Ruining popcorn? The welfare effects of information

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Abstract

Some information is beneficial; it makes people's lives go better. Some information is harmful; it makes people's lives go worse. Some information has no welfare effects at all; people neither gain nor lose from it. Under prevailing executive orders, federal agencies must investigate the welfare effects of information by reference to cost-benefit analysis. Federal agencies have (1) claimed that quantification of benefits is essentially impossible; (2) engaged in "breakeven analysis"; (3) projected various endpoints, such as health benefits or purely economic savings; and (4) relied on private willingness to pay for the relevant information. All of these approaches run into serious objections. With respect to (4), people may lack the information that would permit them to make good decisions about how much to pay for (more) information; they may not know the welfare effects of information. Their tastes and values may shift over time, in part as a result of information. These points suggest the need to take the willingness-to-pay criterion with many grains of salt, and to learn more about the actual effects of information, and of the behavioral changes produced by information, on people's experienced well-being.

Keywords Behavioral economics · Nudges · Willingness to pay · Hedonic forecasting errors · Welfare effects · Information avoidance · Present bias · Information disclosure

JEL Classifications K0 · K2 · D60 · D61 · D8

1 Introduction

With respect to human welfare, information can be divided into three categories. Some information is beneficial; it makes people's lives go better. They might be healthier, wealthier, and happier. Some information is harmful; it makes people's lives go worse. They might be sadder or more frightened. Some information has no welfare effects at all; people neither gain nor lose from it. It is like background noise, a matter of indifference.

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With respect to information, there is also a great deal of heterogeneity out there. Because of their preferences and values, some people benefit from information to which other people are indifferent. Some people are harmed by receiving information from which other people gain. To some people, detailed medical information, offering bad news, is a great boon, because they want it, and because they can use it to diminish their risks. To other people, such information is unwelcome, because it causes fear and distress, and because they cannot or will not do anything in response. These points suggest that on welfare grounds, *personalized disclosure* would be an excellent idea, if it is feasible, and that as compared to personalized disclosure, generalized approaches, providing information to all or none, will produce welfare losses.

Federal law often requires or authorizes federal agencies to mandate disclosure of information. Such agencies are frequently asked to answer four questions. (1) When should government require disclosure, or in other words, in what circumstances is there a market failure? (2) What would be the costs and benefits of disclosure? (3) How can those costs and benefits be measured? (4) Would disclosure of information do more good than harm? Under prevailing executive orders, above all Executive Order 12866, agencies must essentially answer all of those questions, first by identifying a market failure, second by specifying both costs and benefits, and third by showing that the benefits justify the costs.

These questions arise in many contexts, involving calorie labels, mortgage disclosures, energy efficiency labels, fuel economy labels, credit card disclosures, labels for genetically modified food, nutrition facts panels, country of origin labels, dolphin-free tuna labels, sunscreen labels, "conflict minerals" disclosures, graphic warnings for cigarettes, and much more. Some of these labels are designed to enable consumers to protect themselves from risks involving money or health. Some of them attempt to protect third parties or respond to moral concerns—as, for example, when labels offer information that bears on animal welfare. Some of them respond to some kind of consumer (or interest-group) demand for government action, whether or not risks are actually involved.

In all of these cases, assessment of welfare effects can be daunting. Disclosure of information may produce unique challenges for those who are attempting to make such assessments (Robinson et al. 2019). The first problem is that sometimes government agencies know far too little to make any kind of projection of likely effects, because they do not know how people will respond. If people are informed that certain refrigerators or microwave ovens are energy-efficient, or given clear information about the costs of operating household appliances, how will their behavior change? The second problem is that even if agencies can answer that question, they may find it hard to translate people's responses into monetary equivalents. If agencies learn that disclosure of caloric information leads people to consume fewer calories, or that disclosure of the use of genetically modified organisms leads to different consumption choices, what, exactly, is the benefit?

In some cases, agencies simply confess their lack of knowledge. In other cases, they engage in "breakeven analysis," explaining that if the benefits reach a certain level, the costs of mandatory disclosure will be justified. In still other cases, agencies are able to quantify the benefits and costs of information, or at least some of them, by using *endpoints* (economic savings, health benefits, and economic costs). In a final set of cases, they do not focus on endpoints and try instead to measure private willingness to pay for information.

As we shall see, the costs of mandatory disclosure may be higher, and the net benefits lower, than is readily apparent, when and because information produces significant decreases in consumer welfare—as, for example, when calorie labels lead people to buy goods that are lower-calorie but less tasty, or when energy efficiency labels lead people to purchase appliances that cost less to operate but are less attractive. The point was captured in the reaction of one government official to mandatory calorie labels: "They ruined popcorn!"

As we will also see, private willingness to pay appears to be the best approach in theory (Viscusi 2018). On identifiable assumptions, it should capture everything that consumers stand to gain and lose from information. It should take account of the fact that some information produces welfare gains while other information produces welfare losses (Charpentier et al. 2018); it should also take account of the fact that some information will do both at the same time. But for two principal reasons, obtaining a useful willingness-to-pay measure that captures welfare effects raises serious empirical, normative, and conceptual challenges.

The first reason is that to be worth using, willingness to pay should be informed, and often consumers lack the information that would enable them to decide how much to pay for (more) information. As Kenneth Arrow put it long ago, "there is a fundamental paradox in the determination of demand for information; its value to the purchaser is not known until he has the information, but then he has in effect acquired it without cost" (Arrow 1962, p. 615). If people do not have information, they may not know enough to know whether and how much to pay to receive information. At the very least, this point raises serious problem for ex ante estimates of willingness to pay. Ex post estimates may be better.

The second reason is that even if this problem can be surmounted or does not exist, willingness to pay, stated in advance, may fail to capture the actual welfare effects of information. In some of the relevant contexts, preferences may be labile and endogenous. Once informed about the health risks associated with certain foods, for example, people might (begin to) develop different tastes. On plausible assumptions, salt and sugar labels can lead to transformations in tastes. Ex ante willingness-to-pay figures will be insufficiently informative on that count—which creates serious problems for welfare analysis.

There is a large issue in the background here, which involves the welfare effects of nudges more generally. Disclosure of information is a kind of nudge, understood as a choice-preserving intervention that steers people in certain directions (Thaler and Sunstein 2008). Nudges include reminders; warnings; the layout of a cafeteria or a grocery store; statements about existing social norms; and default rules. In some cases, nudges succeed in moving human behavior in the desired directions, producing significant benefits (Benartzi et al. 2017). In some cases, they fail (on reminder warnings, see Viscusi 1991; on ineffective nudges in general, see Sunstein 2018a). Some of the welfare effects, both positive and negative, should not be so difficult to catalogue (Viscusi and Magat 1987). But suppose that people experience a welfare loss *as a result of the nudge itself*, or *as a result of the very behavior that the nudge induces*.

