
REGULATING AGENCIES: USING REGULATORY INSTRUMENTS AS A PATHWAY TO IMPROVE BENEFIT- COST ANALYSIS

Christopher Carrigan, Mark Febrizio, & Stuart Shapiro

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ABSTRACT

Scholars of regulation generally view the procedures that agencies must follow when promulgating rules as instruments by which political principals control bureaucratic agents. Much like political principals attempt to use procedural checks to constrain regulatory agencies' actions, these same agencies employ various regulatory instruments to influence the decisions of private agents, especially firms. Despite the parallel nature of these principal-agent problems, few studies, if any, have looked at whether lessons from one can be used to inform the other. In this paper, we draw analogies between benefit-cost analysis (BCA)—a procedural control employed in the regulatory process—and three regulatory instruments that have similarities to BCA—performance standards, information disclosure requirements, and management-based regulation. We use lessons from research on the effectiveness of regulatory instruments to make predictions regarding the efficacy of BCA in various situations. Just as different regulatory instruments are appropriate for different regulatory contexts, the pathways by which BCA attempts to encourage better regulation may not all be applicable in every circumstance. We argue that such mutual exclusivity should inform how requirements for BCA are designed and that BCA's emphasis on systematic analysis—the pathway most closely resembling management-based regulation—may offer the most promise for encouraging better rules.

AUTHORS

Christopher Carrigan
Assoc. Professor of Public Policy & Public
Administration, the George Washington
University

Stuart Shapiro
Professor, Edward J. Bloustein School of
Planning & Public Policy, Rutgers
University

Mark Febrizio
Policy Analyst, the George Washington
University Regulatory Studies Center

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THE GEORGE WASHINGTON UNIVERSITY REGULATORY STUDIES CENTER

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INTRODUCTION

Principal-agent problems abound in the regulatory world. When Congress or the president hopes to influence the decisions made by regulatory agencies, they face the challenges common to principals—imperfect monitoring, inferior information, and, in many cases, differing preferences. Political principals must overcome these barriers if they want their policy preferences reflected in the decisions of their bureaucratic agents.

Regulatory agencies are also familiar with the principal side of the principal-agent problem. They attempt to influence the decisions of the entities they regulate despite confronting the same problems of imperfect monitoring, inferior information, and differing preferences. Agencies design rules, recognizing that they have at their disposal a wide variety of instruments to encourage compliance by the regulated community. These include means-based regulation, performance standards, information disclosure requirements, management-based regulation, market-based approaches, and voluntary programs.

Deep academic literatures have developed to study both of these principal-agent problems. Yet, despite their similarities in analytical approach and focus on the regulatory space, the two bodies of scholarship have largely not interacted with each other.¹ In this paper, we begin to take this step, using what scholars have written about the uses of different modes of regulation to assess a key procedural requirement associated with the regulatory process, namely the mandate that agencies perform benefit-cost analysis (BCA) to accompany proposed and final rules.²

As depicted in the literature, BCA is intended to help agencies design regulations that are more responsive to the stated goals of the political overseers that authorized these agencies to promulgate them. Scholars have argued that BCA has the potential to encourage agencies to promulgate improved and more responsive regulations through three pathways.³ First, BCA provides a mechanism to be able to decide thoughtfully among alternative policy choices. Second, it allows interested parties to monitor and evaluate agencies' proposals. Finally, it encourages agencies to develop rules in a systematic way.

¹ Carrigan, Christopher, and Cary Coglianese. 2011. "The Politics of Regulation: From New Institutionalism to New Governance," *Annual Review of Political Science* 14: 107-129.

<https://www.annualreviews.org/doi/full/10.1146/annurev.polisci.032408.171344>.

² EO 12866, Sec. 3(f), Sec. 6(a)(3)(A), https://www.reginfo.gov/public/jsp/Utilities/EO_12866.pdf.

³ For examples of BCA: (1) as a decision-making criterion, *see*, Pildes, Richard H., and Cass R. Sunstein. 1995. "Reinventing the Regulatory State," *University of Chicago Law Review* 62, no. 1, pp. 43-44, 52-53; (2) as information disclosure, *see*, Adler, Matthew D., and Eric A. Posner. 1999. "Rethinking Cost-Benefit Analysis," *Yale Law Journal* 109, no. 2, pp. 175, 246; Hahn, Robert W., and Cass R. Sunstein. 2002. "A New Executive Order for Improving Federal Regulation? Deeper and Wider Cost-Benefit Analysis," *University of Pennsylvania Law Review* 150, no. 5, p. 1503; (3) as a systematic process, *see*, Adler and Posner 1999, pp. 245-246; Hahn and Sunstein 2002, pp. 1498-1499.

Considering these mechanisms from the perspective of the instruments that regulators themselves employ to influence business behavior suggests parallels between BCA's uses and strategies in the regulator's toolbox. Specifically, the mechanisms by which BCA attempts to achieve its goals mirror elements of performance standards, information disclosure requirements, and management-based regulation.

Recognizing the parallels between elements of BCA and these three tools yields two important and interrelated sets of insights. First, because regulation is implemented in individual policy contexts by distinct regulators, it can be tailored to the specific circumstances in which it is applied. In fact, the literature studying regulatory mechanisms has clearly demonstrated that different regulatory instruments are appropriate for different regulatory contexts. In contrast, like other rulemaking procedures, BCA is applied broadly, such that all executive branch agencies are required to perform it when proposing regulations designated as "significant."⁴

Still, the environments under which regulators promulgate rules can be very different, in terms of the types of interest groups with which they interact, the substance of the regulatory questions with which they engage, the general interest level in the policies they promulgate, and the degree of involvement of their political overseers. As a result, the avenues by which BCA attempts to encourage better regulation may not be applicable in all circumstances. In reality, the mechanisms by which BCA acts can be mutually exclusive in some circumstances. Thus, it may be impossible for BCA to fulfill simultaneously the three goals of providing a criterion for regulatory decisions, increasing regulatory transparency, and disciplining agency thinking.

Second, given that the pathways by which BCA works are not all likely to be available simultaneously, examining what these pathways require to be effective can allow us to predict when and how frequently BCA can be useful along each. The avenue by which BCA appears to offer the most promise to encourage better rules is through its emphasis on systematic analysis. Admittedly, management-based regulation—which parallels this aspect of BCA by mandating that firms plan for risks in their internal processes—works best when the regulator is able to evaluate a firm's plans and, in many policy areas, political principals may not be able to play this role.⁵

Still, achieving the goals associated with treating BCA as a management-based standard will frequently be more realistic than those associated with performance standards or disclosure requirements. Examining specific calculations to determine whether a rule actually meets a BCA criterion typically requires a deeper level of expertise than simply evaluating the agency's process for crafting that rule. And, whereas an information disclosure mechanism necessitates relying on

⁴ EO 12866, Sec. 3(f), Sec. 6(a)(3)(A).

