Incorporating Equity Concerns in Regulation

Caroline Cecot and Robert W. Hahn

April 2022

2001 L Street NW ● Suite 500 ● Washington, DC 20036
Tel: (202) 828-4405 ● Email: info@techpolicyinstitute.org ● www.techpolicyinstitute.org

Incorporating Equity Concerns in Regulation

Caroline Cecot* and Robert W. Hahn†

April 22, 2022

Abstract

U.S. regulatory agencies have been required to consider the equity and distributional impacts of regulations for decades. This paper examines the extent to which such analysis is done and provides recommendations for improving it. We analyze 187 cost-benefit analyses (CBAs) prepared by agencies from October 2003 to January 2021. We find that only two CBAs provided net benefits of a policy for a specific demographic group. Furthermore, only 20 percent of CBAs calculate some benefits by group (typically for demographic groups) and only 19 percent calculate some costs by group (typically for industry groups such as small entities). Overall, the differences between presidential administrations are relatively small compared to the differences between agencies in their performance using our measures of distributional analysis. And virtually no CBAs provide a distributional analysis that could help regulators evaluate whether the regulation, on net, advantages or disadvantages a particular group.

Key words: cost-benefit analysis; regulation; equity; distributional analysis; regulatory impact analysis

JEL categories: K23, K32, Q58, I0

---

* Assistant Professor of Law, Antonin Scalia Law School, George Mason University.

† Honorary Research Associate, Smith School, University of Oxford; Distinguished Senior Fellow, Technology Policy Institute. We thank Matt Adler, Jake Byl, Scott Farrow, Daniel Hemel, Nathan Hendren, Al McGartland, Dick Morgenstern, Claudio Radaelli, Ricky Revesz, Lisa Robinson, and participants at the Southern Economic Association annual conference for helpful comments. We are grateful to James Gray, Eslem Imamoglu, James Priest, and Tim Wieroniey for excellent research assistance. The usual caveats apply.

1 Introduction

Cost-benefit analysis (CBA) has been used by governments around the world as a rough yardstick for assessing whether the benefits of a policy exceed its costs. In the United States, the federal government has required regulatory agencies to conduct CBA on significant regulatory actions for more than four decades (Executive Order 12,291; Executive Order 12,866). Such actions often include environmental, health, and safety regulations, whose cumulative benefits and costs are estimated to be in the billions of dollars annually. Done well, CBA has the potential to help decision makers to select policies that reduce expected costs or increase expected benefits.

One problem with conventional CBA is that it does not address the distributional impacts of a policy. Typically, the monetary benefits and costs accruing to different groups within the population are weighed equally in measuring the aggregate net benefits of a policy, defined as the difference between benefits and costs. But policies with positive net benefits often have winners and losers. And if those burdened by the policy are members of an already disadvantaged or vulnerable group, such as those who are very poor,[1] the policy might not be worth pursuing on equity grounds.[2] In order to make such a decision, a regulator would need to know the net effects of the policy on different groups. This kind of analysis is referred to as a distributional analysis.

The purpose of this paper is to examine distributional analysis in CBAs that accompany significant federal regulatory proposals within the United States and explore the extent to which these analyses consider equity issues. We focus on U.S. analyses because these analyses are most likely to quantify and monetize the overall effects of policies (Cecot et al. 2008), and the consideration of distributional effects has been required for decades (*e.g.*, Executive Order 12,866). In addition, the Biden administration has shown a particular interest in considering and addressing the impact of federal policies on particular

[1] We use the word "group" in this paper to refer to any subgroup of a larger set, most typically to subgroups of the population, such as poor individuals or racial or ethnic minorities.

[2] In this paper, we purposely do not provide a formal definition of equity. Instead, we focus on the use of distributional analysis as a tool for informing decision makers who might be interested in promoting equity, however defined. In Executive Order 13,985, President Biden defined "equity" as "the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities . . . such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality" (Executive Order 13,985).

populations that may have experienced discrimination or may be otherwise vulnerable. In one of his first directives as president, President Biden instructed the Office of Management and Budget to develop a plan for ensuring that regulatory initiatives "appropriately benefit and do not inappropriately burden disadvantaged, vulnerable, or marginalized communities" (Memorandum 2021). President Biden has also issued executive orders supporting racial equity, encouraging investment in underserved communities, and promoting diversity, equity, and inclusion in the federal workforce (*e.g.*, Executive Order 13,984; Executive Order 14,008; Executive Order 14,035). An historical assessment of how equity issues have been analyzed can help identify the challenges that the Biden administration could face in implementing its priorities.

This paper analyzes existing government practices in doing distributional analysis and suggests how they might be improved. In particular, we examine two questions. First, how have U.S. federal regulatory agencies handled distributional analysis? And second, how might concerns about equity be more effectively incorporated into administrative decision making?

To answer the first question, we build on important contributions by Robinson et al. (2016) and Ellig (2016), who evaluated distributional analysis in CBAs prepared by the Obama administration. For our study, we analyzed 187 CBAs done by federal agencies from October 2003 to January 2021.[3] With this comprehensive data set, we are able to assess the extent to which equity considerations changed across administrations and how agencies compare with each other in terms of doing distributional analysis. We find that, notwithstanding efforts by several administrations to incorporate distributional analysis into regulatory analysis, only two CBAs arguably provided a quantitative estimate of the net benefits of a policy for a specific demographic group (analyzing the net effects on Tribal lands).[4] In addition, only 20% of CBAs estimated some quantitative benefits for a group (typically for a demographic group), and only 19% of CBAs estimated some quantitative costs for a group (typically for industry groups such as small entities). While the analysis of costs by group appears in CBAs conducted by a variety of agencies, the analysis of benefits by group is largely limited to CBAs conducted by the Department of Energy and the Environmental Protection Agency. Finally, while the Obama administration appears to be better than the George W. Bush administration on some

[3] The CBA is usually included in the preamble to the *Federal Register* Notice for the regulation or in a separate technical support document, as part of the required regulatory impact analysis.

[4] Another CBA calculated net benefits for an industry group, motor carriers, but this analysis was not motivated by equity considerations related to the treatment of disadvantaged groups.

measures, any differences between presidential administrations are relatively small compared to the differences between agencies in their performance using our measures of distributional analysis.

Our answer to the second question about how best to address equity concerns is more nuanced. When equity is an important consideration for the decision maker, agencies should do more and better analysis of the distributional impacts of regulations. We provide specific recommendations for improving distributional analysis by investing in the development of good data and models to provide such estimates. Once the analysis is generated, exactly how it should be factored into decision making to promote equity depends on the goal of the decision maker and the administrative process. Given the current state of the art, we argue for giving the agency in charge of regulating a fair amount of discretion in how such concerns should be weighed in regulatory decisions consistent with statutory directives and current guidance.

The plan of this paper is as follows. Section 2 provides an overview of distributional analysis of U.S. regulatory proposals, summarizing executive orders that call for distributional analysis and reviewing some key contributions to the literature. Section 3 presents our results on the extent to which such analysis has been conducted in regulatory analysis. Section 4 discusses challenges that need to be addressed in making greater use of distributional analysis, highlighting the role that economics could play. Section 5 concludes and identifies areas for future research.

