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Do Opportunity Costs of Regulations Appropriately Benefit or Inappropriately Burden Disadvantaged Consumers?

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Abstract

President Biden’s first-day memo “Modernizing Regulatory Review” directs the Office of Management and Budget to “propose procedures that take into account the distributional consequences of regulations... to ensure that regulatory initiatives appropriately benefit and do not inappropriately burden disadvantaged, vulnerable, or marginalized communities.” This paper makes two contributions. First, it discusses how economic analysis can transparently provide the information needed to make value-judgments about what distributional effects are appropriate and inappropriate. Second, it discusses the distributional consequences of regulations that are either designed to reduce externalities or might have the additional benefit of reducing externalities. Examples include tobacco product regulations, appliance energy efficiency standards, and automobile fuel efficiency standards. In many cases, the regulations will increase the prices or decrease the availability of goods that disadvantaged consumers prefer. This paper discussed how to determine whether restricting their consumption opportunities creates net benefits or net costs for disadvantaged consumers. Inframarginal consumers who do not change their consumption face higher opportunity costs but do not receive any benefits from reduced externalities. Empirical challenges include the need to quantify the fraction of inframarginal consumers and the size of the externalities.

1. Introduction

President Biden’s first-day memo “Modernizing Regulatory Review” directed the Office of Management and Budget (OMB) to “propose procedures [for regulatory review] that take into account the distributional consequences of regulations... to ensure that regulatory initiatives appropriately benefit and do not inappropriately burden disadvantaged, vulnerable, or marginalized communities” (Biden 2021). The memo also directs OMB “to ensure that the review process promotes policies that reflect new developments in scientific and economic understanding.” In response, in November 2023 the OMB issued a revised version of its 2003 Circular A-4 guidelines for the benefit–cost analysis (BCA) and regulatory review required

by President Clinton's Executive Order 12866 (OMB 2023a). The revised Circular A-4 includes expanded guidance on distributional analysis and a discussion of new (post-2003) developments in behavioral economics on decision-making biases that result in consumers imposing internalities on themselves.

This paper makes two contributions. First, it discusses how economic analysis can transparently provide the information needed to make value-judgments about what distributional effects are appropriate and inappropriate. Second, it discusses the distributional consequences of regulations that are either designed to reduce internalities or might have the additional benefit of reducing internalities. Examples include tobacco product regulations, appliance energy efficiency standards, and automobile fuel efficiency and emission standards. In many cases, the regulations will increase the prices or decrease the availability of goods that disadvantaged consumers prefer. This paper discussed how to determine whether restricting their consumption opportunities creates net benefits or net costs for disadvantaged consumers. Inframarginal consumers who do not change their consumption face higher opportunity costs but do not receive any benefits from reduced internalities. Empirical challenges include the need to quantify the fraction of inframarginal consumers and the size of the internalities.

2. Defining appropriate benefits and inappropriate burdens

Before turning to internalities, this section discusses the more general problem of how to determine if the distributional effects of a regulation are appropriate or inappropriate. Standard BCA is a tool to evaluate whether regulations fix market failures and improve economic efficiency. Extending BCA to evaluate whether regulations address internalities, that is, individual failures, continues to focus on economic efficiency. Regulations that fix market or individual failures yield positive net benefits and improve economic efficiency as defined by the Kaldor-Hicks compensation principle.

The "Modernizing Regulatory Review" memo's use of the terms "appropriate" and "inappropriate" shifts the focus from efficiency to how a regulation's benefits and costs are distributed. The introduction of the 2003 Circular A-4 explained that: "Where all benefits and costs can be quantified and expressed in monetary units, BCA provides decision makers with a clear indication of the most efficient alternative, that is, the alternative that generates the largest net benefits to society (ignoring distributional effects)" (OMB 2003). In contrast, the introduction of the revised 2023 Circular A-4 no longer refers to economic efficiency, but instead explains that BCA indicates the alternative "that generates the largest welfare improvement to society," and changes the parenthetical comment to "(including distributional impacts)." (OMB 2023a) The revised Circular A-4's shift in focus requires a value judgment about what distributional impacts are appropriate and increase social welfare versus which are inappropriate and reduce social welfare.

