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Transparency in Agency Cost-Benefit Analysis

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Cost-benefit analysis ("CBA") is widely used in agency decisionmaking, summarizing the impacts of an agency's chosen policy. As agency rulemakings have increased in quantity and importance, there has been renewed interest in improving transparency in decisionmaking, especially with respect to the models and data that underlie CBA. Recent proposals have been highly controversial. At least some of the controversy can be attributed to limited information about the usefulness of this type of transparency.

This Article contributes to this debate by evaluating the current level of transparency in CBA and proposing improvements that could make regulatory practice more transparent. First, it suggests a new framework for thinking about transparency in CBA that includes two key dimensions: process transparency and policy transparency. A CBA that scores well on these two dimensions would allow interested parties to scrutinize agency action and hold decisionmakers more accountable. Second, it objectively evaluates the process transparency and policy transparency of a comprehensive set of CBAs for significant rules issued between October 2015 and September 2018. It uses a scorecard methodology, which scores whether a particular CBA met a number of different criteria related to transparency.

The Article finds that many agency CBAs lack basic process transparency, meaning disclosure about their creation and their role in the decisionmaking process may not be adequate. In addition, most CBAs continue to lack transparency about policy impacts, often failing to quantify and monetize costs and benefits. Among CBAs that do monetize at least some costs and benefits, most do not make their data, models, and underlying sources

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readily available online. In light of the results, the Article provides low-cost recommendations for improving transparency in CBA that could do more good than harm. In particular, while models used in the CBA and their inputs should be made available, it is premature to require that all underlying data from studies used in the CBA be made available.

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I. INTRODUCTION

In June 2019, the Environmental Protection Agency (EPA) finalized the Affordable Clean Energy (ACE) rule, which regulates greenhouse gas emissions from existing power plants under the Clean Air Act.[1] The ACE rule was the Trump Administration's replacement for the Obama Administration's Clean Power Plan.[2] The new rule, just like the Obama Administration's version, was accompanied by an analysis of its impacts on the economy, sometimes referred to as a cost-benefit analysis (CBA).[3] According to this analysis, in 2030, the ACE rule would reduce carbon dioxide emissions by 11 million tons in addition to reducing emissions of other air pollutants, such as fine particulate matter.[4]

Controversially, EPA calculated the benefits associated with reducing greenhouse gases and particulate matter *differently* than it had when assessing the Clean Power Plan and prior rulemakings.[5] In particular, it valued carbon dioxide emissions at a lower value per ton reduced, using estimates reflecting the domestic benefits instead of the global benefits of these reductions.[6] The agency also presented a supplemental analysis employing a new model and set of assumptions that substantially lowered the value of reducing particulate

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[1] Repeal of the Clean Power Plan, 84 Fed. Reg. 32520 (July 8, 2019) (to be codified at 40 C.F.R. pt. 60) [hereinafter ACE Rule].

[2] *See* Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64661, 64662 (Oct. 23, 2015) (to be codified at 40 C.F.R. pt. 60) [hereinafter Clean Power Plan]. The Clean Power Plan was repealed by the Trump Administration. *See* ACE Rule, *supra* note 1.

[3] *See* EPA, REGULATORY IMPACT ANALYSIS FOR THE REPEAL OF THE CLEAN POWER PLAN, AND THE EMISSION GUIDELINES FOR GREENHOUSE GAS EMISSIONS FROM EXISTING ELECTRIC UTILITY GENERATING UNITS, EPA-452/R-19-003 (June 2019) [hereinafter ACE RIA]. We refer to all analyses of regulatory impacts as CBA, but these are sometimes referred to as Regulatory Impact Analyses, Economic Analyses, or Technical Support Documents.

[4] *See id.* at ES-6 to ES-7 (short tons). Even though the regulation targets greenhouse gas emissions, the resulting pollution controls would also reduce sulfur dioxide, nitrogen oxides, and mercury from the electricity sector. Fine particulate matter, for example, is a pollutant associated with premature deaths and other adverse health effects. *See id.* at 4-6 to 4-28.

[5] *See, e.g.*, EPA, REGULATORY IMPACT ANALYSIS FOR THE CLEAN POWER PLAN FINAL RULE, EPA-452/R-15-003 (2015) [hereinafter Clean Power Plan RIA].

[6] *Compare* ACE Rule*, supra* note 1, at ES-5*, with* Clean Power Plan*, supra* note 2, at ES-14 to ES-16. There is a dispute in the literature about which value is more appropriate in the case of greenhouse gas emissions. *See, e.g.*, Ted Gayer & W. Kip Viscusi, *Determining the Proper Scope of Climate Change Policy Benefits in U.S. Regulatory Analyses: Domestic versus Global Approaches*, 10 REV. ENVTL. ECON. & POL'Y 245, 245–63 (2016); Peter Howard & Jason Schwartz, *Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon*, 42 COL. J. ENVTL. L. 203, 203–95 (2017); Arden Rowell, *Foreign Impacts and Climate Change*, 39 HARV. ENVTL. L. REV. 371, 371–421 (2015).

matter.[7] This methodology for estimating benefits of particulate matter reductions has been criticized by several scholars.[8]

As simple as it may sound, the reason that EPA's new numbers could be critiqued was because an analysis of this high-stakes regulation was prepared and made available to the public. Transparency in government decisionmaking—defined as information about decisions and the decisionmaking process that is provided to the public—lies at the core of a well-functioning democracy because it allows interested parties to hold decision makers accountable for their decisions. The chain of reasoning is simple: the government makes the basis for its decisions more readily available, lowering the cost of reviewing the merits of government decisions and making it more likely that affected parties will be aware of the debate and offer their views. Transparency is also important in improving government decisionmaking over time, steering an agency toward decisions that have the sturdiest basis in available science and allowing interested parties to replicate results, catch errors, and promote relevant research. In Cass Sunstein's words, "Transparency can be a terrific nudge, and it often fuels change."[9]

As agency rulemakings have increased in quantity and importance,[10] there has been renewed interest in decisionmaking transparency. By and large, this interest has narrowly focused on the disclosure and availability of underlying models and data supporting an agency's action. For example, in 2017, Congress proposed a bill that would "prohibit the [EPA] from proposing, finalizing, or disseminating regulations or assessments based upon science that is not transparent or reproducible."[11] The bill would require EPA to make all supporting data "publicly available online in a manner that is sufficient for independent analysis and substantial reproduction of research results."[12] EPA has also proposed its own rule aimed at ensuring "that the data underlying [significant agency action] are publicly available in a manner sufficient for

[7] *See* ACE RIA, *supra* note 3, at 4–33.

[8] *See e.g.*, Lisa Friedman, *E.P.A. Plans to Get Thousands of Pollution Deaths Off the Books by Changing its Math*, N.Y. TIMES (May 20, 2019), https://www.nytimes.com/2019/05/20/climate/epa-air-pollution-deaths.html (quoting various scholars).

[9] CASS R. SUNSTEIN, HOW CHANGE HAPPENS xii (2019).

[10] Regulatory agencies issue rules that taken together are expected have economic consequences in the billions of dollars. OFFICE OF MGMT. & BUDGET, 2017 DRAFT REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND AGENCY COMPLIANCE WITH THE UNFUNDED MANDATES REFORM ACT 19-20 (2017) [hereinafter *2017 Draft Report to Congress*].

[11] HONEST Act, H.R. 1430, 115th Cong. 1 (2017).

[12] *Id.* at 2, § 2.

independent validation."[13] Preliminary analyses suggest that providing access to all underlying influential data would cost EPA millions of dollars each year.[14]

These proposals have been controversial. Critics argue that they are thinly veiled attempts to stall agency rulemaking and prevent reliance on key studies that use confidential data.[15] A particular concern has been an important—and replicated—study that demonstrates a high value of reducing fine particulate matter emissions.[16] The underlying data for this study has never been publicly released because the researchers rely on participants' medical records, which were obtained with a promise of confidentiality.[17] Supporters, in contrast, point to the increasing importance of quantitative data and analysis in agency decisionmaking.[18] In their view, just as government reasoning generally should be open to scrutiny and debate, the underlying studies that support that decisionmaking should also be open to scrutiny and debate. With access to underlying data, interested parties can check its accuracy and assess its adequacy in supporting agency action. Supporters point to the replicability crisis in the sciences to underscore the need for government agencies to take these issues more seriously.[19] The controversy surrounding the ACE rule, for example, demonstrates how transparency about the basis for government decisionmaking

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[13] Strengthening Transparency in Regulatory Science, 83 Fed. Reg. 18768, 18769 (Apr. 30, 2018) (to be codified at 40 C.F.R. pt. 30).

[14] *See Cost Estimate, S. 544, Secret Science Reform Act of 2015*, CONG. BUDGET OFF. (June 5, 2015), https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/costestimate/s5440.pdf (estimating a cost to EPA of $250 million each year); Randall Lutter & David Zorn, *On the Benefits and Costs of Public Access to Data Used to Support Federal Policy Making* 25 (Mercatus Ctr. Working Paper Sept. 2016) (estimating costs to EPA of $46 million per year). And already, agencies are implementing programs to increase access to publicly funded research data. *See* Lutter & Zorn, *supra* at 7–14 (discussing agency policies on public access to data).

[15] *E.g.*, Robinson Meyer, *Even Geologists Hate the EPA's New Science Rule*, THE ATLANTIC (July 17, 2018), https://www.theatlantic.com/science/archive/2018/07/scott-pruitts-secret-science-rule-could-still-become-law/565325/; Friedman, *supra* note 8.

[16] *See* Douglas W. Dockery et al., *An Association Between Air Pollution and Mortality in Six U.S. Cities*, 329 NEW ENG. J. MED.1753 (1993) [hereinafter *Six Cities Study*]. The study has helped provide the basis for estimating the benefits of reducing particulate matter, and these benefits constitute one of the largest categories of benefits of recent environmental regulations. *See* OFFICE OF MGMT. & BUDGET, REPORTS TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES 6 (2007) (finding that the largest estimated benefit was from reduction in air pollution from fine particulate matter).

[17] *Six Cities Study*, *supra* note 16.

[18] *E.g.*, Angela Logomasini, *EPA Transparency Rule Will Bolster Science and Improve Rulemaking*, COMPETITIVE ENTERPRISE INST. (July 17, 2018), https://cei.org/content/epa-transparency-rule-will-bolster-science-and-improve-rulemaking.

[19] *Id. See also* Lutter & Zorn, *supra* note 14, at 3–4, 15–19 (discussing the replicability crisis). *But see* Meyer, *supra* note 15 (arguing that the proposals go further than data availability policies at major scientific journals).

allows interested parties to debate the desirability of the Trump Administration's regulatory actions.

At least some of the controversy over the sharing of data reflects fundamental disagreements about the value of certain types of transparency in CBA. Notably missing from the arguments of both critics and supporters, however, is *evidence* on the degree of transparency in current agency decisionmaking. Providing greater transparency is not costless.[20] The incremental costs and benefits of different measures should be measured against the baseline level of transparency. Without knowing how transparent agency decisions already are on key dimensions, it is impossible to assess the value of different kinds of additional transparency.

There has been little research directly focused on identifying and measuring different kinds of transparency. Measurement in particular raises two challenges: the first is to provide an objective framework for measuring the extent to which decisionmaking is transparent; the second is to implement that framework. This Article tries to address both of these challenges in the context of significant agency rulemaking and cost-benefit analysis (CBA).

A natural place to start in our attempt to objectively measure transparency is to evaluate the CBAs that have been performed by federal agencies for significant regulations—or, those regulations likely to have an annual effect on the economy of $100 million or more.[21] Since President Reagan, all presidents have required executive agencies to conduct CBAs and rely on the analyses to the extent permissible.[22] Independent agencies, too, are increasingly conducting CBAs,

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[20] *See, e.g.*, Cary Coglianese et al., *Transparency and Public Participation in the Federal Rulemaking Process: Recommendations for the New Administration*, 77 GEO. WASH. L. REV. 924, 928 (2009) ("[I]mproved transparency and public participation are not necessarily unmitigated goods. Even if increasing participation and transparency makes the rulemaking process and its resulting rules more legitimate, too much transparency and public participation can very well detract from making quality decisions in a timely manner.").

[21] *See* Regulatory Planning and Review, Exec. Order No. 12866 § 1(a)-(b), 58 Fed. Reg. 51735 (Oct. 4, 1993) (applying CBA to "[s]ignificant regulatory action[s]," defined as those that "have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy," among other things, and directing agencies to "select those approaches that maximize net benefits . . . unless a statute requires another regulatory approach.").