2 Overview of Distributional Analysis

For decades, presidential executive orders have required federal agencies to consider the distributional impacts of regulatory proposals in the United States. But the extent of the analysis of such impacts has been rarely evaluated. This section briefly reviews the applicable requirements and then discusses two prior empirical evaluations of agency distributional analysis. It also briefly reviews the normative literature that offers suggestions for improving such analysis.

2.1 Regulatory Requirements Across Administrations

The formal process of conducting CBA-focused regulatory review began with the Reagan administration. In 1981, President Reagan issued Executive Order 12,291, which required all executive agencies to conduct a CBA, undertake regulatory actions with societal

benefits that outweigh costs, and choose regulatory objectives that maximize net benefits to society (Executive Order 12,291). The order makes no mention of the distributional consequences of regulations, though it requires agencies to consider "the condition of the particular industries affected by regulations" (Executive Order 12,291).

Later administrations continued to require CBA, and, starting with the Clinton administration, required some consideration of distributional issues when assessing the impact of regulatory proposals. President Clinton replaced the Reagan order with his own order, Executive Order 12,866. The new order continued to require agencies to select approaches that "maximize net benefits," but the phrase was expanded to include consideration of "distributive impacts" and "equity" (Executive Order 12,866). This order remains in place, although President Obama expanded the phrase further in a separate order, requiring agencies to include values like "equity, human dignity, fairness and distributive impacts" in CBAs (Executive Order 13,563). President Clinton issued two other executive orders that emphasized equity and distributional concerns. Executive Order 12,898 directed agencies to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Similarly, Executive Order 13,045 tasked agencies with identifying and assessing risks that may disproportionately affect children. The Trump administration retained these orders on CBA and other analysis even as it imposed additional requirements on agencies, such as adherence to a regulatory budget (*e.g.*, Executive Order 13,771).

To help agencies comply with executive orders, the Office of Management and Budget (OMB) prepares guidance documents, referred to as circulars. One influential guidance document, Circular A-4, assists agencies in conducting regulatory analysis (U.S. OMB 2003). Although Circular A-4 mostly focuses on the conventional practice of CBA, it also refers to distributional analysis several times. In its section about important alternatives to consider, for example, it directs agencies to "study alternative levels of stringency to understand more fully the relationship between stringency and the size and distribution of benefits and costs among different groups" (U.S. OMB 2003, p. 8). It also includes a section titled "Distributional Effects" that states that "regulatory analysis should provide a separate description of distributional effects . . . so that decision makers can properly consider them along with the effects on economic efficiency" (U.S. OMB 2003, p. 14). In addition, many agencies have developed their own guidelines for conducting CBA, and these guidelines have chapters devoted to distributional analysis (*e.g.*, U.S. EPA 2010; U.S. Department of Health and Human Services 2016).

Aside from presidential requirements and agency guidance, Congress can also require agencies to conduct specific analyses of regulatory proposals when it authorizes agencies to issue regulations. While Congress requires agencies to conduct CBA in some contexts, in many contexts Congress is silent on analysis (Cecot 2021). Instead, it directs agencies to issue whatever regulations they deem necessary, appropriate, reasonable, or feasible to fulfill broad statutory objectives. Courts have typically held that such broad language allows—and, in some statutory provisions, requires—the use of CBA to inform regulatory decisionmaking. But Congress has never passed a cross-cutting requirement to conduct CBA that would apply across statutes, and Congress has generally not required agencies to analyze the distribution of benefits and costs for particular demographic groups. Congress has, however, explicitly required all agencies to consider the impact of their rules on small entities, especially the costs imposed on such entities (Regulatory Flexibility Act 1980).

2.2 Empirical Literature on Analyzing Distributional Consequences of Regulations

Because some consideration of distributional impacts has been required for decades, our empirical analysis draws primarily on CBAs conducted by U.S. regulatory agencies to evaluate the likely effects of proposed regulations. There is a large literature in this area that examines the quality of these analyses, often scoring the extent to which they quantify benefits and costs and other important criteria (*e.g.*, Ellig & McLaughlin 2012). This "scorecard" approach was initially developed in Hahn et al. (2000) and has been used to measure the extent to which CBAs reflect political as well as economic factors (*e.g.*, Radaelli 2005; Dunlop et al. 2012; Shapiro & Morrall 2013; Renda 2015; Arndt 2015). Our particular interest in this paper is exploring the extent to which these CBAs have quantified the distributional impacts of regulation.

There are two key papers that have previously examined the extent that CBAs have included distributional analysis. In the first paper, Robinson, Hammitt, and Zeckhauser (2016) examine CBAs accompanying 24 regulations issued during the Obama administration that were aimed at achieving health risk reductions. They find that CBAs "rarely quantify" the distribution of risk reductions by population subgroups. Of the 24 CBAs they examine, the authors report that three provided health risk reductions across advantaged and disadvantaged groups. However, the authors note that none of the CBAs

estimate how costs are distributed across different demographic groups (p. 314). Thus, none of the CBAs in their sample estimate net benefits by group.

The second, a working paper by Ellig (2016), evaluates the quality of 130 CBAs conducted under the Obama administration. On the benefits side, Ellig finds that 27 CBAs (or 20%) have a "reasonably thorough" discussion of incidence of benefits and 31 CBAs have "serious deficiencies" (Ellig 2016, p. 23). On the cost side, he finds that 40 CBAs (or 31%) have a reasonably thorough discussion of the incidence of costs and 13 CBAs have serious deficiencies. Ellig does not report whether any CBA considered the incidence of both benefits and costs on an identified group. In addition, it is difficult to know what Ellig's categories, such as "reasonably thorough," mean in the context of estimating distributional impacts.

These pioneering papers suggest that distributional analysis has not been done very frequently for federal regulations issued during the Obama administration. Our work builds on these papers by considering a large and up-to-date data set of agency CBAs across several presidential administrations.

2.3 Normative Analysis of Promoting Equity through Regulation

While our main analysis is empirical, we draw on several normative contributions in trying to address how distributional analysis should be done. Here, we highlight a few of the main contributions, without making any claim to being comprehensive.

There is a large literature on whether regulation should be used as a tool for promoting equity or redistribution at all. Previously, the conventional wisdom among economists and other scholars has been that because the tax system is a more efficient way of transferring benefits across groups than the regulatory system, regulatory policy need not consider nor attempt to address distributional effects (*e.g.*, Arrow et al. 1996; Kaplow & Shavell 1994). But recently, concern with increasing income inequality, congressional inaction on redistributing income through taxation, and perceived inequity in the cumulative impacts of regulatory policy have motivated some scholars to rethink this conclusion. For example, several scholars have made a case for paying attention to the distributional impacts of policies (*e.g.*, Adler 2019; Revesz 2018; Adler 2016; Robinson et al. 2016; Banzhaf 2011; Farrow 2011; Farrow 1998), and recent empirical analysis has focused on measuring the effectiveness of policies targeted toward specific groups (*e.g.*, Hendren and Sprung-Keyser 2020).

