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Introduction

Governments at all levels have a legitimate and sometimes critical role to play in resolving collective action problems (CAPs), including for example the provision of public goods. Over time, governments and their agencies have developed various decision tools to assist in those efforts. One such tool is regulatory cost-benefit analysis (RCBA), also known as regulatory impact analysis. First used in the federal government beginning in the early 1970s, RCBA is a young and still evolving decision-making tool.[1] Its development carries several important implications for collective action problems, not least that some collective action problems may not be worth resolving.

In theory, RCBA is supposed to be a benign and neutral decision tool that helps society focus resources so as to maximize social welfare in (a) choosing CAPs worth resolving and (b) selecting mechanisms by which to resolve them. In reality, RCBA inevitably involves value judgments that are inherently subjective, and those value judgments can be manipulated to skew the outcome of any RCBA for political ends. In practice, RCBA can be as useful for impeding as facilitating collective action, regardless of actual social-welfare effects.

The most important subjective elements of RCBAs include (a) valuations of human lives and other non-market (*e.g.*, environmental) goods and (b) the parameter values that comprise the social discount rate. In the literature, one finds a large range of acceptable

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[1] For a descriptive history of RCBA in the federal government, along with calls for reform, *see* Daniel H. Cole, *Best Practice in Benefit-Cost Analysis*, 23 RES. L.& ECON. 1 (2007)

values for discount rates and non-market goods, including human lives, large enough to permit the strategic manipulation of outcomes that would either support or oppose collective action to resolve large-scale social-cost problems. Thus, RCBAs are useful for both proponents and opponents of proposed policies for resolving CAPs. Sometimes, competing RCBAs even become focal points for disputes over policy.[2]

The main purpose of this paper is not to assess whether or not RCBAs more often impede or promote collective action, but simply to describe their influence and to explain how and why they are politically useful tools for agencies, *even when those agencies are not required by law to prepare RBCAs*. For better or for worse, RCBAs have significantly influenced policies for dealing with, or not dealing with, collective action problems ranging from airport enlargement to global climate change.[3]

Part I of this paper briefly describes the general process of RCBA. Part II examines some uses and abuses (*i.e.*, political manipulation) of RCBAs by federal government agencies to either promote or impede collective action. Two important implications of Part II are that (1) even if RCBAs were not required by law, federal agencies such as the Environmental Protection Agency (EPA), would have incentives to produce and possibly manipulate RCBAs as a political strategy to preempt or undermine opposition to its regulatory proposals; and (2) because the assumptions of RCBAs (including, for example, the social discount rate) are generally required to be made transparent, manipulation of RCBAs for political ends is not always a successful strategy. Finally, Part III assesses the huge role RCBAs play in debates over domestic and international policies to deal with climate change, which is probably the greatest collective action problem the world has ever confronted. Interestingly, because the stakes in climate change are potentially so high,

[2] This arguably is the case with respect to climate policy, where economists have basically split into two camps, based generally on whether their models focus on the mean expected damages of climate change or incorporate low-probability, high-magnitude climate "catastrophes." Those who focus on the former generally prefer a gradual ramping-up of greenhouse gas regulations. Those who focus on the later generally prefer more rapid and stringent regulations. See *infra* Section III.

[3] *See*, *e.g.*, Robert Haveman, *The Chicago O'Hare Expansion: A Case Study of Administrative Manipulation of Benefit-Cost Principles*, 23 RES. L.& ECON. 183 (2007); WILLIAM D. NORDHAUS AND JOSEPH BOYER, WARMING THE WORLD: ECONOMIC MODELS OF GLOBAL WARMING (2000).

RCBAs are not only helping to shape climate change policy but in important respects climate change is reshaping the theory and practice of RCBA.

I. A Brief Introduction to the RCBA Process: A Study in *Subjective* Choice

RCBA can be simply described as a six step process:

(1) identify the collective action/social-cost problem and determine the goal (sometimes, but not always, exogenous to the RCBA);

(2) identify policy alternatives, including no action;

(3) determine foreseeable impacts, including non-market impacts, of each of the alternatives over their expected life-spans;

(4) assign values to those impacts –
   (a) favorable impacts = benefits,
   (b) unfavorable impacts = costs;

(5) discount future costs and benefits to present day dollars, and calculate the net present benefits or costs for each alternative;

(6) finally, compare the net benefits/costs or all alternatives and choose the alternative with the greatest net benefits or lowest net costs.

If the RCBA process seems straightforward, appearances are deceiving. At every step, there are judgment calls to make, which can bias the RCBA either for or against proposed policies. In Step 1, the selection of the goal or even the way the goal is framed can influence the measurement of success or failure. Step 2, which involves the identification of policy alternatives, inevitably requires more or less arbitrary line-drawing, as the number of conceivable alternatives inevitably outstrips the capacity of any single RCBA or broader decision-making process. Likewise, as every first-year law student comes to realize in Torts class, the determination of foreseeable impacts requires drawing lines that cannot legitimately be tied to neutral principles or presumed consensus.

Steps 4 and 5 in the RCBA process provide more obvious and infamous problems. In Step 4, values must be assigned to non-market goods, such as human lives, scenic vistas, and endangered plant species, without the usually reliable measure of money. Despite arguable improvements in alternative valuation techniques, such as contingent valuation, hedonic pricing, travel-cost methods, *etc*., the range of "acceptable" human life valuations (as defined by editors and peer reviewers at academic journals) remains large, and the choice of any valuation within the "acceptable" range is contestable. Not only do analysts disagree about the values, they cannot even agree about the best *way* of measuring the values. In human life valuation, is it best to measure statistical life years saved or lost? Is it quality-adjusted life years? Are the lives of older statistical persons worth more or less than the lives of younger statistical persons? Do valuations depend on the *per capita* gross domestic product or living standards of the relevant country, county, or city?