[22] *See id.* (currently applicable executive order); Federal Regulation, Exec. Order No. 12291, 46 Fed. Reg. 13193 (Feb. 19, 1981); Improving Regulation and Regulatory Review, Exec. Order No. 13563, 76 Fed. Reg. 3821 (Jan. 21, 2011). Sometimes statutes require cost-benefit analysis for implementing certain provisions. For example, under the Safe Drinking Water Act, EPA must calculate the "incremental costs and benefits associated with each alternative maximum contaminant level considered" and consider these costs and benefits when establishing a maximum contaminant level. 42 U.S.C. § 300g–1(b)(3)(C)(i). In other instances, a statute may prohibit an agency's reliance on cost-benefit analysis. For example, that has been the Supreme Court's interpretation of the National Ambient Air Quality Standards under the Clean Air Act. See 42 U.S.C.

prodded by influential court decisions.[23] In short, CBAs are supposed to disclose the analytical basis for and the economic implications of most important federal regulatory decisions.

In a general sense, CBA already promotes transparency by revealing the likely economic and social impacts of agency decisions to policy makers and interested parties. Without CBA, agency decisions with significant impacts might be made without sufficient awareness by decisionmakers and scrutiny by interested parties. It allows interested parties to hold decisionmakers accountable for likely effects. Yet despite how often CBA is praised for its role in improving decisionmaking transparency,[24] the actual *degree* of transparency in agency CBA has received scant attention from academics. The evidence that exists suggests that CBAs lack basic transparency on several key dimensions. Scholars have employed objective criteria to measure whether CBAs of significant regulations quantify and monetize costs and benefits, for example, finding that they often do not.[25] We know less, however, about how transparent agency CBAs are on other

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§ 7409(b); Whitman v. American Trucking Ass'ns., Inc., 531 U.S. 457, 464–65 (2001). Many statutes, however, neither require nor prohibit cost-benefit analysis. In such instances, agency decisionmaking is often informed by the cost-benefit analysis conducted to comply with executive order requirements. *See* RICHARD L. REVESZ & MICHAEL A. LIVERMORE, RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH 14–15 (2008) (arguing for more engagement with CBA from the environmental community given its increasingly important role in environmental decision-making); CASS R. SUNSTEIN, COST-BENEFIT STATE: THE FUTURE OF REGULATORY REGULATION (2002) (documenting the increasing influence of CBA in agency decisionmaking); CASS R. SUNSTEIN, THE COST-BENEFIT REVOLUTION 10 (2018) ("From 1981 to the present, cost-benefit analysis has often been a decisive decision rule in significant cases.").

[23] *See, e.g.*, Bus. Roundtable v. SEC, 647 F.3d 1144, 1149–51 (D.C. Cir. 2011).

[24] *See, e.g.*, Caroline Cecot, *Deregulatory Cost-Benefit Analysis and Regulatory Stability*, 68 DUKE L.J. 1593, 1612–13 (2019); Christopher C. DeMuth & Douglas H. Ginsburg, *Rationalism in Regulation*, 108 MICH. L. REV. 877, 901 (2010); *Robert W. Hahn & Cass R. Sunstein, A New Executive Order for Improving Federal Regulation? Deeper and Wider Cost-Benefit Analysis*, 150 U. PA. L. REV. 1489, 1517–21 (2002); Michael A. Livermore, *Can Cost-Benefit Analysis of Environmental Policy Go Global?*, 19 N.Y.U. ENVTL. L.J. 146, 160–61 (2011); Eric A. Posner, *Controlling Agencies with Cost-Benefit Analysis*, 68 U. CHI. L. REV. 1137, 1140 (2001); Eric A. Posner & Cass R. Sunstein, *Moral Commitments in Cost-Benefit Analysis*, 103 VA. L. REV. 1809, 1822 (2017); Eric A. Posner & E. Glen Weyl, *Benefit-Cost Paradigms in Financial Regulation*, 43 J. LEGAL STUD. S1, S11 (2014); Edward H. Stiglitz, *Cost-Benefit Analysis and Public Sector Trust*, 24 SUP. CT. ECON. REV. 169, 176–77 (2016); Revesz & Livermore, *supra* note 21, at 14–15. For work challenging the notion that CBA enhances transparency, see FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING 215 (2004); Amy Sinden, *The Economics of Endangered Species: Why Less Is More in the Economic Analysis of Critical Habitat Designations*, 28 HARV. ENVTL. L. REV. 129, 207 (2004); Wendy Wagner et. al., *Misunderstanding Models in Environmental and Public Health Regulation*, 18 N.Y.U. ENVTL. L.J. 293, 337–38 (2010).

[25] *E.g.*, Caroline Cecot et al., *An Evaluation of the Quality of Impact Assessment in the European Union with Lessons for the US and the EU*, 2 REG. & GOVERNANCE 405,

dimensions, especially those dimensions that have recently received the most attention from interested parties.[26]

This Article makes three contributions to the debate on increasing transparency in agency CBA. First, the Article provides a general framework for thinking about transparency in CBA by introducing procedural and substantive dimensions of transparency. In particular, it defines a CBA's process transparency as transparency about the CBA's creation, its availability, and its role in agency decisionmaking. It defines a CBA's policy transparency as transparency about the inputs and outputs that underlie the CBA's conclusions. Second, the Article objectively measures and quantifies the transparency of a sample of CBAs from the last several years to estimate the current level of transparency.[27] The main insight is that many agency CBAs lack basic process transparency and policy transparency. Notably, we confirm that even among CBAs that monetize costs and benefits, most do not make their data, models, and underlying sources readily available. Finally, the Article provides recommendations for improving transparency in CBA that could do more good than harm. After increasing our current understanding of the actual level of transparency, it is easier to identify the most cost-effective measures that could promote transparency. We argue that significant transparency improvements can be achieved with measures that cost relatively little.

405–24 (2008); Jerry Ellig et al., *Continuity, Change, and Priorities: The Quality and Use of Regulatory Analysis Across U.S. Administrations*, 7 REG. & GOVERNANCE 153, 153–73 (2013); Jerry Ellig & Patrick A. McLaughlin, *The Quality and Use of Regulatory Analysis in 2008*, 32 RISK ANALYSIS 855, 855–80 (2012); Robert W. Hahn et al., *Assessing Regulatory Impact Analyses: The Failure of Agencies to Comply with Executive Order 12866*, 23 HARV. J.L. & PUB. POL'Y 859, 859–71 (2000); Robert W. Hahn & Patrick Dudley, *How Well Does the Government Do Cost-Benefit Analysis?*, 1 REV. ENVTL. ECON. & POL'Y 192, 192–211 (2007); Robert W. Hahn & Robert Litan, *Counting Regulatory Benefits and Costs: Lessons for the U.S. and Europe*, 8 J. INT'L ECON. L. 473, 473–508 (2005); Stuart Shapiro & John F. Morrall, III, *The Triumph of Regulatory Politics: Benefit-Cost Analysis and Political Salience*, 6 REG. & GOVERNANCE 189, 189–206 (2012). *See also* Christiane Arndt et al., *2015 Indicators of Regulatory Policy Governance: Design, Methodology and Key Results*, (Org. for Econ. Cooperation & Dev. Working Paper No. 1, 2015), https://www.oecd-ilibrary.org/docserver/5jrnwqm3zp43-en.pdf?expires=1552233713&id=id&accname=guest&checksum=9D8225B01B6B7B35131EE2C8C0FF2A2A (data and methodology); Justus Kirchhoff & Till Nikolka, *How Evidence-based is Regulatory Policy? A Comparison Across OECD*, 15 IFO DICE REPORT 4/2017, at 45–48 (2017), https://www.cesifo-group.de/DocDL/dice-report-2017-4-nikolka_kirchhoff-december.pdf (summary and findings).

[26] One study assessed the availability of models and data, but the criteria were not objective. *See* Ellig et al., *supra* note 25. One study directly measured "transparency" in CBA but its criteria for such transparency was narrow. *See* Arndt et al., *supra* note 24. Part II discusses this prior work in more detail.

[27] In particular, we focus on agency CBAs that monetize at least some costs and benefits. See *infra* Part III for details on the sample. If there is no estimate of any costs or benefits, then the CBA already lacks important dimensions of transparency.

The Article is organized as follows. Part II develops our concept of transparency for CBA and summarizes the literature on transparency of CBA to date. Part III evaluates transparency by reviewing recent CBAs at a variety of regulatory agencies. This allows us to compare measures of transparency both within and across agencies. We discuss the strengths and weaknesses of our measure, and the insights that flow from our empirical analysis. Part IV provides our policy recommendations. Part V concludes.

II. DEFINING AND MEASURING TRANSPARENCY IN COST-BENEFIT ANALYSIS

Since the Reagan Administration, executive agencies in the federal government have been required to conduct some form of CBA for significant regulations and rely on CBA to support decisionmaking to the extent permissible.[28] Independent agencies have also begun to incorporate such analysis into their important rulemakings.[29] A typical CBA will explain the government's rationale for the regulation and list, quantify, and, when possible, monetize the expected benefits and costs of the regulation as compared to the status quo and other regulatory alternatives.[30] The chosen alternative may then be justified in light of its expected regulatory impacts. A CBA for a complicated regulation might rely on hundreds or even thousands of underlying economic and scientific studies to estimate impacts.[31]

CBA is an important component of federal regulatory decisionmaking for at least two reasons. First, CBA can help increase or maximize the aggregate economic welfare of the public, often defined in terms of economic efficiency.[32] It can often shed light on whether a regulation is needed at all from an economic perspective, the kind of regulation that is needed, and the stringency of that regulation. For example, the implementation of a rigorous CBA led the Reagan administration

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[28] *See, e.g.*, Exec. Order No. 12,866, *supra* note 21, at § 1(a)-(b) (applying CBA to "[s]ignificant regulatory action[s]," defined as those that "have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy," among other things, and directing agencies to "select those approaches that maximize net benefits . . . unless a statute requires another regulatory approach."). Many states and countries have introduced similar requirements for conducting CBA. *See* Robert W. Hahn, *State and Federal Regulatory Reform: A Comparative Analysis*, 29 J. LEGAL STUD. 873, 873–912 (2000); Cecot, *supra* note 24, at 405–24.

[29] *See 2017 Draft Report to Congress*, *supra* note 10, at 90–92 (commenting briefly on CBAs from independent agencies).

[30] The estimated costs are largely regulatory compliance costs, which approximate the social or opportunity costs of regulation. Social benefits, meanwhile, may include health improvements from cleaner air or water.

[31] *See, e.g.*, CONG. BUDGET OFF., *supra* note 14, at 3 (estimating that the EPA references about 25,000 scientific studies per year, based on a midpoint of 12 to 50,000 studies referenced for two different regulations); Lutter & Zorn, *supra* note 14, at 24 (estimating that EPA references, on average, 18,000 pieces of scientific research each year).

[32] Economic efficiency typically consists of the sum of producer and consumer surplus. For a discussion of general welfare economics, see ANDREU MAS-COLELL, MICHAEL D. WHINSTON & JERRY R. GREEN, MICROECONOMIC THEORY 545–72 (1995).

to adopt a much stricter standard for phasing out leaded gasoline than either it or the previous administration initially thought warranted by using new scientific data to monetize categories of effects that were previously not monetized and undervalued.[33] Second, regardless of its substantive influence in developing regulatory policies, CBA reveals the expected impacts of chosen regulatory policies to interested parties. This publicly available information increases democratic accountability of agency officials and can provide the impetus for improving decisionmaking over time.

Transparency in CBA, thus, has the potential to improve substantive agency decisionmaking and promote accountability.[34] When decisionmaking relies on CBA, transparency about the CBA's inputs and outputs allows interested parties to scrutinize the quality of the analysis. If interested parties identify errors or provide superior data, for example, their improvements to the CBA might affect an agency's ultimate decision. And even when an agency does not rely on a particular CBA, the analysis will allow interested parties to understand the costs and benefits of agency decisions. We think that most people would agree that improving agency decisionmaking and promoting agency accountability are laudable goals. In the past, such efforts were often met with strong bipartisan support.[35]

Recent proposals to improve transparency in CBA, however, have been controversial, usually supported by Republicans and opposed by Democrats. Of course, the practice of CBA has long been controversial, and this political polarization around transparency in CBA might be a continuation of long-held views on the proper role of CBA in agency decisionmaking. But given that the practice of CBA is already prevalent, it would seem worthwhile to consider ways of making CBAs more transparent.