⁵ In the context of regulatory analysis, the president utilizes the Office of Information and Regulatory Affairs (OIRA) to "regulate" agencies. There is considerable debate over the effectiveness of OIRA in performing this function. See, Shapiro, Stuart. 2005. "Unequal Partners: Cost-Benefit Analysis and Executive Review of Regulations." *Env'tl. L. Rep.* 35, no. 7 (July): 10433-10444.

external observers to decipher potentially incomprehensible analyses,⁶ personnel in regulatory agencies are likely to be more committed to using BCA as a planning tool. This is not to say that the planning element of BCA will always be the most useful pathway to encourage better regulations. The circumstances in which the regulator operates will determine that. However, it does help explain why commentators have frequently criticized BCA's ability in practice to force agencies to adhere to a particular criterion⁷ or provide transparent guides to agency decisions.⁸

In sum, explicitly recognizing the connections between BCA as a mechanism for encouraging regulators to write better and more responsive rules and the instruments that regulators themselves use to oversee firms can enable reformers to suggest pertinent changes to BCA that actually achieve those goals. Still, perhaps more importantly, explicitly recognizing that the pathways by which BCA operates mirror elements of performance standards, information disclosure requirements, and management-based regulation can allow commentators to adopt a more informed perspective on how, when, and where BCA might be effective. Since the pathways by which BCA works might be incompatible in some contexts, acknowledging tradeoffs between them can promote more realistic evaluations of BCA's potential impact and inform future refinements to the tool.

I. Political Principals and Procedural Controls

Questions of how the executive and legislative branches of government can influence bureaucratic decisions have long been viewed through the lens of principal-agent theory.⁹ On the U.S. federal level, both the president and Congress are principals that oversee bureaucratic agents. In the case of regulatory policy, Congress writes and the president signs legislation that delegates responsibility for regulatory decisions to federal agencies.

Even when the responsibility for regulatory action is passed to agencies, presidents and members of Congress still have an interest in the outcome of those decisions. Whether because of their ideological preferences, or because of the need to be responsive to interest groups and the general public, political principals have a desire to influence agency decisions. They operate at a disadvantage however in their attempts to exercise such influence. Bureaucratic agencies have informational advantages, are challenging to monitor, and may have preferences that vary from political principals.¹⁰

⁶ There have been proposals to simplify agency benefit-cost analyses. See, Carrigan, Christopher, and Stuart Shapiro. 2017. "What's wrong with the back of the envelope? A call for simple (and timely) benefit-cost analysis," *Regulation & Governance* 11, no. 2: 203-212. <https://doi.org/10.1111/rego.12120>.

⁷ Hahn, Robert W., and Patrick M. Dudley. "How well does the US government do benefit-cost analysis?" *Review of Environmental Economics and Policy* 1, no. 2 (2007): 192-211.

⁸ Carrigan and Shapiro 2017.

⁹ Cook, Brian J., and B. Dan Wood. 1989. "Principal-agent models of political control of bureaucracy." *American Political Science Review* 83, no. 3: 965-978.

¹⁰ Cook and Wood 1989.

A vast political science literature has explored the means by which political principals attempt to influence the decisions of agencies. Among them are the ability to appoint agency officials,¹¹ determine budgets,¹² conduct oversight hearings,¹³ and use public announcements to apply pressure.¹⁴ In two influential articles in the late 1980s, McCubbins, Noll, and Weingast (McNollgast) highlighted how procedures are used by legislatures as mechanisms to control agencies.¹⁵ McNollgast argued that by requiring agencies to follow certain procedures when making policy decisions, Congress created an environment that maximized the likelihood that those decisions would be made as if the coalition delegating the decision was making them.¹⁶

In the three decades since McNollgast wrote these influential contributions, scholars have worked to not only deepen their arguments, but also extend their reach to include the other branches of government, especially the executive.¹⁷ In addition to identifying factors that might strengthen or mitigate the effectiveness of procedural controls,¹⁸ critics further argued that such procedures were more likely to strengthen the hand of future political officeholders than to ensure that the will of those who introduced the procedures was achieved.¹⁹

Nowhere has the consideration of procedural controls been more important than in the regulatory policy space. Agencies issue thousands of regulatory decisions per year and many of them have significant economic impacts and high political salience. As such, they are precisely the types of agency decisions that political principals have an interest in ensuring are consistent with their delegations of authority. And, when agencies issue regulations, they must follow a multitude of procedures instituted by Congress and the executive. For example, regulators must make their proposed regulations available for public comment,²⁰ submit them to the Office of Management and Budget's Office of Information and Regulatory Affairs (OIRA) for review,²¹

¹¹ Nathan, Richard P. 1983. *The administrative presidency*. John Wiley & Sons.

¹² Pasachoff, Eloise. 2015. "The president's budget as a source of agency policy control." *Yale IJ* 125: 2182.

¹³ McCubbins, Mathew D., and Thomas Schwartz. 1984. "Congressional oversight overlooked: Police patrols versus fire alarms." *American Journal of Political Science*: 165-179.

¹⁴ Kagan, Elena. 2001. "Presidential administration." *Harvard Law Review*: 2245-2385.

¹⁵ See, McCubbins, Mathew D., Roger G. Noll, and Barry R. Weingast. 1987. "Administrative procedures as instruments of political control." *JL Econ. & Org.* 3: 243; and McCubbins, Matthew D., Roger G. Noll, and Barry R. Weingast. 1989. "Structure and process, politics and policy: Administrative arrangements and the political control of agencies." *Va. L. Rev.* 75: 431.

¹⁶ McNollgast.

¹⁷ Moe, Terry M., and Scott A. Wilson. 1994. "Presidents and the Politics of Structure." *Law & Contemp. Probs.* 57: 1.

¹⁸ See, e.g., Bawn, Kathleen. 1995. "Political control versus expertise: Congressional choices about administrative procedures." *American Political Science Review* 89, no. 1: 62-73.

¹⁹ Horn, Murray J., and Kenneth A. Shepsle. 1989. "Commentary on 'Administrative arrangements and the political control of agencies': Administrative process and organizational form as legislative responses to agency costs." *Virginia Law Review* 75, no. 2 (March): 499-508. <https://www.jstor.org/stable/1073181>.

²⁰ 5 USC §551 et seq

²¹ EO 12866, 58 FR 51735.

analyze their impacts on small businesses,²² and measure their costs and benefits.²³ Moreover, in just the past two years, the Trump administration has introduced several new procedures into the regulatory process.²⁴

II. BCA in the Regulatory Process

BCA has been part of the regulatory process in one form or another since the Ford administration as a tool intended to improve the quality and accountability of agency regulatory decisions.²⁵ To derive lessons for BCA from regulatory instruments, we approached the literatures on BCA and regulatory mechanisms using a systematic process. The process, described in detail in Appendix A, involved identifying for each tool the five most highly cited, relevant articles that specifically outlined its characteristics or identified when it could be expected to successfully achieve its objectives. Our goal in following this process was to avoid the possibility that subjective judgments could bias the articles we chose and, as a result, the insights those articles could deliver for the functioning of BCA.

The scholarship studying BCA argues that the instrument can encourage better and more responsive rules through three related means. First, BCA can function as a procedure to decide whether to proceed in promulgating a rule.²⁶ As Pildes and Sunstein suggest, “the emphasis on cost-benefit analysis as the basic foundation of decision” spans presidential administrations, exemplified by the similar focuses of President Reagan’s Executive Order (EO) 12291 and President Clinton’s EO 12866—both of which required agencies to perform economic analysis prior to promulgating significant rules.²⁷ Maintaining flexibility in how BCA is applied is important, as these executive orders, as well as those enacted in subsequent administrations, suggest regulators should factor in “qualitative considerations” and “distributive impacts” when appropriate.²⁸ Still, the value of the framework partly stems from its ability to offer a consistent way to assimilate dissimilar data in deciding whether to proceed with a proposed policy.²⁹ As a result, regulatory decisions can be based, at least in part, on an assessment of whether the benefits exceed the costs, which is equivalent to asking whether the rule will increase social welfare.