Aside from valuing death prevention, how do we measure morbidity effects, which reduce the quality of life, but do not actually kill? What, for example, is the value of a single asthma attack averted? Beyond human lives, how do we value ecosystem effects, for example all of the seabirds, sea mammals, and other wildlife killed in the Exxon *Valdez* oil spill of 1989? Surely no one could claim, with a straight face, that the answers to any of these questions are objectively discernable and politically neutral. Values must be assigned, however, because otherwise those goods would receive a default value of zero in RCBAs, which is almost always worse than assigning an erroneous positive value.

Once more or less arbitrary values are assigned to non-market goods and bads (along with the market values of market goods and bads), any benefits or costs arising after the initial date of policy implementation must be discounted at some rate, including potentially a zero rate. In lay terms, the social discount rate is the rate at which future costs and benefits are reduced to present day dollars, on the presumption that a dollar in hand today is worth more than a dollar tomorrow, next year, or ten years from now because today's dollar can be invested at some positive (if variable) interest rate. Defined somewhat more rigorously, in accordance with the theories of Irving Fisher and Frank Ramsey, $r = p +$

ηg,[4] where: r is the social rate of discount; p is the pure rate of time preference, a measure of impatience; η is the elasticity of marginal utility, also known as the base-case coefficient of relative risk aversion, which measures the amount society would pay today to insure against some expected future loss; and g represents the expected rate of growth in *per capita* consumption, which is usually presumed to be positive – economists typically expect future generations to be better off than present generations – but could be negative if some large-scale disaster occurs, such as a significant asteroid strike or catastrophic climate change.

Importantly, none of the elements comprising the social discount rate can be specified objectively. This is clearly demonstrated by the controversy that followed the UK Treasury's 2006 publication of the *Stern Review on the Economics of Climate Change*.[5] The *Stern Review* adopted an unusually low social discount rate of 1.4% based on a pure rate of time preference of 0.1%, an elasticity of marginal utility of 1, and an expected growth rate in *per capita* consumption of 1.3%. Virtually all of the *Stern Review*'s numerous critics objected to its social discount rate, but for various reasons. Some, including William Nordhaus and Richard S.J. Tol, strongly disagreed with the selection of 0.1% for the pure rate of time preference.[6] Others, such as Partha Dasgupta, had no complaint with the pure rate of time preference, but disagreed with the *Stern Review*'s elasticity of marginal utility of 1.[7] Dasgupta did not dispute Stern's choice of a growth rate for *per capita* consumption, even though he earlier co-authored a paper noting how sufficiently severe climate change could curtail economic growth and potentially justify a zero, or even negative, social

[4] The "Ramsey equation," as it is known, is not the only, and may not be the best, mechanism for determining social discount rates, but it is the standard model and one that is relatively easy to comprehend.

[5] NICHOLAS STERN, THE STERN REVIEW ON THE ECONOMICS OF CLIMATE CHANGE (2007).

[6] *See*, *e.g.*, William Nordhaus, *A Review of the* Stern Review on the Economics of Climate Change, 45 J. ECON. LIT. 686 (2007); Gary Yohe and Richard S.J. Tol, *The* Stern Review*: Implications for Climate Change*, 49 ENVT 36 (2007).

[7] *See* Partha Dasgupta, *Commentary: The Stern Review's Economics of Climate Change*, 199 NAT'L INST. ECON. REV. 4 (2006).

discount rate.[8] Martin Weitzman, after heavily criticizing the *Stern Review*'s use of unconventional discount rates,[9] developed his own integrated assessment model – a kind of RCBA fusing scientific and economic analysis – that focuses heavily on potential low or negative growth scenarios.[10]

Given the lack of agreement over the elements that comprise the social discount rate, it should not be surprising to find widespread disagreement about the social discount rate itself. Writing in 1999, Paul Portney and John Weyant observed that "[t]hose looking for guidance on the choice of discount rate could find justification [in the literature] for a rate at or near zero, as high as 20 percent, and any and all values in between."[11] This is troubling because, for reasons I will discuss shortly, even a seemingly small difference in the discount rate can alter the outcome – in technical terms, change the sign – of a RCBA.

At the end of the 1990s, Martin Weitzman tried to get a better handle on what constituted an "appropriate" discount rate for long-run environmental policies by surveying 2,000 of his fellow economists for their "professionally considered gut feeling" about the appropriate discount rates to apply to climate change policy. In the aggregate, they preferred a schedule of declining discount rates, starting from around 4 percent for near-term effects and falling to 2 percent after 25 years, then to 1 percent after 75 years. Weitzman's findings, which are summarized in Table 1, are remarkably consistent with the UK Treasury's "Green Book" of discount rates for central government policies, presented in Table 2. By contrast, the US President's Office of Management and Budget clings to a 7 percent base discount rate, having previously clung to a 10 percent rate into the 1990s.[12]

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[8] Partha Dasgupta, Karl-Gören Mäler, and Scott Barrett, *Intergenerational Equity, Social Discount Rates, and Global Warming*, *in* P.R. Portney and J.P. Weyant (Eds.), Discounting and Intergenerational Equity 51 (1999).

[9] Martin Weitzman, *A Review of the* Stern Review on the Economics of Climate Change, 45 J. Econ. Lit. 703, 717 (2007).

[10] Martin Weitzman, *Gamma Discounting*, 9 AMER. ECON. REV. 260 (2000).

[11] Paul R. Portney and John P. Weyant, *Introduction*, *in* P.R. PORTNEY AND J.P. WEYANT (EDS), DISCOUNTING AND INTERGENERATIONAL EQUITY 1, 4 (1999).

[12] Office of Management and Budget, Circular A-4, *in* Informing Regulatory Decisions: 2003 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities (2003). *Also see* Cole, *supra* note 1, at __.