A straightforward way to allow for value-judgments about the appropriateness of the distributional impacts of regulations is to use the well-established tools and concepts that public economics research uses to describe the distribution of tax burdens across income groups. For each income group, the analysis will need to estimate the incidence of regulatory benefits and costs. The net impacts on each income group can then be described in absolute terms and relative to the group's average income. Describing the net impacts this way provides information to democratically accountable decision-makers and the public relevant to the normative principle of vertical equity. If the net benefits to low-income groups are larger in absolute terms or larger relative to income, the distribution of regulatory net benefits

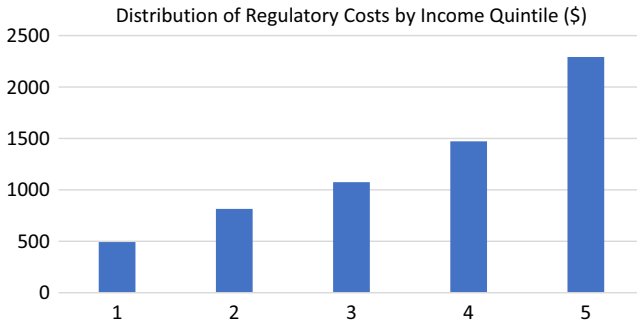


Figure 1. Distribution of regulatory costs by income quintile (\$).

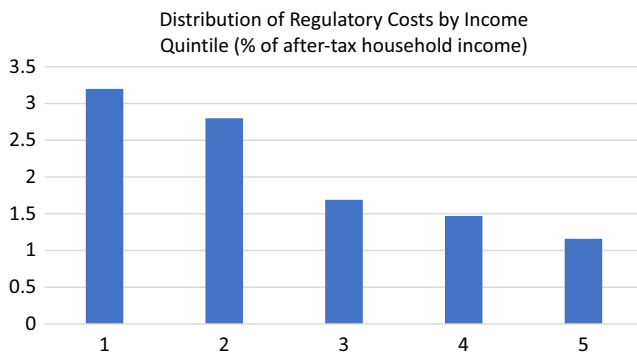


Figure 2. Distribution of regulatory costs by income quintile (% of after-tax household income).

would be judged to improve vertical equity because it brings about greater equality. Just like tax burdens, based on the normative principle of vertical equity the distribution of regulatory benefits and costs relative to income can be described as progressive, proportional, or regressive.

Figures 1 and 2 provide an illustrative example of the distribution of the costs of a hypothetical transportation regulation. The costs of the hypothetical regulation are assumed to result in an increase in the prices of transportation goods and services such that each income group's average expenditures increase by 10 % of their baseline transportation expenditures. The data on the baseline household transportation expenditures are from the US Department of Transportation Bureau of Transportation Statistics.¹ Because transportation expenditures increase with income, in absolute terms the regulatory cost burden also increases with income; the regulatory costs for the top income quintile are about four and one-half times higher than the regulatory costs for the bottom income quintile (Figure 1). However, in the top income quintile regulatory costs are only 1.2 % of the average household income, compared to 3 % of income for households in the bottom income quintile (Figure 2). In this hypothetical example, the distribution of regulatory costs would be judged to be

¹ Average Household Transportation Expenditures by Income Quintile (current dollars), 2022. <https://data.bts.gov/stories/s/Transportation-Economic-Trends-Transportation-Spen/ida7-k95k/>.

regressive and worsen vertical equity. For the same reason that sales taxes are regressive, this example is likely to be typical of the distribution of regulatory costs. The burden of regulatory costs will tend to be regressive when regulatory costs increase the prices consumers pay for goods with an income elasticity of demand less than one, that is for inferior goods and necessities. For example, Tovar, Miguel, and Wolfing (2018) estimate that increases in heating prices and electricity prices are regressive.