For example, people might not enjoy a reminder or a warning; neither of these may be pleasant to receive. Many people experience a welfare loss when they are informed about risks that they are running, even if on balance they are better off as a result of obtaining that information. The welfare effects of learning about a risk of heart disease

or cancer, or about risks associated with consumption, must include consideration of the potential hedonic loss associated with that very information (Charpentier et al. 2018; Thunstrom et al. 2016). In addition, the behavior change induced by nudges may include a loss of welfare; consider exercising, when exercising is not pleasant.

An illustrative example is the debate over Prostate Specific Antigen (PSA) testing, designed to help reduce prostate cancer deaths. Some experts believe that early detection can save lives, by allowing early treatment of aggressive cancers. Others believe that it can cause serious harm, by subjecting men to various adverse effects of radiation, surgery, and other treatments. Suppose that PSA testing does result in early detection and treatment, but that it does not improve survival, or that it improves survival only modestly. For individual patients, not knowing might be best. The argument for not knowing is strengthened if a bad result on a test produces anxiety and distress (which are not pleasant, and which may induce health problems). It is true that if patients fear that they will react strongly to bad news, and prefer ignorance for that reason, they might be suffering from present bias (Thunstrom et al. 2016). But perhaps they are making a reasonable all-things-considered calculation, leading them to want not to know (Welch 2004; Welch et al. 2012).

Of course it is also true that information, or nudges, might produce benefits rather than costs—again, not because of standard effects, but because they confer hedonic benefits. Those who emphasize the costs might have the sign wrong. For example, people might enjoy learning for its own sake; exercising might be pleasant, fun, or rewarding. But my principal emphasis here is on losses rather than gains. One of my goals is to make some progress in understanding welfare losses potentially associated with nudges, even when they are desirable on balance.

A note about the scope of the discussion: The focus here is on the welfare effects of information, not on the appropriate design of particular forms of disclosure. Framing might well matter. It is well-known that labels might be framed in such a way as to be highly effective, or not (Viscusi and Magat 1992; Sunstein 2013). A complex disclosure policy might overload consumers and thus have little or no effect—costs with no benefits. A simple disclosure might misinform consumers and potentially have negative welfare effects for that reason (Bar-Gill et al. 2018). The question here is not how to design or frame disclosures, but more broadly how to assess their benefits and costs.

2 Costs and benefits

With respect to mandatory disclosure of information, the initial question, of course, is whether there is some kind of market failure, justifying government intervention (Sunstein 2018b). Sometimes the market is providing the optimal level of information. But for standard reasons, it may fail to do so (Golman et al. 2017), and unrealistic optimism or present bias on the part of consumers may aggravate the problem (Thunstrom et al. 2016).

Let us bracket these issues and assume that there is a market failure. The question remains: do the benefits of disclosure justify the costs? If it would be expensive to comply with a disclosure requirement—say, $800 million annually—the question of whether the benefits are sufficient would be put in stark relief. We could easily imagine disclosure requirements that do little good, perhaps because consumers pay no attention

to them. If so, such requirements would not be justified on cost-benefit grounds. We could also imagine disclosure requirements from which consumers and third parties would benefit greatly.

2.1 Not wanting to know, and wanting not to know

It is natural to assume that receiving information is beneficial, especially for consumers; for example, it seems good to learn about product characteristics, including performance and durability. But exactly how good? There is a great deal of information that people do not care to receive (and hence has no value for them), and a great deal of information that people want *not* to receive (and hence has negative value). In some cases, people do not want to know (Ullmann-Margalit 2017); in others, they want *not* to know.

You might not much care to learn about the precise metals that were used to make your automobile, or whether the coffee beans at the local store came from Brazil, Colombia, or somewhere else. You might not want to know whether you will get Alzheimer's disease, whether you have a genetic susceptibility to cancer and heart disease, and the year of your likely death. You might not want to know about the risks associated with products that offer immediate pleasure but future harm; consumption might produce guilt or shame, and ignorance might be bliss (Thunstrom et al. 2016).

The general phenomenon of "information avoidance" suggests that people often prefer not to know (Golman et al. 2017; Hertwig and Engel 2016). In some cases, people might be willing to pay nothing for information, and in other cases, they might be willing to pay *not* to receive information (Charpentier et al. 2018). It is important to ask whether their willingness to pay, or not, depends on an absence of information (about the relevant information), on a cognitive bias, or on a rational desire to avoid (for example) distress or to preserve the capacity for surprise.

I conducted a small-scale study of such issues, using Amazon's Mechanical Turk, and asking about 400 Americans whether they wanted information of these general kinds, and also how much they would be willing to pay for that information. Only 47% said that they want to know if they will get Alzheimer's disease. Only 54% wanted to know how the stock market will be doing on January 1, 2020 (!).

About 58% said that they want to know whether they have a genetic disposition to cancer or heart disease. About 57% would like to know whether their partner or spouse ever cheats on them. About 60% said that they wanted to know the annual cost of operating the appliances in their home. Only 42% wanted to know how much the warmer the planet will be in 2100. Only 27% said that they want to know the year of their likely death.

With respect to information that bears on consumption choices, only 43% said that they want calorie labels at restaurants. Their willingness to pay for that information was modest: the median was just $15 annually, and the mean was just $48.61. (For information about the annual cost of operating appliances in the home, willingness to pay was comparable: a median of $15 and a mean of $43.71.) These findings are of particular interest in light of evidence that an overwhelming majority of Americans favor a federal mandate requiring restaurants to disclose the calories associated with their offerings (Sunstein 2016). Many people who favor a federal mandate apparently believe that they themselves will not benefit from the information—and may even be

harmed by it (Thunstrom 2019; Thunstrom et al. 2016). They want their government to require disclosure of information in which they have no interest (or which they would prefer not to get at all).

Willingness to pay was somewhat higher for other kinds of information. For how the stock market will be doing on January 1, 2020, the median was $100 and the mean was $165.93. (Again: !) The median WTP of those who wanted to know whether they had a genetic predisposition to cancer was $79, with a mean of $115. For Alzheimer's the corresponding numbers were $59 and $106.98; for the likely year of death, they were $93 and $154.44; for whether their partner or spouse ever cheats, they were $74.50 and $120.67. For the global temperature in 2100, the numbers were markedly lower: $19 and $59.37. Table 1 gives the results in tabular form.

I also conducted a similar study, exclusively involving information that might benefit consumers, and of the kind on which regulators have focused. Here too, there was a great deal of heterogeneity, and many people showed no interest in receiving that information. Only 62% of respondents wanted information about the standard fee for a late payment of their credit card bill. (Perhaps 30% or more pay their bills on time, or do not care about late fees.) Only 60% wanted to know whether their food contains genetically modified organisms.