Table 1. Aggregation of Economists' Recommended Discount Rates for Climate Change Policy

Time from present	*Discount Rate (%)*
1-5 years	4
6-25 years	3
26-75 years	2
76-300 years	1
More than 300 years	0

Source: Martin Weitzman, *Gamma Discounting*, 9 AMER. ECON. REV. 260, 261 (2000).

Table 2. UK Treasury's Schedule of Declining Long-Term Discount Rates

Period of years	*Discount rate (%)*
0-30	3.5
31-75	3
76-125	2.5
126-200	2
201-300	1.5
300+	1

Source: Her Majesty's Treasury, Greenbook: Appraisal and Evaluation in Central Government, Annex 6, Table 6.1

Table 3. The OMB's Mandatory Discount Rate for Federal Agencies

Time period	*Discount rate (%)*	
	Mandatory	*Permitted Alternative*
1+ years	7	3

Source: Office of Management and Budget, Circular A-4, *in* Informing Regulatory Decisions: 2003 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities (2003).

Very few economists outside of conservative think tanks, regulated industries, or the OMB itself, believe a 7 percent discount rate to be justifiable, at least when it comes to the provision of public goods, such as clean air and water. However, OMB rules *permit* the Environmental Protection Agency (EPA) to use an alternative 3 percent discount rate, in addition to the mandatory 7 percent rate. Thus, the OMB implicitly concedes that there is no such thing as "the correct" social rate of discount. The OMB's rate structure is described in Table 3. The use of multiple discount rates of 7 percent and 3 percent makes some sense, given the lack of consensus about the appropriate social discount rate. It can, however,

confuse the decision-making process because the rates can yield dramatically different outcomes, for which there is no accepted method of reconciliation.

Imagine a policy that immediately upon implementation would impose costs on polluters and administrators amounting to $1 million, but would produce estimated social benefits of $2 million in exactly 15 years. For the sake of simplicity, assume no costs or benefits are created during the intervening years. While this example is highly stylized, it captures a chief characteristic of certain public policies, such as environmental protection measures: costs tend to be front-loaded, while benefits tend to be back-loaded. The costs that are borne in year 1 are not subject to discounting, but the subsequent benefits are discounted. The standard discounting equation is $PV = FV/(1+i)^t$, where PV is present value, FV is future value, i is the annual interest rate, and t is the time. The algebraic "discount factor," $1/(1 + i)^t$, can be used to create a table of numerical discount factors for different time periods. The discount factor for a 3 percent discount rate in 15 years is 0.642; the discount factor for a 7 percent discount rate in 15 years is 0.362. Applying these discount factors to the current hypothetical, using the OMB's mandatory 7 percent discount rate the present value (that is, the value in year 1) of $2 million in benefits accrued in year 15 is $724,000 (2,000,000 x 0.362). Because that product is less than the costs incurred in year 1 (1,000,000), the policy would not pass the cost-benefit test, and should not be implemented. But using the alternative 3 percent discount rate, the present value of the benefits earned in year 15 is $1,284,000 (2,000,000 x 0.642), which exceeds the cost, and therefore passes the cost-benefit test. What should the government to do with this information? If it relies on the 3 percent discount rate, it should implement the policy; but if it uses the 7 percent discount rate, it should not. One way or the other, the choice of the discount rate, by itself, determines the RCBA's outcome and drives the policy decision.

Given all of the subjective and manipulable elements of RCBA, why does government increasingly rely on it as a tool in policy making? The reasons are several, though not entirely comforting: (1) despite the patently subjective elements and potential for political manipulation describe above, RCBAs have a patina of neutrality and at least *seem* more scientific than other decision tools; (2) decision makers like RCBAs because they can boil

down fundamental questions of regulatory policy to a single number, which creates the impression (or misimpression) that the decision is an easy one; (3) even if RCBAs are subjective and manipulable, no other decision tool is less subjective and manipulable; and (4) because RCBAs are supposed to specify assumptions, valuations, discount rates and other variables, they are transparent and can be replicated .

I take reasons (3) and (4) to be legitimate reasons for requiring RCBAs for most regulatory decisions. It should go without saying that the same problems that ostensibly plague RCBAs also affect (though perhaps less obviously) all other decision tools. Decision makers simply cannot avoid making choices based on subjective valuations, including valuations of non-market goods such as human lives, and discounting future costs and benefits at some positive or zero rate. However, in the absence of some formalized decision making process such as RCBA, those assumptions and valuations are likely to remain unspecified and opaque, making it more difficult, if not impossible, for other analysts to review, criticize or replicate analyses. This creates strategic incentives for decision makers, at least in some circumstances, to prefer the relative opacity of informal decision making procedures. However, the virtuous transparency offered by formal RCBAs should not be underestimated. It can, and has, served to check the abuse of decision making processes, as we see in the next section.

II. RCBA For and Against Collective Action

This section consists in two case studies that, together, describe the potential uses and abuses of RCBA to either resolve or impede the resolution of CAPs. The first case study concerns RCBAs prepared by EPA in the late 1990s in support of revised national ambient air quality standards for ozone and particulate matter. The main lesson of that case study is that it makes sense for EPA to support its rules with RCBAs *even when it is legally barred from considering them in rule-making* because they help to undercut political opposition to new rules, thereby facilitating collective action. The second case study focuses on EPA's efforts to support the Bush Administration's "Clear Skies" program – a deviously named

program designed mainly to avoid imposing tougher restrictions on polluters[13] – by manipulating the RCBA process to make "Clear Skies" appear superior to alternative policies.[14] However, this case not only demonstrates the manipulability of RCBAs; it also highlights the critical utility of their transparency for determining best policies for providing public goods or resolving CAPs.