There are at least two reasons why promoting greater transparency in CBA is so controversial. The first reason is that recent proposals have narrowly focused on one aspect of transparency: making all, or almost all, of the underlying data from

[33] See Statement of Christopher DeMuth, in AMERICAN ECONOMIC POLICY IN THE 1980S 508 (Martin Feldstein ed., 1994) ("A very fine piece of analysis persuaded everyone that the health harms of leaded gasoline were far greater than we had thought, and we ended up adopting a much tighter program than the one we had inherited."). For more information about the BCA and the resulting standard, see Albert L. Nichols, Lead in Gasoline, in ECONOMIC ANALYSIS AT EPA: ASSESSING REGULATORY IMPACT 49, 49–86 (Richard D. Morgenstern ed., 1997).

[34] A transparent CBA is not necessarily a high-quality CBA—but it makes possible improvements in quality over time driven by interested parties.

[35] Examples include legislative actions requiring the disclosure and online availability of certain agency records, *see* FOIA Improvement Act of 2016, 5 U.S.C. § 552 (2016); Exec. Order No. 13563, 76 Fed. Reg. 3821, *supra* note 21; eRulemaking, as well as executive directives for keeping logs of meetings with lobbyists, *see* Exec. Order No. 12866, 58 Fed. Reg. 51735, *supra* note 21.

individual studies that support CBA's estimates available online.[36] But that is not the only kind of transparency. Opposition to this move could reflect a view that the costs of *this kind of transparency* outweigh its benefits. The second reason is that there is little information about the current level of transparency in agency CBA. Improving transparency is not costless, and without a clear sense of the level of transparency in today's CBAs, it is difficult if not impossible to evaluate whether the benefits of these new proposals outweigh their costs.

In this Part, we categorize a broader range of transparency in CBA. In particular, we identify and define two dimensions of transparency associated with CBA: "process transparency" and "policy transparency."[37] Process transparency represents the extent to which key factors surrounding the creation of the CBA and its impact on decisionmaking are identified. Policy transparency represents the extent to which information is available about key factors in the CBA. Without process transparency and policy transparency, interested parties would be unable to understand and scrutinize the basis for agency decisionmaking. Table 1 summarizes these categories.

Table 1. Types of Transparency in Cost-Benefit Analysis

Type of Transparency	*Definition*	*Importance*
Process Transparency	The extent to which key factors surrounding the creation of the CBA, its availability, and its impact on decisionmaking are identified. Includes disclosure of who prepared the CBA, when it became available to the agency and the public, and what role it played in an agency's decision.	Allows interested parties to scrutinize the motivations of those preparing the analysis and promotes clarity about the role of CBA in an agency's ultimate decisionmaking.
Policy Transparency	The extent to which information is available about key factors in a CBA. Includes summarizing economic inputs (assumptions) and outputs (costs, benefits, distributional issues), identifying sources for underlying models and data, and making underlying models and data available.	Allows interested parties to interpret the CBA, evaluate its accuracy and adequacy as a basis for agency decisionmaking.

[36] *See* HONEST Act, *supra note*; Strengthening Transparency in Regulatory Science, *supra* note.

[37] For a different account of dimensions of transparency in government decisionmaking more generally, see Donald Heald, *Varieties of Transparency*, in TRANSPARENCY: THE KEY TO BETTER GOVERNANCE? 25, 25–43 (Christopher Hood & David Heald eds., 2006). Our categories are simpler and tailored to evaluating the practice of CBA in agencies.

A. Process Transparency

We define process transparency as the extent to which key factors surrounding the creation of the CBA, its availability, and its impact on decisionmaking are identified. Important "process" aspects include the identities of the internal or external decisionmakers that created the analysis, its availability to the public, and its role in an agency's decisionmaking process. Process transparency ties into fundamental accountability benefits of transparency and is distinct from transparency about the CBA's inputs or outputs, such as the assumptions, methodology, and conclusions that form the substance of CBA. The argument by those who believe in process transparency is straightforward. As CBA becomes ubiquitous, interested parties should be able to access the analysis and understand its origin and its connection to an agency's ultimate decisionmaking.

One dimension of process transparency allows interested parties to scrutinize the motivations of those preparing the analysis and the possible effect such motivations might have on the analysis's substance. In the United States, for example, Executive Order 12,866 requires executive agencies to submit CBAs to the Office of Information and Regulatory Affairs (OIRA) within the White House's Office of Management and Budget (OMB).[38] To promote transparency and, ultimately, accountability, the order outlines a process that ensures that OIRA's proposed changes to the analysis after its review are recorded and publicly available.[39] This example of process transparency reflects the view that the public should know who was responsible for influential decisions affecting the CBA. Moreover, interested parties should know who within an agency or outside of an agency was responsible for preparing the analysis. An internal economic office, for example, might demonstrate an agency's expertise in, and commitment to, preparing CBAs.[40] If an agency uses an external organization to prepare its CBAs, then interested parties should be able to determine whether any such group has a stake in the related regulation. Identifying specific authors would also promote accountability.

A second dimension of process transparency allows interested parties to know exactly how important and influential the CBA is to an agency's decision. If the analysis ultimately played no role in an agency's decision, then the CBA is not a relevant part of the agency's decisionmaking process—regardless of whether it used the best available evidence for its assumptions and estimates.

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[38] *See* Exec. Order No. 12866, 58 Fed. Reg. 51735, *supra* note 21, at 51, 738–39. For a more detailed overview of the OIRA review process, see U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-03-929, OMB'S ROLE IN REVIEWS OF AGENCIES' DRAFT RULES AND THE TRANSPARENCY OF THOSE REVIEWS 29–38 (2003), http://www.gao.gov/new.items/d03929.pd. [hereinafter GAO, OMB's Role].

[39] *See* GAO, OMB's Role, *supra* note 37, at 35.

[40] *See* Jerry Ellig, *Why and How Independent Agencies Should Conduct Regulatory Impact Analysis*, 28 CORNELL J.L. & PUB. POL'Y 1, 24 (2018); Michael A. Livermore, *Cost-Benefit Analysis and Agency Independence*, 81 U. CHI. L. REV. 609, 646 (2014).

Some scholars argue that CBA has been decisive in agency decisionmaking.[41] CBA is certainly widespread, but just because an agency conducted CBA does not mean that it relied on the analysis to inform its chosen regulatory option. Executive Order 12,866 directs executive agencies to "select those approaches that maximize net benefits . . . unless a statute requires another regulatory approach" and promotes reliance on CBA to the extent permissible.[42] CBA helps to identify those policies that would maximize net benefits—but it does not follow that executive agencies will necessarily choose those policies. In some cases, statutory constraints might prevent an agency from choosing the welfare-maximizing option as identified by a CBA. If so, process transparency would require the agency to disclose this restriction. Alternatively, an agency might choose the welfare-enhancing option but not base its decision on the CBA—or it might not choose the welfare-maximizing option due to alternative policy preferences or judgments about costs or benefits that are not quantified or monetized. Again, process transparency would require the agency to be clear about its reasons for relying on or ignoring the substantive conclusions of the CBA. Interested parties must know whether an agency relied on the CBA in its decisionmaking for its investment in scrutinizing and correcting the analysis to be worthwhile. If an agency did not rely on the CBA, then criticisms of it are unlikely to affect the agency's ultimate decision.[43]

A third dimension of process transparency allows interested parties to obtain and comment on an agency's CBA in time to influence agency decisionmaking. Most agencies provide at least 60 days for interested parties to comment on proposed rulemaking before issuing a final rulemaking that responds to significant comments.[44] Process transparency in CBA would require that the analysis is readily available around the time of the proposed rulemaking in order for interested parties to play a meaningful role in raising substantive issues related to the CBA, especially if an agency relied on CBA to inform its proposed rule.

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[41] *See, e.g.*, SUNSTEIN, THE COST-BENEFIT REVOLUTION *supra* note 21, at 10 ("From 1981 to the present, cost-benefit analysis has often been a decisive decision rule in significant cases."). *But see* Robert W. Hahn & Paul C. Tetlock, *Has Economic Analysis Improved Regulatory Decisions?*, 22 J. ECON. PERSP. 67, 72 (2008) (concluding that few CBAs have much effect); Richard Williams, *The Influence of Regulatory Economists in Federal Health and Safety Agencies*, (Mercatus Ctr. Working Paper No. 08-15, 2008) (suggesting that CBA might affect decisionmaking but that its influence might be behind the scenes and not disclosed).

[42] *See* Exec. Order No. 12866, 58 Fed. Reg. 51735, *supra* note 21, at § 1(a)–(b).

[43] An important doctrine of administrative law is that a court will evaluate the agency's stated reasons for its action. *See generally* SEC v. Chenery Corp. (*Chenery I*), 318 U.S. 80 (1943) (stated reasons); Caroline Cecot & W. Kip Viscusi, *Judicial Review of Agency Benefit-Cost Analysis*, 22 GEO. MASON L. REV. 575 (2015) (summarizing when challenges to CBA tend to be successful). *See also* Michigan v. EPA, 135 S. Ct. 2699 (2015) (refusing to consider CBA when agency refused to rely on it).

[44] *See* Administrative Procedure Act (APA), 5 U.S.C. § 553 (2019); *see, e.g.*, United States v. Nova Scotia Food Products Corp., 568 F.2d 240 (2d Cir. 1977) (one of many cases standing for the proposition that APA § 553(c) requires an agency to respond to significant comments received during the comment period).

Process transparency has received some attention from regulatory scholars. One OECD working paper, for example, developed a measure of "regulatory impact assessment transparency"[45] for each member country that was *entirely* focused on a subset of what we define as process transparency.[46] The score for each country was determined by officials' answers to questions such as whether CBAs are made publicly available online; whether they are published before the relevant agency decision; and whether the decision on preparing a CBA is subject to public comment. On this transparency measure, the overall score for U.S. CBAs was low relative to other countries' scores.[47] Similarly, Jerry Ellig and Patrick McLaughlin have qualitatively measured how easily CBAs are found online and whether agencies provide evidence for how they used the CBA.[48] They found that while agency CBAs are increasingly available online, many regulations lack clear evidence that the agency used the CBA in its decisionmaking.[49] This result suggests that it might be difficult for interested parties to assess the value of engaging with the agency's analysis. These studies have shed important light on the lack of process transparency in many agency CBAs, but both studies relied on qualitative, subjective assessments from officials or researchers that may not be easily replicated.

In our analysis, we use a "scorecard" method to provide objective measures of process transparency. A scorecard checks whether the CBA includes a particular item. For process transparency, items include whether the CBA indicates who prepared the analysis, whether it names an author, an internal office, or an external organization, and whether an agency discloses how the CBA was used in decisionmaking.[50] We also record if and when an agency made the CBA available relative to the notice of the proposed rulemaking.

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[45] In the European Union, CBAs are referred to as "regulatory impact assessments." For more information about the practice and the quality of impact assessment in the European Union over time, see Oliver Fritsch, Claudio M. Radaelli, Lorna Schrefler, & Andrea Renda, *Regulatory Quality in the European Commission and the UK: Old Questions and New Findings*, CEPS Policy Paper, n. 362 (2012).

[46] *See* Arndt, *supra* note 24, at 48–50. The paper drew on survey responses about each country's regulatory impact assessment process (the 2014 Regulatory Indicators survey) that were provided by delegates to the OECD Regulatory Policy Committee and by government officials.

[47] *Id.*

[48] Ellig & McLaughlin, *supra* note 24, at 855–80 (evaluating the following questions on a 5-point scale: "Use of Analysis: Does the proposed rule or the RIA present evidence that the agency used the Regulatory Impact Analysis?" and "Accessibility: How easily were the RIA, the proposed rule, and any supplementary materials found online?").

[49] *See id.* at 859, 865, 868 (finding that CBAs in their sample averaged 3.53 out of 5 on accessibility and averaged 2.44 out of 5 on use of analysis).

[50] Specific scorecard questions are included in Appendix Table A2.

B. Policy Transparency

Policy transparency refers to transparency about the CBA's substance—the economic inputs (data and assumptions) and outputs (costs, benefits, distributional impacts) that are summarized in the CBA. A typical CBA will list, quantify, and, when possible, monetize the expected incremental benefits and costs of the regulation compared with the status quo and other regulatory alternatives. The chosen alternative is typically justified in light of its expected net benefits (the difference between benefits and costs). The estimated costs include regulatory compliance costs and effects on supply. Social benefits, meanwhile, may include health improvements from cleaner air or water.[51] Distributional analysis identifies which groups of the population are likely to bear the costs and reap the benefits of the chosen alternative. The estimates of costs and benefits are often based on scientific and economic studies. These studies could be prepared by government entities or by nongovernmental researchers, and they might be peer-reviewed or not. The studies themselves are often empirical, drawing conclusions based on underlying data. A typical CBA will employ models to convert the underlying data and assumptions into the estimates of costs and benefits.