Only 64% wanted to know about the amount of overuse charges for their cell phone. About 67% wanted information about the safety ratings for their tires. (This is relatively high; the word "safety" might be a trigger.) About 65% wanted information about the potential side effects of pain relievers (such as Advil and Tylenol). About 55% wanted information about whether the products they buy contain "conflict minerals" (defined as minerals from Congo, used to finance mass atrocities).

The median willingness to pay, in all of these cases, was pretty small: $8 for late payments ($103 mean); $24 for GMOs ($101 mean); $10 for overuse charges ($95 mean); $16 for safety ratings ($101 mean); $9 for side effects of pain relievers ($85 mean); and $26.50 for conflict minerals ($109 mean). Table 2 provides the results in tabular form.

Table 1 Disclosure of potentially important information

Information offered	Want information	Annual willingness to pay	
		Median ($)	Mean ($)
Whether participant will get Alzheimer's disease	47%	59	106.98
Stock market performance on January 1, 2020	54%	100	165.93
Genetic predisposition to cancer or heart disease	58%	79	115
Whether participant's partner or spouse ever cheats	57%	74.50	120.67
Annual cost of operating the appliances in participant's home	60%	15	43.71
Global temperature in 2100	42%	19	59.37
Likely year of death	27%	93	154.44
Calorie labels at restaurants	43%	15	48.61

Table 2 Consumer disclosure

Information offered	Want information	Willingness to pay	
		Median ($)	Mean ($)
Standard fee for late payment of participant's credit card bill	62%	8	103
Food contains genetically modified organisms	60%	24	101
Amount of overuse charges for participant's cellphone	64%	10	95
Safety ratings for participant's tires	67%	16	101
Potential side effects of pain relievers	65%	9	85
Products contain "conflict minerals"	55%	26.50	109

These are preliminary findings. But it is safe to conclude that many people do not want to receive some information even if it seems relevant to their choices—and that when they do want that information, they do not place a high value on it. Perhaps they think that the information would not affect their choices, or that it would be unpleasant to receive it (Golman et al. 2017).

Here we have good reason for personalized disclosure, giving information only to those who actually want it (assuming that those who want it, and those who do not, do not suffer from a relevant informational problem or behavioral bias). Unfortunately, personalization is often infeasible. Information may be a public good, in the sense that if one person receives it, others do as well; consider calorie labels. For the future, a question is whether new technologies will make personalized or targeted disclosure more feasible than it has ever been before.

2.2 The case of bioengineered food

To see some of the complexities, consider a proposed rule from the U.S. Department of Agriculture (2018a), the Bioengineered Food Disclosure Standard. The agency did not have much difficulty with respect to costs. It projected first-year costs of $600 million to $3.5 billion, with ongoing annual costs of between $114 million and $225 million. With respect to benefits, the agency flatly said that there would be *none* "to human health or the environment" (U.S. Department of Agriculture 2018b, p. 65). To fortify the point, it added that even if the new labels changed the ratio of bioengineered (BE) to non-BE food purchases, "there would be no impacts on human health or the environment." Thus far, it seems that the regulation would impose significant costs for no benefits at all.

Nonetheless, the agency pointed to two categories of benefits. The first involved elimination of (a) a more aggressive approach from one state (Vermont) that might drive the national market or (b) the inefficiencies of diverse state-level labeling requirements. These kinds of benefits are irrelevant to my topic here. (Note, however, that insofar as (a) or (b) mean that a federal approach would produce benefits, the best way to provide them would be by federal preemption of state law—period.)

The second and more pertinent category of benefits comes from providing consumers with "reliable information about BE food products." As the agency noted, consumers "have expressed interest in this information." But it declined to try to monetize that interest. It observed that "consumer surveys, experimental studies, and market outcomes

suggest different valuations." It added that in this context, "Willingness to pay and other experimental studies for BE foods are particularly problematic as a basis for computing potential benefits (consumer surplus), with a number of researchers questioning the high negative consumer valuation of BE products resulting from these types of studies."

Those questions are perfectly legitimate. The surveys suggesting that people are worried about BE products may not tell us much. They may not map onto actual behavior with respect to purchasing decisions; there is good reason to think that they do not (Kalaitzandonakes et al. 2005). In the abstract, people might *say* that they are worried, but in stores, they seem to show that they are not. To the extent that it exists, consumer willingness to pay for the information may well depend on a mistaken belief that BE food products are unsafe or harmful to the environment (Sunstein 2017; Sunstein 2018b). If willingness to pay is based on a mistake of fact, the preferred remedy should be to correct the error rather than to require labels—not least because labels could aggravate and spread the error, by making people think that federal regulators are concerned about the risks (Bar-Gill et al. 2018). That thought could itself produce welfare losses, as people buy products thinking that they are unsafe, or buy alternative products that they like less.

In the end, the USDA (2018b, p. 8) concluded that as against a baseline of no state-level BE labels, "there are no quantified benefits associated with the Federal standard." What is noteworthy is that the USDA did not say that the benefits were zero. Instead it declined to quantify the benefits of providing the information *in any way.*

2.3 Four approaches

As the BE example suggests, and for reasons I have outlined, U.S. agencies have often faced considerable difficulty in quantifying the costs and benefits of disclosure requirements. A general problem, to which I mean to draw attention here, is that they often do far less than they might. In fact, they have adopted four distinctive approaches, imposing increasingly severe information-gathering demands on those producing regulatory impact analyses. It is not always easy to explain why agencies choose one or another approach in particular cases.

The first approach—adopted in the case of BE food, and sometimes the most candid—is to confess a lack of knowledge by acknowledging that, in light of existing information, some important categories of costs and (especially) benefits simply cannot be quantified.[1] The problem with this approach is that it suggests that the decision to

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[1] For an important decision upholding a refusal to quantify benefits, on the ground that quantification was not feasible, see Investment Co. Institute v. Commodity Futures Trading Commission (U.S. Court of Appeals for the D.C. Circuit 2013). In the context of disclosure, the leading decision is National Association of Manufacturers v. SEC (U.S. Court of Appeals for the D.C. Circuit 2014), which upheld against arbitrariness review a regulation that would require disclosure of the use of "conflict minerals":

An agency is not required "to measure the immeasurable," and need not conduct a "rigorous, quantitative economic analysis" unless the statute explicitly directs it to do so. Here, the rule's benefits would occur half-a-world away in the midst of an opaque conflict about which little reliable information exists, and concern a subject about which the Commission has no particular expertise. Even if one could estimate how many lives are saved or rapes prevented as a direct result of the final rule, doing so would be pointless because the costs of the rule—measured in dollars—would create an apples-to-bricks comparison. Despite the lack of data, the Commission *had* to promulgate a disclosure rule.