Case Study 1: RCBA Can Facilitate Collective Action by Minimizing Political Opposition

In 1997, EPA proposed amendments to national ambient air quality standards (NAAQSs) for ozone and particulate matter under the Clean Air Act. The proposed regulations, which EPA ultimately adopted, were significantly more stringent than the previous standards, and entailed substantial costs for cities that could not meet the new standards as well as regulated industries. However, in setting the revised standards, EPA was legally barred from considering those costs. Section 109 of the Clean Air Act requires the agency to set primary NAAQSs to "protect public health…with an adequate margin of safety."[15] Throughout its history, the EPA has consistently interpreted that language to prohibit considerations of cost in setting or revising NAAQSs.[16] That interpretation is based in part on the fact that other provisions in the Clean Air Act expressly permit or even require consideration of costs,[17] suggesting that Congress's failure include any reference to costs in §109 was both deliberate and legally significant.

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[13] For very different perspectives on the "Clear Skies" initiative, compare the EPA's official website < http://www.epa.gov/clearskies/> with the Sierra Club's take < http://www.sierraclub.org/cleanair/clear_skies.asp>.

[14] *See* James E. McCarthy and Larry B. Parker, L.B., CRS Report for Congress: Costs and Benefits of Clear Skies: EPA's Analysis of Multi-Pollutant Clean Air Bills. Congressional Research Service, Washington, D.C. (Nov. 23, 2005).

[15] 42 U.S.C. § 7409.

[16] *See Lead Industries Assn. v. EPA*, 647 F.2d 1130, 1148 (D.C. Cir., 1980) (upholding EPA's interpretation of § 109 of the Clean Air Act to prohibit cost considerations in setting or revising NAAQSs); *Whitman v. American Trucking Assc.*,531 US 457 (2001) (confirming EPA's interpretation that costs cannot be considered in setting NAAQSs).

[17] *See, e.g.*, §111 of the Clean Air Act, 42 USC § 7411 (expressly requiring the EPA to consider costs in establishing technology-based standards of performance for new stationary sources of pollution emissions).

Although EPA was statutorily barred from *considering* costs in setting revised NAAQSs, the agency nevertheless *prepared* RCBAs for its revised standards because it is legally obligated to do so by another statute and an executive order. The 1995 Unfunded Mandates Reform Act requires federal agencies to conduct cost-benefit analyses of all regulations entailing annual economic costs of $100 million or more. The Act also requires the agencies to adopt the economically least burdensome regulatory alternative that accomplishes the regulatory purpose, or to explain why it chose a different option.[18] Executive Order 12,866, issued in 1993 by President Clinton,[19] required (it has since been displaced by a similar Bush Administration Executive Order[20]) executive branch agencies, including the EPA, to prepare cost-benefit analyses for any "significant" regulatory proposals, where "significant" is defined as an annual economic effect of $100 million per year or more. The Executive Order did not, however, require that the benefits of any proposed regulation exceed the costs.[21] Thus, EPA was legally required to prepare RCBAs that it could not legally consider in making its regulatory decisions.

In accordance with the law, EPA duly prepared RCBAs for its proposed revised NAAQSs for ozone and particulate matter. The RCBA for the ozone standard failed a strict cost-benefit test, with estimated benefits ranging from $0.1-1.5 billion and estimated costs of $2.5 billion. By contrast, the RCBA for the revised particular matter NAAQS had estimated benefits of $58-110 billion, which exceeded by at least a factor of 10 the estimated cost of $6 billion.[22] But was this exercise in RCBA simply a waste of time and resources? Perhaps, if one is prepared to believe that EPA *actually* did not consider costs in deciding whether or not to change the standards. The fact that EPA has only rarely changed

[18] 2 USC §§ 658, 658a-g, 1501-1507.

[19] 58 Fed.Reg. 51735 (Oct. 4, 1993).

[20] Executive Order 13422 , 72 Fed.Reg. 2763 (Jan. 23, 2007).

[21] EO 12,866, 58 Fed.Reg. 51735 (Oct. 4, 1993), requires executive branch agencies to prepare cost-benefit analyses for any "significant" regulatory proposals, where "significant" is defines as an annual economic effect of $100 million per year or more. However, it does not require that the benefits of the proposed regulation exceed the costs.

[22] *See* Lester B. Lave, *EPA's Proposed Air Quality Standards: Clean Air Sense*, The Brookings Institution, Summer 1997 < http://www.brookings.edu/articles/1997/summer_environment_lave.aspx>. All figures are in 1997 dollars.

NAAQSs, even though the Clean Air Act requires it to considering doing so at least every five years,[23] suggests that cost does play an informal but important role in EPA's decision making. But even if EPA set the revised NAAQSs for ozone and particulate matter without regard to its own RCBAs, those RCBAs came in very handy when the agency was forced to defend its revised standards against political opposition in Congress.

When EPA announced its revised NAAQSs for ozone and particulate matter, there was a great hue and cry from cities and industries that would bear significant new costs under the regulations.[24] Unusually for a mere regulatory adjustment, the Republican controlled House and Senate held hearings on the new standards,[25] and proposals were made in Congress to undo them.[26] But those efforts went nowhere. Of course, the vast majority of legislative proposals never make it out of committee in Congress. But in this case it is worth considering whether the RCBAs the EPA prepared for its revised ozone and particulate matter standards might have helped at least to mute the opposition. The net benefits of the particulate matter standard were so immense as to be robust to any legitimate sensitivity analyses (*e.g.*, altering of the discount rate), and so could well have pulled the rug out from under the EPA's opponents.[27]

That EPA's RCBAs affected the outcome of the policy dispute in Congress is somewhat speculative. But a cursory review of the Senate's hearings on the NAAQSs

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[23] §109(d)(2)(B), 42 USC § 7409(d)(2)(B).