²² Pub. L. 96-354 94 Stat 1164 (1981).

²³ EO 12866.

²⁴ EO 13771, 82 FR 9339.

²⁵ Tozzi, Jim. “OIRA’s Formative Years: The Historical Record of Centralized Regulatory Review Preceding OIRA’s Founding.” *Administrative Law Review* (2011): 37-69.

²⁶ Pildes and Sunstein. 1995, pp. 6, 46-7; Adler and Posner. 1999, pp. 245-6; Hahn and Sunstein. 2002, p. 1498; Arrow, Kenneth J., et al. 1996. “Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?” *Science, New Series* 272: no. 5259, p. 221; Pearce, D. 1998. “Cost benefit analysis and environmental policy,” *Oxford Review of Economic Policy* 14, no. 4, p. 84

²⁷ Pildes and Sunstein. 1995, p. 6.

²⁸ Hahn and Sunstein. 2002, pp. 1498-9.

²⁹ Arrow et al. 1996. p. 222.

In addition to operating as a decision rule, regulatory scholars also view BCA as a vehicle to increase transparency and improve monitoring of agency decisions.³⁰ For instance, BCA requires agencies to clearly identify the regulation's effects, thereby providing information about potential outcomes to the affected groups and other concerned parties.³¹ BCA can thus assist other federal actors, including Congress and politically appointed officials, in monitoring agency rulemakings and clarifying their decision-making.³² In this way, it is consistent with the McNollgast view of procedures as mechanisms that political overseers employ to monitor and influence agency actions.³³

Finally, BCA encourages regulators to evaluate regulatory approaches in a systematic way. Thus, it can be an important aid to regulatory planning. Because the tool offers relevant information when choosing among different options or levels of stringency by revealing the predicted effects of alternative approaches, BCA allows agencies to assess tradeoffs within and among alternatives.³⁴ What an analysis includes can differ by rule, agency, or even administration, but BCA provides a framework with a common metric to help compare the end states produced by varied regulatory approaches.³⁵ Similarly, BCA can be useful in setting regulatory priorities.³⁶ Since it is a framework that can be employed to assess an action's positive and negative effects as well as evaluate alternative approaches on those same dimensions, naturally, it can help agencies to determine which regulatory actions might maximize scarce agency time and resources. Thus, along with offering insight on whether promulgating a rule is advisable at all, BCA provides information that can be used to rank potential actions in an orderly way³⁷ and mitigate cognitive limitations that can impede that process.³⁸

III. Connecting Regulatory Mechanisms to BCA

As described, the political science literature treats procedural controls as potential solutions to a principal-agent problem associated with political overseers' attempts to influence bureaucratic agents. But, bureaucratic regulators also have to solve a similar principal-agent problem to ensure that the regulated community cleans up the air, makes safe prescription drugs, does not take undue financial risks, and any of the other myriad goals of regulatory policy. To meet these goals,

³⁰ Adler and Posner. 1999. pp. 175, 246; Hahn and Sunstein. 2002. p. 1503.

³¹ Adler and Posner. 1999. p. 175.

³² Adler and Posner. 1999. p. 246.

³³ McNollgast.

³⁴ Pildes and Sunstein, pp. 43-4; Adler and Posner, pp. 198; Hahn and Sunstein, p. 1494.

³⁵ Pildes and Sunstein. 1995, pp. 52-3.

³⁶ Arrow et al. 1996. p. 221; Adler and Posner. 1999. p. 175; Hahn and Sunstein. 2002. p. 1502.

³⁷ Adler and Posner. 1999. p. 175.

³⁸ Hahn and Sunstein. 2002. p. 1502.

regulators have experimented with a wide variety of regulatory tools—each of which is designed to influence the behavior of firms.³⁹

When a regulatory agency faces the question of how to compel behavior from regulated parties, that regulator, depending on the statutory discretion given to it, has a bevy of options. One is simply to tell the firm what actions to take. These mandates could take the form of required purchases and installation of particular equipment, mandatory disclosures about firm products, or targeted reductions in emissions. Alternatively, agencies could instead tell firms how to structure their organization in order to minimize the likelihood of undesirable outcomes such as contaminated food. Agencies could also set up incentives for firms to behave in particular ways or encourage them to voluntarily adopt tasks that help solve policy problems.

Our analysis focuses on three specific regulatory approaches—performance standards, information disclosure requirements, and management-based regulation. In addition to being widely adopted by regulators, these three instruments most closely parallel the pathways by which BCA can improve regulatory decision-making and accountability. Specifically, these three regulatory instruments mirror the three aforementioned means that scholars have argued position BCA to be a procedural solution to the politician-agency principal-agent problem. Although other approaches to regulate may also hold lessons for BCA, the parallels between performance standards, information disclosure, and management-based regulation and the mechanisms by which BCA can influence regulatory decisions are direct and, as we describe, justified through scholarly examinations of their operation.

a. Benefit-Cost Analysis as a Performance Standard

Performance standards are regulatory instruments that require regulated entities to meet a goal or target to achieve compliance.⁴⁰ So, a firm might be required to limit emissions to some stated level or a school might need to demonstrate that students on average achieve certain test scores. Performance-based regulation is often employed as an alternative to design standards, which prescribe the specific actions that firms must take or specific technologies firms must use to comply. Relative to design standards, performance-based regulation offers firms flexibility and

³⁹ As is typically the case, we assume the regulated parties are firms in much of the discussion that follows although they could include schools, other governmental entities, or even individuals.

⁴⁰ See, Coglianese, Cary, Jennifer Nash, and Todd Olmstead. 2003. “Performance-Based Regulation: Prospects and Limitations in Health, Safety, and Environmental Protection,” *Administrative Law Review* 55, no. 4, p. 706; Meacham, Brian, Robert Bowen, Jon Traw, and Amanda Moore. 2005. “Performance-based building regulation: current situation and future needs,” *Building Research & Information* 33, no. 2, pp. 92, 101; May, Peter J. 2003. “Performance-Based Regulation and Regulatory Regimes: The Saga of Leaky Buildings,” *Law & Policy* 25, no. 4, pp. 381, 384; Vogelsang, Ingo. 2006. “Electricity Transmission Pricing and Performance-based Regulation,” *The Energy Journal* 27, no. 4, p. 98; Sappington, David E.M., Johannes P. Pfeifenberger, Philip Hanser, and Gregory N. Basheda. 2001. “The State of Performance-Based Regulation in the U.S. Electric Utility Industry,” *The Electricity Journal* 14, no. 8, p. 72.

encourages innovation by allowing regulated entities to choose their means of complying. The U.S. Corporate Average Fuel Economy (CAFE) standards, which only require that automakers ensure their vehicle fleets collectively meet a certain level of fuel efficiency, are one prominent example of a performance standard in practice because manufacturers are permitted to meet the regulatory benchmark how they see fit.⁴¹

Performance standards exhibit significant heterogeneity, varying by their precision, the threshold employed, and their comprehensiveness. They may be loosely or tightly specified, which influences the amount of discretion, flexibility, and guidance given to regulated entities.⁴² Further, the thresholds or criteria used for evaluating levels of performance may differ and may be based on either measurements or predictions.⁴³ Predictions made through models, simulations, or tools (e.g., probabilistic risk assessment) might be necessary for complex systems and extremely rare, high magnitude, or uncertain events.⁴⁴ Finally, the breadth or comprehensiveness of performance standards depends on whether they are focused on an end goal or a subsidiary goal. For instance, two variations of “building regulation goals” could be: (1) a high level goal focused on protecting the entire structure, or (2) a set of lower level goals that regulate individual aspects of the building, including walls, stairwells, and construction materials.⁴⁵