Quoting Investment Co. Institute v. Commodity Futures Trading Commission (U.S. Court of Appeals for the D.C. Circuit 2013).

proceed is essentially a stab in the dark. When the stakes are large, that seems unacceptable, certainly for policymakers. Refusing to quantify benefits is also a disservice to the public: Should regulators impose significant costs on the private sector without making every effort to be transparent about the benefits that disclosure might confer? To be sure, quantification may turn out not to be feasible.

The second approach involves "breakeven analysis," by which agencies describe what the benefits would have to be in order to justify the costs—and suggest that the benefits are indeed likely/not likely to be of the requisite magnitude. Suppose, for example, that a disclosure requirement would impose annual costs of $100 million and that the product is purchased, every year, by fifty million consumers. Agencies might ask: Is the label worth $2 annually to every consumer? A question of this kind might have an obvious answer.

In principle, this approach is better than a simple confession of ignorance, at least if the agency can show that the benefits have a lower or upper bound. In the case of a lower or upper bound, the decision whether to go forward might become clear. Breakeven analysis is sometimes the only possible path forward. But in hard cases, it involves a high degree of guesswork, and without a lower or upper bound, it seems to be a mere conclusion, a kind of ipse dixit, masquerading as an analytic device. Without reasonable identification of lower or upper bounds, it is not so different from a confession of ignorance.

The third approach is to attempt to specify outcomes in terms of endpoints, such as economic savings or health endpoints. The advantage of this approach is that it actually points to concrete benefits, and it attempts to measure and to monetize them. But it too runs into serious difficulties. The first is epistemic: agencies may lack anything like the information that would enable them to venture such a specification. They might have little idea, for example, how much consumers will save as a result of fuel economy labels, or how much they will benefit from a warning that below a specified SPF, suntan lotions do not reduce the risk of skin cancer.

The second problem is that, for reasons I will explore, even an accurate specification of endpoints will not give a full picture of the actual benefits; in crucial respects, it will almost certainly overstate them. (It may also understate them, as we will see.) In brief, the problem is that people might experience significant losses as well as gains as a result of receiving information. Suppose, for example, that they dislike receiving it, because it saddens or frightens them, or that they switch to a product that is inferior along certain dimensions. An account of endpoints will ignore those losses.

The fourth approach is to identify consumers' willingness to pay. As a matter of abstract principle, that approach might seem to be the right one; on optimistic assumptions it should capture the full universe of losses and gains from the label (Viscusi 2018). One of its advantages is that it should capture both positive and negative welfare effects, and in the process allow regulators to take account of people's willingness to pay *not* to receive information (Charpentier et al. 2018). If people do not care about calorie labels, their willingness to pay $0 will be part of the calculation; if they gain and lose from calorie labels, the net number will capture both gains and losses; if they prefer not to receive the information, a negative willingness to pay will register as well. At the same time, willingness to pay runs into serious and perhaps insuperable normative, conceptual, and empirical challenges. Some of these are distinctive to the setting of willingness to pay to obtain information. Some of them involve the limits of the willingness-to-pay criterion in general.

The most obvious problem is that it is difficult to elicit people's *informed and unbiased* willingness to pay for information. If you lack certain information, how can you know how much to pay for that information? A second challenge comes from behavioral biases. If consumers show present bias or if they are unrealistically optimistic, they may be willing to pay too little (or in some cases too much) to receive information. A third challenge involves the potentially labile character of relevant preferences, including preferences for the very good for which information is provided. Note in this regard that when people offer their willingness to pay, they are attempting to solve a *prediction problem*. That problem may be difficult to solve, perhaps especially (but not only) when people are asked about whether they want to receive information.

In short, we may be dealing here with a gap between "decision utility" (the utility expected at the time of decision) and "experienced utility" (the utility actually experienced) (Kahneman and Thaler 2006). The most obvious solution would be to try to convey experienced utility in advance, so as to reduce the gap. At the time of choice, informed people might be able to know what their experience will be, so that they will take account of it when they are choosing. In practice, however, it may not be feasible to give people a concrete, vivid sense of their experience, especially but not only if preferences and tastes might change.

For that reason, willingness to pay measures may be an unacceptably crude proxy for the actual welfare effects of obtaining information. I mean this point to raise a concern about willingness to pay for information, but it applies more broadly, for example to the valuation of morbidity risks (Viscusi 2018). If we see willingness to pay as an effort to solve a prediction problem, we might wonder whether it is likely to be a sufficiently accurate measure of the actual welfare effects of (say) a severe concussion, chronic bronchitis, ringing in the ears, or a nonfatal heart attack. Of course it is true that more accurate measures may be unavailable.

3 Costs

On the cost side, some of the questions are relatively straightforward. Regulators may well be able to learn the total cost of (for example) producing fuel economy labels and placing them on new vehicles. Production of labels might itself be relatively cheap, but it might turn out to be costly to obtain the information that would end up on the labels, especially if acquiring that information entails a great deal of work and monitoring. In the case of BE food, the agency offered a remarkably large range for costs for the initial year, but the projections were reasonably bounded after that. A separate difficulty, which agencies have often ignored, arises *when the information itself imposes costs on consumers*. It is a mistake to ignore those costs, even if they prove difficult to quantify, and even if consumers benefit on net.[2] Those costs come in several different forms. Some of them will usually be low, but not always.

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[2] For a useful discussion in an especially controversial area, see Levy et al. (2016).

3.1 A small cognitive tax

A cost is involved in reading and processing the information. For each consumer, that cost is likely to be quite low, but across a large number of purchasers, it might turn out to be significant. Information disclosure is, in a sense, akin to a paperwork burden. To be sure, consumers are not compelled to read and process what is disclosed. But even for those who seek to ignore it, its very presence may operate as a modest cognitive tax. Because people have limited mental bandwidth, that tax may not be safely ignored. (If there is a Hell, it is filled with warnings.)

The problem might turn out to be especially serious if labels are complex or if people are deluged with multiple labels. Information overload might result in significant aggregate costs on individuals—and might also ensure that the net benefits of labels are low.

3.2 Ruining popcorn, 1: A hedonic tax on those who do not change their behavior

Much more importantly, the cost may be hedonic, not cognitive. We have seen that sometimes people do not want to receive information, even if it is relevant to their welfare (Thunstrom 2019; Charpentier et al. 2018). Suppose that smokers are given information about the adverse health effects of smoking or that visitors to chain restaurants are given information about the caloric contents of food. Many members of both groups will suffer a hedonic loss. Consider smokers who cannot or will not quit, and customers who decide to choose high-calorie foods notwithstanding the labels (Thunstrom 2019). In hedonic terms, such people will lose, rather than gain, if they are miserable or at least sadder at the time of purchase (Thunstrom et al. 2016).