Assuming that agencies can do distributional analysis well, the analysis can help decision makers take into account equity and distributional concerns. The question of how distributional analysis should be used to guide decisions, however, has been more controversial. Options range from presenting net benefits by group for informational purposes only to allowing distributional analysis to change the agency's substantive views on the desirability and stringency of a regulation. Based on considerations that include political and scientific feasibility, Banzhaf (2011), for example, advocates for a distributional analysis that presents net benefits across groups, but he does not advocate for incorporating the results into substantive regulatory decisions. Revesz (2018) leaves open the possibility of modifying regulations to adjust for especially large inequities. Other scholars argue that equity weights should be directly included within the CBA itself (*e.g.*, Adler 2016), an idea that has been proposed long before the widespread adoption of CBA in regulatory analysis (*e.g.*, Meade 1955; Dasgupta et al. 1972). For example, benefits and costs to different groups, such as high-income and low-income individuals, could be weighted by the marginal utility of income (*e.g.*, Weisbach 2015). A recent paper by Hemel (2022) explores the practical implications of applying such weights consistently to benefits and costs by examining a 2014 rule promulgated by the National Highway Traffic Safety Administration. The rule requires vehicles to have rearview cameras to reduce the risk of crashes when a vehicle is backing up. Hemel finds that, when the estimate of mortality risk-reduction benefits is adjusted for income, the rule is expected to generate net costs for lower-income individuals; without the adjustment, it was expected to yield net benefits for such individuals. The change occurs because, although the regulation is predicted to save more lives from this group, the cost borne by this group in exchange for these risk-reduction benefits would be relatively high (Hemel 2022; see also Adler 2019).

We consider some of the key normative issues in section 4 after we present our empirical analysis. We believe the current state of distributional analysis can shed light on what kinds of analysis and policy design may be most useful in the regulatory sphere. In that sense, the empirical analysis can inform increasing concerns raised by politicians about considering equity in regulatory decisions.

3 Methodology and Results

In this section, we first discuss the methodology we employ to objectively measure whether and how agency CBAs assess distributional impacts. We then present the results of our evaluation.

3.1 Sample and Methodology

We analyze 187 CBAs conducted between October 2003 and January 2021 that monetized at least some costs and at least some benefits of proposed significant regulatory actions. We exclude transfer rules that primarily aim to redistribute income. We identified CBAs that meet these criteria by reviewing reports prepared by the Office of Information and Regulatory Affairs (OIRA) within the Office of Management and Budget and by the Government Accountability Office. These reports summarize benefits and costs from CBAs accompanying significant regulatory actions, allowing us to identify CBAs that monetized at least some benefits and at least some costs. We limit our sample to these relatively complete CBAs because we are interested identifying assessments of *net* benefits for particular groups. If either benefits or costs are not monetized, then the CBA would not have a quantitative basis for making an assessment of net benefits by group. During the relevant period, agencies prepared about 1,000 CBAs for (non-transfer) significant regulatory actions. Of these CBAs, 222 CBAs monetized both benefits and costs. Of the 222 CBAs that fit our criteria, we could locate 187 CBAs, or about 84 percent.[5]

For the analysis, we combine a keyword search with a scorecard methodology to identify and assess distributional analysis in a large sample of CBAs. First, we created a set of keywords and searched for each keyword in every CBA. We selected keywords that would likely capture any discussion of the distributional effects of the regulation on groups, including benefits and/or costs. We chose the keywords after tests on a small sample of CBAs. These keywords were "justice," "equity," "distributional," "minority," "race," "ethnic," "subgroup," "employment," and "small business," and variations of these words. If a keyword appeared within the CBA, we read the relevant section and assessed whether the reference was in the context of assessing benefits or costs to a particular group. In this way, we identified CBAs that contain some discussion or analysis of distributional impacts on groups. The keyword approach is transparent and easily replicable, and it reduces the effort involved in scoring a large sample of CBAs; however, it would not identify a distributional analysis that fails to mention any of the keywords.

Whenever a keyword search identified a discussion of distributional impacts, we graded the attributes of the analysis using a scorecard approach. The questions we scored were

[5] Appendix Table A1 lists all CBAs included in our sample.

"yes" or "no" questions, or they required the reviewer to identify particular elements from a set. Specifically, we asked whether the CBA contained a discussion about equity or environmental justice that was more than a statement that these considerations do not apply. In addition, we asked whether any benefits (or costs) of the regulation were presented for an identified group and, if so, we asked for a list of the identities of these groups.[6] The advantage of the scorecard approach is that it can be replicated easily because the criteria for scoring the attributes of the distributional analysis are objective. The disadvantage is that objective measures may not provide useful information on the quality of any distributional analysis or the ease with which such analysis might be applied in other contexts.

3.2 Results

Our sample includes 187 CBAs conducted between October 2003 and January 2021 that monetized at least some costs and at least some benefits of significant regulatory actions. These CBAs come from three presidential administrations: the G.W. Bush administration (43 CBAs), the Obama administration (115 CBAs), and the Trump administration (29 CBAs). Most CBAs in our sample (61%) were prepared under the Obama administration. The sample also includes CBAs from a variety of agencies. For our categorization, we listed the main agency and not individual subagencies (in other words, we listed the Department of Transportation instead of the National Highway Traffic and Safety Administration or the Federal Aviation Administration). Overall, most CBAs in our sample were prepared by the Environmental Protection Agency (EPA) (59 out of 187), followed by the Department of Transportation (DOT) (34 out of 187) and the Department of Energy (DOE) (32 out of 187). Table 1 shows the distribution of CBAs by presidential administration and by agency within our sample.[7]

Overall, our results are consistent with Robinson et al.'s (2016) finding that distributional analysis of benefits or costs that accrue to different groups is rarely conducted. Although all the CBAs in our sample, by design, provide monetized estimates of at least some of the aggregate benefits and costs of the regulation, only 20% of these relatively complete

[6] Appendix Table A2 lists all scorecard keywords and questions and present summary statistics for the sample.

[7] Two Reports to Congress summarized CBAs that spanned multiple administrations. The 2018 Report to Congress summarized CBAs reviewed between October 2016 and September 2017, and the 2010 Report to Congress summarized CBAs reviewed between October 2008 and September 2009. For these reports, we specifically identified which administration prepared the CBA.

CBAs quantify at least some benefits for a particular group; only 19% quantify at least some costs for a particular group; and only 2% calculated net benefits for a particular group.

Our large sample allows us to investigate additional patterns in distributional analysis. First, we examine whether any CBAs analyze benefits and costs that accrue to the same group, providing an estimate of *net* benefits for the group. Importantly, we find that only two CBAs conducted by the Department of the Interior (DOI) and one CBA conducted by the DOT provides such an estimate of net benefits for a group. Table 2 lists these CBAs. The two DOI CBAs, one supporting a regulation and the other supporting its repeal, provide an estimate of net benefits that would accrue to Tribal lands as a result of changes in oil-and-gas production in those areas from the regulation and its repeal (U.S. DOI 2018; U.S. DOI 2016).[8] Each of these CBAs presents the net benefits of implementing the preferred regulatory option and does not explore how the distribution of net benefits for Tribal lands would change under other proposed options. The DOT CBA, meanwhile, provides an estimate of net benefits that would accrue to motor carriers (in particular, small motor carriers) as a result of the regulation, though its estimates of safety benefits is based on a simplifying assumption that 10% of social safety benefits accrue to carriers (U.S. DOT 2010). This CBA presents net benefits to carriers for two regulatory options. Overall, except for these three CBAs, the practice of calculating net benefits by group—and especially for vulnerable or disadvantaged demographic groups—is nonexistent in our sample.