Like performance standards do in enabling the regulator to evaluate whether a firm has achieved a social goal, BCA provides a criterion to evaluate the outcomes of regulatory actions and to decide among alternatives. When used as a decision-making procedure to evaluate the effects of a regulation, BCA attempts to mirror the manner in which performance standards set goals related to a regulation’s outcomes or results. In fact, if BCA is used as the foundation for the regulatory decision,⁴⁶ it offers a benchmark for choosing whether to move forward based on a comparison of benefits and costs. As it is currently implemented through EO 12866, BCA requires the agency to meet a specific hurdle before promulgating a rule, namely that the regulation’s benefits justify its costs. While an earlier version of the requirement, under EO 12991, perhaps more clearly mirrored a performance standard by requiring a regulation’s benefits to exceed its costs,⁴⁷ the current focus on mandating that benefits justify costs nevertheless parallels performance-based regulation.

Further, when used as a decision-making procedure to assess and compare alternative courses of action, BCA mirrors performance standards’ avoidance of prescribing specific actions for compliance. While different methods of compliance may be relatively better than others, firms

⁴¹ National Highway Traffic Safety Administration, Corporate Average Fuel Economy, accessed July 22, 2019, <https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy>.

⁴² Coglianese, Nash, and Olmstead 2003, pp. 709-10.

⁴³ Coglianese, Nash, and Olmstead 2003, p. 710.

⁴⁴ See, Coglianese, Nash, and Olmstead 2003, pp. 710, 716; May 2003, p. 386.

⁴⁵ May 2003, p. 385.

⁴⁶ Pildes and Sunstein 1995, p. 6.

⁴⁷ Graham, John D. “Saving lives through administrative law and economics.” *U. Pa. L. Rev.* 157 (2008): 395.

have flexibility in how to achieve the standards, much like agencies do, as BCA can accommodate a diversity of approaches that potentially achieve the regulatory goal.⁴⁸ As a result, similar to performance standards' focus on outcomes in evaluating firm compliance, BCA points to results—whether observed or predicted—as the key consideration in deciding whether to pursue a regulatory approach. Thus, while the process is important in both cases, the evaluation of whether the firm complied or whether the agency should pursue a regulatory approach is fundamentally based on whether that mode of action achieved the standard.

b. Benefit-Cost Analysis as an Information Disclosure Requirement

Another approach agencies can use to achieve social goals is to mandate that regulated parties disclose or make public information about their products. Information disclosure requirements are used in a variety of policy areas and can include mandating that regulated entities label food products with information about ingredients or health information, provide terms of contract on legal documents, include warnings or safety classifications with consumer products, and disclose information on payment obligations for loans.⁴⁹ EPA's Toxic Release Inventory, which requires firms above a certain size to make public all environmental discharges, represents another widely studied example of an information disclosure requirement.⁵⁰

Information disclosure mandates are typically implemented based on some combination of four possible rationales: (1) solving information asymmetries in the marketplace; (2) facilitating government monitoring; (3) incentivizing product improvement; or (4) encouraging more thoughtful deliberation.⁵¹ Yet, regardless of the rationale for its implementation, information disclosure is an attractive regulatory approach because it costs the regulator little. By encouraging third party intermediaries to monitor the behavior of regulated parties, thereby assuming a portion of the agency's responsibilities, as well as at least partially shifting the burden of collecting information to the regulated parties, information disclosure significantly reduces information collection and monitoring costs for the regulator.⁵²

Information disclosure bears a close resemblance to BCA's pathway to improve regulations through transparency by requiring information be provided by one party to another in a transaction. Much like information disclosed to customers of a product, BCA provides information about the

⁴⁸ Specifically, the directive “to choose from among alternative regulatory approaches those that ‘maximize net benefits’” offers this flexibility toward diverse approaches. *See*, Pildes and Sunstein 1995, pp. 43-4.

⁴⁹ Day, George S. 1976. “Assessing the Effects of Information Disclosure Requirements: Experience with Past Information Disclosures is a Useful Guide for Those Trying to Understand and Respond to New Requirements.” *Journal of Marketing* 40, no. 2: 42-52.

⁵⁰ Karkkainen, Bradley C. 2001. “Information as environmental regulation: TRI and performance benchmarking, precursor to a new paradigm.” *Geo. LJ* 89: 257.

⁵¹ Sage, William M. 1999. “Regulating through information: disclosure laws and American health care.” *Colum. L. Rev.* 99: 1701.

⁵² Karkkainen 2001.

likely effects of a rule, thereby ensuring that those impacted (and their elected representatives) understand the potential implications of the requirement prior to its enactment.⁵³

Members of the public who become more informed about the actual implications of an agency's actions may be better positioned to pressure an agency to alter its approach. Thus, BCA can enable interested parties to monitor and evaluate agencies' proposals, much like information disclosure positions interested parties to monitor and evaluate regulated entities' actions. Further, both information disclosure and BCA shift the burden of collecting information to the agent. The result is that, in addition to making it easier for those affected by a rule to understand its implications, BCA can improve the oversight capabilities of other government actors because the "political branches can monitor agencies more easily when the agencies monetize the advantages and disadvantages of projects than when agencies use qualitative decision procedures."⁵⁴

c. Benefit-Cost Analysis as Management-Based Regulation

Unlike most other regulatory tools, management-based regulation focuses on the decisions regulated firms make well before the issue the regulator is attempting to control manifests itself.⁵⁵ Otherwise known as "mandated self-regulation" or "enforced self-regulation," this approach forces firms to plan and develop internal rules in an attempt to achieve the program's goals.⁵⁶ In so doing, management-based regulation neither specifies the technology required for compliance nor does it compel firms to achieve specific outputs or outcomes, in contrast to more traditional approaches.⁵⁷ Rather, firms are simply required to plan for risks in their operations, an approach which allows them flexibility to tailor their planning to their specific circumstances.⁵⁸ And, while the plans are mandated and may be subject to approval by the regulator or a third party, management-based regulation need not even require firms to implement them once they are developed.⁵⁹

Through the planning requirement, management-based regulation seeks to focus managers to consider more critically how their operations accord with social goals as well as to encourage greater information exchange between the regulator and its regulated firms. By forcing firms to

⁵³ Hahn and Sunstein 2002, p. 1503; Adler & Posner 1999, p. 175.

⁵⁴ Adler and Posner 1999, p. 246.

⁵⁵ Coglianese, Cary, and David Lazer. 2003. "Management-Based Regulation: Prescribing Private Management to Achieve Public Goals," *Law & Society Review* 37, no. 4: 691-730.

⁵⁶ Braithwaite, John. 1982. "Enforced Self-Regulation: A New Strategy for Corporate Crime Control," *Michigan Law Review* 80, no. 7 (June): 1466-1507.

⁵⁷ Bennear, Lori Snyder. 2007. "Are management-based regulations effective? Evidence from state pollution prevention programs," *Journal of Policy Analysis and Management* 26, no. 2 (Spring): 327-348.