To be sure, there is a normative question whether regulators should count, as costs, the adverse hedonic effect of truthful information. Is it a cost, or a benefit, if people learn, truthfully, that they have diabetes or cancer? On net, that might well be a benefit, at least if they can do something about the problem. (If they cannot or do not, it might be a cost, on net, at least in terms of subjective welfare.) But there is a cost as well, and potentially a large one, even if the net effect is positive. So long as we are operating within a welfarist framework, the hedonic loss must be treated as a cost. It might turn out to be low, but regulators should not ignore it (as they typically do).

Compare: Many people do not want to get blood tests, even if doctors advise them to do so, because they do not want to bear the hedonic cost of less-than-good results. The failure to get the tests might be a product of a behavioral bias (for example, present bias, see Thunstrom et al. 2016), but it might also be a product, in whole or in part, of a rational aversion to receiving negative information. Recall that large numbers of people do not want to know if they have a genetic disposition to cancer or heart disease; one reason must be the hedonic loss of receiving that information. Some labels belong in the same category, in the sense that they give people information that they are unhappy to hear (again, this is is true even if on balance, they are better off with it than without it).

I have said that ideally, disclosure would be personalized, and indeed, markets and life allow for a lot of personalized disclosure. You can check your bank balance a lot or a little. You can weigh yourself every day or never. You can get a Fitbit and see how much exercise and sleep you are getting; perhaps you would enjoy knowing that and perhaps it would help you to improve your health. Or perhaps you would find a Fitbit to

be a bit of a nightmare. If you want a Fitbit, or if you despise the idea, you might suffer from a lack of information or a behavioral bias. But you might not. Recall that personalized disclosure has large advantages. In the same vein, government might try targeted disclosures, on the theory that it would have higher net benefits.

3.3 Ruining popcorn, 2: A hedonic tax on those who do change their behavior

Even if people might be able to quit smoking or end up choosing lower-calorie items, and will hence benefit greatly on net, they will incur a cost by seeing something that inflicts pain. In principle, that cost should also count, even if it is greatly outweighed by benefits. The point is not that the hedonic cost is necessarily a trump card; if people make different choices once they are informed, the presumption should be that they are better off. But *by how much*?

To answer that question, the hedonic cost must be taken into account. For many people, a calorie label imposes a serious cost, simply because it informs them that the delicious cheeseburger they are about to eat is also going to make their belly bulge (Thunstrom 2019). It is true that there is a difference between theory and practice, and that in practice, reasonable regulators might not know what to do with this hedonic cost (other than perhaps to recognize it without quantifying it). The only point is that the cost is real.

3.4 A consumer welfare loss

There is a fourth loss, in the form of a consumer welfare loss. Suppose that people decide that on balance, they should have a salad rather than a cheeseburger, on the grounds that the latter has many more calories. If they choose the salad because of a calorie label, they are probably better off on balance—and in a sense, they are sadder but wiser (and healthier). They are sadder to the extent that they enjoy their meal less.

Assessment of the magnitude of the loss poses serious conceptual and empirical challenges (addressed below), and here as well there will be heterogeneity within the population. Some people will be much sadder, and some people only a little bit sadder. But there is no question that a consumer welfare loss will occur, and that it might turn out to be a significant fraction of the benefits. In principle, a decision to forego the cheeseburger might make people only modestly better off, if the hedonic loss is almost as high as the health gain. Whenever a mandatory label leads people to substitute product A for product B, there is a welfare loss to the extent that aside from the characteristic on which the label focusses, product B is better than product A.

Suppose, for example, that consumers are choosing between two essentially equivalent cars; that the more fuel-efficient one would cost $2000 less annually to operate because of its greater fuel efficiency; that the less fuel-efficient one would cost $500 more upfront; and that because of the fuel economy label, they select the fuel-efficient car. For each such consumer, we might be tempted to say that the label has produced $1500 in gains. But in actual practice, the effects of a fuel economy label will be much more complicated to assess. Some consumers will end up purchasing cars that are more fuel-efficient but inferior along some dimension, so that they will gain $1500 minus X, where X refers to the desirable features of the unchosen car that they otherwise prefer. It is hard for public officials to know whether X is, on average, $100, or $1000, or $1450.

3.5 The problem of endogenous preferences

All this assumes that preferences are consistent and exogenous. In some contexts, however, that assumption is not correct (Grüne-Yanoff and Hansson 2009). This point complicates the foregoing analysis and creates a risk that analysis of costs will ignore shifts in tastes that are induced by information itself. The point is not that beliefs will change. It is that tastes and preferences might change independently of changes in beliefs.

Suppose that at Time 1, people enjoy cheeseburgers a lot and enjoy salads only a little. Now suppose that having seen the labels, people switch at Time 2 because they want to make healthier choices. At Time 2, they suffer costs as a result of the switch; they miss cheeseburgers (delicious!) and they do not much like salad (boring!). But at Time 3, people might come to dislike cheeseburgers (disgusting!) and to love salad (fresh!). In principle, changes in people's preferences over time must be taken into account by the considered cost-benefit analyst, though doing so presents serious empirical challenges. What was once a high cost might turn into a low cost. It might be difficult to know the magnitude of the change and even the sign (perhaps those who switch to salad will crave cheeseburgers and grow to despise salad).

4 Benefits

On the benefits side, the assessment can be even more challenging.[3] If the government mandates a fuel economy label, for example, agencies might want to project the economic and environmental benefits from the mandate. At the outset, it should be clear that any projection would be challenging to produce. Suppose that we are focused on WTP. How are people to know what a fuel economy label is worth? What information should be provided to them, in order to help them to answer that question? Might the information turn out to be biasing, if only because it serves as a kind of anchor, and makes some variables salient?

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[3] For example, according to the U.S. Environmental Protection Agency and U.S. Department of Transportation (2011), speaking of new fuel economy labels:

> The agencies recognize that Executive Order 13563 directs agencies "to use the best available techniques to quantify anticipated present and future benefits as accurately as possible." In this context, however, quantitative information is not available, and the agencies have therefore chosen instead to continue with a qualitative assessment of benefits. It is difficult to develop a good baseline for the fleet using the existing label, partly because the existing label is not designed to incorporate advanced technology vehicles. It is even more difficult to develop a comparison for the fleet with the new labels, because the effects of label designs on vehicle purchases are not known. Thus, any assessment of quantitative effects of label design on vehicle sales involves a great deal of speculation. The agencies believe that informed choice is an end in itself, even if it is hard to quantify; the agencies also believe that the new labels will provide significant benefits for consumers, including economic benefits, though these benefits cannot be quantified at this time.