In essence, policy transparency is the ease with which interested parties can understand the CBA's substantive conclusions. One important aspect of this is the clear presentation of overall conclusions. In fact, one of the criticisms of CBA is that the presentation of impacts is so technical and dense that basic information on effects is actually less transparent than agency decisionmaking that does not include CBA.[52] Another important aspect is the disclosure of inputs. These inputs include the individual categories of costs and benefits that are considered and summarized, and the scientific studies and assumptions that are used in the CBA.

Policy transparency also captures the interest of recent proposals in increasing transparency in CBA: disclosure of the underlying models that convert inputs to outputs and the underlying data that informs empirical estimates. We refer to this dimension of policy transparency separately as "analytical transparency." Analytical transparency is the extent to which interested parties can identify and gain access to key models and data that underlie an agency's CBA. Such transparency is important to interested parties seeking to scrutinize the basis of an agency's decisionmaking. For example, in *Owner-Operator Independent*

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[51] For more detail on costs and benefits of regulation, see Robert W. Hahn & John A. Hird, *The Costs and Benefits of Regulation: Review and Synthesis*, 8 YALE J. ON REG. 233 (1991).

[52] *See, e.g.*, Duncan Kennedy, *Cost-Benefit Analysis of Entitlement Problems: A Critique*, 33 STAN. L. REV. 387, 443 (1981) ("[CBA] is arbitrary. . . . The focus on particular problems legitimates arbitrary assumptions and masks their political content."); Amy Sinden, *Cass Sunstein's Cost-Benefit Lite: Economics for Liberals*, 29 COLUM. J. ENVTL. L. 191, 194 (2011) (book review) ("The danger of CBA . . . lies in its false promise of determinacy, its pretense of objectivity and scientific accuracy. . . . [which] renders CBA . . . vulnerable to manipulation . . . .").

Drivers Association v. Federal Motor Carrier Safety Administration ("FMCSA"), the Court of Appeals for the D.C. Circuit vacated relevant portions of the FMCSA's rule because the agency failed to give interested parties an opportunity to comment on the methodology of the crash-risk model that the agency used to justify an increase in the maximum number of driving hours for truck drivers.[53] The more analytically transparent an agency's CBA is, the easier it is for interested parties to meaningfully participate in ensuring that the CBA is well-reasoned.

The major guidance documents that inform agency CBA procedures have long promoted some aspects of analytical transparency. One early guidance document from the Office of Management and Budget's Office of Information and Regulatory Affairs (OIRA),[54] which reviews agency CBAs, emphasized that

> [a]nalysis of the risks, benefits, and costs associated with regulation must be guided by the principles of full disclosure and transparency. Data, models, inferences, and assumptions should be identified and evaluated explicitly, together with adequate justifications of choices made, and assessments of the effects of these choices on the analysis.[55]

Another influential guidance document, Circular A-4, also directs agencies to "clearly set out the basic assumptions, methods, and data underlying the analysis and discuss the uncertainties associated with the estimates" so that a "qualified third party reading the analysis" could "understand the basic elements of your analysis and the way in which you developed your estimates."[56] It further encourages agencies to post their analysis "with all the supporting documents, on the internet so interested parties can review the findings."[57]

In addition, many agencies have developed their own guidelines for conducting CBA, and these guidelines generally support transparency with respect to underlying models and data. The Environmental Protection Agency (EPA), for example, maintains a guidance document describing its use of CBA that states that the "economic analysis of an environmental regulation should carefully describe the models it relies on, the major assumptions made in running the models . . . , and any areas of outstanding uncertainty."[58] It also states that "economic analysis should clearly describe all important data sources and references used," making them "available to policy makers, other researchers,

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[53] Based on *Owner-Operator Independent Drivers Assoc. v. Federal Motor Carrier Safety Administration*, 494 F.3d 188 (D.C. Cir. 2007), where the D.C. Circuit held that FMCSA failed to disclose the methodology underlying a key model used in the CBA supporting its regulation of hours of service for long-haul truck drivers.

[54] *See* Exec. Order No. 12866, 58 Fed. Reg. 51735, *supra* note 21.

[55] OFFICE OF MGMT. & BUDGET, ECONOMIC ANALYSIS OF FEDERAL REGULATIONS UNDER EXECUTIVE ORDER 12866 (1996).

[56] OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, at 17 (2003).

[57] *Id.*

[58] EPA, GUIDELINES FOR PREPARING ECONOMIC ANALYSES 11–10 (2010).

policy analysts and the public" unless the data is confidential or private.[59] Among other things, it encourages analysts to "include a table that clearly lays out all of the key assumptions and the potential magnitude and direction of likely errors in assumptions in the summary of results."[60]

Overall, policy transparency supports the democratic legitimacy of agency actions. The impacts summarized in a CBA require detailed information about the value of benefits and costs to affected parties. If policy judgments are being made without a strong scientific or empirical basis—and if these judgments are not in line with those of the public—then interested parties should have the opportunity to weigh in. Beyond the lay public, sophisticated stakeholders in the regulatory process need policy transparency to be able to scrutinize an agency's reasoning and raise concerns during the notice-and-comment period.

Regulatory scholars employing the scorecard methodology have measured aspects of policy transparency of CBA. For example, we (and our coauthors) have previously evaluated whether CBAs quantify and monetize costs and benefits and whether the estimates are clearly presented.[61] Stuart Shapiro and John F. Morrall, III, have also measured whether CBAs provide estimates of costs and benefits.[62] These studies have generally found that many CBAs lack this kind of basic policy transparency. Jerry Ellig and Patrick McLaughlin have produced the most complete analysis of policy transparency to date.[63] In addition to questions about the CBA's presentation and assessment of costs and benefits, they also qualitatively measured whether the data and models used in the analysis could be easily verified.[64]

In our analysis, we focus on obtaining objective measures of recent policy transparency, including analytical transparency, by using a scorecard method. For policy transparency, items include whether the CBA provided a roadmap or summary of the analysis, whether the CBA explained any non-monetized costs or benefits, and whether an agency disclosed, cited, and made publicly available key models and data.[65]

III. THE ANALYSIS

In this Part, we describe the sample and methodology we employ to objectively measure aspects of process transparency and policy transparency. Our review

[59] *Id.*

[60] *Id.*

[61] Cecot et al., *supra* note 24, at 405–24; Hahn et al, *supra* note 24, at 859–71; Hahn & Dudley, *supra* note 24, at 192–211.

[62] Shapiro & Morrall, *supra* note 24, at 89–206.

[63] *See* Ellig & McLaughlin, *supra* note 24, at 855–80 (measuring aspects of policy transparency on a 5-point scale).

[64] For example, they found that CBAs in their sample averaged 2.85 out of 5 on data availability, suggesting that only some models and data were identified and supported by peer-reviewed literature. *Id.*

[65] Specific scorecard questions are included in Appendix Table A2.

focuses on fifty CBAs for significant regulatory actions from October 2015 to September 2018.[66] For executive agencies, we analyze those CBAs that monetized at least some costs *and* at least some benefits. For independent agencies, we review CBAs that monetized at least some costs *or* at least some benefits. In other words, we score the CBAs that have some baseline empirical policy transparency in order to explore the incremental costs and benefits of additional transparency about the models and data that underlie the empirical estimates. In this Part, we describe how we chose our sample of CBAs and how we measure each dimension of transparency.

A. Sample

We identify, in an objective and comprehensive way, the most complete recent CBAs for economically significant regulatory actions—which often have an economic impact of $100 million or more.[67] The study focuses on recent CBAs because our goal is to understand the current level of transparency in CBAs. In addition, it focuses on significant regulatory actions because executive agencies are required to conduct CBA pursuant to Executive Order 12,866 for these most important actions.[68] Historically, agencies issue about 100 economically significant regulatory actions each year.[69] The study excludes "transfer" rules, or rules designed to move resources from the federal government to designated segments of the population. It includes only "non-transfer" rules, which are rules designed to achieve regulatory objectives such as improving air quality. The study then focuses on those CBAs that monetize at least some costs and at least some benefits, as represented by relevant Reports to Congress and Government Accountability Office's summaries.[70] Thus, we purposefully grade CBAs that already reflect a degree of empirical policy transparency and for which the disclosure of underlying models and data might provide meaningful

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[66] Our sample includes CBAs from the last year of the Obama Administration (about 42 percent of the sample) and the first two years of the Trump Administration (about 58 percent of the sample). We do not find statistically significant differences on most of our measures by administration. In any event, the point of this study is to assess the average level of transparency in CBAs, not to assess differences in transparency among presidential administrations. Previous work in this area has found that presidential administrations tend not to matter much when it comes to economic assessment. *See* Art Fraas & Richard Morgenstern, *Identifying the Analytical Implications of Alternative Regulatory Philosophies*, 5 J. BENEFIT-COST ANALYSIS 137, 142 (2014) (concluding that the key elements of economic analysis across presidential administrations have been "generally insulated from politics," with differences "largely in areas for which there is reasonable debate within the academic community").

[67] *See supra* note 24.

[68] *See* Exec. Order No. 12866, 58 Fed. Reg. 51735, *supra* note 21.

[69] *See* OFFICE OF MGMT. & BUDGET, REVIEW COUNTS, REGINFO.GOV, https://www.reginfo.gov/public/do/eoCountsSearchInit?action=init (last visited Aug. 19, 2019); OFFICE OF MGMT. & BUDGET, FAQ, https://www.reginfo.gov/public/jsp/Utilities/faq.myjsp (last visited Aug. 19, 2019).

[70] *See 2017 Draft Report to Congress, supra* note 10, at 90–92. To access GAO summaries, see GAO, CONGRESSIONAL REVIEW ACT, https://www.gao.gov/legal/other-legal-work/congressional-review-act (last visited Aug. 19, 2019).

information.[71] The final sample includes 37 CBAs[72] from executive agencies from October 2015 through September 2018.

In addition, we include 13 CBAs from independent agencies during that time period, but we use a slightly different decision rule: we include all CBAs that monetize at least some costs *or* at least some benefits. Because independent agencies are not required to conduct CBA through the executive order, many agencies do not conduct CBA, and when they do, those CBAs are often qualitative. We decided on a less stringent threshold for these CBAs in order to evaluate a sizable sample and obtain useful results.[73] Our sample of CBAs for executive and independent agencies includes about 22 percent and 30 percent, respectively, of CBAs for this time period, as summarized in Table 2.[74]

Table 2. Sample

	Executive Agencies	**Independent Agencies**
Number of significant rules from October 2015 to September 2018	167	43
Our sample	37 Monetize at least some costs *and* benefits	13 Monetize at least some costs *or* benefits

B. Methodology

Our main approach to measuring the analytical transparency of our sample of CBAs is through the use of a scorecard methodology. A scorecard checks whether the CBA included a particular item. We developed a simple scorecard that grades the CBA on key elements of process transparency and policy transparency. The items we review are all objective. [75] Most are "yes" or "no" questions, but some are quantitative. For example, regarding the authorship of each CBA, we ask separately whether the CBA identifies individual authors, an internal office, or an external organization. We also ask how many references in its sections devoted to estimating costs and benefits are published in peer-reviewed journals.

[71] The idea is that a relatively complete CBA is a necessary condition for disclosure of underlying data to be worthwhile in any sense. Without a CBA—or with a CBA that provides only qualitative information on costs or benefits—an agency action, even if purportedly based on CBA, lacks at least some policy transparency and disclosure of underlying data may not be helpful.

[72] Two CBAs are for one joint rulemaking—one CBA was prepared by EPA and one was prepared by DOT.

[73] We present these results separately.

[74] Thus, the majority of CBAs do not monetize at least some costs and benefits, a fact consistent with earlier work. *See, e.g.*, Hahn et al., *supra* note 24, at 861 (finding that only 29 percent of CBAs between 1996 and 1999 quantified net benefits).

[75] Appendix Table A2 lists all scorecard questions.

Two reviewers scored each CBA.[76] Before scoring any CBA, each reviewer was required to closely read the CBA's table of contents, abstract, executive summary, and introductory chapter. Some scorecard questions required the reviewers to answer based on these introductory sections. For example, one of the scorecard questions asks whether the summary contains monetized estimates of costs and benefits. Other scorecard questions required the reviewers to search for specific keywords or evaluate specific sections of the CBA. For example, reviewers were asked to search for references to "non-monetized" (including listed variations of the term and related terms such as "unquantified") effects and answer whether the effects were identified and described. Reviewers were also asked to answer questions about the number of different types of references (peer-reviewed journals, government documents, or unpublished sources) provided in chapters on benefits and costs, respectively. This approach is consistent with other objective studies that use a scorecard methodology. The Article presents aggregate results separately for executive agencies and for independent agencies on each dimension of transparency. For additional insights, we took a closer look at the highest-scoring and lowest-scoring CBAs identified by our approach.