⁵⁸ Gunningham, Neil, and Darren Sinclair. 2009. "Organizational Trust and the Limits of Management-Based Regulation," *Law & Society Review* 43, no. 4: 865-900; and May, Peter J. 2007. "Regulatory regimes and accountability," *Regulation & Governance* 1, no. 1 (March): 8-26.

⁵⁹ Coglianese and Lazer 2003.

engage in planning, the promise of this approach is that these same organizations might leverage their investments to identify and implement changes that simultaneously benefit them as well as society.⁶⁰ Further, by outsourcing planning to firms, management-based regulation offers the advantage of assigning responsibility with the parties that have the most complete information about firm operations, namely the organizations themselves.⁶¹ It can also mitigate firm resistance to the regulatory requirements, as plans are ultimately designed by each organization's employees rather than its regulatory overseers.⁶²

Through its emphasis on planning, the third pathway by which BCA can encourage better rules parallels management-based regulation. By providing an approach that allows comparison across regulatory alternatives, BCA encourages systematic planning both with respect to considering various approaches and prioritizing regulatory needs. Stated differently, when used as a procedure for evaluating the projected impacts of regulations, BCA echoes the manner in which management-based regulation directs firms to engage in regimented planning and internal rulemaking without specifying the particular actions required for compliance. Like management-based regulation, BCA is not necessarily a clean substitute for controlling decision-making because a specific output is not necessarily demanded.⁶³ The scholarship on BCA emphasizes its implications for agency planning and internal processes, not simply its analytical outcomes.⁶⁴ For example, Hahn and Sunstein recommend “seeing cost-benefit analysis as a tool and a procedure, rather than as a rigid formula to govern outcomes.”⁶⁵

BCA further functions like management-based regulation in the sense that planning responsibility is shifted from the principal to the agent, which is the party with the most relevant information. Relatedly, BCA does not specify exactly how an agency should comply with an administration's agenda while still ensuring consideration of costs and benefits in regulatory analysis. Adler and Posner explain how BCA assists agencies like the Environmental Protection Agency in ranking the seriousness or consequences of regulatory options, especially when “more

⁶⁰ Coglianesse and Lazer 2003.

⁶¹ Braithwaite 1982.

⁶² Coglianesse and Lazer 2003.

⁶³ Pearce 1998, p. 97.

⁶⁴ In this manner, BCA resembles the requirement that agencies conduct environmental impact analysis under the National Environmental Protection Act (NEPA). While environmental impact analysis could also be seen as an information disclosure requirement and has had successes in this regard, its greatest successes according to some scholars have been in forcing agencies to reorganize their decision-making process to incorporate environmental concerns. *See*, Shapiro, Stuart. 2016. *Analysis and public policy: successes, failures and directions for reform*. Edward Elgar Publishing; and Taylor, Serge. 1984. *Making bureaucracies think: the environmental impact statement strategy of administrative reform*. Stanford, CA: Stanford University Press. BCA can perform a similar function by forcing agencies to weigh economic considerations when making regulatory decisions. Moreover, management-based regulation can also perform this function by elevating the role of regulatory compliance officers within regulated entities. *See*, Parrillo, Nicholas R. “Federal Agency Guidance and the Power to Bind: An Empirical Study of Agencies and Industries.” *Yale J. on Reg.* 36 (2019): 165.

⁶⁵ Hahn and Sunstein 2002, p. 1498.

politically salient environmental concerns” are matched against less notable but higher impact issues.⁶⁶ By placing risks and consequences in perspective, as well as helping to neutralize individual cognitive biases, BCA can lead to better priority-setting in rulemaking.⁶⁷

IV. Deriving Lessons for BCA from Regulatory Instruments

In the same way that the pathways by which BCA operates mirror elements of performance standards, information disclosure, and management-based regulation, so too can the insights from the scholarship studying these regulatory approaches offer ideas on when BCA may achieve its purpose to improve rulemaking and encourage accountability. This section explores these relationships, considering the conditions under which performance standards, information disclosure requirements, and management-based regulation might be expected to achieve their goals with an eye toward applying these insights to BCA.

a. Matching Instruments to Regulatory Contexts

The ability of performance standards to achieve regulatory goals is largely determined by the precision of the standard itself, the capability of the regulator to monitor whether regulated entities achieve that benchmark, and the extent to which the set of regulated entities can be realistically governed by a specific criteria. Effective performance-based regulation is characterized not only by transparent and clear objectives that reduce uncertainty and ambiguity,⁶⁸ but also by outcomes that can be directly measured or reliably assessed through suitable indicators.⁶⁹ This becomes more difficult in environments where the regulated processes are heterogeneous and the population of regulatory targets is diverse.

Similarly, performance standards tend to be more suitable for stable environments less characterized by frequent and sizable shifts in technology or other industry conditions. Thus, particularly in dynamic environments, standards need to be crafted to accommodate emerging technologies and innovation as well as adapt to potential hazards and changing expectations.⁷⁰ Further, the flexibility and discretion offered by the standards must be accompanied by sufficient accountability, monitoring, and oversight,⁷¹ which includes appropriate levels of education and training for those who assess compliance activities and conduct verification.⁷²

⁶⁶ Adler and Posner 1999, p. 175.

⁶⁷ Hahn and Sunstein 2002, p. 1502.

⁶⁸ Coglianese, Nash, and Olmstead 2003, p. 717; Meacham et al. 2005, p. 102; May 2003, pp. 387-8; Sappington et al. 2001, p. 77.

⁶⁹ Coglianese, Nash, and Olmstead 2003, p. 712; Meacham et al. 2005, pp. 94, 101; May 2003, p. 386.

⁷⁰ Coglianese, Nash, and Olmstead 2003, p. 711; Meacham et al. 2005, p. 99; May 2003, p. 389.

⁷¹ Meacham et al. 2005, pp. 101-2; May 2003, p. 398; Sappington et al. 2001, p. 79 in footnote 1.

⁷² Coglianese, Nash, and Olmstead 2003, pp. 714, 720; Meacham et al. 2005, p. 93; May 2003, p. 398.

Like performance standards, an effective information disclosure requirement establishes an objective, quantifiable, standardized, and broadly accessible metric.⁷³ However, because it relies on third parties, including interest groups and the general public, to achieve regulatory goals, the design of a disclosure mandate must consider more than just the regulated entities and the inspection personnel. Not only must third parties care enough about the information being released to respond to it,⁷⁴ but the requirement must also encourage regulated entities to provide the data in a way that can be comprehended and acted upon by those users.⁷⁵ Thus, it needs to be complete and reliable, without being overly narrow,⁷⁶ and allow comparisons between relevant options.⁷⁷ Finally, the information should be easily accessible and provided timely to consumers at no direct cost.⁷⁸

Few contexts likely meet the large number of preconditions needed for effective information disclosure. Moreover, the power of information disclosure to encourage firms to consider social goals appears to wane over time.⁷⁹ Thus, while information disclosure might seem like a simple and inexpensive approach to regulating, the list of factors that determine its effectiveness demonstrates that it must be crafted with care.

Relative to performance standards and information disclosure requirements, management-based regulation's value as a regulatory approach is greater when an industry is characterized by organizations whose operations are heterogeneous and when the technology employed by them is changing quickly.⁸⁰ In part, this is because more conventional approaches are less feasible in these circumstances. Further, management-based regulation can be especially useful when industry outputs are difficult to monitor and measure and the nature of the risk that requires regulation is not well understood.⁸¹

Still, the very conditions that make management-based regulation an attractive option also can make enforcement challenging. For example, trying to ascertain what constitutes a "good faith" plan can be difficult when the firms whose plans the regulator is evaluating are dissimilar.⁸² Moreover, by assigning control to the regulated entities, the agency reduces the amount of information it acquires. However, this information imbalance can be exploited by firms that treat

⁷³ Karkkainen 2001, p. 295.