The results of a distributional analysis that uses the vertical equity approach help democratically accountable decision-makers and the public use their value-judgments to decide whether the distribution of regulatory impacts is appropriate. As in Figures 1 and 2, it is useful to present the distribution of impacts in both absolute levels and relative to income, to allow for differences in value-judgments. The principle of vertical equity is not necessarily universal or absolute; for example, some decision-makers might judge it inappropriate to impose very high regulatory costs or negative net benefits on higher-income households. To allow for other differences in value-judgments, it is also useful to present separate distributions of regulatory benefits and costs. The wording of the “Modernizing Regulatory Review” memo suggests that different value-judgments might apply to the distribution of regulatory benefits versus burdens; for example, strong advocates for the poor might judge it inappropriate to place any regulatory cost burden on low-income households.

An alternative approach to regulatory distributional analysis is to formalize some set of value judgments into a social welfare function. The modern optimal tax literature in public economics uses social marginal welfare weights based on a generalized utilitarian social welfare function and assumptions about the parameter that governs the strength of inequality aversion, that is the value judgment that more equality of income is desirable. The optimal tax literature is careful to acknowledge that social welfare weights rest on value judgments, not on empirical evidence.² As noted above, the revised Circular A-4 guidelines describe BCA as a tool to determine which regulations improve social welfare. In another shift from standard BCA’s focus on economic efficiency, the revised Circular A-4 allows agencies to conduct weighted BCA and recommends a specific value for the parameter that plays the same role in calculating the weights as the degree of societal inequality aversion plays in social welfare weights (OMB 2023a, pp. 65–67). The OMB approach to weighted BCA is consistent with a specific parameterization of the utilitarian social welfare function used in modern optimal tax literature.³

² For example, Allcott, Lockwood, and Taubinsky (2019, footnote 10) explain that “the social marginal welfare weights reflect a policy-maker’s or society’s normative preference for reducing wealth inequality – they cannot be inferred by observing behavior.”

³ The revised Circular A-4 describes the weights as accounting for diminishing marginal utility and cites empirical evidence that the intra-personal income elasticity of marginal utility is around 1.4 (OMB 2023a, p. 67). The income elasticity of marginal utility enters the formula for BCA weights in the same way the inequality aversion parameter enters the formula for social marginal welfare weights. However, the marginal utility interpretation of BCA weights requires inter-personal utility comparisons, which remain controversial. Even advocates of inter-personal utility comparisons like the economist John Harsanyi and the legal scholar Matthew Adler recognize that many economists and philosophers disagree. Harsanyi (2018) observes that “Many economists and philosophers take the view that our limited information about other people’s minds renders it impossible for us to make meaningful interpersonal comparisons of utility.” Adler (2019, p. 76) observes that: “The discipline of economics is not in consensus about interpersonal well-being comparisons... Outside the [social welfare function] literature ... economists are often skeptical of interpersonal comparisons.”

Compared to the vertical equity approach, the social welfare function approach to distributionally weighted BCA has important limitations. Most fundamentally, it substitutes the value-judgments the analyst builds into the BCA weights for the value-judgments of democratically accountable decision-makers and the public. Just, Hueth, and Schmitz's (2004, p. 41) chapter-long comparison of the social welfare function approach versus standard BCA concludes that: "Apparently, little hope exists for determining a social welfare function on which general agreement can be reached." For example, instead of a utilitarian social welfare function, some decision-makers' preferences might be better described by a modified Rawlsian social welfare function that puts a high or even absolute priority on providing regulatory benefits for, and avoiding placing burdens on, the least fortunate members of society. Botzen and van den Bergh (2014) summarize 14 different social welfare functions that reflect different criteria and value judgments. Acland and Greenberg (2023) argue in favor of BCA weights based on a utilitarian social welfare function but reject equity weights based on additional value-judgments.⁴ Even if societal preferences can be roughly approximated by a generalized utilitarian social welfare function, OMB's recommended value for the inequality aversion parameter builds a strong preference for redistribution into the BCA weights.

