ARTICLES

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 incremental improvements. 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.

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The Article finds that many agency CBAs lack basic process transparency, meaning that their creation and role in the decisionmaking process is not clear. 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 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 adequately described and made publicly available, it is premature to require that all underlying data from studies used in the CBA be made available. In line with this incremental approach to improving CBA transparency, we argue that the move toward adopting an "open policy framework" in government policymaking should weigh benefits and costs carefully.

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 eleven 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 under the ACE Rule *differently* than it had when assessing the effect of the Clean Power Plan and prior rulemakings under the Obama Administration.[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

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1. Repeal of the Clean Power Plan, 84 Fed. Reg. 32,520 (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. 64,661, 64,662 (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, EPA-452/R-19-003, 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 (2019) [hereinafter ACE RIA], https://www.epa.gov/sites/production/files/2019-06/documents/utilities_ria_final_cpp_repeal_and_ace_2019-06.pdf. We refer to all analyses of regulatory impacts as cost–benefit analyses (CBAs), but these are sometimes referred to as Regulatory Impact Analyses (RIAs), Economic Analyses, or Technical Support Documents.

4. *See id.* at ES-6, 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 4-6–4-28.

5. *See, e.g.*, EPA, EPA-452/R-15-003, REGULATORY IMPACT ANALYSIS FOR THE CLEAN POWER PLAN FINAL RULE (2015) [hereinafter CLEAN POWER PLAN RIA], https://19january2017snapshot.epa.gov/sites/production/files/2015-08/documents/cpp-final-rule-ria.pdf.

6. *Compare* ACE RIA, *supra* note 3, at ES-5, *with* Clean Power Plan RIA, *supra* note 5, at ES-14–ES-16. There is a dispute in the literature about which value is more appropriate in

also presented a supplemental analysis employing a new threshold-based model and set of assumptions that substantially lowered the value of reducing additional particulate 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 risk-management decisionmaking could be critiqued in this way was because an analysis of this high-stakes regulation was prepared and made available to the public. This is not an isolated example. The National Highway Traffic Safety Administration (NHTSA) and EPA have also faced criticism for their proposed rollback of tailpipe rules for vehicles, referred to as the SAFE Rule.[9] Scholars,[10] including the EPA's Science Advisory Board,[11] pointed out serious errors in the agencies' CBA after examining one of its models—errors that could tilt the overall cost–

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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).

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. *See* The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks, 83 Fed. Reg. 42,986 (proposed Aug. 24, 2018) [hereinafter SAFE Proposed Rule]; *see also* DOT & EPA, PRELIMINARY REGULATORY IMPACT ANALYSIS FOR THE SAFER AFFORDABLE FUEL-EFFICIENT (SAFE) VEHICLES RULE FOR MODEL YEAR 2021 – 2026 PASSENGER CARS AND LIGHT TRUCKS 91 (2018) [hereinafter SAFE RIA], https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/ld_cafe_my2021-26_pria_0.pdf. For an overview of the rule, the associated analysis, and the criticism, see Robinson Meyer, *The Trump Administration Flunked Its Math Homework*, THE ATLANTIC (Oct. 31, 2018), https://www.theatlantic.com/science/archive/2018/10/trumps-clean-car-rollback-is-riddled-with-math-errors-clouding-its-legal-future/574249/.

10. *See* Antonio M. Bento et al., *Flawed Analyses of U.S. Auto Fuel Economy Standards*, 362 SCIENCE 1119 (2018); Robinson Meyer, *We Knew They Had Cooked the Books*, THE ATLANTIC (Feb. 12, 2020), https://www.theatlantic.com/science/archive/2020/02/an-inside-account-of-trumps-fuel-economy-debacle/606346/ ("Within weeks of SAFE's publication in August 2018, analyses from outside economists and the Honda Motor Company vindicated the EPA team's assessment. Those groups found that the SAFE study was a turducken of falsehoods: it cited incorrect data and made calculation errors, on top of bungling the basics of supply and demand.").

11. *See* Letter from Michael Honeycutt, Chair, Science Advisory Board (SAB), to Andrew R. Wheeler, Administrator, EPA (Feb. 27, 2020), https://yosemite.epa.gov/sab/sabproduct.nsf/LookupWebProjectsCurrentBOARD/1FACEE5C03725F268525851F006319BB/$File/EPA-SAB-20-003+.pdf.

benefit balance of the proposed rule. Again, the true costs and benefits of the rule would have been obscured had the agencies never produced the analysis or had they concealed key models and assumptions from scrutiny.[12]

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 decisionmakers 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, "[t]ransparency can be a terrific nudge, and it often fuels change."[13]

As agency rulemakings have increased in quantity and importance,[14] there has been renewed interest in agency decisionmaking transparency. By and large, this interest has narrowly focused on the disclosure and availability of raw data from studies 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."[15] If it had passed, 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."[16] EPA has also proposed its own rule aimed at ensuring "that the data underlying [significant agency action] are publicly available in

12. Reports suggest that NHTSA officials did try to conceal the key underlying model from Environmental Protection Agency (EPA) officials. *See* Meyer, *supra* note 10 ("[T]he EPA team asked NHTSA for a copy of the raw computer code used to generate its cost–benefit study. . . . Instead of sending over raw code, the NHTSA team had sent a compiled program. This meant that EPA staff could not examine the model's underlying calculations in full.").

13. CASS R. SUNSTEIN, HOW CHANGE HAPPENS xii (2019).

14. Regulatory agencies issue rules that taken together are expected have economic consequences in the billions of dollars. OFFICE OF MGMT. & BUDGET, OFFICE OF INFO. & REGULATORY AFFAIRS, 2017 DRAFT REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND AGENCY COMPLIANCE WITH THE UNFUNDED MANDATES REFORM ACT 19–20 (2018) [hereinafter 2017 DRAFT REPORT TO CONGRESS], https://www.whitehouse.gov/wp-content/uploads/2017/12/draft_2017_cost_benefit_report.pdf.

15. HONEST Act, H.R. 1430, 115th Cong. (2017).

16. *Id.* at § 2.

a manner sufficient for independent validation."[17] Preliminary analyses suggest that providing access to all underlying influential data would cost EPA millions of dollars each year.[18]

These proposals have been controversial. Critics argue that they are thinly veiled attempts to stall agency rulemaking and prevent reliance on key scientific studies that use confidential data.[19] A particular concern has been an important—and independently verified—study, known as the Six Cities study, that demonstrates a high value of reducing fine particulate matter emissions.[20] The underlying raw 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.[21]

In contrast, supporters point to the increasing importance of quantitative data and analysis in agency decisionmaking.[22] In their view, just as government reasoning generally should be open to scrutiny and debate, the supporting underlying studies should also be open to scrutiny. 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

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17. Strengthening Transparency in Regulatory Science, 83 Fed. Reg. 18,768, 18,769 (Apr. 30, 2018) (to be codified at 40 C.F.R. pt. 30). In March 2020, EPA announced a supplemental notice of proposed rulemaking, clarifying certain aspects of the 2018 proposed rule. *See* Supplemental Notice of Proposed Rulemaking to the Strengthening Transparency in Regulatory Science Proposed Rule, 85 Fed. Reg. 15,396 (Mar. 18, 2020).