⁷⁴ Konar, Shameek, and Mark A. Cohen. "Information as regulation: The effect of community right to know laws on toxic emissions." *Journal of environmental Economics and Management* 32, no. 1 (1997): 109-124.

⁷⁵ Day 1976.

⁷⁶ Karkkainen 2001.

⁷⁷ Day 1976.

⁷⁸ Karkkainen 2001.

⁷⁹ Fung, Archon, Mary Graham, and David Weil. 2007. *Full disclosure: The perils and promise of transparency*. Cambridge University Press.

⁸⁰ Bennear 2007.

⁸¹ Gunningham and Sinclair 2009.

⁸² May 2007.

planning as just another step in their process rather than engaging with it responsibly.⁸³ As a result, a successful management-based regulatory program requires firms to commit to planning and may necessitate that the regulator perform inspections to ensure that the plans are compliant and being utilized if, in fact, implementation is required.⁸⁴

b. Specific Instrument Lessons for Benefit-Cost Pathways

Like performance standards, BCA can encourage better regulations by applying a clear criterion to decide among approaches only when the principals are engaged and can measure whether the chosen approach has met the criterion. Yet Congress is almost never involved at this level, and the courts are erratic in their consideration of the accompanying BCA in evaluating whether the agency acted in an “arbitrary and capricious” manner in promulgating the rule.⁸⁵ In contrast, OIRA, in the executive branch, does carefully consider the evidence supporting rules, including the accompanying BCA. However, it does so in select cases, given its limited resources and the intensive nature of such reviews. Thus, while OIRA does have the capability to evaluate whether a BCA and the associated rule meet a specific benchmark, its ability to do so in practice is at best imperfect, as the demands it faces far outstrip the agency’s bandwidth to provide such oversight broadly.⁸⁶

Moreover, in the way BCA is currently applied in the regulatory process, the benchmark by which a principal might decide whether the rule achieves the standard is not clearly stated, as EO 12866 only requires the benefits to “justify” the costs. Even when the standard is more prescriptive (such as maximizing net benefits or ensuring that benefits exceed costs), because there is tremendous amount of uncertainty in economic analysis, what appear to be clear objectives are often ambiguous, which also compromises BCA’s effectiveness as a performance standard.

Finally, in some cases, agencies may be precluded by statute from considering costs at all in promulgating rules. Thus, we might expect the performance standard aspect of BCA to be effective in encouraging better rules in relatively rare cases. BCA is most likely to be successful as a performance standard when there is a clear criterion for its application, and the rule itself is salient enough to convince political principals to devote limited resources to evaluating the analysis. These are not conditions frequently met in the regulatory process.

BCA’s ability to encourage regulatory accountability through transparency is likely limited as well. Similar to information disclosure requirements, BCA can in theory lead to better rules by providing third parties with the information needed to monitor agencies’ regulatory actions. However, the quality of the disclosure depends on how broadly it is disseminated, its accessibility,

⁸³ Coglianese and Lazer 2003.

⁸⁴ Braithwaite 1982; May 2007.

⁸⁵ Bull, Reeve, and Jerry Ellig. 2017. “Judicial Review of Regulatory Impact Analysis: Why Not the Best?” *Administrative Law Review* 69, no. 4.

⁸⁶ Carrigan and Shapiro 2017.

and its clarity. To provide meaningful information to third parties, BCA must be accessible not only to officials within the agency and oversight bodies such as OIRA, but also to external organizations, their representatives, and researchers. In other words, the information must actually reach the audience that is capable of using it.

Furthermore, third parties must be able to understand the information disclosed. BCAs vary in quality, standardization, and complexity, making their comprehensibility a real barrier.⁸⁷ To be effective, information disclosure should provide complete, reliable, and sufficiently broad data. To fulfill the objective of an information disclosure requirement, BCAs should be comprehensive and understandable with respect to their main components, including identifying the problem to be solved, assessing alternatives, estimating benefits and costs, and providing a reasoned basis for the selected alternative. In addition, the estimates of costs and benefits should be reliable and accurate, the alternatives considered should reflect a wide range of reasonable approaches, and unintended consequences should be taken into account (e.g., countervailing risks and ancillary benefits).⁸⁸

In fact, BCAs, like economic analyses more generally, are not easy for even sophisticated users to comprehend.⁸⁹ Moreover, an agency's incentives in preparing its BCA do not often lend themselves to producing an analysis that is comprehensible to most observers. Oftentimes, a BCA is only available to third parties after a rule has already gone through extensive planning—typically during the proposed rule stage at the earliest. As a result, the agency will likely have decided on its preferred approach before the BCA is provided to the public. Further, because it needs to prepare itself for the potential that the rule may be later challenged in court, an agency does not benefit by considering reasonable regulatory alternatives or inviting scrutiny of the BCA through transparency.⁹⁰ In addition, changes between a proposed and final rule are not generally substantial, so it might be too late in many cases to significantly influence regulations in a positive way.⁹¹ Thus, we might expect the information disclosure elements of BCA to be effective in encouraging better rules and more careful oversight by political principals on a limited basis. BCA could be expected to improve rules when the analysis achieves the goals of being both clear and thorough. Meeting both of these criteria is a challenge, meaning that BCA is less likely to be effective at dramatically increasing the quality of rules through the information disclosure pathway.

⁸⁷ Carrigan and Shapiro 2017.

⁸⁸ Dudley, Susan, et al. 2017. "Consumer's Guide to Regulatory Impact Analysis: Ten Tips for Being an Informed Policymaker." *Journal of Benefit-Cost Analysis* 8, no. 2 (Summer): 187-204.

⁸⁹ Carrigan and Shapiro 2017.

⁹⁰ Wagner, Wendy E. "The CAIR RIA: Advocacy Dressed Up as Policy Analysis." In: Harrington W, Heinzerling L, Morgenstern R (eds) *Reforming Regulatory Impact Analysis* (2009), pp. 56–81. Resources for the Future Press, Washington, DC; Sinden, Amy. "The Economics of Endangered Species: Why Less Is More in the Economic Analysis of Critical Habitat Designations." *Harvard Environmental Law Review* 28, no. 1: 129-214; and Day 1976.

⁹¹ Balla, Steven J., and William T. Gormley, Jr. 2018. *Bureaucracy and democracy: Accountability and performance*. 4th ed. Thousand Oaks, CA: CQ Press.

As a vehicle for planning like management-based regulation, BCA can spur improved regulations by engendering the systematic development of rules when agencies are committed to following an ordered process and their political overseers can evaluate plans. Management-based regulation is effective when regulated firms are heterogeneous in operations.⁹² The entities that BCA “regulates” can be dissimilar as well. Notably, regulatory agencies exhibit variation along several dimensions, such as appointment of key leadership and decision-makers,⁹³ sub-agencies and offices, and their delegated authorities or issue areas.

While regulators use management-based regulation to address uncertain risks, an administration may face uncertainty in translating its objectives into better regulatory decisions as well. The president or other political overseers might have broad goals that they do not know how to accomplish, but experts within regulatory agencies are often well equipped to translate those broad goals into actionable rules. Just as management-based regulation requires regulated entities to develop goals and procedures intended to mitigate risks, thereby assigning the task to those with the most expertise to achieve it, BCA can be oriented to require agencies to adjust their processes to meet analytical goals (e.g., higher-quality analysis) that increase the probability of promulgating beneficial rules.