Several illustrative calculations suggests that the OMB's recommended value for the inequality aversion parameter might be extreme relative to decision-makers' and the public's preferences. Using OMB's formula for the BCA weights and the average after-tax incomes by quintile used to generate Figure 2, \$1 of regulatory benefits or costs to households in the bottom income quintile is given about 33 times the weight given to \$1 of benefits or costs to households in the top quintile.⁵ Harberger (1978) points out that if BCA weights truly reflect societal preferences, they imply the margin of inefficiency that would be acceptable when transferring income from higher-income groups to lower-income groups. Consider a transfer of \$1000 from the top quintile that delivered \$40 to the bottom quintile, that is, a 96 % efficiency loss. With the BCA weights calculated as above, the transfer results in positive distributionally weighted net benefits; the weighted costs to the top quintile are \$206 and the weighted benefits to the bottom quintile are \$269. Although the transfer would be judged appropriate using BCA weights, casual empiricism suggests that many decision-makers and the public would find this level of inefficiency unacceptable.⁶

⁴ Acland and Greenberg (2023) argument in favor of weights based on a utilitarian social welfare function rests on the controversial assumption (discussed in footnote 3 above) that it is possible to make inter-personal utility comparisons.

⁵ In my calculations using OMB's (2023a, footnote 126, p. 66) formula, the weight given to subgroup $j = (y_j/y_3)^{-1.4}$, where y_j is the average income of subgroup j , y_3 is the average income of the middle quintile, and 1.4 is the OMB's recommended value for the inequality aversion parameter. OMB discusses the choice of the use of median versus mean income and recommends that income should be measured inclusive of taxes and transfers. The Department of Transportation data used in Figure 2 do not provide a measure of income inclusive of transfers. In those data, in the bottom two income quintiles average household expenditures are larger than average after-tax income. Assuming the difference is due to transfers, using household expenditures in the formula to measure income inclusive of transfers for the bottom quintile means that \$1 to the bottom quintile is given 12.6 times the weight given to \$1 to the top quintile. The weights are very sensitive to the inclusion of taxes and transfers. Using the average before-tax incomes in the formula means that \$1 to the bottom quintile is given about 54 times the weight given to \$1 to the top quintile.

⁶ Harberger (1978, p. S113) made the same observation about the inefficiency implied by a much less extreme set of weights. In the past when I taught cost-benefit analysis, when I asked for a show of hands about the level of

Another way to illustrate the value judgment in the OMB recommendation is to compare it to margin of inefficiency in US transfer programs. Using an estimate that it costs taxpayers approximately \$1.50 to \$2.00 to transfer \$1 to an anti-poverty program recipient, Boardman et al. (2018, pp. 502–503) argue that BCA weights assigned to the disadvantaged should not exceed 1.5 or 2 times the value assigned to the advantaged; otherwise, the same improvements in vertical equity can be achieved at lower cost by expanding current tax-and-transfer programs. In their sensitivity analysis, Allcott, Lockwood, and Taubinsky (2019, p. 1610) use 1.0 as their baseline inequality aversion parameter and 0.25 for the weak aversion case, much weaker redistributive motives than the OMB's recommended value of 1.4. Interestingly, setting the inequality aversion parameter equal to 0.25 means the weight given to the bottom income quintile is about 1.9 times the weight given to the top quintile, which fits the range proposed by Boardman et al. (2018).

Analysis of whether the distribution of regulatory benefits and costs is progressive, proportional with income, or regressive uses the familiar concept of vertical equity in tax burdens and limits the analysis to questions that economists have the expertise to answer. Standard BCA's focus on economic efficiency does not reflect the value judgment that economic efficiency is the only, or even the most important, policy goal. Practitioners of standard BCA recognize the importance of distributional concerns and the value of human dignity, civil rights and liberties, and other criteria for evaluating regulations. But economists cannot claim to have any special professional expertise to make value judgments about these criteria. As one of the founders of standard BCA put it, "If we are to take a (hopefully justified) professional price in our work [in BCA], we also must have the modesty and honesty not to claim for our profession more than we are particularly qualified to deliver" (Harberger 1971). Economists have the expertise to measure economic efficiency and the distribution of regulatory benefits and costs, but economists cannot claim to have any special professional expertise to make strong value judgments about the distributional effects.