Second, we identify the groups that agencies analyze whenever they conduct a distributional analysis for benefits or costs. We find that, overall, agencies calculate impacts on racial and ethnic minorities, age-based groups such as children and the elderly, low-income households, and small entities. Table 3 lists the analyzed groups for each CBA that contains an estimate of benefits or costs for some group.[9] A key finding is that costs, if calculated for any group, were almost always calculated for small entities or industry groups and not for demographic groups. In contrast, demographic groups were often the subject of quantitative distributional analysis of regulatory benefits, without attempts

[8] In the United States, Tribes lease their own land for oil and gas production, and companies make upfront payments to Tribal governments for the rights to develop the leases. In these rules, the agency compared regulatory compliance costs with expected methane emission reductions and cost savings from reducing methane leakage on Tribal lands (U.S. DOI 2018; U.S. DOI 2016).

[9] For convenience, the CBAs in Tables 2 and 3 are listed under the year of the annual Report to Congress that includes them and not the year in which they were prepared.

to calculate regulatory costs. As discussed previously, however, understanding the *net* benefits that accrue to an identified group is fundamental to any strategy aimed at ensuring that a disadvantaged group enjoys an increase in economic welfare.

Third, we examine whether there are differences in the analysis by agency. EPA has the most CBAs in our sample (59 CBAs), and almost half of these CBAs (46%) include a substantive discussion of equity, often in the context of considering environmental justice and in qualitative terms. Less than a sixth of EPA CBAs quantitatively analyze any benefits (15%) or costs (14%) for groups.[10] The next most represented agency in our sample is the DOT (34 CBAs), and its CBAs virtually never discuss equity considerations (3%) or calculate benefits (6%) or costs (6%) for groups. That said, one of the few DOT CBAs that does evaluate benefits and costs for a particular group calculates *net* benefits for the group (albeit an industry group). The DOE, which has 32 CBAs in our sample, emerges as an agency that frequently engages in a quantitative analysis of at least some benefits by group. In 75% of its CBAs, the agency evaluates the impact of the regulation on identifiable subgroups of consumers that may be disproportionately affected by a new or amended national standard, such as low-income and senior-only households and small entities. The agency calls this analysis a "consumer subgroup analysis." Oftentimes, the analysis provides the life-cycle cost savings and the average payback periods for more expensive appliances due to energy-efficiency requirements.[11] In 22% of its CBAs, the DOE also separately quantifies some of the costs of compliance, typically for small entities. The Department of Health and Human Services (25 CBAs) calculates some benefits by group in one CBA and some costs by group in 20% of CBAs. And the DOI, with only two CBAs in our sample, provides an estimate of some benefits and some costs (net benefits) for an identifiable group (Tribal lands) in both CBAs. The remaining agencies in our sample never analyze benefits by group in their CBAs, though some of them analyze costs by group, particularly for small entities, in some of their CBAs.

Finally, we examine whether there are differences in the analysis by presidential administration. The summary statistics reveal that 14% of CBAs conducted by the Trump administration, 18% of CBAs conducted by the Obama administration, and 18% of

[10] The majority of EPA CBAs that quantitatively analyzed benefits by group (7 out of 9) came from the Office of Air and Radiation. The remaining EPA CBAs that analyzed benefits by group (2 out of 9) came from the Office of Chemical Safety and Pollution Prevention.

[11] In most cases, the life-cycle cost savings are still positive under some range of assumptions. For simplicity, we categorize this analysis as quantifying *benefits* by group.

CBAs conducted by the George W. Bush administration contain a substantive discussion of equity. There was no statistically significant difference between presidential administrations on this measure. But only 7% of Bush-era CBAs quantitatively evaluate at least some of the benefits by group, while 26% of Obama-era CBAs and 17% of Trump-era CBAs present some quantitative information on benefits by group. On the cost side, 9% of Bush-era CBAs evaluate costs of regulations by group, while 24% of Obama-era CBAs and 14% of Trump-era CBAs do so. Here, there is no statistically significant difference between the Obama and Trump administrations, but the Obama administration appears to be better than the Bush administration in terms of their analysis of benefits or costs by group using our measures and sample.[12] Once we take into account the mix of agencies in the sample rules issued by each administration, however, these differences become statistically insignificant.[13]

Overall, the differences between presidential administrations are relatively small compared to the differences between agencies in their performance on our measures of distributional analysis. While distributional analysis of benefits and costs for an identified group is uncommon, the analysis of only costs for small entities is conducted by a diverse set of agencies. The analysis of benefits for demographic groups, however, is largely limited to DOE and EPA when it is done at all. And virtually no CBAs provide a distributional analysis that could help regulators evaluate whether the regulation, on net, advantages or disadvantages a particular group.

4 Challenges for Distributional Analysis

The preceding section showed that very little quantitative distributional analysis of regulations is done for significant regulations, *even when* CBAs provide at least some quantitative information on aggregate benefits and costs. This section explores three areas

[12] In particular, the differences in the proportions of CBAs providing benefits by group and costs by group across the two administrations are significantly different from zero. The p-values for equal proportions across the two administrations are as follows: 0.0085 (benefits by group) and 0.0362 (costs by group).

[13] In a regression of benefits by group, CBAs conducted by specific agencies, namely the Department of Energy, the Department of the Interior, and the Environmental Protection Agency, drive any statistically significant difference in this measure; indicator variables for presidential administration are statistically insignificant. In a regression of costs by group, CBAs conducted by several agencies are associated with better performance, but the indicator variable for the Obama administration remains positive and statistically significant at the 10% level compared to the Bush administration. After including a time trend, however, any difference becomes statistically insignificant.

where economists could make a substantial contribution to the debate on distributional analysis: when it should be done, how to do it better, and which decision rule to use.

4.1 When to Do Distributional Analysis

Distributional analysis probably does not make sense for every regulation. For example, at the federal level in the United States, CBA is required only for significant regulatory actions that include actions expected to have an annual effect on the economy of $100 million or more (Executive Order 12,866). This decision appears to be motivated, in part, by the fact that formal CBA is costly to do, and in some cases, the benefits of conducting the analysis may not outweigh the costs. A similar logic would apply to doing distributional analysis. It may not, for example, make sense to do distributional analysis for regulations that are not significant or when the CBA does not quantify and monetize many impacts in the aggregate.

Economics can also provide a framework for thinking about when to do distributional analysis within those categories of CBAs. One such framework is to suggest doing distributional analysis when benefits exceed costs of doing the analysis. An obvious question is how to characterize these benefits and costs. On the benefit side, information on this kind of analysis could be valuable because it increases transparency and accountability, both of which may have intrinsic value. Another possible benefit is that it may reveal information that could change the substantive decision (Raiffa 1970). The cost side is easier to measure in principle, but we are not aware of any efforts to measure the costs of doing distributional analysis for proposed regulations.