18. *See* CONG. BUDGET OFFICE, COST ESTIMATE FOR S. 544, SECRET SCIENCE REFORM ACT OF 2015 (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) [hereinafter COST ESTIMATE]; 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), https://www.mercatus.org/system/files/Mercatus-Lutter-Public-Access-Data-v3.pdf (estimating a cost to EPA of $46 million each year). Already, agencies are implementing programs to increase access to publicly funded research data. *See id.* at 7–14 (discussing agency policies on public access to data).

19. *E.g.*, Robinson Meyer, *Even Geologists Hate the EPA's New Science Rule*, 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.

20. *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* 2017 DRAFT REPORT TO CONGRESS, *supra* note 14, at 12 (finding that the largest estimated benefit was from reduction in air pollution from fine particulate matter).

21. Dockery et al., *supra* note 20.

22. *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.

in the sciences to underscore the need for government agencies to take these issues more seriously.[23] The controversies surrounding the CBAs for the ACE Rule or the SAFE Rule, for example, demonstrate how transparency about the basis for government decisionmaking allows interested parties to debate the desirability of the Trump Administration's regulatory actions.

At least some of the controversy over data sharing 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 discussion about the degree of transparency in current agency decisionmaking. Providing greater transparency is not costless.[24] The incremental costs and benefits of different interventions 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 in agency decisionmaking. 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 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.[25] Since President Reagan, all presidents have required executive agencies to conduct CBAs and rely on the analyses to the extent permissible.[26] Independent agencies, too, are increasingly

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23. *Id.*; *see also* Lutter & Zorn, *supra* note 18, at 3–4, 15–19 (discussing the replicability crisis). *But see* Meyer, *supra* note 19 (arguing that the proposals go further than data availability policies at major scientific journals).

24. *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.").

25. *See* Regulatory Planning and Review, Exec. Order No. 12,866 § 1(a)–(b), 58 Fed. Reg. 51,735, 51,738 (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").

26. *See id.* (currently applicable executive order); Exec. Order No. 12,291, 46 Fed. Reg. 13,193 (Feb. 19, 1981); Improving Regulation and Regulatory Review, Exec. Order No.

conducting CBAs, prodded by influential court decisions.[27] 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 policymakers 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,[28] the actual *degree* of

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13,563, 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, the 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 CBA. 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. § 7409(b) (2012); Whitman v. Am. 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 CBA 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 decisionmaking); 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.").

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

28. *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); Revesz & Livermore, *supra* note 25, at 14–15; Edward H. Stiglitz, *Cost-Benefit Analysis and Public Sector Trust*, 24 SUP. CT. ECON. REV. 169, 176–77 (2016). 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*,

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.[29] We know less, however, about how transparent agency CBAs are on other dimensions, especially those dimensions that have recently received the most attention from interested parties.[30]

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

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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).

29. *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, 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=1589486434&id=id&accname=guest&checksum=99F62C3752498393BB6129636B05DBC3 (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).

30. One study assessed the availability of models and data, but the criteria were not objective. *See* Ellig et al., *supra* note 29. One study directly measured "transparency" in CBA but its criteria for such transparency was narrow. *See* Arndt et al., *supra* note 29. Part II discusses this prior work in more detail.

transparency.[31] 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 makes 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. We discuss our recommendations in the context of the movement toward more open policy analysis in government.[32]

The Article is organized as follows. Part I develops our concept of transparency for CBA and summarizes the literature on transparency of CBA to date. Parts II and III evaluate transparency by identifying and reviewing a sample of 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 discusses the move toward open policy analysis and our recommendations.

I. 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.[33] Independent agencies have also begun to incorporate such analysis into their important rulemakings.[34] A typical CBA will explain the government's

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31. 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.

32. *See, e.g.*, E. Miguel et al., *A Framework for Open Policy Analysis* 2 (forthcoming), https://osf.io/preprints/metaarxiv/jnyqh/.

33. *See, e.g.*, Exec. Order No. 12,866, *supra* note 25, 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 29, at 405–24.

34. *See* 2017 DRAFT REPORT TO CONGRESS, *supra* note 14, at 90–92 (commenting briefly on CBAs from independent agencies).

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.[35] 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.[36]

CBA is an important component of federal regulatory decisionmaking for at least two reasons. First, CBA can help maximize the aggregate economic welfare of the public, often defined in terms of economic efficiency.[37] 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 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).[38] 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 an administration's policies 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.[39] When decisionmaking relies

35. 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.

36. *See, e.g.*, COST ESTIMATE, *supra* note 18, at 2–3 (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 18, at 24 (estimating that EPA references, on average, 18,000 pieces of scientific research each year).

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

38. *See* Statement of Christopher DeMuth, *in* AMERICAN ECONOMIC POLICY IN THE 1980S 508 (Martin Feldstein ed., 1st 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 CBA and the resulting standard, see Albert L. Nichols, *Lead in Gasoline*, *in* ECONOMIC ANALYSES AT EPA: ASSESSING REGULATORY IMPACT 49, 49–50, 57–77 (Richard D. Morgenstern ed., 1997).

39. A transparent CBA is not necessarily a high-quality CBA, but, over time, it makes possible quality improvements driven by interested parties.

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 use a CBA to maximize aggregate welfare, its disclosure of the costs and benefits of the chosen regulatory alternative through CBA will allow interested parties to understand the impact 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.[40]

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 additional reasons why efforts to promote greater transparency in CBA are controversial. The first reason is that recent proposals have narrowly focused on one aspect of transparency: making publicly available all, or almost all, of the underlying raw data from individual studies that are used to support the CBA's estimates, sometimes as a condition of their use in CBA.[41] 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."[42] Process

40. For example, legislative actions may require the disclosure and online availability of certain agency records. *See* FOIA Improvement Act of 2016, 5 U.S.C. § 552(e)(3), (e)(6)(B), (h)(4)(B)–(C) (2018); Exec. Order No. 13,563, 76 Fed. Reg. 3821, 3821–22 (Jan. 18, 2011). Other examples include eRulemaking and executive directives for keeping logs of meetings with lobbyists. *See* Exec. Order No. 12,866 § 1(a)–(b), 58 Fed. Reg. 51,735, 51,735 (Sept. 30, 1993).

41. *See* HONEST Act, H.R. 1430, 115th Cong. § 2 (2017); Strengthening Transparency in Regulatory Science, 83 Fed. Reg. 18,768, 18,768–69 (Apr. 30, 2018) (to be codified at 40 C.F.R. pt. 30).