[24] *See*, *e.g.*, US Sen. Jim Inhofe, *Congress Must Act to Block Unjustified Air Regulations*, The Daily Oklahoman, Sept. 12, 1997, at 4; Vicki Torres, *Firms Push for Some Breathing Room*, Los Angeles Times, Oct. 22, 1997, at Part D., Page 9; *Cleaner Air? Tougher standards pose a headache for cities and states*, Houston Chronicle, July 14, 1997, at 20.

[25] *See*, *e.g.*, Clean Air Act: Ozone and Particulate Matter Standards, Hearings Before the Senate Subcommittee on on Clean Air, Wetlands, Private Property and Nuclear Safety and the Committee on Environment and Public Works, 105th Cong., 1st Sess., S. Hrg. 105-50, Pt. 1 < http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=105_senate_hearings&docid=f:45560.pdf>.

[26] *See*, *e.g.*, S. 1084, 105th Cong., 1st Sess. (July 29, 1997) (bill to reinstate original ozone and particular matter standards) < http://thomas.loc.gov/cgi-bin/query/D?c105:4:./temp/~c1053SYhpc::>; H.R. 1984, 105th Cong., 1st Sess (July 19, 1997) (bill to impose four year moratorium on new ozone and particulate matter standards) < http://thomas.loc.gov/cgi-bin/query/D?c105:6:./temp/~c1053i5kOc::>.

[27] Because the RCBA for the revised ozone standard was negative, it might have been used by opponents to that revised standard. However, that does not appear to have happened, perhaps because the two revised standards were cast in a single rule, for which the combined economic outcome was highly positive.

indicates that they may have had an effect, as Senators who opposed the standards expressly denied that the issue was economic; instead, they argued that the scientific basis for the standards was flawed.[28] Apparently, they understood that even if they amended §109 of the Clean Air Act to require that NAAQSs be based on a cost-benefit analysis, such a provision would not avail them at least in the case of the revised particular matter standard.

If there is a lesson from this case study it is that the careful preparation of quality RCBAs can be a useful strategy for helping to resolve collective action problems, even in cases where RCBAs are not legally required or cannot be legally considered. They may still play a valuable role in the political process by muting potential opposition that otherwise might succeed in overturning welfare-enhancing regulations to reduce social costs and/or provide public goods. By the same token, a carefully prepared RCBA indicating that a proposed regulatory change would create significant net social costs might be useful for muting political support for such a change.

Case Study II: Abuses of RCBA and the Vital Check of Transparency

In the mid 2000s, The Bush Administration promoted a group of bills known collectively as "Clear Skies," which would require a 70 percent reduction in SO_2 and NO_X emissions by 2018, although actual attainment would likely be delayed until 2026 or later because of the legislation's generous "banking" provisions. The ostensible goal of "Clear Skies" was to deal comprehensively with air pollution from the electric utility industry. In 2003, that industry was responsible for 72 percent of all sulfur dioxide emissions, 24 percent of nitrogen oxide emissions, and 41 percent of carbon dioxide emissions, and more than 40 percent of all mercury emissions in the United States. Power plant emissions of some pollutants – notably sulfur dioxide and nitrogen oxides – had been trending downwards thanks mainly to the acid rain program of the 1990 Clean Air Act Amendments.

[28] *See* Clean Air Act: Ozone and Particulate Matter Standards, *supra* note 20.

However, utilities had long complained about the "complexity" of the "multilayered and interlocking pathwork of controls" applied to them.[29] A more simplified and uniform approach to power-plant regulation had been evolving for several years, under existing statutory mandates, within the EPA. But the Bush Administration and Congress advocated competing legislative proposals that would have regulated utility emissions of major air pollutants in a more comprehensive and integrated way. Competing with "Clear Skies" were two legislative proposals, one sponsored by Senator James M. Jeffords (I-Vt.) and the other by Senator Thomas R. Carper (D-Del.). Like the Bush Administration bill, those proposals would have permitted banking and trading of allowances, but unlike "Clear Skies," they would have required greater overall emissions reductions on shorter deadlines. In addition, the Jeffords and Carper bills (but not "Clear Skies") would have imposed regulatory controls to reduce utility emissions of carbon dioxide in order to mitigate climate change.

On October 27, 2005, EPA published a RCBA, comprised of 45 separate documents,[30] comparing the various legislative proposals to control air pollution emissions from power plants. That RCBA concluded that "Clear Skies" was preferable because it produced greater net social benefits than either the Jefford's bill or the Carper bill. However, because the RCBA was based on dubious assumptions that were absolutely vital to its outcome, including a highly controversial "senior death discount," which imposed a lower value on the lives of (statistical) elderly Americans, and because those dubious assumptions had to be explicitly set out in the RCBA itself, other analysts, and even the general public, could review and criticize the RCBA and its findings.[31]

Less than one month after EPA published its RCBA comparing "Clear Skies" with the Jeffords and Carper proposals, the Congressional Research Service (CRS) – a nonpartisan

[29] McCarthy and Parker, *supra* note 12.

[30] This fact is itself problematic from the point of view of those concerned with the transparency, clarity, and utility of BCAs.

[31] McCarthy and Parker, *supra* note 12.

research and analysis agency of Congress – published a report heavily criticizing the EPA's assumptions and analysis. What follows is a brief synopsis of the CRS report.

EPA's RBCA accurately concluded that "Clear Skies" would cost less than the alternative legislative proposals. That conclusion was unsurprising because Clear Skies was far less ambitious than the other two legislative proposals. It required fewer emissions reductions over a longer period of time. Meanwhile, what matters is not gross costs or benefits, but the *net*. And, according to the EPA's own estimates, the "Clear Skies" bill would have provided $6 billion in annual benefits in 2010, compared to $51 billion in annual benefits for Senator Carper's bill and $83 billion in annual benefits under Senator Jefford's bill.