Political principals have difficulty monitoring the regulatory outputs of agencies.⁹⁴ The limited success and implementation of retrospective review requirements,⁹⁵ many of which stem from presidential directives, supports this claim. The planning component of BCA mitigates this problem. Relative to evaluating the specific calculations that inform a BCA, these same principals, oftentimes through an oversight agency like OIRA, are likely to be better equipped to evaluate agency planning. For example, although it takes significant capability to scrutinize a particular model to estimate benefits, it requires much less expertise to check analytical outputs for certain features, including whether the agency attempted to quantify benefits and costs or adhered to a certain process such as considering a minimum number of regulatory alternatives.⁹⁶

⁹² Coglianese and Lazer 2003, 691.

⁹³ Selin, Jennifer L. 2015. “What Makes an Agency Independent?” *American Journal of Political Science* 59, no. 4 (October): 971-987.

⁹⁴ This mirrors management-based regulation. *See*, Coglianese and Lazer (2003), p. 711: “Government needs to possess the capacity to monitor planning or implementation, or both, in order for management-based regulation to be effective.”

⁹⁵ Marcus Peacock, Sofie E. Miller, and Daniel R. Pérez, “A Proposed Framework for Evidence-Based Regulation,” February 22, 2018, <https://regulatorystudies.columbian.gwu.edu/proposed-framework-evidence-based-regulation>.

⁹⁶ Management-based regulation relies upon a commitment to planning by firms and regulators. While the emphasis on conducting rigorous regulatory analyses might depend on each presidential administration’s focus, BCA requirements may also help by leading agencies to give economists and others who value systematic analysis more prominent places in the regulatory decision-making process. Nevertheless, if the “cultural commitment ... of those who are expected to implement the system” is lacking in regulatory agencies and political principals, the effectiveness of emphasizing the planning components of BCA could be limited. *See*, Gunningham and Sinclair 2009, p. 870.

c. Broader Implications for Employing Benefit-Cost Analysis

Considering BCA in terms of its parallels to different regulatory instruments has broader ramifications that reach beyond simply suggesting opportunities for marginal improvements in function. Our research illustrates that emulating management-based regulation is the most likely pathway for BCA's success as a tool to improve regulation. The literature on information disclosure requirements reveals that BCA, in most contexts, will have difficulty meeting the conditions for such requirements to be effective. Additionally, while management-based regulation and performance standards are both intended to provide some degree of flexibility to regulated entities, overall, BCA seems better able to function as a process-based decision aid than a clear standard or criteria.

Not only is an emphasis on forced planning most appropriate in rapidly changing contexts where the targets for planning exhibit substantial heterogeneity—which is certainly true among regulatory agencies—but also the limited capability of principals to adequately evaluate regulatory analyses means focusing more on the process will likely yield greater benefits. Just as management-based regulation does with regulated entities, the planning function of BCA centers the work with the party most capable of performing that work, in this case the agency itself.

In addition to illustrating the potential fruitfulness of focusing more attention on BCA as a planning vehicle relative to a decision tool or a mode to foster transparency, the analysis further suggests that the contexts in which BCA works better as a performance standard are likely to be different from the situations when it would function well as an information disclosure requirement or as a management-based tool. For example, to operate as a performance standard, BCA must accurately account for benefits and costs, but to work as an information disclosure requirement, it must be understandable to third parties. A tradeoff between accuracy and simplicity likely exists in many situations. Similarly, performance standards work best in homogeneous environments while management-based regulations work best in heterogeneous ones.⁹⁷

In other words, the purposes of BCA may be mutually exclusive depending on the context in which it is used. BCA cannot be all things in all situations. Recognizing the possibility of exclusivity may aid reformers in reaching more careful judgments about whether BCA is succeeding and recognizing the need to apply different measures of success in different circumstances. Just as regulations are tailored to the specific circumstances in which they are applied, BCA can be implemented differently depending on the nature of the rule being analyzed, the goals of the administration, and the capabilities of the regulating agency. In sum, recognizing that the conditions in which one pathway through which BCA can encourage greater accountability and better regulations can directly oppose the conditions by which another pathway can operate, a reasonable evaluation of BCA's success in fostering rules that achieve social goals demands the clear recognition that the circumstances do actually matter.

⁹⁷ See, Coglianese, Nash, and Olmstead 2003; and Coglianese and Lazer 2003.

CONCLUSION

Criticisms of the use BCA in the regulatory process often focus on the extent to which its application allows it to operate as a performance standard, illustrating which alternative maximizes net benefits or achieves benefits that justify the costs. Our analysis suggests this emphasis may be misguided.

By examining the parallels between BCA and various regulatory instruments, including performance standards, information disclosure requirements, and management-based regulation, we demonstrate that the pathway where BCA is most likely to encourage agencies to form better and more responsive rules is through its ability to encourage systematic planning. Because regulators perform BCAs to govern vastly different policy environments, and political overseers are often limited in their capacity to effectively evaluate economic analyses, focusing on how BCA can be used to incentivize agencies to form regulations in systematic ways is likely to bear the most fruit in improving the regulatory process.

More broadly, illustrating the connections between BCA and its counterparts used by regulators to achieve social goals demonstrates the incompatibility, in many cases, of the various mechanisms by which BCA supposedly operates to improve agency rules. Much like regulators pick alternative approaches based on which is best for the circumstances in which they operate, the instances in which BCA can simultaneously function as a decision-making criteria, a vehicle for encouraging greater transparency, and a planning tool are likely limited. Such a realization should encourage reformers not only to consider the specific context in evaluating whether BCA has aided regulatory performance, but also to realize that BCA cannot sensibly be expected to achieve all or even most of its objectives at once.

Appendix A: Literature Search Process

We used a systematic process to search the literature for lessons on the identifying characteristics of each regulatory instrument and when it was successful. Moreover, the same process was applied to study BCA. When conducting a literature review, subjective decisions may influence which articles are included in the discussion. Thus, objections relating to excluded articles and selective citation practices are valid concerns. Our process was devised to minimize those concerns. For each procedural control and regulatory instrument, the basic process consisted of the following elements: (1) defining search terms; (2) searching Google Scholar for articles; (3) sorting and filtering the collected articles by citations and relevance; and (4) reviewing the contents of the articles.

First, we defined search terms for each instrument and procedure. The goal was to retrieve search results that were sufficiently broad to avoid under-inclusivity but narrow enough to exclude most articles that fall outside of the scope of the topic area. Since a tradeoff exists between over- and under-inclusive searches, we composed and selected search terms to return balanced results. The specific search terms we used for each regulatory tool are as follows:

1. BCA – (regulation OR regulatory OR policy) (“benefit-cost analysis” OR “cost-benefit analysis” OR “regulatory impact analysis”)
2. Performance standards – regulation (“performance standards” OR “performance-based regulation” OR “outcome-based regulation” OR “performance-based standards”)
3. Information disclosure – regulation (“information disclosure” OR “disclosure requirements” OR “regulatory disclosure” OR “mandatory disclosure” OR “disclosure regulations”)
4. Management-based regulation – regulation (“management-based regulation” OR “management based regulation” OR “enforced self-regulation” OR “enforced self regulation” OR “mandated self-regulation” OR “mandated self regulation”)

Second, we conducted a systematic search for each instrument and procedure. Using private browsing mode to limit the impact of past search history on results, we conducted a Google Scholar search. The search was sorted by relevance, with the boxes “include citations” and “include patents” both unchecked. We recorded the top 150 results in a spreadsheet, limiting the results to peer-reviewed journals and law reviews.⁹⁸ Each spreadsheet entry included information on the author or authors, title, year, journal, citations, and hyperlink.