42. For a different—and more general—account of dimensions of transparency in

transparency represents the extent to which key factors surrounding the creation of the CBA and its impact on the agency's chosen regulatory alternative 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 when the CBA was created, when it became available to the agency and the public, and what role it played in an agency's decision.	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 models and data available.	Allows interested parties to interpret the CBA, evaluate its accuracy and adequacy as a basis for agency decisionmaking.

government decisionmaking, see Donald Heald, *Varieties of Transparency*, *in* TRANSPARENCY: THE KEY TO BETTER GOVERNANCE? 25, 29–37 (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 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 the agency's ultimate decision.

A key dimension of process transparency is that it allows interested parties to know whether the agency considered the CBA when it made its regulatory decision. If the analysis was done simply to comply with Executive Order 12,866 and played no role in informing the 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. Improving its assessment of impacts could improve the informational value of the effects of the chosen policy to the public and play an important role in holding the government accountable for its actions, but it would not change the agency's decision in that particular rulemaking, which presumably was not tied to the substantive conclusions of the CBA. Transparency on this dimension is important for the large number of statutes for which an agency may consider costs in making its decision but is not necessarily required to do so.

Some scholars argue that CBA has been decisive in agency decisionmaking.[43] 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

43. *See, e.g.*, SUNSTEIN, THE COST–BENEFIT REVOLUTION, *supra* note 26, 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 there is scant evidence that CBAs have any significant overall effect); Richard Williams, *The Influence of Regulatory Economists in Federal Health and Safety Agencies* (Mercatus Ctr. at George Mason Univ., Working Paper No. 08-15, 2008), https://www.mercatus.org/system/files/WP0815_Regulatory%20Economists.pdf (suggesting that CBA might affect decisionmaking but that its influence might be behind-the-scenes and not disclosed).

another regulatory approach" and promotes reliance on CBA to the extent permissible,[44] but this requirement is not judicially enforceable. In some cases, a particular statutory provision might prohibit an agency from choosing the welfare-maximizing option as identified by a CBA.[45] If so, process transparency would require the agency to disclose this statutory restriction in its CBA and the rulemaking. This disclosure would alert interested parties to the relevant branch of government to hold accountable for net costly regulations—in these cases, it would be Congress. In the other cases, a statutory provision might explicitly require the agency to rely on CBA.[46] If so, process transparency would require the agency to disclose the central role CBA must play in its decisionmaking—flagging the particular importance of the substantive quality of the CBA. But in most cases, a statutory provision might permit, but not explicitly require, an agency to rely on CBA.[47] An agency might not choose a welfare-enhancing option, as revealed by CBA, due to alternative policy preferences or judgments about costs or benefits that are not quantified or monetized. In these cases, process transparency would require the agency to disclose its reasons for relying on or ignoring the substantive conclusions of the CBA. Again, this disclosure would allow the public to hold the agency and, in particular, the President accountable for such choices, which is one important benefit of transparency. But if an agency does not rely on the CBA, criticisms of the CBA—or the agency's decision not to rely on it—are unlikely to affect the legal validity of the agency's regulatory choices, if the agency acted within its discretion not to rely on the CBA and explained its decision.[48]

Another dimension of process transparency allows interested parties to obtain and comment on an agency's CBA in time to influence agency

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44. *See* Exec. Order No. 12,866 § 1(a)–(b), 58 Fed. Reg. at 51,735.

45. *See, e.g.*, 42 U.S.C. § 7409(b) (2012) (displaying national ambient air quality standards under the Clean Air Act, interpreted to prohibit EPA from considering costs); 16 U.S.C. § 1533(b)(1)(A) (2012) (species listing decisions under the Endangered Species Act).

46. *See, e.g.*, Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 136(bb) (2018); Toxic Substances Control Act, 15 U.S.C. § 2605(c)(1) (2012); Energy Policy and Conservation Act, 42 U.S.C. § 6295(o)(2)(B)(i) (2012); Safe Drinking Water Act, 42 U.S.C. § 300g-1(b)(3)(C)(i) (2012).

47. For an overview of statutory variants on the consideration of costs, see generally CASS R. SUNSTEIN, THE COST–BENEFIT STATE, *supra* note 26, at 12–16.

48. *See* Caroline Cecot & W. Kip Viscusi, *Judicial Review of Agency Benefit-Cost Analysis*, 22 GEO. MASON L. REV. 575, 575 (2015) (summarizing when challenges to CBA tend to be successful). An important doctrine of administrative law is that a court will evaluate the agency's stated reasons for its action. *See* SEC v. Chenery Corp. (*Chenery I*), 318 U.S. 80, 87–88 (1943); *see also* Michigan v. EPA, 135 S. Ct. 2699, 2711 (2015) (refusing to consider CBA when agency refused to rely on it).

decisionmaking when the agency relies on CBA. Most agencies provide at least sixty days for interested parties to comment on proposed rulemaking before issuing a final rule that responds to significant comments.[49] Process transparency in CBA would require that the analysis is readily available around the time of the proposed rulemaking, if not earlier, 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.

Process transparency has received some attention from regulatory scholars. One working paper by the Organisation for Economic Co-operation and Development (OECD), for example, developed a measure of "regulatory impact assessment transparency"[50] for each member country that was *entirely* focused on a subset of what we define as process transparency.[51] 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 the United States' CBAs was low relative to other countries' scores, but no details about this score were presented.[52] Similarly, Jerry Ellig and Patrick McLaughlin have qualitatively measured how easily CBAs could be found online and whether agencies discussed how they used the CBAs.[53] They found that, while agency CBAs are increasingly available online, many regulations do not discuss how the agency used the CBA in its

49. *See* Administrative Procedure Act (APA), 5 U.S.C. § 553 (2018) (rulemaking); *see, e.g.*, United States v. N.S. Food Prod. Corp., 568 F.2d 240 (2d Cir. 1977) (finding that APA § 553(c) requires an agency to respond to significant comments received during the comment period).

50. In the European Union, "impact assessments" are prepared to support policymaking by summarizing the expected costs and benefits of proposals. For more information about the practice and quality of impact assessment in the European Union over time, see generally Oliver Fritsch et al., *Regulatory Quality in the European Commission and the UK: Old Questions and New Findings* 1–3 (Ctr. European Policy Studies, Working Paper No. 362, 2012), https://www.ceps.eu/download/publication/?id=7383&pdf=WD362%20Fritsch%20et%20al%20Regulatory%20Quality%20in%20the%20Commission%20and%20the%20UK.pdf.

51. *See* Arndt, *supra* note 29, at 48–49. The paper considered survey responses about each country's regulatory impact assessment process (the 2014 Regulatory Indicators survey), which were provided by delegates to the Organisation for Economic Co-operation and Development (OECD) Regulatory Policy Committee and by government officials.

52. *Id.* at 16 fig.4.