The incremental benefits of the "Clear Skies" bill would have been even lower but for dubious assumptions in the RCBA about the regulatory baseline, *i.e.*, the starting point for required emissions reductions. Specifically, the EPA assumed that in the absence of new legislation neither EPA nor the states would impose additional regulatory controls on power plant emissions. This assumption was contradicted by three newly minted EPA rules regulating power plant emissions of sulfur dioxide, nitrogen oxides, and mercury. Not only did EPA's final RCBA for "Clear Skies" not mention those new rules; it denied that any such rules were conceivable. However, if they had been included in the RCBA, the reported incremental benefits of Clear Skies would have been much lower; and the *net* benefits of Senator Jefford's bill would have "far exceed those of Clear Skies" as well as Senator Carper's bill.

In addition to its unrealistic baseline assumptions, EPA's RCBA for "Clear Skies" made no attempt to monetize environmental benefits, which disadvantaged the Jeffords and Carper proposals significantly because their more stringent emissions requirements were designed and predicted to lead to greater environmental benefits than the Bush Administration's "Clear Skies" initiative. Worse still, the BCA did not model the health effects of regulating mercury emissions. According to a different CRS Report to Congress,[32]

[32] James E. McCarthy, CRS Report for Congress: Mercury Emissions from Electric Power Plants: An Analysis of EPA's Cap-and-Trade Regulations. Congressional Research Service, Washington, D.C. (April 15, 2005).

health benefits from EPA's mercury regulations ranged from "a few million dollars per year to several billion dollars per year." Omitting these benefits from the "Clear Skies" RCBA favored the Bush Administration's proposal over the alternative proposals that would have more quickly imposed more stringent caps on mercury emissions. Similarly, the EPA's RCBA for Clear Skies did not attempt to monetize the benefits of reductions in carbon dioxide emissions.

The CRS Report also found that EPA's Clear Skies BCA unreasonably assumed that the price elasticity for electricity and natural gas would be zero and that power plants were subject to short-term construction constraints. Each of these dubious assumptions served to make the Bush Administration's "Clear Skies" initiative more attractive and Senator Jefford's bill in particular less attractive because it would have imposed greater compliance costs on the utility industry.

Finally, the CRS found that "EPA's benefit analysis is limited and incomplete, which works to the disadvantage of alternatives to Clear Skies that include more stringent standards."[33] A Washington Post reporter was more pointed in her conclusion: "The Bush Administration skewed its analysis of pending legislation on air pollution to favor its bill over two competing proposals."[34] The EPA argued in response that the CRS "ignores and misinterprets our analysis."[35] Most interestingly, the government's economic watchdog, the OMB, which is charged with reviewing the quality of agency RCBAs, was completely silent about EPA's BCA for Clear Skies, raising questions about whether OMB review is designed to maximize regulatory efficiency or simply to minimize the quantity of regulation.[36]

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[33] McCarthy and Parker, *supra* note 12, at 16.

[34] Julie Eilperin, *Report Accuses EPA of Slanting Analysis; Hill Researchers Say Agency Fixed Pollution Study to Favor Bush's 'Clear Skies'*, Washington Post, Dec. 3, 2005, at A08.

[35] *Id.*

[36] Compare the recent case of an RCBA for protecting endangered bull trout in Montana, when OMB required the US Fish and Wildlife Service to eliminate 55 pages that detailed the expected benefits because the agency used a similar methodology to that employed by the Bush Administration to derive the benefits for its "Clear Skies" initiative. *See* Eilperin, *supra* note 27. Little wonder that OMB has gained a reputation for being anti-regulatory, rather than simply pro-efficiency. This reputation is supported by OMB's persistent reliance on high discount rates, as well as quantitative empirical evidence. Of 25 environmental, health, and safety regulations "significantly

This case study yields two important lessons. First, RCBAs can be, and have been, strategically manipulated towards certain preferred outcomes. In this case, an RCBA was structured specifically to prefer legislation that minimized costs for industry, thereby reducing the potential social-welfare improvements from collective action to reduce air pollution. The second lesson is somewhat more comforting, however. The agency's effort failed – "Clear Skies" was not enacted – in large part because the political manipulation of the RCBA was discovered. And it was discoverable because the methodology of RCBA requires the explicit specification of assumptions and valuations. It is an illustration of Justice Brandeis's famous aphorism, "sunlight is the best of disinfectants."[37] Nevertheless, the second lesson is not completely reassuring because neither the Jeffords bill nor the Carper bill was enacted either. The bottom line was that the Bush Administration was for its bill or no bill at all; if it could not achieve collective action on its terms, it did not want collective action. This is not at all unusual, of course. Congress is under no constitutional responsibility to either enact economically efficient legislation or to avoid enacting economically inefficient legislation. RCBA merely provides information for decision making; it does not determine political outcomes.

III. RCBA And Climate Change

This section explores the use of RCBA in the context of what is probably the greatest collective action problem policy makers have ever faced: global climate change.[38] Variable cost and benefit estimates have played, and continue to play, a vital role in determining the positions of parties in climate negotiations, thereby affecting collective action. This section begins by briefly describing (a) how RCBA has been applied in the climate change context,

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affected" by OMB review between June 2001 and July 2002, 24 were significantly weakened and none was strengthened. *See* David Driesen, *Is Cost-Benefit Analysis Neutral?*, 77 U. COLO. L.REV. 335 (2006).

[37] LOUIS D. BRANDEIS, OTHER PEOPLES' MONEY (1913).

[38] This section is largely adapted from Daniel H. Cole, *Climate Change and Collective Action*, 61 CURRENT LEGAL PROBS. 229 (2008).

(b) the outcomes of those RCBAs, and (c) how they have affected climate negotiations and institutions. In addition to the political impacts of RCBAs on climate policy, it is interesting to observe the ways in which the problem of climate change itself is influencing the method and practice of RCBA.