In a background document explaining the revised Circular A-4, OMB (2023b, pp. 48–49) argues that measures of both economic efficiency and social welfare are descriptive but involve normative value-judgments when used as a basis for policy decisions. However, although the economics profession has reached a broad consensus about the measurement of the economic efficiency of a regulation, there is no consensus about how to measure social welfare. The multitude of different social welfare functions provide a multitude of descriptions of the social welfare impacts of a regulation. Moreover, the calculation of weighted net benefits implies a value judgment and a policy decision. For example, if a standard BCA finds that a regulation is inefficient, but weighted net benefits are positive, it is reasonable for decision-makers to infer that the distributional analysis of the efficiency/equity tradeoff shows that the regulation is desirable. In contrast, a regulatory distributional analysis focused on vertical equity along the lines of Figures 1 and 2 provides democratically accountable decision-makers and the public with transparent information to inform their value-judgments about the desirability of the efficiency/equity tradeoffs.⁷

acceptable inefficiency of transfers from the rich to the poor, usually the majority of students indicated that around 50 percent inefficiency or more was unacceptable.

⁷ It should be noted that a distributional analysis along the lines of Figure 1 and weighted BCA can be similar. Mathematically, Figure 1's calculations of the regulatory impacts relative to the income quintile's income is equivalent to using a BCA weight equal to the inverse of the income quintile's average income divided by the middle quintile's average income. Put differently, Figure 1's calculations are equivalent using formula for the social

3. Benefit–cost analysis and Internalities

In this section, the discussion turns from the more general problem of how to determine if the distribution of regulatory effects is appropriate, to the specific challenges faced in the analysis of regulations that are either designed to reduce internalities or might have the additional benefit of reducing internalities. The revised 2023 Circular A-4 discusses internalities in its discussion of new developments in behavioral economics relevant to regulatory analysis (OMB 2023a, pp. 17–18). Behavioral economics research integrates insights from psychology into neoclassical economics models of human behavior. Positive behavioral economics research has provided a rich set of testable predictions and empirical findings about human behavior, with many new scientific developments since the 2003 Circular A-4. The 2023 Circular A-4’s discussion of internalities rests on behavioral welfare economics/behavioral BCA, that is normative economics. Bernheim (2016) and Weimer (2017) provide in-depth discussions of the challenges and potential for behavioral BCA.

Behavioral economics research on decision-making biases suggests that in certain predictable situations, individuals may fail to act in their own self-interest and impose what have come to be known as internalities on themselves (Camerer et al. 2003). A central challenge for behavioral BCA is to distinguish rational choices versus choices that are due to behavioral biases and impose internalities. A regulation that restricts rational choices creates opportunity costs for consumers and creates economic efficiency losses. A regulation that restricts choices due to behavioral biases reduces the internalities individuals impose on themselves and create economic efficiency gains. In short, internalities turn an opportunity cost into a benefit.

Whether a regulation that restricts choices appropriately benefits or inappropriately burdens disadvantaged consumers hinges on whether their choices are rational or due to behavioral biases. Tobacco regulations are a good, albeit controversial, example. Cigarette consumption and implied cigarette taxes paid per year are highest for the lowest-income groups and decline strongly and monotonically with income (DeCicca, Kenkel, and Lovenheim 2022, Figures 5 and 6). As a result, the burden of cigarette excise tax shows “dramatic regressivity ... the lowest-income consumers pay on average about 2.5 percent of their income in cigarette taxes, while the highest-income group pays under a tenth of a percent” (DeCicca, Kenkel, and Lovenheim 2022, pp. 98–99 and Figure 7). However, if low-income consumers’ choices to smoke impose internalities on themselves, a tax that causes low-income smokers to reduce their cigarette consumption also reduces internalities. The benefits of the reduction in internalities could offset some and possibly all of the burden of taxation. Using a model that incorporates internalities, Gruber and Koszegi (2004) conduct simulations that show under plausible parameters cigarette taxes can be progressive. However, Colman and Remler (2008) find that because tax-responsiveness does not show a strong income gradient empirically, even after accounting for internalities, cigarette taxes are regressive.