⁹⁸ The search excluded books, book chapters, working papers, think tank publications, government publications, publications from NGOs and intergovernmental organizations (e.g., the OECD), and duplicate entries.

Third, before reviewing the content of the literature searches, we sorted and filtered the collected entries for each procedure and instrument. After compiling the 150 entries in a spreadsheet, they were sorted in multiple levels—first by number of citations and then by original order collected. Each co-author then independently worked through the 150 selections, highlighting those articles that appeared to be relevant based on the title and other collected metadata. We combined the highlighted results, and sorted the resulting list by total highlights (highest to lowest; range: 0–3) and citations (highest to lowest; range: nonnegative integers).

Fourth, we reviewed the substantive content of the articles. Beginning at the top of the list, we worked through at least five articles for each regulatory procedure and instrument to answer two guiding questions. Because the search goal was somewhat different for BCA relative to the instruments, the first question for BCA was formulated to identify its purposes relative to its characteristics. The specific questions which guided the article reviews are as follows:

1. For BCA, what are the purposes of the procedure? For the instruments, what are the characteristics of the instrument (e.g., what makes a regulation a management-based regulation)?
2. When is the procedure or the instrument likely to be effective (or ineffective if positioned that way)?

Further, we attempted, where possible, to use similar terms in describing the instrument characteristics and when that instrument is likely to be effective. Thus, we documented our results with similar terms when recording common ideas, even if the exact same terminology was not used.

The end goal was to review no less than five relevant articles, each of which answers at least one of the questions. If we started reviewing an article that was not relevant, we moved on to the next one on the list. Additionally, each reviewer had the discretion to move on to more than five articles if neither of the two questions were sufficiently answered after five articles. At the end of the process, we produced a synthesized literature review for BCA and each instrument, which detailed its purposes or characteristics and documented the conditions and contexts when it was effective or ineffective. Below is the final list of articles that we used to form our comparisons between BCA and the regulatory instruments.

a. Benefit-Cost Analysis

Adler, Matthew D., and Eric A. Posner. 1999. “Rethinking Cost-Benefit Analysis,” *Yale Law Journal* 109, no. 2: 165-248. <https://heinonline.org/HOL/P?h=hein.journals/ylr109&i=203>.

Arrow, Kenneth J., Maureen L. Cropper, George C. Eads, Robert W. Hahn, Lester B. Lave, Roger G. Noll, Paul R. Portney, Milton Russell, Richard Schmalensee, V. Kerry Smith, and Robert

N. Stavins. 1996. "Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?" *Science, New Series* 272: no. 5259 (April): 221-222. <https://www.jstor.org/stable/2889625>.

Hahn, Robert W., and Cass R. Sunstein. 2002. "A New Executive Order for Improving Federal Regulation? Deeper and Wider Cost-Benefit Analysis," *University of Pennsylvania Law Review* 150, no. 5 (May): 1489-1552. <https://www.jstor.org/stable/3312946>.

Pearce, D. 1998. "Cost benefit analysis and environmental policy," *Oxford Review of Economic Policy* 14, no. 4 (December): 84-100. <https://doi.org/10.1093/oxrep/14.4.84>.

Pildes, Richard H., and Cass R. Sunstein. 1995. "Reinventing the Regulatory State," *University of Chicago Law Review* 62, no. 1 (Winter): 1-129. <https://www.jstor.org/stable/1600132>.

b. Performance Standards

Coglianesi, Cary, Jennifer Nash, and Todd Olmstead. 2003. "Performance-Based Regulation: Prospects and Limitations in Health, Safety, and Environmental Protection," *Administrative Law Review* 55, no. 4 (Fall): 705-730.

May, Peter J. 2003. "Performance-Based Regulation and Regulatory Regimes: The Saga of Leaky Buildings," *Law & Policy* 25, no. 4 (October): 381-401. <https://doi.org/10.1111/j.0265-8240.2003.00155.x>.

Meacham, Brian, Robert Bowen, Jon Traw, and Amanda Moore. 2005. "Performance-based building regulation: current situation and future needs," *Building Research & Information* 33, no. 2: 91-106. <https://doi.org/10.1080/0961321042000322780>.

Sappington, David E.M., Johannes P. Pfeifenberger, Philip Hanser, and Gregory N. Basheda. 2001. "The State of Performance-Based Regulation in the U.S. Electric Utility Industry," *The Electricity Journal* 14, no. 8 (October): 71-79. [https://doi.org/10.1016/S1040-6190\(01\)00240-8](https://doi.org/10.1016/S1040-6190(01)00240-8).

Vogelsang, Ingo. 2006. "Electricity Transmission Pricing and Performance-based Regulation," *The Energy Journal* 27, no. 4: 97-126. <https://www.jstor.org/stable/23297035>.

c. Information Disclosure Requirements

Day, George S. 1976. "Assessing the Effects of Information Disclosure Requirements." *Journal of Marketing* 40, no. 2 (April): 42-52. <https://www.jstor.org/stable/1251005>.

Karkkainen, Bradley C. 2001. "Information as environmental regulation: TRI and performance benchmarking, precursor to a new paradigm." *Georgetown Law Journal* 89, no. 2 (January): 257-370.

Konar, Shameek, and Mark A. Cohen. 1997. "Information as regulation: The effect of community right to know laws on toxic emissions." *Journal of Environmental Economics and Management* 32, no. 1 (January): 109-124. <https://doi.org/10.1006/jeem.1996.0955>.

Sage, William M. 1999. "Regulating through information: disclosure laws and American health care." *Columbia Law Review* 99, no. 7 (November): 1701-1829.

Stephan, Mark. 2002. "Environmental information disclosure programs: They work, but why?" *Social Science Quarterly* 83, no. 1 (March): 190-205. <https://doi.org/10.1111/1540-6237.00078>.

d. Management-Based Regulation

Benear, Lori Snyder. 2007. "Are management-based regulations effective? Evidence from state pollution prevention programs." *Journal of Policy Analysis and Management* 26, no. 2 (Spring): 327-348. <https://doi.org/10.1002/pam.20250>.

Braithwaite, John. 1982. "Enforced Self-Regulation: A New Strategy for Corporate Crime Control," *Michigan Law Review* 80, no. 7 (June): 1466-1507. <https://www.jstor.org/stable/1288556>.

Coglianesse, Cary, and David Lazer. 2003. "Management-Based Regulation: Prescribing Private Management to Achieve Public Goals," *Law & Society Review* 37, no. 4: 691-730. <https://doi.org/10.1046/j.0023-9216.2003.03703001.x>.

Gunningham, Neil, and Darren Sinclair. 2009. "Organizational Trust and the Limits of Management-Based Regulation," *Law & Society Review* 43, no. 4: 865-900. <https://doi.org/10.1111/j.1540-5893.2009.00391.x>.

May, Peter J. 2007. "Regulatory regimes and accountability," *Regulation & Governance* 1, no. 1 (March): 8-26. <https://doi.org/10.1111/j.1748-5991.2007.00002.x>.