53. Ellig & McLaughlin, *supra* note 29, at 858–59 (evaluating the following questions on a five-point scale: "Use of Analysis: Does the proposed rule or the [Regulatory Impact Analysis (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?").

decisionmaking.[54] 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 for process transparency. A scorecard checks whether the CBA includes a particular item. For process transparency, items include whether the CBA was publicly available at the time of the proposed rule and whether the CBA describes how the CBA was used in the agency's decisionmaking.[55]

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.[56] 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 may be peer-reviewed. The studies themselves are often empirical, drawing conclusions based on some underlying raw data. A typical CBA will employ models and make assumptions in order to convert information from these studies 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

54. *See* Ellig & McLaughlin, *supra* note 29, at 868 (finding that CBAs in their sample averaged 3.53 out of 5 on accessibility and 2.44 out of 5 on use of analysis).

55. Specific scorecard questions are included *infra* in Appendix Table A2.

56. 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, 273 (1991).

that basic information on effects is actually less transparent than agency decisionmaking that does not include CBA.[57] 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 models that convert inputs to outputs and the underlying data that supports the studies that inform 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 Drivers Ass'n v. Federal Motor Carrier Safety Administration* (FMCSA),[58] 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.[59] 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 substantively well-reasoned.

The major guidance documents that inform agency CBA procedures have long promoted analytical transparency by encouraging agencies to clearly identify models and data and to make them publicly available whenever possible. One early guidance document from the Office of Management and Budget's Office of Information and Regulatory Affairs (OIRA),[60] which reviews agency CBAs, emphasized that:

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57. *See, e.g.*, Duncan Kennedy, *Cost–Benefit Analysis of Entitlement Problems: A Critique*, 33 STAN. L. REV. 387, 388 (1981) (arguing that CBA's use results in an incoherent system); Amy Sinden, *Cass Sunstein's Cost–Benefit Lite: Economics for Liberals*, 29 COLUM. J. ENVTL. L. 191, 194 (2004) (book review) ("The danger of CBA . . . lies in its false promise of determinacy, its pretense of objectivity and scientific accuracy[,] . . . render[ing] CBA . . . vulnerable to manipulation . . . .").

58. 494 F.3d 188 (D.C. Cir. 2007).

59. *Id.* at 206; Sinden, *supra* note 57, at 201 (holding that the Federal Motor Carrier Safety Administration (FMCSA) failed to disclose the methodology underlying a key model used in its CBA supporting its regulation of hours of service for long-haul truck drivers).

60. *See* Exec. Order No. 12,866, 58 Fed. Reg. 51,735, 51,737 (Sept. 30, 1993), *supra* note 25.

> Analysis 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.[61]

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."[62] It further encourages agencies to post their analysis "with all the supporting documents, on the Internet so interested parties can review the findings."[63]

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 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."[64] It also states that "economic analysis should clearly describe all important data sources and references used[,]" making them "available to policy makers, other researchers, policy analysts and the public" unless the data is confidential or private.[65] 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."[66]

Overall, policy transparency supports the democratic legitimacy of agency actions. The impacts summarized in a CBA require detailed information

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61. OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, ECONOMIC ANALYSIS OF FEDERAL REGULATIONS UNDER EXECUTIVE ORDER 12866 (Jan. 11, 1996) https://georgewbush-whitehouse.archives.gov/omb/inforeg/riaguide.html

62. OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4, REGULATORY ANALYSIS 17 (2003), https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf

63. *Id.*

64. EPA, GUIDELINES FOR PREPARING ECONOMIC ANALYSES 11-10 (2010), https://www.epa.gov/sites/production/files/2017-08/documents/ee-0568-50.pdf

65. *Id.*

66. *Id.*

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 in CBA. For example, we—and our co-authors—have previously evaluated whether CBAs quantify and monetize costs and benefits and whether the estimates are clearly presented.[67] Stuart Shapiro and John F. Morrall, III, have also measured whether CBAs provide estimates of costs and benefits.[68] 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.[69] 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.[70]

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.[71]

II. 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 focuses on fifty CBAs for significant regulatory actions from October 2015 to September 2018.[72] For executive agencies, we analyze those

67. *See* Cecot et al., *supra* note 29, at 405 (comparing the United States' risk assessments with the European Union's risk assessments); Hahn et al., *supra* note 29, at 860–61 (suggesting a lack of information); Hahn & Dudley, *supra* note 29, at 194 (concluding there is an inadequate amount of economic information).

68. Shapiro & Morrall, *supra* note 29, at 190.

69. Ellig & McLaughlin, *supra* note 29, at 855–56.

70. For example, they found that CBAs in their sample averaged 2.85 out of 5 on data availability, which suggests that only some models and data were identified and supported by peer-reviewed literature. Ellig & McLaughlin, *supra* note 29, at 866–67.

71. Specific scorecard questions are included *infra* in Appendix Table A2.

72. Our sample includes CBAs from the last year of the Obama Administration (about 42%

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.[73] 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.[74] Historically, agencies issue about 100 economically significant regulatory actions each year.[75] The study excludes "transfer" rules, or rules designed to move resources from the federal government to designated segments of the population. It includes only "nontransfer" 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 the Government Accountability Office's (GAO's) summaries.[76] Thus, we purposefully grade CBAs that already

of the sample) and the first two years of the Trump Administration (about 58% of the sample). We do not find statistically significant differences on most of our measures based on 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").

73. *See supra* note 25.

74. *See* Exec. Order No. 12,866, 58 Fed. Reg. 51,735, 51,738.

75. *See OIRA Review Counts*, REGINFO.GOV, https://www.reginfo.gov/public/do/eoCountsSearchInit?action=init (last visited Apr. 6, 2020) (allowing a search of all economically significant regulatory actions within a given date range); *Regulations and the Rulemaking Process FAQ*, REGINFO.GOV, https://www.reginfo.gov/public/jsp/Utilities/faq.myjsp (last visited May 14, 2020).

76. *See, e.g.*, 2017 DRAFT REPORT TO CONGRESS, *supra* note 14, at 92. To access the Government Accountability Office (GAO) summaries, see *Congressional Review Act*, U.S. GOV'T

reflect a degree of empirical policy transparency and for which the disclosure of underlying models and data might provide meaningful information.[77] The final sample includes thirty-seven CBAs[78] from executive agencies from October 2015 through September 2018.

In addition, we include thirteen 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 by the Executive Order to conduct CBAs, many agencies do not conduct CBAs, 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 to obtain useful results.[79] Our sample of CBAs for executive and independent agencies includes about 22% and 30%, respectively, of CBAs for this time period, as summarized in Table 2.[80]

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

ACCOUNTABILITY OFFICE, https://www.gao.gov/legal/other-legal-work/congressional-review-act (last visited May 14, 2020).

77. 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.

78. Two CBAs are for one joint rulemaking—one CBA was prepared by EPA and one was prepared by Department of Transportation (DOT).

79. We present these results separately.

80. 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 29, at 861 (finding that only 29% of CBAs between 1996 and 1999 quantified net benefits).