Another good example of whether regulations appropriately benefit or inappropriately burden low-income consumers are sugar-sweetened beverage (SSB) regulations. Allcott, Lockwood, and Taubinsky (2019) develop a formula for the optimal tax on SSBs that balances the gains from reducing SSB-related externalities and internalities with the tax’s distributional consequences. Data on SSB purchases show that low-income households consume twice as many liters of SSBs per year than high-income households consume

marginal welfare weights and setting the inequality aversion parameter to equal 1. In Figure 1’s calculations, the weight-equivalent for the bottom quintile is about 12 times the weight-equivalent for the top quintile.

(Allcott, Lockwood, and Taubinsky 2019, p. 1562 and Figure I). Empirical estimates of consumer demand for SSB suggest that low-income households are slightly more price-elastic than high-income households. However, the proxies used to measure internalities show a strong negative income gradient (Allcott, Lockwood, and Taubinsky 2019, p. 1601 and Figure V). As a result, the benefits of the reduction in internalities from the optimal SSB tax are distributed progressively, although the opportunity costs are distributed regressively (Allcott, Lockwood, and Taubinsky 2019, Figure IX). The regressively distributed opportunity costs are larger than the progressively distributed externality benefits, so on the whole redistributive motives reduce the optimal SSB tax. Instead of an SSB tax, an alternative SSB regulation that targets externalities, such as informative labels, could have a more desirable balance and might yield a progressive distribution of net benefits.⁸

The examples of tobacco regulations and SSB regulations highlight three inter-related empirical challenges for distributional analysis in a behavioral BCA. The first challenge is to determine whether policy-significant externalities exist. The second challenge is to measure the magnitude and distribution of externalities across income groups. The third challenge is to estimate the regulatory-responsiveness of externalities across income groups.

As already mentioned, the first challenge – to determine whether a policy-significant externality exists – makes the difference between whether restricting consumer choice creates benefits or imposes opportunity costs. Due to both its importance and the difficulty in making this determination, experts in behavioral BCA recommend using strict evidence standards. Bernheim and Rangel (2005) point out that standard efficiency-based BCA is “grounded in the doctrine of revealed preference. That is, we infer what people want from what they choose.” But behavioral BCA requires the rejection of the doctrine of revealed preference and the determination that what people choose is not in their own best interest. Because of the danger that value-judgments might drive that determination, Bernheim and Rangel argue that “it behooves us to set a high scientific threshold for reaching a determination, based on objective evidence, that a given problem calls for divergent positive and normative models.” Bernheim (2016) proposes a behavioral revealed preference framework, where the first core task in the framework is to identify consumer decisions that merit deference. He stresses the need for a reasoned evidence-based foundation for the normative conclusion that a consumer decision does not merit deference, that is that the consumer is making a mistake. Similarly, Boardman et al. (2022, pp. 1171–1172) propose that the “rebuttable principle of individual rationality” should be applied to the possibility that behavioral biases lead to consumer mistakes: “We contend that analysts ... need to present strong empirical evidence that individuals are indeed making serious mistakes.”