There are well known advantages and disadvantages of the objective scorecard approach, which we summarize briefly.[77] On the one hand, a scorecard approach allows researchers to objectively evaluate a large sample of CBAs. This allows us to identify common strengths and weaknesses with respect to key elements of process and policy transparency. For example, the study records whether the CBA identifies its author. A CBA that does not disclose any author lacks a key element of process transparency, and the prevalence of such nondisclosure is noteworthy. The study also records whether the CBA monetizes at least some costs or benefits, which is a key element of transparency about the policy's likely effects. On the other hand, this approach does not allow us to critically evaluate an agency's statements or estimates, which may be incomplete or incorrect. For example, while the study records whether a CBA discloses the use of an external organization to prepare the CBA, it cannot distinguish between a CBA that did not *use* an external organization and one that did not *disclose* the use of an external organization. As another example, the study cannot assess whether the monetization of costs and benefits was analytically sound.

IV. TRANSPARENCY RESULTS AND DISCUSSION

This Part describes the results of our empirical study of the transparency of agency CBAs. In general, we find that many CBAs do *not* meet basic elements of transparency. In particular, it is often difficult to understand the role that the analysis played in an agency's decisionmaking, much less understand and

[76] Each reviewer was assigned twenty-five CBAs to score. The reviewers then switched and confirmed each other's work. The reviewers disagreed [X] percent of the time. Any disagreements were resolved by one of us.

[77] *See id.* at 864–65, 877 for more details on the advantages and disadvantages of the scorecard methodology.

evaluate the validity of underlying estimates. This is especially true for CBAs prepared by independent agencies. This Part discusses the results for each dimension of transparency. We discuss analytical transparency—a subset of policy transparency—in a separate section. Table 3 provides summary statistics.

Table 3. Percent "Yes" Responses, by Agency Type

Scorecard Measure	*Executive*		*Independent*	
	N	*"Yes" Response*	*N*	*"Yes" Response*
PROCESS TRANSPARENCY				
Is the preliminary CBA a separate document?	37	86%	13	0
Was the preliminary CBA posted on regulations.gov?	37	95%	13	70%
Was the preliminary CBA posted on the agency website?	37	73%	13	92%
Was the preliminary CBA posted at least at the same time as the proposed rule?	37	84%	13	100% (same document)
Does the CBA disclose any author, including specific individuals, an internal office, or an external firm?	37	68%	13	8%
Does it name individuals?	37	5%	-	-
Does it name an internal office?	37	68%	-	-
Does it name an external firm?	37	44%	-	-
In the ES, does this CBA mention the relationship between it and the agency's decisionmaking?	37	46%	13	0
POLICY TRANSPARENCY				
Does the CBA contain an executive summary (ES)?	37	97%	13	100%
Does the ES contain a summary of costs and benefits?	36	75%	13	0
Does the ES identify components of costs and benefits and their numerical values?	36	75%	13	0
If it does, does it do so in a table?	29	83%	13	0
Does the ES indicate the discount rates used in the summary of costs and benefits?	36	67%	13	0
Does the ES identify any models used in the analysis?	36	22%	13	0
Does the ES identify any data used in the analysis?	36	42%	13	15%
Does the CBA provide an estimate of some monetized benefits?	37	97%	13	23%
Does the CBA provide an estimate of some monetized costs?	37	97%	13	46%
Does the CBA state that there are non-monetized benefits?	37	41%	13	54%

Scorecard Measure	***Executive***		***Independent***	
	N	***"Yes" Response***	***N***	***"Yes" Response***
If so, does the CBA identify the non-monetized benefits?	14	86%	6	100%
Does the CBA state that there are non-monetized costs?	37	30%	13	31%
If so, does the CBA identify the non-monetized costs?	12	83%	4	75%
Do the monetized benefits exceed the monetized costs?	36	92%	5	60%
ANALYTICAL TRANSPARENCY				
Does the CBA discuss analytical models in the text?	37	75%	13	31%
Are any models identified as "key," "influential," or "important"?	27	0	4	0
Does the CBA provide links to ALL named models?	27	5%	4	0
Does the CBA provide detailed descriptions of ALL named models?	27	70%	4	25%
Does the CBA provide a link to ANY named model?	27	46%	4	0
Does the CBA provide a detailed description of ANY named model?	27	81%	4	50%
Does the CBA indicate that any of the models confidential, proprietary, or otherwise unavailable?	27	4%	4	0%
Does the CBA discuss data in the text?	37	97%	13	100%
Is any data identified as identified as "key," "influential," or "important"?	37	19%	13	8%
Whenever the CBA discusses data, does it provide a citation?	36	11%	13	8%
Does the CBA provide a citation at least one time when it discusses data?	36	91%	13	83%
Is any of the data confidential, proprietary, or otherwise unavailable?	36	17%	13	15%
Are any government reports or regulations cited as references for data?	36	91%	13	85%
Are any unpublished reports (not published in journals) cited as references for data?	36	25%	13	15%

A. Process Transparency

Process transparency focuses on features related to the timely disclosure of the analysis and its role in agency decisionmaking. Such disclosure is necessary for meaningful public engagement on substantive issues relating to CBA.

For CBAs prepared by executive agencies, process transparency is relatively high on at least some dimensions. About two-thirds of CBAs (68 percent) identify an internal office or division as their source. About 44 percent of CBAs identify an external organization as collaborating with an agency on the CBA.[78] For the remaining CBAs, agencies either received no external support or did not disclose it. Only two CBAs, both from the Department of Transportation, list individual author names. As far as we know, no previous study has examined this feature of process transparency.

Most CBAs (86 percent) are prepared as separate documents posted to Regulations.gov, a government website that provides key rulemaking information.[79] The website was launched in January 2003 as part of the eRulemaking Program based within the EPA.[80] The goal was to increase public access to regulatory materials and increase public participation in rulemaking.[81] On Regulations.gov, relevant information on each rulemaking is typically organized into a "docket folder" for interested parties. Each docket is divided into "Primary Documents," which typically contain the proposed and final rules, and "Supporting Documents," which contain economic and environmental analyses, studies and other references, transcripts of hearings, and public comments. CBAs are typically posted to the docket's supporting documents section.[82]

The CBAs themselves are not consistently named, but they are most commonly referred to as regulatory impact analyses, technical support documents, or economic analyses. In most cases (84 percent), agencies post the preliminary

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[78] The Department of Energy prepared all of its CBAs in collaboration with Navigant Consulting, Inc. and Lawrence Berkeley National Laboratory. Other external organizations that were identified in our sample were Eastern Research Group, Inc., Abt Associates Inc., Econometrica, Inc., EC/R Incorporated, and ICF International.

[79] *See* REGULATIONS.GOV, GOVERNANCE, https://www.regulations.gov/aboutProgram (last visited Aug. 19, 2019). The executive steering committee for the eRulemaking Program is chaired by EPA and OMB. About 14 percent of CBAs were not in a separate document. Instead, the expected costs and benefits were summarized in the notice of proposed rulemaking. About 5 percent of CBAs were posted only on an agency's website and not on Regulations.gov.

[80] *See* E-Government Act of 2002, Pub. L. No. 107-347, § 206, 116 Stat. 2899, 2915-16 (establishing eRulemaking Program); *About Us*, REGULATIONS.GOV, https://www.regulations.gov/aboutProgram [https://perma.cc/69P6-R5GA] (last visited Aug. 19, 2019) (describing the eRulemaking Program). EPA's eRulemaking Management Office (PMO) works with the Office of Management and Budget (OMB) and other agencies to develop the website. *Id.*

[81] *See About Us*, *supra* note 80.

[82] Of CBAs posted on Regulations.gov, 91 percent were posted to the Supporting Documents section.

analyses to the docket shortly before or on the same day as the proposed rulemaking, giving interested parties at least 60 days to comment on the analyses.[83] About 56 percent of the rulemaking dockets we analyzed also included in the Supporting Documents section at least some models, spreadsheets, and data. Again, it appears that no previous study has reported these aspects of process transparency.

Only about half (46 percent) of CBAs discuss the relationship of the CBA to an agency's ultimate decision in its opening sections. The role of the CBA in an agency's decisionmaking is critical for understanding the administrative process. Without it, it is difficult to tell whether improvements to the CBA would make any difference to an agency's chosen regulatory action. Jerry Ellig and Patrick McLaughlin have qualitatively measured whether agencies provide evidence for how they used the CBA in their rulemakings, also finding that many regulations lack clear evidence that an agency used the CBA in its decisionmaking.[84]

In contrast, CBAs prepared by independent agencies often do not satisfy include many of the features that we identified as promoting process transparency. In particular, CBAs are never publicly available as separate documents, which means that expected impacts are provided only briefly in the notices of proposed rulemakings. The analysis is not separately authored, there is little discussion of the analysis's role, and the notice of proposed rulemaking is not consistently posted on Regulations.gov.[85]

B. Policy Transparency

Policy transparency focuses on the presentation of estimated impacts of regulatory actions. The majority of CBAs prepared by executive agencies for significant actions lack basic policy transparency. Of the 167 such CBAs issued during our time period, only 37 monetized at least some costs and benefits—

[83] Agencies are encouraged to provide interested parties at least 60 days to comment on proposed regulations during notice-and-comment rulemaking. *See* APA, § 553; *see also* Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 21, 2011).

[84] Ellig, Jerry, and Patrick A. McLaughlin. 2012. "The Quality and Use of Regulatory Analysis in 2008." Risk Analysis 32: 855–80 (evaluating "Use of Analysis: Does the proposed rule or the RIA present evidence that the agency used the Regulatory Impact Analysis?" and finding that CBAs averaged 2.44 out of 5 on this measure).

[85] Independent agencies tend not to participate in Regulations.gov. REGULATIONS.GOV, NONPARTICIPATING AGENCIES, https://www.regulations.gov/docs/Non_Participating_Agencies.pdf (last visited Aug. 19, 2019) (including agencies such as Securities and Exchange Commission, which often prepares CBAs). When independent agencies posted documents to Regulations.gov, the documents were typically posted as free-standing documents, without a full rulemaking docket containing all primary and supporting documents in one place. Our reviewers located notices for 69 percent of our sample of CBAs from independent agencies by searching agency websites.

about 22 percent.[86] This means that a small portion of CBAs actually present estimates of the expected effects of significant agency actions. The subset of CBAs with this basic empirical policy transparency is the sample we use for the scorecard analysis.

Almost all of the CBAs in our sample contained an executive summary or overview (97 percent). This is a significant improvement when compared with findings from earlier research in this area,[87] but this result might be driven by our more recent sample that consists of CBAs that monetized at least some costs and benefits. In our sample, the overview summarized the basic components of costs and benefits about 75 percent of the time and presented these in a table about 83 percent of the time.[88] It is less common for a the summary to discuss important models (22 percent) and data (42 percent) used in the analysis.

Because we chose CBAs that monetized some relevant impacts, our entire sample provides basic information about costs and benefits. For those that state that there exist non-monetized costs or benefits, 86 percent identify at least some of these non-monetized costs or benefits. In the vast majority of cases, 89 percent of our sample, the monetized benefits exceed the monetized costs.[89]

CBAs prepared by independent agencies also had low scores on policy transparency. Although all CBAs contain an executive summary of the analysis, these summaries rarely discuss the components of costs and benefits. The monetized benefits exceed the monetized costs in only about 23 percent of CBAs. It is clear that non-monetized benefits play a large role in justifying agency action, but non-monetized benefits are not always identified and described.[90]

C. Analytical Transparency

Analytical transparency is the subset of policy transparency that focuses on the identification and availability of models and data that underlie the estimation of policy effects. Almost all of the CBAs from executive agencies in our sample discuss models (75 percent) or data (97 percent). Notably, however, no CBAs identified any model as influential or important, and only eight CBAs identified

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[86] When we exclude transfer rules, our sample is more than 30 percent of the CBAs prepared for significant rules. For example, for rules prepared between October 2015 and September 2016, agencies prepared 81 CBAs, where 31 CBAs were for transfer rules. Excluding transfer rules, our sample of 15 CBAs from that period is 31 percent of CBAs. *See, e.g.*, *See 2017 Draft Report to Congress*, *supra* note 10.

[87] *See e.g.*, Hahn et al., *supra* note 24, at 876 (finding that only half of CBAs contained an executive summary).

[88] This percent is higher than found in prior studies. *See id.* (finding that 29 percent of CBAs used an executive summary to present tables of qualitative or quantitative estimates of benefits and costs).

[89] This percent is higher than found in prior studies. *See id.* at 870 (finding that only 28 percent of the rules present information on net benefits).