B. Methodology

Our main approach to measuring the transparency of our sample of CBAs was 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 reviewed were all objective.[81] Most were "yes" or "no" questions, but some were quantitative. For example, we asked separately whether the CBA identified an internal office or an external organization as preparing the CBA. We also asked how many references in its sections were devoted to estimating costs and benefits published in peer-reviewed journals. Two reviewers scored each CBA.[82] 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 "nonmonetized" (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. This 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 and lowest scoring CBAs identified by our approach.

There are well known advantages and disadvantages of the objective scorecard approach, which we summarize briefly.[83] 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 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

81. Appendix Table A2 lists all scorecard questions.

82. Each reviewer was initially assigned twenty-five CBAs to score. The reviewers then switched and confirmed each other's work. Any disagreements were resolved by one of us.

83. See Hahn et al., *supra* note 29, at 864–65, 877, for more details on the advantages and disadvantages of the scorecard methodology.

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.

III. 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 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 an internal office or an external firm that prepared the CBA?	37	68%	13	0%
Does it name an internal office?	37	68%	-	-
Does it name an external firm?	37	44%	-	-
In the executive summary (ES), does this CBA mention the relationship between it and the agency's decisionmaking?	37	46%	13	0%

Scorecard Measure	***Executive***		***Independent***	
	N	***"Yes" Response***	***N***	***"Yes" Response***
POLICY TRANSPARENCY				
Does the CBA contain an 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 nonmonetized benefits?	37	41%	13	54%
If so, does the CBA identify the nonmonetized benefits?	14	86%	6	100%
Does the CBA state that there are nonmonetized costs?	37	30%	13	31%
If so, does the CBA identify the nonmonetized 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%

Scorecard Measure	***Executive***		***Independent***	
	N	***"Yes" Response***	***N***	***"Yes" Response***
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 are 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 "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 a nec-

essary prerequisite for meaningful public engagement on substantive issues relating to CBA and for decisionmaking accountability.

For CBAs prepared by executive agencies, process transparency is relatively high on at least some dimensions. About two-thirds of CBAs (68%) identify an internal office or division as their source. About 44% of CBAs identify an external organization as collaborating with an agency on the CBA.[84] For the remaining CBAs, agencies either received no external support or did not disclose it. As far as we know, no previous study has examined this feature of process transparency, but it might provide useful information about the importance or quality of the CBA. An internal economic office, for example, might demonstrate an agency's expertise in, and commitment to, preparing CBAs.[85]

Most CBAs (86%) are prepared as separate documents posted to Regulations.gov, a government website that provides key rulemaking information.[86] The website was launched in January 2003 as part of the eRulemaking Program based within the EPA.[87] The goal was to increase public access to regulatory materials and increase public participation in rulemaking.[88] 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.[89]

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84. The Department of Energy (DOE) 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.

85. *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).

86. *See About Us*, REGULATIONS.GOV, https://www.regulations.gov/aboutProgram (last visited May 14, 2020). The executive steering committee for the eRulemaking Program is chaired by EPA and the Office of Management and Budget (OMB). About 14% of CBAs were not in a separate document. Instead, the expected costs and benefits were summarized in the notice of proposed rulemaking. About 5% of CBAs were posted only on an agency's website and not on Regulations.gov.

87. *See* E-Government Act of 2002, Pub. L. No. 107-347, § 206, 116 Stat. 2899, 2915–16 (establishing eRulemaking Program); *About Us*, *supra* note 86 (describing the eRulemaking Program). EPA's eRulemaking Program Management Office (PMO) works with the OMB and other agencies to develop the website. *About Us*, *supra* note 86.

88. *See About Us*, *supra* note 86.

89. Of CBAs posted on Regulations.gov, 91% were in the Supporting Documents section.

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%), agencies post the preliminary analyses to the docket shortly before or on the same day as the proposed rulemaking, giving interested parties at least sixty days to comment on the analyses.[90] About 56% of the rulemaking dockets we analyzed also included in the Supporting Documents section at least some models, spreadsheets, and data.

Only about half (46%) of CBAs discuss the way the agency expects to use the analysis in its ultimate decision. 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 do not discuss how the agency used the CBA.[91]

In contrast, CBAs prepared by independent agencies often do not include many of the features that we identified as promoting process transparency. In particular, the underlying CBAs are not publicly available as separate documents, which means that expected impacts are summarized only briefly in the notices of proposed rulemakings. There is little discussion of the analysis's role, and the notice of proposed rulemaking is not consistently posted on Regulations.gov.[92]

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 continue to lack basic policy transparency. Of the 167

90. Agencies are encouraged to provide interested parties at least sixty days to comment on proposed regulations during notice-and-comment rulemaking. *See* APA, 5 U.S.C. §§ 551–559, 561–570a, 701–706, 553 (2012); *see also* Exec. Order No. 13,563, 3 C.F.R. § 215 (2011).

91. Ellig & McLaughlin *supra* note 29, at 859, 867 (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).

92. Independent agencies tend not to participate in Regulations.gov. *Nonparticipating Agencies*, REGULATIONS.GOV, https://www.regulations.gov/docs/Non_Participating_Agencies.pdf (last visited Apr. 8, 2020) (including agencies such as Securities and Exchange Commission (SEC), 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 on Regulations.gov for 70% of our sample of CBAs from independent agencies.

CBAs issued during our time period, only thirty-seven monetized at least some costs and benefits—about 22%.[93] 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%). This is a significant improvement when compared with findings from earlier research in this area,[94] but of course, our sample consists of more complete CBAs that monetized at least some costs and benefits. In our sample, the overview summarized the basic components of costs and benefits about 75% of the time and presented these in a table about 83% of the time.[95] It is less common for the summary to discuss important models (22%) and data (42%) 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 nonmonetized costs or benefits, 86% identify at least some of these nonmonetized costs or benefits. In the vast majority of cases, 89% of our sample, the monetized benefits exceed the monetized costs.[96]

We also evaluated analytical transparency, or the subset of policy transparency that focuses on the identification and availability of models and data that underlie the estimation of policy effects. The majority of the CBAs from executive agencies in our sample discuss models (75%) or data (97%) in at least some instances. Notably, however, no CBAs identified any model as influential or important, and only eight CBAs identified some data as influential or important. Of those CBAs that mention models, most describe all the named models in detail (70%). No CBA links to all the named models, but 46% provide a link to at least one named model. While only about 11% of CBAs provide a citation each time they discuss data, almost all of them (91%) provide a citation at least once when they discuss some relevant data.

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93. When we exclude transfer rules, our sample is more than 30% 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% of CBAs. *See, e.g.*, 2017 DRAFT REPORT TO CONGRESS, *supra* note 14, at 21.

94. *See, e.g.*, Hahn et al., *supra* note 29, at 876 (finding that only half of CBAs contained an executive summary).

95. Again, this percent is higher than found in prior studies that included CBAs that did not monetize at least some costs and benefits. *See* Hahn et al., *supra* note 29, at 876 (finding that 29% of CBAs used an executive summary to present tables of qualitative or quantitative estimates of benefits and costs).

