of faith and environmental conservatism not fully justified by available information? As long as CBAs are advisory and not determinative, more knowledge is surely better than less knowledge. Economic leaps of faith and environmental conservatism are entirely legal if agencies think that the law they are using and the circumstances warrant it. In effect, Ackerman, Heinzerling, and Massey are arguing that because a CBA might have introduced some economic caution into OSHA's actions, it is better that it was not done in this case and that it not be done in future cases.

The authors appear convinced that "quantifying effects . . . is exactly what cost-benefit analysis requires. In the absence of hard estimates of the magnitudes involved, many benefits would typically be omitted from a cost-benefit analysis." It would be much more accurate to say that CBA is a technique for analyzing the economic efficiency of decisions and can accommodate nonquantified data as well as quantified.

Ackerman, Heinzerling, and Massey further state that a negative CBA would guide an agency in the "wrong" direction if followed in cases such as vinyl chloride in which they believe the evidence was clear. What they are really saying is that regulations should be approved even when the total economic losses exceed the total economic gains to the population. It is not clear how the authors would, from an economic viewpoint, differentiate the "good" regulations from "bad" ones, especially without 30 added years of experience to guide them.

LEAD IN GASOLINE

Ackerman, Heinzerling, and Massey agree that the U.S. Environmental Protection Agency CBA on completing the removal of lead from gasoline in the 1980s concluded that the regulation had positive net benefits and therefore met the CBA test. It is furthermore likely that a retrospective CBA of this decision using current data would reach the same positive conclusion as the original CBA, because the recognized benefits of removing all the lead have only increased and the costs were fairly well understood at the time. Hence, Ackerman, Heinzerling, and Massey do not criticize that CBA; instead, they examine the earlier 1973 decision to start phasing out lead in gasoline. They argue that if CBA had been used for that decision, it would have yielded the "wrong" answer that a phase-out should not be implemented.

Because no CBA was done (or required) for the earlier 1973 decision, their conclusion is based on the assumption

that the lack of more recent data would have precluded the EPA from doing a CBA, and that the decision would have been environmentally negative if based on a CBA. If the same executive order that necessitated the later CBA had been in effect in the 1970s, the EPA would almost certainly have made a serious effort to do a CBA for the 1973 decision. It is impossible to say now what data would have been used or what the conclusions would have been. The authors argue that important data used in the 1980s analysis did not exist in 1973 and therefore the CBA could not have been completed. But there is nothing to have precluded a 1970s CBA from assuming reasonable data and calculating assumed net benefits, or using other data that may have existed at that time, or even from conducting a nonquantitative CBA.

If currently available benefits data are used in a hypothetical retrospective CBA, there is little doubt that the net benefits of the 1973 decision would have been "positive"—that is, contrary to Ackerman, Heinzerling, and Massey's conclusion—because removal of the major portion of a pollutant (accomplished by the 1973 decision) is normally much more cost-beneficial than the last and usually more difficult and expensive portion (accomplished by the 1980s decision). Because only data available in 1973 are used, the outcome cannot be definitely negative without a careful analysis of all available benefits data that might have been used in 1973, which Ackerman, Heinzerling, and Massey do not provide.

In very costly environmental regulatory efforts, a multistage process that puts off the very high marginal cost/low marginal benefit final control steps until improved data are available is sometimes an economically efficient approach. Removing lead from gasoline may serve as a useful example in this regard. Such an approach may lead to a good tradeoff between doing too much and regretting it, and doing nothing and later realizing that something was desirable. Rather than preventing the first steps toward control, CBA may be particularly useful as a guide to the economically efficient final level of control.

Ackerman, Heinzerling, and Massey make an additional point that "the use of cost-benefit analysis by an administration hostile to environmental protection will almost certainly not produce the equivalent of another lead phase down" because "political support for a methodology that valued benefits relatively expansively" is also necessary in their view. An administration hostile to a proposed environmental action is not likely to bother to undertake a CBA in the first place since it would have no plans to take the action and therefore would have no need to conduct such a CBA. Political decisions can influence how CBAs are done, but the virtue of CBA is that it forces agencies to lay out the available economic evidence for their preferred option (and for other options to achieve similar ends) for all to see and examine.

CONCLUSION

In the case of the Grand Canyon dams, Ackerman, Heinzerling, and Massey's conclusion was incorrect because they argue that a CBA would have led to an environmentally "negative" conclusion. But in fact, a retrospective CBA using current data (but 1960s prices) would not support building the dams. In the vinyl chloride case, their conclusion may be accurate based on data available in 1974—but not using current data. Finally, if the authors' stated assumption of no new data were applied in the 1973 lead case, the outcome of a hypothetical 1973 lead CBA is much less certain than they state, and if current benefits were used, the outcome would almost certainly be environmentally "positive." These points are summarized in Table 1.