For more than three decades, economists have been preparing ever larger and more sophisticated RCBAs to model the damages from climate change and the costs and benefits of policies to prevent or retard it. The most famous of these efforts is probably the *Stern Review*, published by the UK Treasury in Fall 2006.[39] Ironically, it is not a proper cost-benefit analysis at all because (a) it does not explicate the model it uses to value non-market goods, including human lives, hence its calculations cannot be replicated, and (b) it contains no sensitivity analysis, although after receiving a great deal of criticism, Sir Nicholas Stern subsequently added a rudimentary sensitivity analysis.[40]

RCBAs for climate change are based on complex models, known as "integrated assessment models" (IAMs) for the way they combine scientific information with economic analysis. Models known by acronyms such as DICE, RICE, FUND, and PAGE2002 have become famous among the relatively small coterie of economists and policy analysts working on climate change issues. The modelers and analysts disagree on various technical issues, including the appropriate social discount rate for climate policies, as well as on policy recommendations, including how quickly and deeply carbon emissions should be reduced. But they generally agree on two fundamental points: (1) "business as usual" (*i.e.,* no action on climate change) would be very costly and (2) the social costs of moderate[41] climate change will be unevenly and inequitably distributed around the world, with

[39] *See* STERN, *supra* note 4.

[40] For a detailed assessment of the *Stern Review* and various critiques of it, *see* Daniel H. Cole, *The Stern Review and Its Critics: Implications for the Theory and Practice of Benefit-Cost Analysis*, 48 NAT. RES. J. 53 (2008).

[41] Most climate change IAMs focus on the mean expected damages from probability density functions, which approximate to a 2-4 degrees Celsius increase in global mean temperature over the next century. This range of likely temperature change constitutes "moderate" climate change. Few of the IAMs provide for more extreme climate scenarios, which reside in the right tail of probability density functions. Analyses that focus more attention on low-probability, high-magnitude climate change could well alter the consensus that some countries might suffer substantially less than others, thereby altering negotiations for collective action.

developing countries bearing far more of the costs than the developed countries that have contributed most to the existing stock of greenhouse gases in the atmosphere.

The differential economic effects of climate change are exemplified in the following table:

Table 4. Effects of 2.5ºC GMT increase on GDP (mean estimates)	
Country	*Net Cost (or Benefit) as % of GDP*
USA	0.45
China	0.22
Japan	0.50
OECD Europe	2.83
Russia	-0.65
Eastern Europe	0.71
Africa	3.91
India	4.93
Source: William D. Nordhaus and Joseph Boyer, *Warming the World* 91, Table 4.10 (MIT Press 2000).	

Economists disagree about the precise valuations in Table 4 – indeed, William Nordhaus has updated his own DICE model several times since 2000, and later versions derive somewhat larger damages for the US and other developed countries – but nearly all would agree that India and African countries will suffer more than the US, China, or Europe. To a large extent, this is simply a consequence of the structure of economic activity in various countries. The US economy is highly diversified and not hugely reliant on agriculture or

other highly climate-sensitive activities. The economies of Africa and India remain far more climate-sensitive.

The expected differential socio-economic outcomes from moderate climate change carry important implications for climate policy as a collective action problem. The unequal distribution of costs (and benefits) creates diverse incentives for different countries, and there is every reason to expect that countries will behave and bargain strategically in accordance with their perceived interests. Differential incentive structures and resulting strategic behavior could well impede effective and efficient climate change agreements. Indeed, they already have done so.

At first blush, the Kyoto Protocol on climate change mitigation appears to be a success story of collective action. It was signed by more than 180 countries, and has been ratified by approximately one-third of those, which are responsible in the aggregate for more than half of global greenhouse gas emissions. But substantively, the Protocol constitutes a failure of collective action. Suffice it to say that the treaty is fully consistent with a net increase in global greenhouse gas emissions between now and 2012 above the 1990 baseline. This is largely down to the fact that the Kyoto Protocol does not require emissions reductions from developing countries, including China and India, which are two of the world's four largest emitters of greenhouse gases. It did not help, of course, that US President George W. Bush denounced the treaty in 2001,[42] which meant that three of the world's four largest emitters were not bound by the Protocol to reduce their emissions.

It is not clear whether President Bush's decision to denounce the Kyoto Protocol was based on any particular IAM/RCBA of climate change, but it was expressly economic. He argued that the costs of complying with the Kyoto Protocol were simply too high for the US economy.[43] For similar reasons, Russia – another of the world's largest emitters of

[42] *See*, *e.g.*, Julian Borger, *Bush kills global warming treaty*, The Guardian, 29 Mar. 2001 < http://www.guardian.co.uk/environment/2001/mar/29/globalwarming.usnews>.

[43] *See*, *e.g.*, John Heilprin, *Bush stands firm against Kyoto pact*, The Boston Globe, Nov. 7, 2004, < http://www.boston.com/news/politics/president/articles/2004/11/07/bush_stands_firm_against_kyoto_pact/> (citing White House estimates that Kyoto would have cost the US economy $400 billion and 5 million jobs, while merely transferring greenhouse gas reducing activities to countries without binding emissions reduction targets under the Protocol). President Bush also complained that the Protocol did not require emissions reductions from China or

greenhouse gases – demanded "side payments" (*i.e.*, bribes) first to sign and then to ratify the Kyoto Protocol. Especially after the Bush Administration withdrew US support from the climate regime, the Russian government knew that the Kyoto Protocol could never take legal effect without its own participation. It also expected, like President Bush, that the costs of climate change in Russia would be low or even negative. Indeed, Table 4 indicates that Russia might benefit on net from moderate increases in global mean temperatures.[44] In order to persuade Russia to ratify the Kyoto Protocol, the international community issued excess emissions credits to the Russian government, which it would be able to sell in the international emissions trading markets created by the Protocol. Those excess credits would create profit opportunities for Russia, but at the cost of undermining the already modest global emissions reduction targets of the Protocol. Any country that purchased Russian credits would be allowed to emit more greenhouse gases, but those emissions increases would not be offset by actual emissions reductions in Russia or anywhere else. This has become known as the problem of Russian "hot air."