96. This percent is higher than found in prior studies. *See* Hahn et al., *supra* note 29, at 870 (finding that only 28% of the rules present information on net benefits).

The CBAs in our sample do not disclose any reliance on confidential or proprietary models, but 16% 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; CBAs rarely cited unpublished sources.[97] 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 generally did not go through peer review or 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."[98] 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.[99]

Meanwhile, CBAs prepared by independent agencies 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% of CBAs. It is clear that nonmonetized benefits play a large role in justifying agency action, but nonmonetized benefits are not always identified and described.[100] Very few CBAs prepared by independent agencies discuss, cite,

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97. In chapters devoted to benefits, executive agency CBAs cited to unpublished studies about 5% of the time. In chapters devoted to costs, executive agency CBAs cited to unpublished studies about 14% of the time.

98. *See* Ellig & McLaughlin, *supra* note 29 (unpublished supplemental "Regulatory Scorecard Scoring Methodology") (on file with authors).

99. Ellig & McLaughlin, *supra* note 29, at 865 (excluding transfer regulations). Their description of a score of three 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.").

100. About 54% of CBAs identify nonmonetized benefits, even though about 77% of the sample does not monetize benefits.

or provide links to all models and data. About 83% provided a data source at least once. Two out of the thirteen CBAs in our sample disclose that they rely on confidential, proprietary, or otherwise unavailable data.

C. Case Studies

In this Section, we describe our highest and lowest scoring CBAs for additional insights on the value of transparency in CBA. The most transparent executive agency CBA as measured by our scorecard is the Department of Energy's (DOE's) CBA for its regulation prescribing energy conservation standards for commercial warm air furnaces.[101] 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, published by DOE's Office of Energy Efficiency and Renewable Energy Building Technologies Program, discloses that it was "prepared . . . by staff members of Navigant Consulting, Inc., and Lawrence Berkeley National Laboratory."[102] The preliminary CBA was posted on Regulations.gov two weeks before the notice of proposed rulemaking.[103] 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.[104] In this case, the relevant statutory provision *requires* the

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101. *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], https://energy.mo.gov/sites/energy/files/technical-support-document---commercial-warm-air-furnaces_doe.pdf. Another CBA, the EPA'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), https://nepis.epa.gov/Exe/ZyPDF.cgi/P100R1BF.PDF?Dockey=P100R1BF.PDF. The top five included three DOE CBAs, one EPA CBA, and one DOT CBA.

102. DOE, WARM AIR FURNACES, *supra* note 101.

103. *See Docket Folder Summary*, REGULATIONS.GOV, https://www.regulations.gov/docket?D=EERE-2013-BT-STD-0021 (last visited Apr. 9, 2020); *Docket Browser*, REGULATIONS.GOV, https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0&dct=SR%2BO&D=EERE-2013-BT-STD-0021 (last visited May 14, 2020). The proposed rule (which was posted at the same time as the direct final rule) was posted on February 4, 2015, while the preliminary CBA was posted on January 20, 2015. *See id.*

104. 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.

agency to "determine whether the benefits of the standard exceed the burden of the proposed standard" by considering several factors.[105]

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.[106] It presents this summary clearly in a table,[107] providing key information such as the discount rate that it uses in the analysis.[108] The CBA provides descriptions of all named models, though it does not provide links to these models.[109] 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.[110] GRIM, which contains inputs based on manufacturer interview feedback and discussions, is available as an Excel spreadsheet on the rulemaking docket on Regulations.gov.[111] In fact, all of the models are available on the rulemaking docket on Regulations.gov. The CBA does not disclose the use of any confidential or proprietary models, and it does not appear that any such models were actually used. The descriptions of the models discuss assumptions and acknowledge uncertainties.[112] The CBA also identifies key data, what it calls key inputs and outputs,[113] and it discusses the sensitivity of estimates to certain data.[114] All data contain citations, and the CBA does not rely on unpublished studies.[115]

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105. 42 U.S.C. § 6313(a)(6)(B)(ii) (2012).

106. *See* DOE, WARM AIR FURNACES, *supra* note 101, at 1-2.

107. *See id.* at 1-2.

108. *See id.* at 1-1.

109. *See id.* at 2-5–2-13.

110. *See id.* at 12B-1–12B-3.

111. *See NOPR Government Regulatory Impact Model (GRIM)*, REGULATIONS.GOV, https://www.regulations.gov/document?D=EERE-2013-BT-STD-0021-0008 (last visited May 14, 2020).

112. *See id.* at 2-5–2-13.

113. *See* DOE, WARM AIR FURNACES, *supra* note 101, at 2-1.

114. For example, the CBA states that:

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 [American Cancer Society] ACS study. For DOE's High Net Benefits Estimate, the benefit-per-ton estimates were based on the Six Cities study, which are nearly two-and-a-half times larger than those from the ACS study.

See DOE, WARM AIR FURNACES, *supra* note 101, at 1-2 (internal citations omitted).

115. *See* DOE, WARM AIR FURNACES, *supra* note 101, at 1-2 (citing to four references in the benefits chapter; three citing to peer-reviewed journals and one citing to a government document).

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.[116] 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.[117] 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 was posted a few days after the final rule.[118] The CBA contains an executive summary and monetizes some effects.

The CBA 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 to inform its regulatory decision. 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."[119] This is also why the agency did not seek comments on the rule in advance.[120] None of this detail was disclosed in the CBA itself.

Thus, one reason that this CBA is not transparent as measured by our scorecard is because the value of additional transparency was low in light of the minimal role the CBA played in the rulemaking. In fact, any resources devoted to increasing process or policy transparency here might not have been cost–benefit justified. Notwithstanding this possibility, the agency should have clarified the CBA's minimal role in the CBA itself. But the example highlights why a flexible approach to some kinds of transparency, especially the expensive kinds of transparency, makes sense; there exist cases where the benefits of additional transparency might not outweigh the costs.

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116. Implementation of the Provision of the Comprehensive Addiction and Recovery Act of 2016 Relating to the Dispensing of Narcotic Drugs for Opioid Use Disorder, 83 Fed. Reg. 3071 (Jan. 23, 2018) (to be codified at 21 C.F.R. pt. 1301). The least transparent CBAs overall were CBAs from independent agencies, see Federal Deposit Insurance Corporation (FDIC) and SEC. The Department of Justice (DOJ) CBA was the only executive agency CBA in the top five least transparent. SEC CBAs were three of the top five.

117. *Id.* at 3071.

118. *See Docket*, REGULATIONS.GOV, https://www.regulations.gov/docket?D=DEA-2018-0002 (last visited Apr. 9, 2020). The CBA was posted on January 25, 2018, while the final rule was posted on January 23, 2018. Dispensing of Narcotic Drugs for Opioid Use Disorder, 83 Fed. Reg. at 3071.

119. Dispensing of Narcotic Drugs for Opioid Use Disorder, 83 Fed. Reg. at 3072.

120. DOJ issued the rule as a final rule without notice-and-comment under APA's § 553 good-cause exception from notice-and-comment rulemaking requirements.