If assessing the benefits and costs of conducting distributional analysis is infeasible or impractical, there are some rules of thumb that policy makers may want to explore. For example, policy makers may wish to explore formal distributional analysis when the benefits of the proposed regulatory action to the vulnerable (however defined) might not exceed the costs. This concern could arise when benefits or costs are concentrated on specific groups or geographic areas rather than widely distributed or when the costs, even if widely distributed, are likely to place a greater burden on low-income populations than other populations (*e.g.*, are regressive).

4.2 How to Do More and Better Distributional Analysis

To address the issue of how to do more, and better, distributional analysis, we need to squarely address why doing such analysis is currently the exception rather than the rule. Based on our analysis, we think that there are two main reasons for this state of affairs: (1) a lack of political will or pressure and (2) a lack of good data and models or devoted resources.[14]

Although Presidents Clinton, Obama, and Biden each issued executive orders and, in the case of Biden, a memorandum, stating the need to do more analysis that considered distributional impacts, they did not apply sufficient political pressure on agencies to produce this analysis. In particular, they did not provide any significant incentives for doing such analysis. Compliance with executive-order requirements, by itself, is not subject to outside judicial review. A presidential administration, however, could adopt internal incentives, such as providing additional resources for the regulatory agency when such analysis is done or requiring a full explanation of what the agency did to try to comply with the request for distributional analysis. Even directing OIRA to provide guidance for and oversee compliance with distributional analysis, as it does with CBA generally, could have a big impact (see Farrow 2011).

There is also evidence to suggest that Congress could make a difference if it chose to do so. The most common distributional analyses in our sample were the analyses of energy-efficiency standards on low-income consumers and the analyses of regulatory burdens on small entities. Both analyses are encouraged or required by Congress. The analysis of energy-efficiency standards, for example, stems from the DOE's statutory requirements. The Energy Policy and Conservation Act (1975) requires the agency to consider the economic impact of any energy-efficiency standard on manufacturers and consumers. Since at least 1996, the agency has interpreted this language to require it to pay attention to impacts on significant subgroups of consumers, including low-income consumers, and significant subgroups of manufacturers (U.S. DOE 1996). Similarly, the analysis of the impact of regulations on small entities is the only kind of distributional analysis that Congress requires all agencies to conduct.

While laws may stimulate distributional analysis of regulations, there does not seem to be a strong political demand on the part of Congress for such analysis. In the context of CBA, Congress has never passed a cross-cutting statutory requirement, though it has

[14] Robinson et al. (2016) consider additional reasons for the paucity of distributional analysis.

considered several bills that would require it. Congress seems unlikely to pass a cross-cutting requirement for distributional analysis, which relies on CBA to some extent, though that may change in the future.

If decision makers wish to increase consideration of equity issues in economic analysis, we recommend a two-pronged strategy. First, there needs be increased funding for research in this area; and second, there needs to be funding of efforts that would make it easier to do these kinds of analyses in the future. We provide some examples below of what we have in mind.

On the research side, agencies would need to develop more disaggregated models of costs and better models of benefits. Such models should be informed by experimental results. By experimental, we mean, ideally, doing experiments or quasi-experimental analysis that would enable us to better understand the aggregate impact of a regulation as well as its impact on specific subgroups (List 2022). Greenstone (2009) makes an argument for using randomized controlled trials in a variety of regulatory contexts. Of course, it may be difficult to do these trials for reasons of politics, economics, and technology. Nonetheless, such randomized pilots should be introduced where possible. Where this is not possible, or the cost is prohibitive, it may be useful to do ex ante analyses of the distributional impact of regulations that often rely on engineering economic estimates or other simplifying assumptions.[15]

For estimating costs, researchers could help by developing models that show how regulations are likely to alter costs for specific subgroups of the population. Such models exist in selected areas, such as for electric utilities, but more of this work needs to be done for industries that are less heavily regulated, such as in transport and drugs. Similarly, the benefits of regulations by group are often poorly understood. There is some modeling that shows how mortality risk-reduction benefits vary by group, but the contexts are limited due to gaps in data and scientific understanding. All of these areas could be advanced with more funding for research.

In addition to increased funding for research, funding efforts that would directly lower the cost of doing such distributional analysis for particular regulations could facilitate its use. We have in mind developing "off-the-shelf" models on the cost side and the benefit side, as well as "off-the-shelf" data sets that make it easier to develop estimates.

[15] For an analysis that compares ex ante and ex post estimates of regulatory costs, see Harrington, Morgenstern, and Nelson (2000).

For example, it is possible, in principle, to develop models of some industries that show the impact of cost increases on different groups. These models could be partial equilibrium, or where appropriate, general equilibrium. Data sets could also be developed that lower the cost of doing such analysis. This includes geographical information system data that shows roughly where people live, say by income or race. These data sets could then be connected to regulatory impacts. Having such models and data sets readily available to practitioners would help with actually doing the distributional analysis.

While we believe a lot more could be done on both the benefit and the cost side to disaggregate the benefits and costs by different groups, the task will take time. The previous analysis shows that estimating net benefits by group appears to be a significant challenge for regulators, given the current state of the art and the current politics.

4.3 What Decision Rule to Use

Economists have no special status in specifying the precise decision rule or social welfare function because this is ultimately a value judgment. However, they can help assess efficiency and distributional impacts of using different decision rules (*e.g.*, when information on distributional impacts is reasonably complete) (Finkelstein and Hendren 2020). Possible decision rules could include ensuring an overall welfare improvement for the regulation using conventional measure of benefits and costs; requiring a welfare improvement for *all* groups; and using welfare weights for different groups and examining whether particular objective functions lead to an increase in social welfare.

After an agency completes a distributional analysis, there is a question of how this information should be weighed in the final decision to regulate. The preceding analysis, along with previous research, suggests that there will be a paucity of good information on distributional impacts of regulation for a significant fraction of regulations in the near term.

Given the paucity of information, we advocate giving decision makers a fair amount of discretion in deciding how to use the results of a distributional analysis in the ultimate decision on whether and how to regulate. At the same time, it may be useful to ask the decisionmaker to justify any decision in writing.

5 Conclusion

This paper sheds light on the extent to which distributional impacts are analyzed in regulation in the United States. We assembled a comprehensive data set of cost-benefit analyses spanning three presidential administrations, and then examined two questions. First, how have federal regulatory agencies handled distributional analysis? And second, how might concerns about equity be more effectively incorporated into administrative decision making?

We find that, notwithstanding efforts by several administrations to incorporate distributional analysis into regulatory analysis, estimating the expected net benefits of a regulation by group is quite rare. Furthermore, few CBAs quantify at least some benefits by group (20%) and costs by group (19%). These percentages are based on a sample of relatively complete CBAs for which at least some aggregate benefit and cost estimates are provided. These percentages would likely be substantially lower if we analyzed all CBAs of significant federal regulatory activity, many of which do not provide either quantified benefit or cost information for the overall population or specific subgroups. Given the current state of the art, we argue for giving the agency in charge of regulating a fair amount of discretion in how distributional concerns should be weighed in regulatory decisions.