In short, "The primary benefits associated with this rule are associated with improved consumer decision-making resulting from improved presentation of information. At this time, EPA and NHTSA do not have data to quantify these impacts" (U. S. Environmental Protection Agency & U.S. Department of Transportation 2011).

4.1 Behavior change

To project benefits, regulators might want to identify the effect of labels on behavior, at least if they are concerned with economic or other endpoints. In principle, a randomized controlled trial would be valuable and perhaps necessary for that purpose. If one group sees a particular label and a similar group sees a different label (or no label), regulators should be able to specify the effect of the label on purchasing decisions. Armed with that information, they could estimate economic and environmental consequences (at least if they could generalize from the trial).

Unfortunately, it is sometimes difficult or impossible to run randomized controlled trials. In these circumstances, making any kind of projection of how consumers will react to a label is exceedingly difficult. Agencies might rely on surveys or on focus groups, which can provide relevant information. Carefully designed surveys might tell us a great deal about how consumers and workers will respond to information (Viscusi and Magat 1987). Even so, it might be hazardous to project, from survey research, specific numbers with respect to behavior change.

As we have seen, agencies sometimes attempt to identify likely endpoints in terms of money or health. If they do not have randomized controlled trials, they might use surveys to test whether people will spend less, save more, or avoid risks (ibid.). The results might be surprising; people might overreact or underreact to information. If agencies were able to make accurate projections, they would know something important. Suppose, for example, that on average, consumers would save $X as a result of a well-designed fuel economy label, with environmental benefits of $Y. Perhaps technological innovations will make projections of that kind increasingly feasible. The problem is that for the reasons given thus far (including an assortment of welfare losses), the projection would not give an adequate estimate of the (net) benefits.

4.2 Willingness to pay

Even if we have a randomized controlled trial, showing that a calorie label changes behavior to a specified degree, we do not know the net welfare benefits. We have seen that endpoints, in terms of money and health, do not provide an accurate picture of those benefits. Because endpoints do not include a series of cognitive and hedonic costs, they might well be an upper bound. (They might also fail to include some hedonic benefits, in which case they might turn out to be a lower bound.)

Suppose, for example, that because of a fuel economy label, people end up buying cars that are more fuel-efficient but otherwise less desirable. On balance, they might be better off, but there will be a welfare loss. Or consider the pervasive problem of heterogeneity. Suppose that some consumers gain a great deal from calorie labels; their health improves and they enjoy seeing them, while also enjoying the lower-calorie meals they are now choosing. Suppose that others lose; they do not change their behavior at all but are pained by what they see. Suppose that still others both gain and lose; their health improves but they are pained by what they see and they also like their meals less. In principle, regulators should aggregate all of these effects. And indeed, there is evidence of considerable diversity with respect to the welfare effects of calorie labels (Thunstrom 2019).

In these circumstances, regulators might explore the issue from another direction. Rather than asking about the economic savings from the fuel-efficient car or the health benefits of calorie lavels, they might ask an entirely different question (ibid.): *how much would consumers be willing to pay for a fuel economy or calorie label*?

It is true that if people are asked about their willingness to pay for information in the abstract, they will have to answer some challenging questions. How will they use that information? And how often will they use it? It is also true that in surveys, answers to questions about risk reduction raise serious puzzles. Surveys find, for example, that there is a large disparity between willingness to pay and willingness to accept, and also that many consumers would be unwilling to accept *any* finite payment to purchase and use some risky products (Viscusi and Magat 1992). Findings of this sort raise questions about whether willingness-to-pay or willingness-to-accept figures for information (potentially leading to economic savings or reductions in health risks) adequately capture welfare effects; I will return to that problem. But at least in principle, those figures should be both informative and useful. They should capture everything that people care about—not simply endpoints, but the full range of costs and benefits of information.

In the context of reports about home energy use, Allcott and Kessler (2015) have focused on willingness to pay. In their valuable and provocative work, they find that on average, people are willing to pay *something* for those reports, but that the average amount that they are willing to pay is far less than the average economic savings that people enjoy as a result of the reports (Thunstrom 2019 is in the same vein). One of their findings is that the standard evaluation, focusing on average economic savings, greatly overstates the net welfare gain from the reports (by a factor of five). It is not clear why the willingness-to-pay figures are so much lower than the economic gain; why would people pay (say) $2.30 for a report that would enable them to save (say) as much as $7?

But on reflection, the answer is not terribly mysterious. It is plausible to speculate that the relatively lower WTP reflects an assortment of welfare losses from receiving the report: the time spent reading it, the emotional tax of receiving less-than-good news, the time spent taking steps to reduce energy use. Whatever we think of the precise numbers given by Allcott and Kessler, willingness to pay should capture factors of this kind. In some cases, it should capture the fact that some or many people would be willing to pay nothing for information or might even pay something to ensure that they do not receive it (Thunstrom 2019; Charpentier et al. 2018).

Of course some people undoubtedly *enjoy* reports of the kind that Allcott and Kessler studied, which suggests that a full accounting would also have to identify the hedonic *benefits* of receiving information. Consistent with this point, Allcott and Kessler find a high degree of heterogeneity and emphasize the potential welfare gains of targeted policy, ensuring that the reports do not go to people who do not want them.

Under ideal conditions, and bracketing the endogeneity issue, the right question for regulators to ask involves willingness to pay. They should not focus solely on the economic benefits that consumers might receive if (for example) they purchase more fuel-efficient cars. The reason is that on optimistic assumptions, the willingness-to-pay question ought to include everything that matters to consumers. (Of course it is true that the question will not fully capture third-party effects, and again, it will not capture welfare effects if preferences are endogenous.)

4.3 Anchoring, information, and behavioral biases

As an empirical matter, however, it may not be easy to obtain a reliable answer to the willingness-to-pay question, or anything close to it. We might simply ask people, as Allcott and Kessler did, but for their answers to be relevant, it would be important to provide pertinent information—for example, about the potential benefits (purely economic and otherwise) of labels. We want informed willingness to pay, rather than willingness to pay in an informational vacuum.

Unfortunately, providing that information might "anchor" consumers and hence bias their answers. Suppose, for example, that consumers were told that the average family saves $7 per year as a result of receiving home energy reports, or that fuel economy labels lead people to save $100 annually, on average, as a result of purchasing more fuel-efficient vehicles. Respondents would likely anchor on such numbers. If so, it is not clear what their answers would tell us. Anchored answers would not be especially informative about welfare effects.