In practice, several examples of regulatory BCAs implicitly adopt a presumption of individual irrationality and assume that even though the empirical evidence is mixed, policy-significant externalities exist. The first example is the FDA’s preliminary regulatory analysis of a rule to prohibit menthol cigarettes. It includes a 12-page appendix that reviews prior research conducted over the past 20 years on behavioral BCA of tobacco regulatory policy (FDA 2022). Noting a “lack of consensus” and the complexity of modeling consumer

⁸ Label policies need to be carefully designed to avoid unintended consequences. Barahona, Ortera, and Ortera (2023) study a Chilean policy that required labels on products with sugar or calories levels above threshold values. They find that consumers switched to unlabeled products that consumers mistakenly believe to be healthier. They find that optimal food labels and sugar taxes yield similar gains in consumer welfare, but the benefits of the optimal food labels are more progressively distributed.

decisions about an addictive good with internalities, the preliminary regulatory impact analysis “does not estimate changes in consumer surplus stemming from the proposed menthol product standard.” In behavioral BCA of tobacco regulations, a prohibition causes zero consumer surplus loss only if cigarette demand is entirely irrational. By not quantifying the consumer surplus loss, the preliminary regulatory impact analysis tends to minimize the loss. The FDA approach is equivalent to assuming that all individual decisions to consume menthol cigarettes are mistakes that do not merit deference.

A second example comes from the EPA’s (2023) draft regulatory impact analysis of vehicle emissions standards. The regulation is not aimed to reduce internalities, but the analysis assumes that improved fuel efficiency resulting from the emissions standards has additional benefits for irrational consumers who make systematic mistakes about the value of fuel efficiency. However, the EPA’s review of decades of research concluded that “the research has not reached a consensus . . . it is not clear how consumers incorporate fuel economy in their purchase decision. . . .” (EPA 2023, p. 4–39). EPA goes on to acknowledge that a possible explanation for observed consumer behavior is simply that “Consumers might prioritize other vehicle attributes over fuel economy in their vehicle purchase process.” If this is the correct explanation, the vehicle emission standards force consumers to give up attributes that they value more highly than the fuel savings. That is, instead of creating benefits by reducing internalities, the regulation imposes opportunity costs. In the face of a lack of scientific consensus, the EPA’s assumption that consumer mistakes about energy efficiency are widespread violates Bernheim’s argument that there should be a high scientific threshold for the normative conclusion that a consumer decision does not merit deference and Boardman et al.’s rebuttable principle of individual rationality.

The background document explaining the revised Circular A-4 emphasizes that the OMB will use the same standards for high-quality evidence to document internalities that it recommends agencies use “when assessing any evidence that underlies a regulatory analysis” (OMB 2023b, p. 19). However, the behavioral BCA experts cited above suggest that the evidence standards for assessing internalities should be especially high. The FDA and EPA regulatory analyses discussed above – as well as a set of regulatory initiatives from 2009–2011 by the Department of Energy, the EPA, and the Department of Transportation that make similar assumptions (Gayer and Viscusi 2013) – were conducted under the 2003 Circular A-4 guidance that did not explicitly discuss behavioral economics research on internalities. It is not clear whether the OMB will require a higher standard of evidence when it reviews regulatory analyses completed under the revised 2023 Circular A-4 guidance.

If the evidence for the existence of an internality meets strict evidence standards, the next challenge for distributional regulatory analysis is to measure the distribution of internalities across income groups. In the examples discussed above – cigarette smoking and SSB consumption – the internality-related consumer behaviors show strong negative gradients with income. However, it does not necessarily follow that the distribution of internalities is strongly associated with income. For example, although Allcott, Lockwood, and Taubinsky (2019) find that SSB internalities decline with income, measured internalities only explain part of the consumer behavior-income gradient. The remaining part of the negative gradient could reflect income-related heterogeneity in rational preferences for SSBs.⁹ In two behavioral

⁹ The remaining heterogeneity could also reflect unmeasured internalities, inbut obviously this speculation does not meet strict evidence standards.