We think academics could contribute to this discussion in several ways. First, they could help catalogue what has been done in different domains of policy with respect to distributional impacts. These include tax policy and regulatory policies outside of the area examined here (*e.g.*, independent regulatory agencies). We suspect that such analysis has not been done in many government policy analyses or has been done in a limited way. Second, they could help develop tools that would make it easier for policy makers to do such analysis. Such tools might include models that estimate the impact of regulation of specific industries on different groups. Third, they could explore more broadly how the use of different equity weights in policy might affect whether a policy passes a benefit-cost test.

Although distributional analysis could help agencies maximize net benefits by, for example, taking into account the diminishing marginal utility of income, we end with a note of caution. The increased attention to equity that the Biden administration appears to be embracing might not lead to an increase in the well-being or economic welfare for particularly vulnerable groups or society at large. A lot depends on the implementation

and decision rules that are selected. The ultimate result is an empirical question that future scholars may want to explore if legislators and regulators choose to go down this path.

References

Adler, Matthew D. Measuring Social Welfare (Oxford University Press, 2019).

_____. "Benefit-Cost Analysis and Distributional Weights: An Overview." *Review of Environmental Economics & Policy* 10, no. 2 (2016): 264-285.

Arndt, Christiane, et al. "2015 Indicators of Regulatory Policy Governance: Design, Methodology, and Key Results." OECD Regulatory Policy Working Papers, No. 1 (2015).

Arrow, Kenneth, et al. "Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?" *Science* 272, no. 5259 (1996): 221-222.

Banzhaf, H. Spencer. "Regulatory Impact Analyses of Environmental Justice Effects." *Journal of Land Use & Environmental Law* 27, no. 1 (2011): 1-30.

Biden, Joseph R. "Modernizing Regulatory Review: Memorandum for the Heads of Executive Departments and Agencies." *The White House*, Jan. 20, 2021. www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/modernizing-regulatory-review/

Cecot, Caroline. "Congress and Cost-Benefit Analysis." *Administrative Law Review* 73, no. 4 (2021): 787-832.

Cecot, Caroline, et al. "An Evaluation of the Quality of Impact Assessment in the European Union with Lessons for the US and EU." *Regulation & Governance* 2, no. 4 (2008): 405-424.

Dasgupta, Ajit K., Sen, Amartya, & Marglin, Stephen A. "Guidelines for Project Evaluation." New York: UNIDO, United Nations (1972): 1-48.

Dunlop, Claire A, et al. "The Many Uses of Regulatory Impact Assessment: A Meta-Analysis of EU and UK Cases." *Regulation & Governance* 6, no. 1 (2012): 23-45.

Energy Policy and Conservation Act, Pub. L. No. 94-163, 89 Stat. 871 (1975), 42 U.S.C.A. § 6295.

Ellig, Jerry and Patrick A. McLaughlin. "The Quality and Use of Regulatory Analysis in 2008." *Risk Analysis* 32, no. 5 (2012): 855-80.

Ellig, Jerry. "'Evaluating the Quality and Use of Regulatory Impact Analysis: The Mercatus Center's Regulatory Report Card, 2008-2013." Working Paper, Mercatus Center at George Mason University (2016).

Exec. Order. No. 12291, 46 Fed. Reg. 13193 (Feb. 17, 1981), https://www.archives.gov/federal-register/codification/executive-order/12291.html#12291

Exec. Order. No. 12866, 58 Fed. Reg. 51735 (Sep. 30, 1993), https://www.archives.gov/files/federal-register/executive-orders/pdf/12866.pdf

Exec. Order. No. 12898, 59 Fed. Reg. 7629 (Feb. 16, 1994), https://www.archives.gov/files/federal-register/executive-orders/pdf/12866.pdf

Exec. Order. No. 13,045, 62 Fed. Reg. 19885 (Apr. 23, 1997), https://www.govinfo.gov/content/pkg/FR-1997-04-23/pdf/97-10695.pdf

Exec. Order. No. 13771, 82 Fed. Reg. 9339 (Feb. 3, 2017), https://www.federalregister.gov/documents/2017/02/03/2017-02451/reducing-regulation-and-controlling-regulatory-costs

Exec. Order. No. 13985, 86 Fed. Reg. 7009 (Jan. 25, 2021), https://www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government

Exec. Order. No. 14008, 86 Fed. Reg. 7619 (Feb. 1, 2021), https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad

Exec. Order. No. 14035, 86 Fed. Reg. 34593 (June 30, 2021), https://www.federalregister.gov/documents/2021/06/30/2021-14127/diversity-equity-inclusion-and-accessibility-in-the-federal-workforce

Farrow, Scott, "Environmental Equity and Sustainability: Rejecting the Kaldor-Hicks Criteria." *Ecological Economics*, 27, no. 2 (1998): 183-188.

Farrow, Scott, "Incorporating Equity in Regulatory and Benefit-Cost Analysis Using Risk Based Preferences." *Risk Analysis*, 31, no. 6 (2011): 902-907.

Finkelstein, Amy and Hendren, Nathaniel. "Welfare Analysis Meets Causal Inference." *Journal of Economic Perspectives* 34, no. 4 (2020): 146–167.

Golberg, Elizabeth. " 'Better Regulation': European Union Style." Harvard Kennedy School M-RCBG Association Working Paper No. 98 (2018).

Greenstone, Michael. "Toward a Culture of Persistent Regulatory Experimentation and Evaluation." in D. Moss and J. Cisternino: New Perspectives on Regulation. Cambridge, MA: The Tobin Project (2009): 111-26

Hahn, Robert W. et al. "Assessing the Quality of Regulatory Impact Analyses." *The Harvard Journal of Law and Public Policy* 23, no. 23 (2000).

Harrington, Winston, Morgenstern, Richard D., and Nelson, Peter. "On the Accuracy of Regulatory Cost Estimates." *Journal of Policy Analysis and Management* 19, no. 2 (2000): 297-322.

Hemel, Daniel J. "Regulation and Redistribution with Lives in the Balance." *University of Chicago Law Review*, Forthcoming (2022).

Hendren, Nathaniel and Sprung-Keyser, Ben. "A Unified Welfare Analysis of Government Policies." *The Quarterly Journal of Economics* 135, no. 3 (2020): 1209–1318.

Kaplow, Louis and Shavell, Steven. "Why the Legal System is Less Efficient than the Income Tax in Redistributing Income." *The Journal of Legal Studies* 23, no. 2 (1994): 667-681.

List, John A. The Voltage Effect: How to Make Good Ideas Great and Great Ideas Scale (2022).

Meade, James E. Trade and Welfare: Mathematical Supplement (London: Oxford University Press, 1955).

Okun, Arthur M. Equality and Efficiency: The Big Tradeoff (Washington, D.C.: Brookings Institution Press, 2015).

Posner, Richard A. "Taxation by Regulation." *The Bell Journal of Economics and Management Science* 2, no. 1 (1971): 22-50.

Radaelli, Claudio M. "Diffusion without Convergence: How Political Context Shapes the Adoption of Regulatory Impact Assessment." *Journal of European Public Policy* 12, no. 5 (2005): 924-43.

Raiffa, Howard. Decisionmaking Under Uncertainty (1970).