Imagine that the problem of anchoring could be overcome and that informed consumers would be willing to pay (say) $10, on average, for fuel economy labels. If so, we might have some sense of the benefits, at least if behavioral biases are not distorting people's answers. In actual practice, however, such biases might well produce distortions; consider present bias and optimistic bias, which may lead to willingness-to-pay figures that are unduly low or unduly high in light of the welfare benefits. In any case, survey evidence is imperfectly reliable, in part because of the familiar problems with contingent valuation studies of any kind (recall the USDA's comments about consumer surveys) and in part because of the difficulty of informing consumers in a sufficiently neutral way.

For health-related disclosures, the problem is even harder. Consumers might not know enough to give good answers to the questions about how much they are willing to pay for information. Consider calorie labels. One goal of such labels is to reduce obesity, which causes an assortment of health problems, including premature mortality. If they are focusing on endpoints rather than willingness to pay for labels, regulators have established ways to turn health effects into monetary equivalents. For example, a statistical death is now valued at about nine million dollars.[4] But how many premature deaths would be prevented by calorie labels? And what would be the effect of such labels on adverse health outcomes short of death?

To answer such questions, regulators have to undertake two tasks. First, they must begin by making some prediction about the effect of calorie labels on what people choose to eat. Second, they have to follow that prediction by specifying the health consequences of lower levels of caloric intake. At least it can be said that if they can accomplish those tasks, they will have some sense of the benefits of the labels, once (and this is a third task) they turn the various consequences into monetary equivalents. After undertaking all three tasks, regulators will have specified endpoints—but for the reasons given, a specification of endpoints will overstate benefits because it will not

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[4] The defining work here comes from W. Kip Viscusi. See Viscusi (2018); many people draw on his research. See, e.g., Thomson and Monje (2015) explaining, "On the basis of the best available evidence, this guidance identifies $9.4 million as the value of a statistical life." See also Sunstein (2014), providing the underlying theory and a discussion of how "agencies . . . assign monetary values to the human lives that would be saved by a proposed regulation."

include various cognitive and hedonic losses. (As noted, there may also be hedonic benefits.)

Alternatively, we could (again) ask how much people would be willing to pay for calorie labels (Thunstrom 2019).[5] As before, asking that question is, in principle, preferable to an effort to assess health states, because the answer will capture all variables that matter to consumers.[6] Also as before, there are formidable challenges in using surveys to elicit reliable numbers free from biases of various kinds. And if preferences are endogenous and labile, willingness-to-pay numbers might greatly understate the welfare gain from labels. Recall that people might develop tastes for the products to which they shift. (I am also bracketing the questions raised by addictive goods, such as cigarettes, for which labels might be beneficial on welfare grounds precisely because they help break the hold of the addiction. Note the claim that cigarette taxes might well make smokers happier (Gruber and Mullainathan 2002).)

4.4 Willingness to pay as a solution to a prediction problem

There is a larger problem, to which I have briefly referred. When consumers state their willingness to pay, they are solving a *prediction problem*. To take a mundane case: When a consumer decides to spend $30,000 for a new car, rather than $25,000 or $35,000, she must be making a prediction about the welfare effects of the expenditure. In choosing among three cars, the solution to a prediction problem, for individual consumers, is not exactly easy. Can consumers reliably foresee the welfare effects, for them, of each of the cars? Actually the prediction problem is much harder than that. Consumers should be asking about the range of alternative uses for $30,000. That is exceedingly difficult. Perhaps most consumers have sensible rules of thumb and so do not go far wrong. But still.

Turn now to health risks: a broken back, a severe concussion, heart disease, diabetes. (Not long ago, I was hit by a car and had a severe concussion. Ex ante, I had no idea what a severe concussion was like.) Deciding how much to pay to eliminate a 1/n risk of any one of those requires a judgment about what it would be like to suffer from the

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[5] See Loureiro et al.'s (2006, p. 263) finding that "on average, consumers are willing to pay close to 11% above the initial price to obtain cookies with nutritional labelling." Further, "Consistent with prior expectations, our results also indicate a difference between the [willingness-to-pay] of individuals suffering from diet-related health problems (estimated mean 13%) and those who do not suffer any diet-related health problems (estimated mean 9%)" (Loureiro et al. 2006, p. 249).

[6] In the words of the FDA (2014, p. 64),

> To our knowledge, Abaluck (2011) is the only study that translates the potential effect of increasing nutrition information on consumption into estimates of welfare gains using willingness-to-pay based on revealed preferences (Ref. 43). This study uses the variation in nutrition information generated by Nutrition Labeling and Education Act (NLEA) as a method to determine how changes in individuals' beliefs about nutrient content affect consumption decisions. The differential changes in nutrition information across food categories, measured in units of calories per gram, allow the study to identify a general model of food demand as a function of nutrient characteristics that accounts for the total daily diet, prior beliefs about nutrient content, and preferences, including willingness to substitute across food categories.

As before, however, the willingness-to-pay criterion may run into normative objections, even from the standpoint of welfare. See generally Bronsteen et al. (2015) raising questions about willingness to pay in view of people's occasional failure to know what will promote their welfare.

relevant injury or illness. Are consumers in a good position to make that judgment? Usually not. Are they in a good position to make judgments about much it is worthwhile to obtain information that would permit them to reduce the risk of suffering from those conditions? Usually not.

In light of these challenges, regulators have two highly imperfect options. First, they can work on the two relevant tracks to try to produce answers: exploring endpoints and enlisting surveys (preferably accompanied by relevant information to assist respondents). On prominent occasions, they have tried the former.[7] Second, they can acknowledge the difficulties, confess that they cannot surmount them, and use breakeven analysis, by which they ask what the benefits would have to be in order to justify the costs, and then do what they can to generate a reasonable lower or upper bound.

Suppose, for example, that an energy-efficiency label for refrigerators would cost $10 million annually and that eight million refrigerators are sold in the United States every year. Even if the average consumer saves only $0.50 annually as a result of the label, the cost will be made up in just three years. Perhaps regulators can specify a lower or upper bound on benefits, thus allowing breakeven analysis to have some discipline. Breakeven analysis can be crude, but in some cases, it will suggest that the argument for disclosure of information is either very strong or very weak.

5 Third parties—and morality

Some actual or imaginable labels are meant to protect third parties, not consumers as such. Suppose that some or many consumers are concerned about the use of certain minerals to finance mass atrocities, and they favor labeling, or some kind of disclosure requirement, so that consumers can decline to purchase products that contain such minerals. Or suppose that consumers care about where goods were made, perhaps because they want to purchase products from their own nation or perhaps because they do not want to purchase products from nations that do not respect human rights. They might seek "country of origin" labels for that reason. Or suppose that some or many consumers care about the welfare of animals in general or certain animals in particular; because they do, they seek labels to reflect how animals were (mis)treated. Or suppose that consumers want fuel economy labels, in part so that they can save money on gasoline, but also because they want to reduce conventional air pollution and emissions of greenhouse gases.