[90] About 54 percent of CBAs identify non-monetized benefits, even though about 77 percent of the sample does not monetize benefits.

some data as influential or important. Of those CBAs that mention models, most describe all the the named models in detail (70 percent). No CBA links to all the named models, but 46 percent provide a link to at least one named model. While only about 11 percent of CBAs provide a citation each time they discuss data, almost all of them (91 percent) provide a citation at least once when they discuss some relevant data. The CBAs in our sample do not disclose any reliance on confidential or proprietary models, but 16 percent of CBAs disclose that they rely on some data that are confidential, proprietary, or otherwise unavailable.

When discussing cost and benefit estimates, the vast majority of references and citations are to studies published in peer-reviewed journals and studies or prior analyses in government documents; rarely do CBAs cite unpublished sources.[91] While the government documents cited in CBAs might also rely on peer-reviewed studies, it is not clear that they do. In any event, citing to the government documents requires interested parties to parse through another source that did not go through independent verification.

Our findings on analytical transparency are consistent with prior work by Jerry Ellig and Patrick McLaughlin. They qualitatively measured what we call analytical transparency on a scale from 0 to 5 for a subset of CBAs. The lowest score (0) indicated that the CBA provided "No evidence the agency did any research to identify plausible models or assumptions," while the highest score (5) indicated that "All aspects of models and assumptions are consistent with or based on cited literature or analyses. It is obvious to the reader that cited works are recent, peer-reviewed scientific publications."[92] They found the average score on this measure to be 2.83 out of 5, suggesting that only some models and data were identified and supported by peer-reviewed literature.[93]

Very few CBAs prepared by independent agencies discuss, cite, or provide links to all models and data. About 83% provided a source for at least one source of data. Two out of the thirteen CBAs in our sample disclose that they rely on confidential, proprietary, or otherwise unavailable data.

D. Case Studies

In this Section, we describe our highest and lowest scoring CBAs to provide insights for the value of transparency in CBA. The most transparent executive

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[91] In chapters devoted to benefits, executive-agency CBAs cited to unpublished studies about 5 percent of the time. In chapters devoted to costs, executive-agency CBAs cited to unpublished studies about 14 percent of the time.

[92] Ellig & McLaughlin *supra* note 24, 855–80.

[93] *Id.* (excluding transfer regulations). Their description of a score of 3 is "The analysis cited some publications or analyses justifying its assumptions or models, but not all aspects are bolstered by citations." *Id.* In general, their evaluation methodology was comprehensive but qualitative, meant to more accurately capture the quality of the analysis. *Id.* ("The main drawbacks of qualitative evaluation are that the results can be more subjective, less transparent, and harder to replicate. Several aspects of our research design seek to keep these costs within tolerable limits.").

agency CBA as measured by our scorecard is the Department of Energy's (DOE's) CBA for its regulation on warm air furnaces.[94] The regulation prescribes energy conservation standards for commercial warm air furnaces. It is part of the DOE's program to increase energy efficiency in various commercial and consumer products—and all of these CBAs scored highly on our measures of transparency.

The CBA names its Office of Energy Efficiency and Renewable Energy Building Technologies Program and discloses that it was "prepared . . . by staff members of Navigant Consulting, Inc., and Lawrence Berkeley National Laboratory."[95] The preliminary CBA was posted on Regulations.gov two weeks before the notice of proposed rulemaking.[96] It is also available on the agency's website. The CBA was posted in the Supporting Material section of the docket along with all the models and spreadsheets used in the analysis. The CBA also indicates that it is meant to support the rulemaking.[97]

The CBA contains an overview that provides a succinct summary of the different components of costs and benefits, including the values of reductions in carbon dioxide and nitrogen oxide emissions.[98] It presents this summary clearly in a table,[99] providing key information such as the discount rate that it uses in the analysis.[100] The CBA provides descriptions of all named models, though it does not provide links to these models.[101] For example, the CBA describes the Government Regulatory Impact Model (GRIM), a product-specific industry cash-flow model that estimates the financial impact of more-stringent energy conservation standards for each product.[102] GRIM, which contains inputs based on manufacturer interview feedback and discussions, is available as an Excel spreadsheet on the rulemaking docket on Regulations.gov. In fact, all of the models are all available on the rulemaking docket on Regulations.gov. The CBA does not disclose the use of any confidential or proprietary models, and it does

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[94] *See* DEP'T OF ENERGY, TECHNICAL SUPPORT DOCUMENT: ENERGY EFFICIENCY PROGRAM FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT: COMMERCIAL WARM AIR FURNACES (2015) [hereinafter DOE, WARM AIR FURNACES]. Another CBA, the Environmental Protection Agency's CBA for its landfills regulation, was a close second. *See* EPA, REGULATORY IMPACT ANALYSIS FOR THE FINAL REVISIONS TO THE EMISSION GUIDELINES FOR EXISTING SOURCES AND THE NEW SOURCE PERFORMANCE STANDARDS IN THE MUNICIPAL SOLID WASTE LANDFILLS SECTOR (2016), The top five included three DOE CBAs, one EPA CBA, and one DOT CBA.

[95] DOE, WARM AIR FURNACES, supra note 93.

[96] See REGULATIONS.GOV, RULEMAKING DOCKET, https://www.regulations.gov/docket?D=EERE-2013-BT-STD-0021 (last visited Aug. 19, 2019). The proposed rule was posted on 2/4/15, while the preliminary CBA was posted on 1/20/15. *Id.*

[97] This could be clearer, but we find that CBAs rarely provide more detail than this acknowledgement—if they acknowledge the role of the CBA at all.

[98] *See* DOE, WARM AIR FURNACES, supra note 93, at 1-2.

[99] *Id.*

[100] *Id.* at 1-1.

[101] *Id.* at 2-5 to 2-13.

[102] *Id.* at 12B-1 to 12B-3.

not appear that any such models were actually used. The descriptions of the models discuss assumptions and acknowledge uncertainties. The CBA also identifies key data, what it calls key inputs and outputs,[103] and it discusses the sensitivity of estimates to certain data.[104] All data contain citations, and the CBA does not rely on unpublished studies.[105]

The least transparent executive agency CBA as measured by our scorecard is the Department of Justice's CBA implementing regulations relating to the dispensing of drugs for opioid use disorders.[106] This rulemaking expanded the categories of practitioners who may, under certain conditions, dispense a narcotic drug for the purpose of maintenance treatment or detoxification treatment. The rulemaking docket on Regulations.gov is very sparse. It does not contain a proposed rule or preliminary CBA or any other supporting material; it includes only the final CBA and final rule. The final CBA does not mention any authors, and it was posted a few days after the final rule.[107] The CBA contains an executive summary and monetizes some effects.

The CBA also does not clearly describe its role in the agency's decisionmaking. Further review of the final rule reveals that the agency did not rely on the CBA at all. It states that "[the agency] is obligated to issue this final rule to revise its regulations so that they are consistent with [statutory requirements and another agency's rulemaking]. . . Thus, [the agency] would have to issue this final rule regardless of the outcome of the agency's regulatory analysis. Nonetheless, [the agency] conducted this analysis as discussed below."[108] This is also why the agency did not seek comments on the rule in advance.[109] None of this detail was disclosed in the CBA itself.

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[103] *Id.* at 2-1.

[104] *See, e.g.*, DOE, WARM AIR FURNACES, supra note 85, at 1-2 ("For DOE's Primary Estimate and Low Net Benefits Estimate, the agency is presenting a national benefit-per-ton estimate for particulate matter emitted from the Electric Generating Unit sector based on an estimate of premature mortality derived from the ACS study (Krewski et al., 2009). For DOE's High Net Benefits Estimate, the benefit-per-ton estimates were based on the Six Cities study (Lepuele et al., 2011), which are nearly two-and-a-half times larger than those from the ACS study.").

[105] *Id.* (four references in benefits chapter, three citing to peer-reviewed journals and one citing to a government document).

[106] DEP'T OF JUSTICE, IMPLEMENTATION OF THE PROVISION OF THE COMPREHENSIVE ADDICTION AND RECOVERY ACT OF 2016 RELATING TO THE DISPENSING OF NARCOTIC DRUGS FOR OPIOID USE DISORDER. The least transparent CBAs overall were CBAs from independent agencies, see FDIC and SEC. The DOJ CBA was the only executive agency CBA in the top five least transparent. SEC CBAs were three of the top five.

[107] The CBA was posted on Jan. 25, 2018, while the final rule was posted on Jan. 23, 2018. *See* DOCKET, https://www.regulations.gov/docket?D=DEA-2018-0002 (last visited Aug. 19, 2019).

[108] DOJ, FINAL RULE, https://beta.regulations.gov/document/DEA-2018-0002-0001.

[109] It was issued the rule as a final rule without notice-and-comment under APA's § 553 good-cause exception from notice-and-comment rulemaking requirements.

It is therefore possible that this CBA is not transparent because the value of transparency was low in light of the minimal role the CBA played in this rulemaking. Notwithstanding this possibility, the agency should have at least clarified the CBA's minimal role in the CBA. But the example highlights why a flexible approach to transparency makes sense; there exist cases where the benefits of many kinds of additional transparency might not outweigh the costs.

V. RECOMMENDATIONS

Our results reveal that even among the most complete CBAs, there are substantial gaps in both process transparency and policy transparency. Proponents of increased transparency in CBA are right to question a practice of preparing CBAs without disclosure of key information about their creation and role, and without adequate documentation on the underlying models and data.

Our analysis also reveals that there are relatively inexpensive ways to greatly increase transparency. Examples include timely posting CBAs in the rulemaking docket and noting whether and how an agency used the CBA in its decisionmaking. In this Part, we discuss several possible reforms in each category of transparency. Table 3 provides an overview of these recommendations and summarizes our subjective estimate of their costs and benefits.

Table 4. Recommendations for Improving Transparency

Recommendation	Costs and Benefits
Process Transparency	
1. Timely posting all CBAs on Regulations.gov and improving the search function on the site	Costs – minimal to modest. Agencies already prepare CBAs before finalizing a notice of proposed rulemaking and most agencies already post them. Benefits – substantial. Timely access to CBAs is fundamental to transparency in decisionmaking. Even when CBAs are posted, the current search function makes it difficult to find CBAs.
2. Identifying CBA authors and collaborators	Costs – minimal. Benefits – modest. Value in understanding who plays a role in developing the analysis.
3. Explicitly discussing the CBA's role in an agency's decisionmaking at the outset	Cost – minimal. Benefits – substantial. Interested parties should know how important the consideration of costs and benefits was to an agency's ultimate decision.
Policy Transparency	
1. Clearly identifying components of costs and benefits, especially non-monetized costs and benefits that are important to an agency's conclusions	Costs – moderate. Agencies should already identify important categories of costs and benefits. If they do, then this recommendation imposes few costs. If they do not, then this recommendation will impose moderate costs. Benefits – substantial. Interested parties can understand the expected effects of the rule.
2. Identifying, describing, and posting all key models used to calculate estimates of costs and benefits	Costs – minimal. Benefits – substantial. Interested parties would be able to scrutinize and improve models.
3. Identifying and citing all key inputs—the data and the assumptions—employed in models in order to calculate costs and benefits	Cost – minimal. Benefits – substantial. This recommendation does not require agencies to obtain and post underlying data from studies, but it would require agencies to clearly identify and cite the relevant studies.
4. Disclosing reliance on confidential, proprietary, or unpublished models and data	Costs – minimal. Benefits – moderate. This recommendation flags areas where more transparent and independently verified research might be valuable.

Notes: These estimates of costs and benefits represent our subjective assessments.

A. Process Transparency

Improving process transparency is not only fundamentally important but also likely to be relatively inexpensive across the board. Below we describe the three proposals for improving process transparency described in Table 4.

1. Timely posting all CBAs on Regulations.gov and improving the search function on the site

We suggest that all CBAs should be easy to find online, preferably in one place such as the rulemaking docket on Regulations.gov.[110] Thus, our first recommendation in Table 4 is for *all agencies* to post CBAs on Regulations.gov *before the notice of proposed rulemaking* and to improve the *ease of searching* for CBAs on the website. This recommendation is reflected in President Obama's Executive Order 13,563, which required agencies to provide "timely online access to the rulemaking docket on [R]egulations.gov, including relevant scientific and technical findings, in an open format that can be easily searched and downloaded."[111] Our recommendations are broadly consistent with this directive.

Currently, most executive agencies participate in Regulations.gov,[112] but most independent agencies do not.[113] While these agencies might post material such as proposed and final rules on Regulations.gov, they tend not to create dockets that contain supporting documents and other material. This group includes independent agencies such as the Federal Communications Commission, the Federal Deposit Insurance Corporation, and the Securities and Exchange Commission, even though courts have interpreted their statutory mandates as requiring an analysis of costs and benefits.[114] Independent agencies should be encouraged to participate in Regulations.gov so that their analyses are accessible to interested parties.