IV. TOWARD MORE OPEN POLICY ANALYSIS

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.

But the results also reveal 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 4 provides an overview of these recommendations and summarizes our subjective estimate of their costs and benefits.

Table 4. Recommendations for Improving Transparency

Recommendation	**Cost 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 external contributors to the CBA	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.

Recommendation	**Cost and Benefits**
Policy Transparency	
1. Clearly identifying components of costs and benefits, especially nonmonetized 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 agency 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 raw data from supporting 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.

Note: 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 of 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.[121] 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."[122] Our recommendations are broadly consistent with this directive.

Currently, most executive agencies participate in Regulations.gov,[123] but most independent agencies do not.[124] 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.[125] 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 insufficient. 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 resource, providing important information on agency rulemaking, but many features could be improved. Regulations.gov currently allows interested

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

122. *See* Exec. Order No. 13,563, 76 Fed. Reg. 3821, 3821–22 (Jan. 21, 2011) (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").

123. *See Participating Agencies*, REGULATIONS.GOV, https://www.regulations.gov/docs/Participating_Agencies.pdf (last visited May 14, 2020).

124. *See Nonparticipating Agencies*, REGULATIONS.GOV, https://www.regulations.gov/docs/Non_Participating_Agencies.pdf (last visited May 14, 2020).

125. *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).

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.[126] 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.[127] 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 the EPA is tasked, along with the Office of Management and Budget (OMB), with ensuring that Regulations.gov provides timely and efficient access to important rulemaking documents.[128] 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.[129] But the new version still does not help sort CBAs from other supporting documents.[130] 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.[131] At the very least, CBAs

126. *See, e.g.*, *Financial Responsibility Requirements Under CERCLA Section 108(b) for Facilities in the Petroleum and Coal Products Manufacturing Industry*, REGULATIONS.GOV, https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0 &dct=SR%2BO&D=EPA-HQ-OLEM-2019-0087 (last visited Apr. 9, 2020) (showing the 449 supporting documents posted for one EPA regulation).

127. It is not easy to find CBAs even knowing the rulemaking docket, the regulation's identifying number (RIN), or the CBA's title. The current Regulations.gov search returns many results, and some dockets contain hundreds of supplemental materials. *See* REGULATIONS.GOV, https://www.regulations.gov/?tab=search (last visited May 14, 2020).

128. *See About Us*, *supra* note 86. The executive steering committee for the eRulemaking Program is chaired by EPA and OMB. *Id.*

129. *See* REGULATIONS.GOV BETA, https://beta.regulations.gov (last visited May 20, 2020).

130. *See id.*

131. *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,

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 sixty 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.

2. Identifying external contributors to the CBA

Next, we recommend that each CBA clearly identify groups involved in preparing the CBA. This recommendation would impose very little cost on an agency but provide some needed and consistent transparency. Identifying groups 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 and support its chosen regulatory strategy—and if it did not, it should disclose the agency's reason for not doing so in light of Executive Order 12,866.[132] 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.[133] 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 stated reasons for its action.[134] If an agency did not rely on the CBA, for example, then challenging the CBA's underlying data or choice of

116th Cong. (2019); Setting Manageable Analysis Requirements in Text Act of 2019, S. 1420, 116th Cong. (2019).

132. *See* Exec. Order No. 12,866, 58 Fed. Reg. 51,735, 51,741–42.

133. *See* APA, 5 U.S.C. §§ 551–559, 561–570a, 701–706, 553 (2012); Am. Radio Relay League, Inc. v. FCC, 524 F.3d 227, 236 (D.C. Cir. 2008).

134. *See generally* SEC v. Chenery Corp. (*Chenery I*), 318 U.S. 80 (1943) (demonstrating the Supreme Court's review of an agency's stated reasons for an action); Cecot & Viscusi, *supra* note 48, at 592 (summarizing when challenges to CBA tend to be successful); 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]'").

model as being of poor quality is, in most cases, fruitless as any error would be harmless with respect to the agency's ultimate decision.[135] In those cases, however, interested parties could challenge the agency's decision to not rely on the analysis.

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 to improve agency decisionmaking and accountability.

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 nonmonetized 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.[136] 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% of CBAs prepared by executive agencies during that period).

When identifying and describing categories of costs and benefits, we encourage agencies to include the nonmonetized 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 apparently rely on nonmonetized 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 given available scientific or economic

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135. If an agency lawfully does not rely on the analysis, then errors in the analysis do not call into question the agency's reasoning. *See* Cecot & Viscusi, *supra* note 48, at 592. 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. *See* Cecot & Viscusi, *supra* note 48, at 592.

136. Cecot & Viscusi, *supra* note 48, at 592.

evidence.[137] Executive Order 12,866 explicitly recognizes this fact.[138] 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 nonmonetized impacts are sizeable—and especially if they change the overall cost–benefit assessment—then these should be identified and discussed qualitatively.[139] By identifying and describing these impacts clearly in its CBA, an agency flags important areas where additional research and retrospective review would be particularly valuable.

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 guidance document from the OMB encourages agencies to do this.[140] 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.[141] It is too early to tell whether this guidance is being implemented.

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137. The categories of impacts that cannot be monetized is not static but rather shrinks over time. *See, e.g.*, Cecot, *Deregulatory Cost–Benefit Analysis and Regulatory Stability*, *supra* note 28, at 1609 ("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.").

138. *See* Exec. Order No. 12,866, 58 Fed. Reg. 51,735, 51,741–42.

139. This recommendation reinforces other recommendations to clarify the role of nonmonetized 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 137, 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 nonmonetized effects).

140. *See* OFFICE OF MGMT. & BUDGET, EXEC. OFF. OF THE PRESIDENT, IMPROVING IMPLEMENTATION OF THE INFORMATION QUALITY ACT 8 (Apr. 24, 2019).

141. *Id.*

These recommendations highlight the incremental steps that agencies could take to improve transparency and availability of models, short of maintaining a depository, allowing only consideration of open data, or both. In particular, agencies could provide tables summarizing the models, data, and studies they think are important, with descriptions, 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.

Notably, these recommendations would not require posting the raw data that underlies important scientific 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 individual scientific studies used to generate estimates be made publicly available as a condition for use in CBA is a far larger task. Recent proposals ask for this, but it appears premature to require this in light of our results for at least two 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 it was published in a prestigious peer-reviewed journal and has been independently verified. Epidemiological studies that tie exposure to pollutants to various health effects, for example, frequently rely on confidential health data, and it may not always be possible to make the data publicly available without compromising privacy, even with some information redacted. Second, even if some confidential data is excluded, the proposal to maintain a government depository of raw data from studies used in CBA is much costlier than some of our other recommendations and deserves a more careful CBA.