Regulatory Flexibility Act, Pub. L. No. 96-354, 94 Stat. 1164 (1980), https://www.govinfo.gov/content/pkg/STATUTE-94/pdf/STATUTE-94-Pg1164.pdf

Renda, Andrea. "Regulatory Impact Assessment and Regulatory Policy." in Regulatory Policy in Perspective: A Reader's Companion to the OECD Regulatory Policy Outlook (2015).

Revesz, Richard L. "Regulation and Distribution." *New York University Law Review* 93 (2018): 1489-1578.

Robinson, Lisa A., Hammitt, James K., and Zeckhauser, Richard J. "Attention to Distribution in U.S. Regulatory Analyses." *Review of Environmental Economics and Policy 2016* 10, no. 2 (2016): 308-328.

Shapiro, Stuart and Morrall, John. "Does Haste Make Waste? How Long Does It Take to Do A Good Regulatory Impact Analysis?" *Administration & Society* (2013).

U.S. Department of Energy. "Energy Conservation Program for Consumer Products: Procedures for Consideration of New or Revised Energy Conservation Standards for Consumer Products." *Federal Register* 61, no. 136 (1996): 36974-87.

U.S. Department of Health and Human Services. *Guidelines for Regulatory Impact Analysis*. 2016. https://www.aspe.hhs.gov/sites/default/files/migrated_legacy_files//171981/HHS_RIAGuidance.pdf?_ga=2.141929010.1088912007.1646423642-1908537186.1646423642

U.S. Department of Interior. *Regulatory Impact Analysis for the Final Rule to Rescind or Revise Certain Requirements of the 2016 Waste Prevention Rule*. 2018.

_____. *Regulatory Impact Analysis for the Waste Prevention Rule*. 2016.

U.S. Department of Transportation. *Regulatory Impact Analysis of Electronic On-Board Recorders*. 2010.

U.S. Environmental Protection Agency. *Technical Guidance for Assessing Environmental Justice in Regulatory Analysis*. 2016. 1-82. https://www.epa.gov/sites/production/files/2016-06/documents/ejtg_5_6_16v5.1.pdf

_____. *Plan EJ 2014*. Washington, DC, 2011. 1-185. https://nepsis.epa.gov/Exe/ZyPDF.cgi/P100DFCQ.PDF?Dockey=P100DFCQ.PDF

_____, Office of Policy - National Center for Environmental Economics. *Guidelines For Preparing Economic Analyses*. 2010. 7-1 – 7-50. https://www.epa.gov/sites/default/files/2017-08/documents/ee-0568-50.pdf

_____, Council on Environmental Quality. *Environmental Justice: Guidance Under the National Environmental Policy Act*. 1997. https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

U.S. Office of Management & Budget. "Circular A-4, Regulatory Analysis." *Federal Register* 68, no. 196 (2003): 58366.

Viscusi, W. Kip. "The Value of Life: Estimates With Risks By Occupation And Industry." *Economic Inquiry* 42, no. 1 (2004): 29-48.

Weisbach, David A. "Distributionally Weighted Cost-Benefit Analysis: Welfare Economics Meets Organizational Design." *Journal of Legal Analysis* 7, no. 1 (2015): 151-182.

Tables

Table 1. Cost-Benefit Analyses Summary Results

Summary	Total CBAs	Discussion of Equity/ Environmental Justice	Some Benefits by Group	Some Costs by Group
By Presidential Administration				
Trump	29	4	5	4
Obama	115	21	30	28
G.W. Bush	43	8	3	4
By Agency				
Environmental Protection Agency	59	27	9	8
Dept. of Transportation	34	1	2	2
Dept. of Energy	32	3	24	7
Dept. of Health and Human Services	25	2	1	5
Dept. of Labor	12	0	0	4
Dept. of Agriculture	8	0	0	3
Dept. of Justice	6	0	0	4
Dept. of Homeland Security	6	0	0	0
Dept. of Interior	2	0	2	2
Dept. of Housing and Urban Development	1	0	0	1
Treasury	1	0	0	0
Defense	1	0	0	0
Total (Oct. 2003 to Sept. 2019)	187	33	38	36

Notes: Our sample contains 187 CBAs reviewed by the Office of Information and Regulatory Affairs within the Office of Management and Budget between October 2003 and January 2021. These reviews occurred under the Trump, Obama, and G.W. Bush administrations. For our categorization, we listed the main agency and not individual subagencies (in other words, Department of Transportation instead of National Highway Traffic Safety Administration or Federal Aviation Administration). Across agencies, the Department of Energy, which has 32 CBAs in our sample, often engages in distributional analysis of benefits (cost savings) in CBAs with some monetized benefits and costs.

Source: Authors' analysis. [CBAs and scoring on file with authors and available at request.] CBAs identified by the Office of Information and Regulatory Affairs Reports to Congress, 2003-2020, and reports by the Government Accountability Office; and CBAs obtained from Regulations.gov and agency websites.

Table 2. Cost-Benefit Analyses with Net Benefits by Group

Year	Related Rule (RIN)	President, Agency	Net Benefits by Group	Analyzed Alternatives by group?
2019	Rescission of Waste Prevention Rule (1004-AE53)	Trump, DOI	Tribal lands	No
2018	Waste Prevention, Production Subject to Royalties, and Resource Conservation (1004-AE14)	Obama, DOI	Tribal lands	No
2011	Electronic On-Board Recorders (2126-AA89)	Obama, DOT	Motor carriers	Yes (two regulatory options)

Notes: CBAs that quantified net benefits by group. The "year" refers to the Office of Information and Regulatory Affairs Report to Congress that identified the CBA.
Source: Authors' analysis. [CBAs and scoring on file with authors and available at request.]

Table 3. Cost-Benefit Analyses with Some Benefits or Some Costs by Groups

Year	Related Rule (RIN)	President, Agency	Some Benefits by Group	Some Costs by Group
2021	Energy Conservation Program: Energy Conservation Standards for Portable Air Conditioners (1904-AD01)	Trump, DOE	Low-income households, senior-only households, small entities	
2021	Energy Conservation Program: Energy Conservation Standards for Commercial Packaged Boilers (1904-AD01)	Trump, DOE	Low-income households, small entities	
2021	Energy Conservation Program: Energy Conservation Standards for Air Compressors (1904-AC83)	Trump, DOE	Small entities	
2021	Medicare Program; F12021 Hospice Wage Index and Payment Rate Update (0938-AU09)	Trump, HHS		Small entities
2020	Final Rule to Revise the TSCA Dust-Lead Post-Abatement Clearance Levels (2070-AJ82)	Trump, EPA	Race, ethnicity, and poverty status; children	Small entities
2020	National Bioengineered Food Disclosure Standard (0581-AD54)	Trump, USDA		Small entities
2018	Energy Conservation Standards for Miscellaneous Refrigeration Products (1904-AC51)	Obama, DOE	Low-income households, senior-only households	
2018	Energy Conservation Standards for Ceiling Fans (1904-AD28)	Obama, DOE	Low-income households, small entities	Small entities
2018	Energy Conservation Standards for Central Air Conditions and Heat Pumps (1904-AD37)	Obama, DOE	Low-income households, senior-only households	