Simply posting CBAs on Regulations.gov, however, is not sufficient. The analyses should be (1) easy to locate within the rulemaking dockets and (2) posted before the notice of proposed rulemaking. First, we recommend that Regulations.gov be revamped to allow interested parties to more easily locate important supporting documents such as CBAs. The website is already a useful

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[110] We also found that independent agencies rarely create rulemaking dockets on Regulations.gov. They should follow executive agency practice in this regard.

[111] *See* Exec. Order No. 13563, 76 Fed. Reg. 3821, *supra* note 21, at 3821–22 (directing agencies to "promote that open exchange" by providing "an opportunity for public comment on all pertinent parts of the rulemaking docket, including relevant scientific and technical findings").

[112] REGULATIONS.GOV, PARTICIPATING AGENCIES, https://www.regulations.gov/docs/Participating_Agencies.pdf (last visited Aug. 19, 2019).

[113] REGULATIONS.GOV, NONPARTICIPATING AGENCIES, https://www.regulations.gov/docs/Non_Participating_Agencies.pdf (last visited Aug. 19, 2019).

[114] *See, e.g.*, Bus. Roundtable v. SEC, 647 F.3d 1144, 1448-49 (D.C. Cir. 2011); Chamber of Commerce of the U.S. v. SEC, 412 F.3d 133, 136 (D.C. Cir. 2005).

resource, providing important information on agency rulemaking, but many features could be improved. Regulations.gov currently allows interested parties to sort searches by notice, proposed rule, final rule, supporting and related material, and public comments. CBAs are typically posted as supporting material, and agencies vary how much supporting material they post in the docket; some agencies, such as the EPA, post hundreds of supporting documents. Agencies should not be discouraged from providing additional rulemaking information, but less useful information should not drown out highly relevant material, such as the CBA when it summarizes the basis for an agency's action. Regulations.gov would be improved if it would separately sort CBAs and other impact assessments, ensuring that they are easy to find within the rulemaking docket.[115] This could be done by allowing interested parties to sort searches by CBA or by designating a separate category on the docket for CBAs.

The eRulemaking Management Office within EPA is tasked, along with OMB, with ensuring that Regulations.gov provides timely and efficient access to important rulemaking documents.[116] The eRulemaking Management Office and OMB should work together to implement these changes to Regulations.gov. In fact, eRulemaking Management Office is actively testing a new beta version of the website that already vastly improves the functionality of the search and the organization of each docket.[117] But the new version still does not help sot CBAs from other supporting documents. The changes we propose here should be next on eRulemaking Management Office's agenda.

Second, these analyses should also be posted in advance of the proposed rulemaking to ensure adequate time for review and scrutiny by interested parties. This recommendation dovetails with recent proposals for more notice in advance of proposed rulemakings.[118] At the very least, CBAs should be posted along with the proposed rulemaking so that interested parties have the ability to review and comment on it within the comment period—typically 60 days. This recommendation may impose modest costs on an agency in coordinating the release of rulemaking information, but in our view, it is needed for the CBA to play a more useful role in the administrative process. The President or OIRA could direct agencies to post CBAs before the notice of proposed rulemaking.

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[115] It is not easy to find CBAs even knowing the rulemaking docket, the regulation's RIN, or the CBA's title. The current Regulations.gov search returns many results, and some dockets contain hundreds of supplemental materials.

[116] *See* REGULATIONS.GOV, GOVERNANCE, https://www.regulations.gov/aboutProgram (last visited Aug. 19, 2019). The executive steering committee for the eRulemaking Program is chaired by EPA and OMB.

[117] See REGULATIONS.GOV BETA, https://beta.regulations.gov.

[118] *See* Susan E. Dudley & Sally Katzen, *Crossing the Aisle to Streamline Regulation*, WALL ST. J. (May 13, 2019, 7:04 PM), https://www.wsj.com/articles/crossing-the-aisle-to-streamline-regulation-11557788679; *see also* Early Participation in Regulations Act of 2019, S. 1419, 116th Cong. (2019); Setting Manageable Analysis Requirements in Text Act of 2019, S. 1420, 116th Cong. (2019).

2. Identifying CBA authors and collaborators

Next, we recommend that each CBA clearly identify the authors, whether they are specific individuals or an internal office within an agency. It should always disclose any involvement of an external organization. This recommendation would impose very little cost on an agency but provide some needed and consistent transparency about the offices and groups that play a role in developing the analysis. Identifying authors would increase trust in the analysis and encourage developing expertise within an agency.

3. Explicitly discussing the CBA's role in an agency's decisionmaking at the outset

Finally, we recommend that all CBAs discuss the role of the analysis in an agency's decisionmaking. In particular, the executive summary or introduction should state clearly and explicitly whether an agency relied on the analysis to inform its decisionmaking and support its action—and if it did not, it should disclose the agency's reason for not doing so in light of Executive Order 12,866. Current judicial review under APA allows interested parties to challenge an agency's CBA for its reasonableness and even to request underlying data, as long as the interested parties raise these challenges and requests during the rulemaking process.[119] When interested parties seek to challenge the quality of an agency's CBA, courts will require a clear statement from the agency on how it used the analysis—as courts will generally only review the adequacy of an agency's states reasons for its action.[120] If an agency did not rely on the CBA, for example, then challenging the CBA's underlying data or choice of model as being of poor quality is, in most cases, fruitless as any error would be harmless.[121]

These low-cost recommendations for increasing process transparency would help improve rulemaking over time and increase accountability. In many ways, process transparency is a prerequisite to using a CBA's policy transparency.

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[119] *See* Administrative Procedure Act, 5 U.S.C. § 553 (2019); Am. Radio Relay League, Inc. v. FCC, 524 F.3d 227, 236 (D.C. Cir. 2008).

[120] *See generally* SEC v. Chenery Corp. (*Chenery I*), 318 U.S. 80 (1943) (stated reasons); Cecot & Viscusi, *supra* note 42, at 592 (summarizing when challenges to CBA tend to be successful). *See also* Michigan v. EPA, 135 S. Ct. 2699, 2711 (2015) (refusing to evaluate the EPA's CBA because "[t]he Government concedes . . . that 'EPA did not rely on the [CBA] when deciding to regulate power plants,' and that '[e]ven if EPA had considered costs, it would not necessarily have adopted . . . the approach set forth in [that analysis]'").

[121] If an agency lawfully does not rely on the analysis, then errors in the analysis do not call into question the agency's reasoning. But a well-conducted analysis, if it casts doubt on an agency's reasoning or conclusions, could still be useful to challengers even when the agency did not rely on it. Cecot & Viscusi, *supra* note 42, at 592.

B. Policy Transparency

In this Section, we provide four recommendations, summarized in Table 4, for improving policy transparency of CBAs.

1. Clearly identifying components of costs and benefits, especially non-monetized costs and benefits that are important to an agency's conclusions

First, we recommend that agencies clearly identify the different categories of costs and benefits considered in the analysis and monetize impacts to the extent feasible. Researchers who have used scorecard methods to grade agency CBAs often recommend that more CBAs monetize at least some costs and benefits and present those impacts clearly. This information helps interested parties evaluate government policies. This recommendation bears repeating in light of the small number of CBAs that provide an estimate of both costs and benefits (our sample of CBAs from executive agency is 22 percent of CBAs prepared by executive agencies during that period).

When identifying and describing categories of costs and benefits, we encourage agencies to include the non-monetized ones, too. Our analysis demonstrates that these impacts are not always described. These descriptions are particularly important in those CBAs that do not provide any estimate of costs or benefits because such CBAs rely on nonmentioned costs or benefits for an agency's decision on whether or not to proceed with the regulatory action. Of course, in some cases, it may be impossible to quantify or monetize all costs and benefits, at least at this time.[122] Executive Order 12,866 explicitly recognizes this fact. It does not mean that an agency cannot act on an important issue unless all possible costs and benefits can be monetized. But if an agency believes that these non-monetized impacts are sizeable—and especially if they change the overall cost-benefit assessment—then these should be identified and discussed qualitatively.[123] By identifying and describing these impacts, an agency flags important areas where additional research and retrospective review would be particularly valuable.

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[122] The categories of impacts that cannot be monetized is not static but rather shrinks over time. *See, e.g.*, Cecot, *supra* note 23 ("Over time, the set of unquantified effects gets ever smaller as research into impacts improves."); Richard L. Revesz, *Quantifying Regulatory Benefits*, 102 CAL. L. REV. 1423, 1436 (2014) ("The evolution of regulatory cost-benefit analysis over the past several decades shows that agencies have eventually come to quantify important categories of benefits that they once considered nonquantifiable.").

[123] This recommendation reinforces other recommendations to clarify the role of non-monetized costs and benefits, such as through break-even analysis or retrospective review. *See, e.g.*, Jonathan S. Masur & Eric A. Posner, *Unquantified Benefits and the Problem of Regulation Under Uncertainty*, 102 CORNELL L. REV. 87, 92 (2016) (providing a framework for accounting for these effects); Revesz, *supra* note 124, at 1425 (recommending break-even analysis); Robert W. Hahn, *The Economic Analysis of Regulation: A Response to the Critics*, 71 U. CHI. L. REV. 1021, 1037–38 (2004) (incentivizing monetization by attaching less weight to non-monetized effects).

2. Identifying, describing, and posting all key models used to calculate estimates of costs and benefits

3. Identifying and citing all key inputs—the data and the assumptions—employed in models in order to calculate costs and benefits

Our second and third recommendations for improving policy transparency focus on analytical transparency. Our analysis of CBA's analytical transparency revealed fundamental gaps that could be easily addressed. Each agency, for example, should identify important models and data used in the CBA—just as the DOE currently does—and provide links and citations to the models and studies. A recent OMB guidance document encourages agencies to do this.[124] It asks agencies to identify "influential" information (models or data) and to reveal "the specific methods, design parameters, equations or algorithms, parameters, and assumptions used" in its analyses.[125] It is too early to tell whether this guidance is being implemented.

These recommendations highlight the incremental steps that agencies could take to improve transparency and availability of models, short of maintaining a depository and/or only allowing consideration of open data. In particular, agencies could provide tables summarizing the models and data they think are important, with links and references. Our analysis reveals that some agencies, such as the DOE, follow best practices in posting important spreadsheets and models in the rulemaking docket. This practice should be more widespread. All agencies should disclose and make available all models along with important inputs and assumptions. This recommendation would not require posting the raw data that underlies important studies, such as the Six Cities study discussed in the introduction. Rather, this recommendation would require, say, disclosing the model that quantifies reductions in fine particulate matter and citing the study that informs monetization of these reductions. Requiring that all underlying raw data from the scientific studies used to generate estimates be made readily available is a far larger task. Recent proposals ask for this, but it seems premature to require this.[126]

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[124] OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, OMB M-19-15, IMPROVING IMPLEMENTATION OF THE INFORMATION QUALITY ACT 3 (Apr. 24, 2019).

[125] *Id.*

[126] Our analysis suggests that the incremental benefits of having agencies collect and post the underlying data might be low, regardless of whether the costs of doing so are $46 million or $250 million for an agency each year. First, there are preliminary process transparency and policy transparency issues that would need to be addressed first, such as disclosure of the CBA's role in the decisionmaking and its estimate of impacts. Second, by simply relying on peer-reviewed studies, as agencies typically do, agencies can take advantage of the fact that many journals are adopting their own disclosure policies. In other words, those interested in examining the underlying data from a study that supports an agency estimate may be able to do so by going to the journal that published the study. If the study was government-funded, agencies are already developing plans to ensure that the underlying data is publicly available.

4. Disclosing reliance on confidential, proprietary, or unpublished models and data

Finally, agencies should disclose the use of any confidential and proprietary models and data as well as on unpublished studies. In fact, agencies might choose to limit reliance on such data when possible, at least if better data or studies are available. Such disclosure would flag areas where more transparent and independently verified research might be valuable. Future analyses can more easily revisit those estimates in light of newly published or more verifiable studies and models.

OIRA already regularly reviews executive agency CBAs under Executive Order 12,866 and issues guidelines on preparing these analyses.[127] The agency is thus best-positioned to implement these four recommendations for improving policy transparency and strike the right balance between ensuring consistency and allowing flexible approaches in light of the different rulemaking contexts. A legislative approach, in contrast, is likely to be overly blunt. And agency requirements, meanwhile, would likely lack consistency. Our analysis, for example, reveals how differently agencies approach transparency in CBA. Under OIRA's oversight, agencies could tinker with the level of analytical transparency, and OIRA could provide exceptions based on its experience over time. We recognize that OIRA is famously understaffed, but these proposals are modest. In addition, we think that over time, compliance with these transparency recommendations could simplify OIRA's tasks by making the analyses clear and well-organized.