In fact, there is reason to think such a step would not be cost–benefit justified at this time. We show that many CBAs already rely on studies in peer-reviewed journals, and many of these journals are moving toward more openness in making data and models from their publications available. The benefits, then, of having the government duplicate these efforts at this time are low. And most importantly, 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). The first step is to ensure agencies *rely* on CBA when issuing significant regulatory actions and comply with *basic* dimensions of transparency in CBA before moving on to higher levels of analytical transparency. The value of the costly process of making underlying raw data publicly available will not be

realized when the agency's reliance on CBA, much less any particular study, is not always evident.

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 unpublished studies. In fact, agencies might choose to explicitly place lower weight on such data when possible, at least in those situations when better data or studies are available. Such disclosure would flag areas where more open 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.[142] 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.

CONCLUSIONS

This Article suggested a new framework for thinking about transparency in CBA that includes two key dimensions: process transparency and policy transparency. It then objectively evaluated these dimensions of transparency by examining a comprehensive set of CBAs for significant rules issued between 2015 and 2018. A main finding is that many agency CBAs lack basic process transparency, meaning that their creation and role in the decisionmaking process is not clear. 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 readily available online.[143]

142. *See* Exec. Order No. 12,866, 58 Fed. Reg. 51,735, 51,735; *see also* OFFICE OF MGMT. & BUDGET, EXEC. OFF. OF THE PRESIDENT, CIRCULAR A-4, REGULATORY ANALYSIS 17 (2003).

143. While the U.S. regulations examined here do not do particularly well on some of the

There are growing concerns in the social science community about the transparency and reproducibility of research and policy analysis.[144] Some scholars have suggested that there is a credibility crisis and a reproducibility crisis that plagues science.[145] Similarly, in the area of policy analysis, usually undertaken by governments and government contractors, there are issues of credibility and reproducibility. In a recent article, researchers suggest a new framework for open policy analysis that would require data and models be made easily available in special formats.[146] Their framework includes three key principles: computational reproducibility, analytic transparency, and making outputs of the analysis transparent.[147] In the United States, Congress and agencies have proposed reforms that would require government regulations to rely on studies based on publicly available data.

We think an open policy framework deserves serious consideration. But we are a bit more cautious about proceeding with a new paradigm before a full consideration of the benefits and costs when it comes to regulatory decisionmaking in the United States. The benefits in a general sense are clear. More open policy analysis may increase trust in the system, make it easier for interested parties to reproduce and critique results and find errors, and make it easier to design more effective policies. These benefits are particularly valuable now in light of rising concerns about the legitimacy of agency actions and questions about the judiciary's continued role in promoting transparency.

At the same time, there are significant short-run costs to such a system that need to be carefully assessed. How much extra effort is involved in moving to an open-policy framework? Should the open policy framework apply to all decisions, no matter how small? What will the direct costs be to agencies, and if budgets are fixed, how will this affect agency performance? What are the likely costs of delay that could result from implementing this

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dimensions of transparency examined here, it is not clear that other countries are substantially better. For example, in Europe, there is no requirement for making models and data available in Impact Assessments (which are similar in spirit to U.S. RIAs that contain CBAs), but discussion of models and data is encouraged. *See* EUROPEAN COMM'N, BETTER REGULATION "TOOLBOX" 514 (last visited May 14, 2020), https://ec.europa.eu/info/sites/info/files/better-regulation-toolbox.pdf.

144. *See* Miguel, *supra* note 32.

145. *See, e.g.*, Monya Baker, *Is There A Reproducibility Crisis?*, 533 NATURE 452, 452–54 (May 26, 2016), https://www.nature.com/news/polopoly_fs/1.19970!/menu/main/topColumns/topLeftColumn/pdf/533452a.pdf.

146. *See* Fernando Hoces de la Guardia & Jennifer Sturdy, *Best Practices for Transparent, Reproducible, and Ethical Research*, INTER-AMERICAN DEVELOPMENT BANK 14 (Feb. 2019) (illustrating the prioritized research practices in Table 1).

147. *See id.* at 12–14.

policy? To what extent will this information actually be used? If information or models are currently proprietary, should the government stop using them? These questions are beyond the scope of this paper, but we think they need to be thought through carefully before considering major departures from the status quo.

Our approach to improving the transparency of policy analysis and, in particular, agency CBA is more incremental. And it is tied to our basic understanding of where we are today, as revealed by the results of our analysis. Our analysis shows that, for many recent CBAs, basic process transparency and policy transparency is lacking. This is especially true for CBAs from independent agencies. In other words, we find substantial room for introducing measures that promote transparency that would likely pass a benefit–cost test. We propose a series of low-cost and simple recommendations for improving transparency, which can be implemented by OIRA.

It might seem odd that such recommendations have not already been implemented. One possible explanation is that lawmakers are not terribly aware, or interested in, the current state of affairs. Another 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 and accrue to the public at large. They include enhanced credibility and trust, reproducibility, and possibly improved rulemaking.

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.[148] This system polices significant breaches of decisionmaking transparency that involve important underlying data and models. There are concerns, however, about the continuing viability of this method of obtaining this disclosure.[149] An explicit

148. *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).

149. *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 Vt. Yankee Nuclear Power Corp. v. Nat. Res. Defense Council, 435 U.S. 519 (1978)).

legislative requirement codifying judicially required disclosure for meaningful notice-and-comment may be useful.

Notably absent from our recommendations is a proposal to make publicly available all underlying data and models from scientific studies that a CBA relies on. The value of disclosure of underlying data and models from supporting studies is tied to the role of the studies in the CBA (policy transparency) and the role of CBA in the agency's ultimate decisionmaking (process transparency). The first step, then, is to ensure compliance with these *basic* dimensions of transparency in CBA before moving on to higher levels of analytical transparency.

Overall, our proposals would ensure that all interested parties have a clear idea of the 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 policies and may also not wish that this information be made more transparent. At the same time, legislators have shown an intermittent interest in developing better and more transparent policy outcomes and in measuring the results of government policies.[150]

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. But the tool must also be able to flexibly incorporate the newest insights from scientific and other studies to ensure that regulatory decisions are based on the best available data. A good starting point is for CBAs prepared for significant rules to identify and clearly explain the role of key models, studies, and assumptions in the analysis. That is the first step—and our key recommendation. If that step is adopted, then further research will be needed to assess its effectiveness and explore the benefits and costs of initiating more ambitious policies aimed at promoting transparency in regulatory decisionmaking.

150. *E.g.*, Foundations for Evidence-Based Policymaking Act, Pub. L. No. 115–435, 132 Stat. 5529 (2019) (establishing a process to modernize government data management).

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 the fiscal year, spanning from October 2015 to September 2016; year 2017 refers to rules reviewed in the fiscal year spanning from October 2016 to September 2017; year 2018 refers to rules reviewed in the fiscal year spanning from October 2017 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 an internal office or an external firm?
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 nonmonetized benefits?
If so, does the CBA identify the nonmonetized benefits?
Does the CBA state that there are nonmonetized costs?
If so, does the CBA identify the nonmonetized costs?

Do the monetized benefits exceed the monetized costs?
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 "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.