Ackerman, Heinzerling, and Massey's analysis does not support their conclusions in one case and is uncertain in another based on use of data available at the time the decision was made. They claim to be analyzing decisions based on data available at the time, but they elect, in the case of the dams, to use more recent prices that applied to a later time period of analysis. And if current data as defined above are used, CBA appears to reach what Ackerman, Heinzerling, and Massey would regard as the "right" conclusion every time.

This is hardly an indictment of the usefulness of CBA. Rather, it suggests the importance of investing in better cost and benefit data before a decision is made rather than engaging in more leaps of economic faith in situations in which that is not necessary. The cases studied by Ackerman, Heinzerling, and Massey were major decisions at the time, but over time the economic consequences of major environmental decisions are likely to increase, not decrease, because low-cost environmental enhancement opportunities have al-

TABLE 1

Reconsidering Ackerman, Heinzerling, and Massey

Overview and response to their analysis

Policy proposal	Date of relevant CBA	CBA conclusion	Critics' argument for why CBA would have given the "wrong" answer	Problems with critics' argument	Is their criticism correct?	CBA if current data were used
Building the Grand Canyon dams	1966 (revised, 1967)	Unfavorable	Nuclear prices rose after decision was made, so CBA would have been favorable to dams.	Subsequent price changes would have changed later CBAs using same methodology, but not those in late 1960s when decision was made.	No	Unfavorable
Controlling vinyl chloride in workplace	None conducted	N/A	CBA would have been unfavorable based on 1974 knowledge of benefits and costs.	Critics use different discount rates for benefits and costs; conclusion depends on assumptions as to hypothetical 1974 OSHA CBA.	Possibly	Probably favorable
Removing lead from gasoline	1985	Favorable for 1980s	1973 CBA "could not have been performed" without data resulting from 1973 regulation.	Critics assume that quantification is required. Further, the use of current benefits data would almost certainly have resulted in favorable 1973 CBA.	Uncertain	Favorable

ready been undertaken. An economically inefficient decision on how much to control global warming, for example, could have very large economic effects.

CBA is currently an add-on requirement of the executive branch that is only to be applied to regulatory decision-making "to the extent permitted by law and where applicable." In other words, CBA conclusions with regard to environmental regulations are almost always advisory in nature, not determinative, except in those few cases in which CBA conclusions are specified as decision criteria for regulations in the legislative mandates under which they are developed.

Under most laws by which the EPA and other federal environmental regulatory agencies operate, the criteria prescribed for taking action do not include the economic efficiency of the proposed actions, and in some cases preclude the use of economic considerations. Because the Clean Air Act generally does not allow use of economic efficiency as a criterion, Ackerman, Heinzerling, and Massey are incorrect to argue that use of CBA at the time of the 1973 leaded gasoline decision would have precluded the phase out.

There are at least three plausible roles for CBA in regulatory decision-making:

- Require by statute that regulations meet a CBA test as well as the current criteria.
- Require by executive order that CBAs be carried out for all proposed major regulations, but make them advisory rather than determinative.
- Do not carry out or use CBA at all.

Ackerman, Heinzerling, and Massey appear to favor the third option. It is not clear how they would suggest that regulatory agencies make decisions that involve important economic considerations. Should they choose the options with the maximum benefits regardless of costs? What if those costs are very high and would have large negative economic effects (such as may be the case for some options for controlling global warming)? Current policy is best characterized by the second option, and allows agencies to balance economic and non-economic considerations as they think best.

Surely the choice of roles is the major issue. While the case studies offered by the authors are interesting as histories of the environmental issues involved, they do not appear to shed much light on the choice of roles for CBA, or even to present a very good case for their preferred outcome.

Agencies should have the right to make economic leaps of faith and exercise environmental conservatism. But decision-makers and the public are better off understanding that they are leaping and why they are doing so. The current use of CBA facilitates that.

Contrary to Ackerman, Heinzerling, and Massey's conclusions, CBA can play a useful role in regulatory decision-making based on its application to their three case studies from the 1960s and 1970s. CBA is not and cannot be a tool for predicting the long-term efficiency of decisions made at different times and with different levels of knowledge. Instead, it is a tool for summarizing the economic efficiency of a proposed action at a specific time based on the benefit and cost information available at the time a decision needs to be made. The results can be no better than the data available at the time of the analysis. It can also be used to analyze whether a past decision was economically efficient based on later information as to actual costs and benefits as long as it is anchored in the specific time frame when the decision was made. This cannot influence the decision actually made, but provides some insight as to the actual economic efficiency of earlier decisions and may suggest the wisdom of greater or less conservatism in the use of CBA cost and benefit estimates in making future decisions.

A good case can be made that the primary problem with CBA has not been its use, but the fact that it has not played a major role in most regulatory decisions as shown by after-the-fact comparisons of the costs per life saved and net benefits of regulations by various agencies. This was what the original Morrall and Hahn papers attempted to point out. R

READINGS

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