VI. CONCLUSIONS

Our analysis shows that, for many recent CBAs, basic process and policy transparency is lacking. This is especially true for CBAs from independent agencies. We propose a series of low-cost and simple recommendations for improving transparency, which can be implemented by OIRA. These recommendations come at an important moment, when there are rising concerns about the legitimacy of agency actions and questions about the judiciary's continued role in promoting transparency.

It might seem odd that such recommendations have not already been implemented. The most plausible explanation is that there is a disconnect between those who bear the costs of increasing transparency and those who reap the benefits. Increasing transparency would impose near-term costs on an agency. These costs include direct costs of explaining methodologies and making models and data available, as well as indirect costs of responding to challenges and correcting errors. The benefits, in turn, are less direct. They include enhanced credibility and trust, reproducibility, and better rulemaking.

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[127] *See* Exec. Order No. 12866, 58 Fed. Reg. 51735, *supra* note 21. OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, *supra* note 25, at 17.

Our recommendations also have another benefit: they can be implemented immediately without additional congressional action. But that's not to say that there might not be an important role for Congress to play. For example, Congress could explicitly authorize judicial review that promotes disclosure of important data such as the CBA and its underlying models. Courts have interpreted the APA's requirements for notice-and-comment rulemaking as requiring a certain level of disclosure in order to ensure that comments and judicial review can be meaningful.[128] This "fire alarm" oversight system polices significant breaches of decisionmaking transparency that involve important underlying data and models.[129] There are concerns, however, about the continuing viability of this method of obtaining this disclosure.[130] An explicit legislative requirement codifying judicially required disclosure for meaningful notice-and-comment may be useful.

Notably absent from our recommendations is a proposal to make all underlying data and models from studies that a CBA relies on to be publicly available. We think such a proposal is premature for at least four reasons. First, if not carefully crafted, such a requirement might exclude potentially useful information, such as the Six Cities Study that relied on confidential data, despite that fact that is was published in a prestigious peer-reviewed journal and has been replicated. Second, this proposal is potentially much costlier than some of our other recommendations and deserves a more careful cost-benefit analysis. Third, many CBAs already rely on studies in peer-reviewed journals, which are moving toward more openness in making data and models from their publications available. The benefits, then, of having the government duplicate these efforts seem low. And finally, the value of disclosure of underlying data and models from supporting studies is tied to transparency of the role of the studies in the CBA (policy transparency) and of the role of CBA in the agency's ultimate decisionmaking (process transparency). It seems the first step is to ensure compliance with these basic dimensions of transparency in CBA.

Overall, our proposals would ensure that all interested parties have a clear idea of the rational connection between the CBA (and the models and data that underlie its estimates) and an agency's ultimate decision. While we believe our recommendations have value for the public, we are under no delusion that Congress would necessarily support them. In some cases, legislators may not wish to know the expected benefits and costs associated with their policies and may also not wish that this information be made more transparent. At the same

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[128] *See, e.g.*, Sierra Club v. Costle, 657 F.2d 298, 403–04 (D.C. Cir. 1981); Portland Cement Ass'n. v. Ruckelshaus, 486 F.2d 375, 402 (1973).

[129] The reference is to the metaphor used in a famous article about congressional oversight. *See* Mathew D. McCubbins & Thomas Schwartz, *Congressional Oversight Overlooked: Police Patrols versus Fire Alarms*, 28 AM. J. POLITICAL SCIENCE 165 (1984).

[130] *See* Am. Radio Relay League, Inc. v. FCC, 524 F.3d 227, 245 (Kavanaugh, J., dissenting) (arguing that these disclosure requirements are not sufficiently explicit in the APA and are therefore in tension with Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, 435 U.S. 519 (1978)).

time, legislators have shown an intermittent interest in developing better and more transparent policy outcomes and in measuring the results of government policies.[131]

It took decades for CBA to achieve widespread acceptance as an important tool in the decisionmaking process of regulatory agencies. But key to its continued success is the public's trust in the soundness of the analysis, which is related to the extent of process transparency and policy transparency. Without crucial and meaningful transparency, CBA is susceptible to attacks that it is too easily manipulated for the benefit of key politicians and interest groups. We hope that this line of research can shed some light on how to measure transparency better and identify actions that, at a minimum, would improve the regulatory process.

[131] *E.g.*, Foundations for Evidence-Based Policymaking Act (P.L. 115-435) (Jan. 2019).

Appendix

Table A1. Sample

Executive Agencies		
Agency	**Rule**	**Year***
USDA	New Performance Standards for Salmonella and Campylobacter in Not-Ready-to-Eat Comminuted Chicken and Turkey Products and Raw Chicken Parts	2016
DOE	Energy Efficiency Standards for Commercial Warm Air Furnaces	2016
DOE	Energy Efficiency Standards for Residential Dehumidifiers	2016
DOE	Energy Efficiency Standards for Commercial and Industrial Pumps	2016
DOE	Energy Efficiency Standards for Residential Boilers	2016
HHS	Electronic Health Record Incentive Program	2016
HHS	Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption	2016
DHS	Electronic Visa Information Update System	2016
DOT	Electronic Logging Devices and Hours of Service Supporting Documents	2016
DOT	Operation and Certification of Small Unmanned Aircraft Systems	2016
DOT	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles and Work Trucks: Phase 2	2016
EPA	Standards for Municipal Solid Waste Landfills	2016
EPA	Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles—Phase 2	2016
EPA	Oil and Natural Gas Sector: Emissions Standards for New and Modified Sources	2016
EPA	Third-Party Certification Framework for the Formaldehyde Standards for Composite Wood Products	2016
DOE	Energy Conservation Standards for Central Air Conditioners and Heat Pumps	2017
DOE	Energy Conservation Standards for Dedicated-Purpose Pool Pumps	2017
DOE	Energy Conservation Standards for Walk-In Coolers and Walk-In Freezers	2017
HHS	Federal Policy for the Protection of Human Subjects; Final Rules	2017
HHS	Nutrition Labeling of Standard Menu Items in Restaurants and Similar Retail Food Establishments	2017
DOI	Waste Prevention, Production Subject to Royalties, and Resource Conservation	2017
DOL	Walking Working Surfaces and Personal Fall Protection Systems (Slips, Trips, and Fall Prevention)	2017
DOL	Occupational Exposure to Beryllium	2017
DOL	Definition of the Term Fiduciary--Delay of Applicability Date	2017
USDA	NOP; Organic Livestock and Poultry Practices	2017
DHS	Definition of Form I-94 to Include Electronic Format	2017
DOT	Sound for Hybrid and Electric Vehicles	2017
DOT	Commercial Driver's License Drug and Alcohol Clearinghouse	2017
DOT	Entry-Level Driver Training	2017
HUD	Instituting Smoke-Free Public Housing	2017
ATBCB	Information and Communication Technology Standards and Guidelines	2017
DOE	Energy Conservation Standards for Miscellaneous Refrigeration Products	2017
DOE	Energy Conservation Standards for Ceiling Fans	2017
DOI	Waste Prevention, Production Subject to Royalties, and Resource Conservation; Revision or Rescission of Certain Requirements	2018

HHS	Revision of the Nutrition and Supplement Facts Labels and Serving Sizes of Foods That Can Reasonably Be Consumed At One Eating Occasion	2018
USDA	Organic Livestock and Poultry Practices	2018
DOJ	Implementation of Regulations Relating to the Dispensing of Narcotic Drugs for Opioid Use Disorder	2018
Independent Agencies		
Agency	**Rule**	**Year***
FDIC	Assessments	2016
SEC	Business Conduct Standards for Security-Based Swap Dealers and Major Security-Based Swap Participants	2016
SEC	Disclosure of Payments by Resource Extraction Issuers	2016
SEC	Security-Based Swap Transactions Connected with a Non-U.S. Person's Dealing Activity that are Arranged, Negotiated, or Executed by Personnel Located in a U.S. Branch or Office or in a U.S. Branch or Office of an Agent; Security-Based Swap Dealer De Minimis Exception	2016
SEC	Simplification of Disclosure Requirements for Emerging Growth Companies and Forward Incorporation by Reference on Form S-1 for Smaller Reporting Companies; Interim Final	2016
SEC	Standards for Covered Clearing Agencies	2016
FDIC	Recordkeeping for Timely Deposit Insurance Determination	2017
SEC	Investment Company Liquidity Risk Management Programs	2017
SEC	Investment Company Swing Pricing	2017
FDIC, etc.	Regulatory Capital Rules: Retention of Certain Existing Transition Provisions for Banking Organizations That Are Not Subject to the Advanced Approaches Capital Rules	2018
SEC	Optional Internet Availability of Investment Company Shareholder Reports	2018
SEC	Regulation of NMS Stock Alternative Trading Systems	2018
SEC	Smaller Reporting Company Definition	2018

Notes: * Year 2016 refers to rules reviewed in fiscal year October 2015 to September 2016; year 2017 refers to rules reviewed in fiscal year October 2016 to September 2017; year 2017 refers to rules reviewed in fiscal year October 2015 to September 2018.

Table A2. Scorecard Questions

PROCESS TRANSPARENCY
Is the preliminary CBA a separate document?
Was the preliminary CBA posted on regulations.gov?
If so, when was the preliminary CBA posted on regulations.gov?
Was the preliminary CBA posted on the agency website?
Was the proposed rule posted on regulations.gov?
If so, when was the proposed rule posted on regulations.gov?
Is the final CBA a separate document?
Was the final CBA posted on regulations.gov?
Does the CBA disclose any author, including specific individuals, an internal office, or an external firm?
If so, does it name individuals?
If so, does it name an internal office?
If so, does it name an external firm?
If the CBA names an external firm, please indicate its name.
In the abstract, executive summary, summary, introduction, or overview (collectively, "ES"), does this CBA mention the relationship between it and the agency's decisionmaking?
In the ES, does the CBA say that it **influenced or otherwise affected** the agency's decisionmaking?
In the ES, does the CBA say that it **supports** the agency's decisionmaking?
In the ES, does the CBA state that the agency **did not** use the analysis in its decisionmaking?
POLICY TRANSPARENCY
Does the CBA contain an "abstract," "introduction," "summary," "overview," or "executive summary" (collectively, "ES")?
Does the ES contain a summary of costs and benefits?
Does the ES identify components of costs and benefits and their numerical values?
If it does, does it do so in a table?
Does the ES indicate the discount rates used in the summary of costs and benefits?
Does the ES identify any models used in the analysis?
Does the ES identify any data used in the analysis?
Does the CBA provide an estimate of some monetized benefits?
Does the CBA provide an estimate of some monetized costs?
Does the CBA state that there are non-monetized benefits?
If so, does the CBA identify the non-monetized benefits?
Does the CBA state that there are non-monetized costs?
If so, does the CBA identify the non-monetized costs?
Do the monetized benefits exceed the monetized costs?
ANALYTICAL TRANSPARENCY
Does the CBA discuss analytical models in the text?
Are any models identified as "key," "influential," or "important"?
Does the CBA provide links to ALL named models?
Does the CBA provide detailed descriptions of ALL named models?
Does the CBA provide a link to ANY named model?
Does the CBA provide a detailed description of ANY named model?
Does the CBA indicate that any of the models confidential, proprietary, or otherwise unavailable?
Does the CBA discuss data in the text?
Is any data identified as identified as "key," "influential," or "important"?

Whenever the CBA discusses data, does it provide a citation?
Does the CBA provide a citation at least one time when it discusses data?
Is any of the data confidential, proprietary, or otherwise unavailable?
Are any government reports or regulations cited as references for data?
Are any unpublished reports (not published in journals) cited as references for data?
Does the CBA contain a chapter or section that discusses the estimates of the regulation's benefits?
If so, how many sources (articles, reports, and other sources) are cited in the footnotes or references to this chapter or section?
If so, how many times does the CBA cite journal-published studies?
If so, how many times does the CBA cite unpublished working papers or books?
If so, how many times does the CBA cite U.S. government reports?
How many times is data linked or directly provided?
Does the CBA contain a chapter or section that discusses the estimates of the regulation's costs?
If so, how many sources (articles, reports, and other sources) are cited in the footnotes or references to this chapter or section?
If so, how many times does the CBA cite journal-published studies?
If so, how many times does the CBA cite unpublished working papers or books?
If so, how many times does the CBA cite U.S. government reports?
How many times is data linked or directly provided?

Notes: There are also additional scorecard questions about specific models which were used in some CBAs.