In such cases, there are two sets of benefits: (1) the benefits to consumers themselves, assuming that they would enjoy a welfare gain if their moral commitments were vindicated (Posner and Sunstein 2017) and (2) the benefits to third parties. The two are

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[7] See U.S. Food and Drug Administration (2011) noting the longer lifespans, fewer cancers and diseases, as well as increased property and monetary values of non-smokers. See also U.S. Department of Labor (2016) requiring that employees have access to OSHA logs, and U.S. Environmental Protection Agency and U.S. Department of Transportation (2011) explaining, "The agencies believe that informed choice is an end in itself, even if it is hard to quantify; the agencies also believe that the new labels will provide significant benefits for consumers, including economic benefits, though these benefits cannot be quantified at this time." Finally, see U.S. Food and Drug Administration (2014, p. 11) explaining, "The final rule may also assist consumers by making the long-term health consequences of consumer food choices more salient and by providing contextual cues of food consumption."

separate. In principle, the right measure of (1) should be willingness to pay (ibid.), but it will not be simple to elicit it. It is important to emphasize the potentially significant challenges in quantifying both (1) and (2).

In some of these cases, the third-party effects are not obscure, and the real challenge is how to quantify them. As before, it is necessary to begin by making some projections about consumer behavior. To what extent would consumers change their purchasing habits in response? Even if that question can be answered, it would be necessary to tie any such changes to reduced costs or increased benefits for third parties. And even if that problem can be resolved, it would be necessary to quantify and monetize the resulting effects. It is no wonder that in the context of conflict minerals, the agency concluded that quantification was not possible.[8] Perhaps it should have engaged in some form of breakeven analysis, explaining that the requirement was likely to survive cost-benefit analysis even if its effect were modest. But perhaps it lacked the information that would have allowed it to make that analysis plausible.

It should be clear that insofar as third-party effects are the reason for government intervention, a corrective tax, rather than some kind of label, is the preferred response. But disclosure might be feasible when a corrective tax is not. And in some cases, a label might have multiple objections; the fuel economy label is an example. It is designed to help consumers save money; to reduce conventional air pollutions; and to reduce greenhouse gases. Regulators should of course do their best to monetize all of the relevant costs and benefits. To do that, regulators need to know what consumers care about, and how their response will translate into quantified savings.

6 The role of courts

My focus has been on the decisions by regulatory agencies, which are charged with assessing the benefits and the costs of proposed and final regulations (Sunstein 2018b). To comply with prevailing requirements, imposed by executive order, they must do the best they can to produce relevant numbers for disclosure requirements. But it should be clear that the analysis bears on judicial decisions as well. A full discussion would require a great deal of space; consider here two simple points.

First, agency decisions may be challenged in court as arbitrary or capricious or otherwise violative of law. A regulation that imposes high costs for no benefits may well qualify as arbitrary (ibid.). Indeed, a regulation might be found arbitrary and therefore unlawful if an agency imposes high costs without making some effort to show that it is also producing high benefits. To that extent, an agency's failure to come up with some accounting of both costs and benefits might result in judicial invalidation of its decisions. Of course an agency might be able to defend itself by showing that it is not feasible to produce numbers.

Second, courts are often in the business of imposing or overseeing information disclosure by private actors, as in the context of product liability cases (Viscusi 1991). As of now, judicial decisions do not ordinarily include an analysis of costs and benefits.

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[8] See U.S. Court of Appeals for the D.C. Circuit (2015) explaining, "The Commission was 'unable to readily quantify' the 'compelling social benefits' the rule was supposed to achieve: reducing violence and promoting peace and stability in the Congo," quoting U.S. Securities and Exchange Commission (2012).

One reason is that existing law is usually not understood to require it, or to authorize judges to require it. Another reason is that even if courts had discretion to require some kind of quantitative analysis, they might be reluctant, because they are not well-equipped to generate numbers. But whenever a court is mandating some kind of warning or testing the adequacy of such a warning, it makes sense to have, at the very least, a rough-and-ready sense of what the warning will achieve, and at what cost (ibid.). I expect that we will see large advances on that count in coming years.

7 Taking stock

In numerous contexts, congress has required or authorized federal agencies to impose disclosure requirements. In all those contexts, executive agencies are required, by executive order, to try to catalogue the benefits and costs of disclosure requirements, and to demonstrate that the benefits justify the costs. Such agencies face persistent challenges in projecting benefits. They use four different approaches: they refuse to do so on the grounds that quantification is not feasible; they engage in breakeven analysis; they project end-states, such as economic savings or health outcomes; and they estimate willingness to pay for the relevant information.

Each of these approaches raises serious questions and runs into strong objections. On highly optimistic assumptions, the right question generally involves willingness to pay (Viscusi 2018), which should capture everything that matters, including the hedonic gains and losses associated with receiving information (and thus the possibility that on balance, people would be willing to pay nothing, or would even be willing to pay something not to receive information). One of the advantages of asking the willingness-to-pay question is that it will almost certainly reveal a great deal of heterogeneity, and thus put a spotlight on the potential of personalized disclosure—and of ensuring that information goes only to the people who want it.

In many settings, markets allow for personalized disclosure. In the future, regulators might inquire into that possibility, at least where information is not a public good. But for those who embrace the willingness-to-pay criterion, there is a serious problem. In practice, people often lack enough information to give a sensible answer to the question how much they would be willing to pay for (more) information. How much would you be willing to pay for information about the presence of chemical XYZ in your favorite food, when you know little or nothing about chemical XYZ or its effects? People face informational deficits, and they might also suffer from behavioral biases (including present bias and optimistic bias).

We have also seen that when preferences are labile or endogenous, even an informed and unbiased answer to the willingness-to-pay question may fail to capture the welfare consequences, because *people may develop new tastes and values as a result of information*. Willingness-to-pay figures are an effort to solve a prediction problem, and in some cases, people are not in a good position to produce sensible solutions. In these circumstances, breakeven analysis is the very least that should be required, and it is sometimes the most that agencies can do. If agencies can identify lower or upper bounds, a breakeven analysis will sometimes show that mandatory disclosure is justified on welfare grounds—and sometimes that it is not.

The challenge is that breakeven analysis is a confession of ignorance, and that without lower or upper bounds, that form of analysis will leave us at sea. It would be far better for agencies to make progress in answering difficult questions about the actual effects of information on people's experienced well-being; those effects might be strongly positive or strongly negative. The next generation of work on disclosure requirements—and regulatory benefits in general—should make it a priority to produce those answers.

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