The overall weakness of the Kyoto Protocol, and continuing impediments to more successful post-Kyoto climate negotiations, can be attributed in large part to perceptions of the differential costs and benefits of climate change and policies designed to control it. For better or worse, RCBAs for climate change have directly affected, or even determined, the outcomes of climate negotiations. This is not to say that economic modelers had any intentions of impeding collective action on climate change, but their models have certainly contributed significantly to the impediments.

Consider a simple thought experiment to emphasize the point about the effects of RCBAs on collective action to control climate change. Suppose (counterfactually) that climate change IAMs indicated that moderate global mean temperature increases would cost the US and Russian economies 6-8 percent of GDP, instead of 1-3 percent. In that case,

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India, but there too his argument was economically rather than environmentally based. He was not so much concerned with the environmental integrity of the Kyoto Protocol but with its potential impacts on international economic competitiveness.

[44] I do not mean to endorse the cost estimates from Nordhaus and Boyer, *supra* note 2, but only to explain how they might have supported Russian government decisions about participation in the Kyoto regime.

would President Bush have denounced the Kyoto Protocol? Would Russia have required side payments to participate in the emissions reduction regime? Would the Kyoto Protocol itself have been a stronger treaty? I believe that answers to these questions are self-evident.

Climate modelers are aware of how their models can influence the outcome of negotiations. The *Stern Review*, for example, was deliberately modeled so as to account for higher-harm scenarios that previous models neglected. It was Stern's view that those earlier models underestimated the damages from unabated climate change.[45] By employing a lower social discount rate and by considering a greater number of potentially more costly climate-change effects, Stern inevitably increased the mean expected damages from climate change *for all countries*. Like Stern, Martin Weitzman thought that most existing climate models underestimated the costs of unabated climate change, though he did not like the way the *Stern Review* dealt with the issue by playing with the discount rate. So, Weitzman prepared his own, immensely complex IAM, which incorporates directly into the damage function low-probability, high-harm scenarios.[46] This is not to suggest that either Stern or Weitzman is necessarily engaged in a strategic game to manipulate the outcome of climate change RCBAs in order to promote certain policy ends. Arguably, their efforts are primarily intended to improve the methodology of RCBA, in light of the tremendous complexities of climate science. In other words, the potentially high stakes and complexities of climate change are forcing economic analysts to revise both the theory and practice of RCBA. Nevertheless, by increasing the mean estimates of damages from even moderate increases in global mean temperatures, their RCBAs could well influence policy makers in the direction of steeper and more rapid mitigation of greenhouse gas emissions. That seems, at least, to have been an unstated goal of the *Stern Review*. And it is worth noting that since the *Stern Review* was published, a lot more attention has been paid to the economics of

[45] *See* STERN, *supra* note 4, at 150-1.

[46] Martin L. Weitzman, *On Modeling and Interpreting the Results of Catastrophic Climate Change*, REV. ECON. & STATS (forthcoming 2009).

catastrophic climate change, including by economists and policy analysts who previously focused on the mean expected damages.

At the same time, the *Stern Review* is another example of how RCBAs can be politically manipulated to support certain policy ends – in this case, more rapid and more stringent regulation of greenhouse gas emissions. It was far from a model RCBA. In several respects, the *Stern Review* failed to comply with conventional and, presumably, best practices for economic analyses. For instance, it failed to specify valuations for human lives and other non-market goods; and it did not initially include a sensitivity analysis that would have shown the extent to which the outcome depended on its unusually low discount rates or other assumptions, although Sir Nicholas Stern later added a token sensitivity analysis. Importantly, Stern and his co-authors were roundly criticized for their methodological shortcuts and omissions, as well as for their unconventional assumptions.[47] These criticisms were only possible because Stern and his co-authors publicly stated their assumptions and published their conclusions. In this way, they contributed significantly to an ongoing public discussion of the economics of climate change.

Moreover, even if the *Stern Review* was politically skewed towards a preferred policy outcome, it constituted one economic analysis of climate change among many others, all of which expressed certain policy preferences. Some might have constituted better RCBAs (on some definition of "better") than the *Stern Review*, but given the great complexities and uncertainties of the climate change problem, virtually all of them provide useful information for policy makers. In other words, the *Stern Review* was just one entry in the marketplace of economic analyses of climate change. As such, neither the *Stern Review* nor any other economic analysis of the climate change problem actually resolves the collection action problem; but all contribute to a resolution of the problem (one way or another) by providing valuable, if not wholly consistent, information to policy makers.

[47] For an assessment of the *Stern Review* as a RCBA, *see*, *e.g.*, Daniel H. Cole, *The* Stern Review *and Its Critics: Lessons for the Theory and Practice of Benefit-Cost Analysis*, 48 NAT. RES. J. 53 (2008).

Conclusion

Those who write about collective action problems and solutions should not neglect the significant role RCBAs can and do play in either impeding or facilitating collective action. This paper has shown that RCBAs can facilitate collective action to resolve social-cost problems (or provide public goods) by muting political opposition. However, because RCBAs are capable of being manipulated for political ends, they can be used to impede collective action by interest groups that benefit from the status quo. The only saving grace is that, even if they are manipulated, the transparency of formal RCBA methods makes it relatively easy to discover the manipulations, at least as compared with other, more opaque, decision tools.

This paper has merely described how RCBAs can and do affect collective action. More research is needed to determine the extents to which RCBAs actually influence outcomes, and to delineate more precisely the strategic use and abuse of RCBAs to affect collective action.