BCAs of cigarette regulation, Cutler et al. (2015) and Jin, Liu, and Wang (2015) measure the size of the internality based on the cigarette demand in a comparison group of highly educated consumers whose choices are assumed not to involve internalities. The assumption that highly educated consumers do not experience internalities builds in a negative association between internalities and income. DeCicca et al. (2017) provide data showing that consumers with different levels of schooling make different choices across various domains: consumers with less than a high school education are less likely to purchase hardcover books, prefer classical music, or play golf, and are more likely to enjoy watching religious television. Preference heterogeneity across schooling groups casts doubt on whether this approach to measure smoking internalities, and the corresponding conclusion that smoking internalities decline with income, meet strict evidence standards.

The third challenge for regulatory distributional analysis is to estimate the regulatory-responsiveness of the internalities across income groups. Behavioral analyses find that cigarette and SSB taxes are regressive despite reducing internalities, because low-income consumers are not strongly more tax-responsive than higher-income consumers (Allcott, Lockwood, and Taubinsky 2019; Colman and Remler 2008). For inframarginal consumers who do not respond to the incentives created by a regulation, the regulation can impose opportunity costs without providing any offsetting internality-reducing benefits. For example, the FDA's (2022) analysis of the prohibition of menthol cigarettes predicts that most menthol smokers will switch to non-menthol cigarettes. Because menthol and non-menthol cigarettes carry the same health risks, menthol smokers who switch bear the opportunity cost of foregoing their preferred flavor but do not gain any offsetting health benefits.¹⁰

Non-marginal consumers add an extra dimension to distributional analysis of internality-related regulations. Although reducing smoking internalities can provide progressively distributed benefits across income groups, the regulations may not be equitable within an income group. For example, menthol prohibition involves a tradeoff between helping some smokers to quit or switch to less risky e-cigarettes while imposing opportunity costs on continuing smokers. The distributional consequences of such tradeoffs are especially concerning if the non-marginal consumers are those who impose the largest internalities on themselves. Menthol smokers who are strongly addicted or face other mental health issues may be the most likely to continue to smoke after their preferred flavor is prohibited.

4. Concluding remarks

The revised OMB Circular A-4 provides guidance for a modernized regulatory review of the distributional consequences of regulations that are either designed to reduce internalities or might have the additional benefit of reducing internalities. In many cases, the most important task of BCA is to identify regulations that fix market failures and increase economic efficiency. This paper argues that it is also within the expertise of economists to conduct and transparently report distributional analysis of regulatory benefits and costs based on the

¹⁰ Kenkel et al.'s (2024) analysis of stated preference data suggests that in response to a prohibition of menthol cigarettes, instead of switching to non-menthols, many menthol smokers would be willing to purchase menthol cigarettes in illegal markets. The model estimates imply that illegality creates substantial opportunity costs that the smokers are willing to incur to obtain their preferred flavor. While the nature of the opportunity costs changes, it remains the case that these smokers bear additional opportunity costs but do not gain any offsetting health benefits.

principle of vertical equity used in the analysis of tax burdens. At the same time, economists should be careful not to impose their own value-judgments in their regulatory analysis, for example by adopting a specific social welfare function or building an extreme preference for redistribution into BCA weights. The practical challenges of regulatory distributional analysis also should not be downplayed. For example, many general equilibrium effects on prices in markets other than the regulated good “envelope out” in standard efficiency-based BCA due to the optimizing behavior of suppliers and demanders (Chetty 2009; Harberger 1971). In contrast, a complete distributional analysis needs to include all transfers of income that result from price changes even when the price changes have no implications for economic efficiency.

Regulatory analysis that involves internalities faces even more difficult challenges. Analysts should use strict standards of evidence to determine whether policy-significant internalities exist. It can be difficult to determine whether consumer choices reflect rational decisions or internality-generating mistakes. As a result, it can be difficult to determine if a regulation that restricts consumer choice creates opportunity costs for rational consumers or creates benefits for consumers who impose internalities on themselves. Additional empirical challenges are to measure the size and distribution of internalities and to estimate the regulatory-responsiveness of internalities. It is not clear that the evidence base for behavioral BCA is strong enough to support the extension to distributional analysis.

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