Year	Related Rule (RIN)	President, Agency	Some Benefits by Group	Some Costs by Group
2018	Energy Conservation Standards for Dedicated-Purpose Pool Pumps (1904-AD52)	Obama, DOE	Senior-only households	
2018	Energy Conservation Standards for Walk-In Coolers and Walk-In Freezers (1904-AD59)	Obama, DOE	Small entities	Small entities
2018	Walking Working Surfaces and Personal Fall Protection Systems (Slips, Trips, and Fall Prevention) (1218-AB80)	Obama, DOL		Different industries, small entities
2018	Occupational Exposure to Beryllium (1218-AB76)	Obama, DOL		Small entities
2018	Organic Livestock and Poultry Practices (0581-AD44)	Obama, USDA		Business size
2017	Energy Efficiency Standards for Commercial and Industrial Pumps (1904-AC54)	Obama, DOE		Small entities
2017	Energy Efficiency Standards for Residential Dehumidifiers (1904-AC81)	Obama, DOE	Low-income households, senior-only households	Small entities
2017	Energy Efficiency Standards for Residential Boilers (1904-AC88)	Obama, DOE	Low-income households, senior-only households	Small entities
2017	Energy Efficiency Standards for Commercial Warm Air Furnaces (1904-AD11)	Obama, DOE	Small entities	
2017	Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles—Phase 2; Fuel Efficiency Standards for Medium and Heavy-Duty Vehicles and Work Trucks—Phase 2 (2060-AS16, joint with DOT)	Obama, EPA	Children, minority groups	
2017	Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles—Phase 2; Fuel Efficiency Standards for Medium and Heavy-Duty Vehicles and Work Trucks—Phase 2 (2127-AL52, joint with EPA)	Obama, DOT	Children, minority groups	
2017	Formaldehyde Emissions Standards for Composite Wood Products Final Rule (2070-AJ44)	Obama, EPA	Race, ethnicity, and poverty status	Firm types, small entities

Year	Related Rule (RIN)	President, Agency	Some Benefits by Group	Some Costs by Group
2017	New Performance Standards for Salmonella and Campylobacter in Not-Ready-to-Eat Comminuted Chicken and Turkey Products and Raw Chicken Parts and Changes to Related Agency (0583-ZA10)	Obama, USDA		Small entities
2017	Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption (0910-AG35)	Obama, FDA		Farm size
2017	Oil and Natural Gas Sector: Emissions Standards for New and Modified Sources (2060-AS30)	Obama, EPA		Small entities
2016	Confined Spaces in Construction (1218-AB47)	Obama, DOL		Small entities
2016	Energy Efficiency Standards for Automatic Commercial Ice Makers (1904-AC39)	Obama, DOE	Small entities	Small entities
2016	Energy Conservation Standards for General Service Fluorescent Lamps and Incandescent Reflector Lamps (1904-AC43)	Obama, DOE	Low-income households, institutions that serve low-income populations	
2016	Current Good Manufacturing Practice and Hazard Analysis and Risk-Based Preventive Controls for Food and Animals (0910-AG10)	Obama, FDA		Facility size
2016	Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category (2040-AF14)	Obama, EPA	Low-income and minority communities	
2016	Review of the National Ambient Air Quality Standards for Ozone (2060-AP38)	Obama, EPA	Age	
2015	Energy Efficiency Standards for External Power Supplies (1904-AB57)	Obama, DOE	Low-income households, small entities	
2015	Energy Conservation Standards for Walk-In Coolers and Walk-In Freezers (1904-AB86)	Obama, DOE	Small entities	
2015	Energy Efficiency Standards for Metal Halide Lamp Fixtures (1904-AC00)	Obama, DOE	Firm types	
2015	Energy Conservation Standards for Commercial Refrigeration Equipment (1904-AC19)	Obama, DOE	Firm types	
2015	Energy Conservation Standards for Residential Furnace Fans (1904-AC22)	Obama, DOE	Low-income households, senior-only households	

Year	Related Rule (RIN)	President, Agency	Some Benefits by Group	Some Costs by Group
2015	Energy Efficiency Standards for Certain Commercial and Industrial Electric Motors (1904-AC28)	Obama, DOE	Small entities, firm types	Small entities
2015	Criteria and Standards for Cooling Water Intake Structures (2040-AE95)	Obama, EPA		Small entities
2015	Medicare and Medicaid Programs; Regulatory Provisions to Promote Program Efficiency, Transparency, and Burden Reduction (0938-AR49)	Obama, HHS	Rural and small entities	
2014	Reconsideration of Final National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (2060-AQ58)	Obama, EPA		Small entities
2013	OSHA Hazard Communication Standard (1218-AC20)	Obama, DOL		Small entities
2013	2010-2011 Hours of Service Rule (2126-AB26)	Obama, DOT		Small entities
2013	Energy Efficiency Standards for Fluorescent Lamp Ballasts (1904-AB50)	Obama, DOE	Low-income households, houses of worship, historical facilities, institutions that serve low-income populations	
2013	National Emission Standards for Hazardous Air Pollutants from Coal-and-Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Electric Utility Steam Generating Units (2060-AP52)	Obama, EPA	Race, educational attainment	Small entities
2012	Cross-State Air Pollution Rule (CAIR Replacement Rule) (2060-AP50)	Obama, EPA	Race, educational attainment	
2012	Energy Efficiency Standards for Clothes Dryers and Room Air Conditioners (1904-AA89)	Obama, DOE	Low-income households, senior-only households	
2012	Energy Efficiency Standards for Residential Refrigerators, Refrigerator-Freezers, and Freezers (1904-AB79)	Obama, DOE	Low-income households, senior-only households	
2011	Energy Efficiency Standards for Commercial Clothes Washers (1904-AB93)	Obama, DOE	Consumers not served by municipal water and sewer providers, small entities	

Year	Related Rule (RIN)	President, Agency	Some Benefits by Group	Some Costs by Group
2011	Amendments to the National Emission Standards for Hazardous Air Pollutants and New Source Performance Standards (NSPS) for the Portland Cement Manufacturing Industry (2060-AO15)	Obama, EPA		Small entities
2011	Revised Regulations Implementing Titles II and III of the ADA (1190-AA44 & 1190-AA46)	Obama, DOJ		Small entities
2011	Interim Final Electronic Prescription Rule (1117-AA61)	Obama, DOJ		Small entities
2010	Energy Efficiency Standards for Commercial Refrigeration Equipment (74 FR 1092)	Bush, DOE	Small entities	
2009	Control of Emissions from New Locomotives and New Marine Diesel Engines Less than 30 liters per Cylinder (2060-AM34)	Bush, EPA	Age	
2009	Current Good Manufacturing Practice in Manufacturing, Packing, or Holding Dietary Ingredients and Dietary Supplements	Bush, HHS		Small entities
2009	Current Good Manufacturing Practice for Blood and Blood Components	Bush, HHS		Small entities
2006	Electronic Orders for Schedule I and II Controlled Substance	Bush, DOJ		Small entities
2006	Clean Air Mercury Rule	Bush, EPA	Age	Small entities

Notes: CBAs that quantified at least some costs or benefits by group. The "year" refers to the Office of Information and Regulatory Affairs Report to Congress, where one was available, that identified the CBA. Source: Authors' analysis. [CBAs and scoring on file with authors and available at request.]