



DETERMINING THE SOCIAL COST OF CARBON

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A recent article in *Science* warned that the incoming Trump Administration will try to revise the Social Cost of Carbon (SCC), a metric that federal agencies use for cost-benefit analysis of a variety of regulations concerning global warming.¹ The current SCC is on the order of \$50 per ton. Trump Administration officials could change two calculation assumptions to reduce the figure substantially: the discount rate and the geographic scope. A change in the 2020 discount rate from 2.5 percent to 5 percent could reduce the 2020 SCC from \$62 to \$12. A change in the geographic scope from the world, which is used now, to the United States alone could have similar if not larger effects. These two changes together could lead to estimates that would make many current regulations appear to have costs that exceed their benefits.

In this essay, I take up the question of geographic scope in determining the SCC—and I will assume, for the sake of analysis, that monetary cost is the appropriate measure to measure the impact of emissions, even though money itself has different utility to different people as a function of their ability to pay for things. I also assess the effect of the discount rate.²

To begin, it is important to note that the regulation of carbon is done to prevent harm. It is analogous to the precautions that polluters take to prevent pollution. Tort law usually holds polluters liable if they are negligent in taking too little care. The usual test of negligence is that the care taken is less than optimal. Optimal care means that increases in care up to this point have greater benefit than cost, and increases beyond this point have greater cost than benefit. In other words, the benefit per dollar declines as the amount spent in care increases.

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¹ See David Malakoff et. al., *Trump Team Targets Changes to Key Metric that Calculates Social Cost of Carbon*, *SCI.*, Dec. 16, 2016, <https://www.science.org/content/article/trump-team-targets-changes-key-metric-calculates-social-cost-carbon>.

² Jonathan Baron, *The Discount Rate for the Social Cost of Carbon*, *REGUL. REV.* (Jan. 18, 2017), <https://www.theregreview.org/2017/01/18/baron-discount-rate-social-cost-carbon/>.

One issue in calculating the SCC involves identifying who suffers the effects of climate change. In fact, the victims are spread around the world. If we abandon the global scope, we will end up with less regulation, and, as a result, we will harm more people, both inside and outside the United States. The money saved by limiting the geographic scope to the United States presumably will benefit U.S. residents only, so they might be adequately compensated. But the foreigners will not be. The result of using the national rather than global scope is that we harm foreigners, by using the lower level of regulation. Undervaluing the social cost of carbon is, in a way, an aggression, from the perspective of foreign policy.

From a utilitarian point of view—again, assuming that money is an adequate replacement for utility—using the global scope is a no-brainer. Psychologically, however, people may not perceive this sort of harm as morally wrong. The way individuals think about harm depends on how it is framed. In a recent paper, I report that people think it is especially wrong to hurt co-nationals by acts or by omissions, and to hurt foreigners by acts.³ But psychology scholarship reveals that people find hurting foreigners by omission is not so bad.⁴ It is as if we are not responsible for the well-being of people living abroad in the same way we are responsible for co-nationals.

Thus, if people think of choosing the lower level of regulation—or lowering the social cost of carbon—as an omission, they will not think it is so wrong to harm foreigners in this way. They might also think of raising the level of regulation—or increasing the social cost of carbon—as an action hurting co-nationals, and hence find it objectionable. Hence, this framing would pit a “wrong” harmful *action* against a “not wrong” harmful *omission*, and would lead to opposition to the higher level of regulation.

Other psychological framings of the SCC issue pit a wrong action against a wrong omission. The harm from action would probably dominate. Although “failing to reduce the level of regulation” could be seen as harming co-nationals by omission, hence wrong, the alternative option of “reducing the level of regulation” would be harmful to foreigners, hence even more wrong because it is an act. Likewise, if people think of “emitting more carbon” as the act of interest, then this act would harm foreigners, and thus be considered wrong. The omission of “not emitting more carbon” would harm co-nationals by raising costs, but this would count as a less harmful omission. From a practical perspective, framing the situation these ways would be more conducive to using a global scope for the SCC.

The choice about the geographic scope of SCC can also be understood as a question of cooperation or defection in a social dilemma. Other nations are faced with the same choice. It is in each nation’s interest to use its own national scope in calculating its social cost of carbon, but it is in the overall interest of the world to use the global scope. And this conclusion takes into

³ Jonathan Baron, *Parochialism as a Result of Cognitive Bias*, in UNDERSTANDING SOCIAL ACTION, PROMOTING HUMAN RIGHTS 203, 218 (Ryan Goodman, Derek Jinks & Andrew K. Woods eds., 2012).

⁴ *Id.*

account the global cost of regulation as well as the benefit, because the total cost of the regulation over the world would not exceed the total benefit, even if every nation used the global SCC.

Again, a psychological factor becomes relevant. Although the analysis just described does not depend on the number of cooperators, empirical studies demonstrate that people feel a greater obligation to cooperate when they believe that a greater number of others will cooperate as well.⁵ As a global power, the United States may have an even greater effect on these perceptions than most other nations will have. And, in this case, the degree of cooperation is public for the most part, so we cannot hide any failure to cooperate very easily.

Because of the likely effect of our cooperation on others, the national benefit of the United States maintaining a global scope when calculating the SCC could be quite a bit higher if we take into account the effect of our behavior on other nations. If we pay X dollars to directly prevent the emission of Y tons of carbon, the actual reduction would be Y times some factor, because other nations would be affected by what we do. The multiplier could be greater than two, depending on which nations are influenced, and by how much. The influence on other nations' behavior occurs regardless of whether we aim for a national or global SCC. Because of it, the benefit-cost ratio is greater than it would be in the absence of imitation by others, therefore, increasing the optimal amount of regulation for the United States.

I doubt that this imitation effect is considered in any analysis. The reason it is not considered is that it is very difficult to estimate the multiplier. When numbers are difficult to estimate, people tend to give up and assume some default—in this case assuming no impact of imitation, or, in other words a multiplier of one. But the multiplier is surely higher than that, and important. Some estimate is surely better than an estimate that practically insures substantial under-regulation.

In sum, we definitely should not use the national SCC calculated as if the behavior of others were independent of choices made by U.S. authorities. From a moral point of view, we should calculate the social cost of carbon using the global scope. If we choose to think of it this way, use of the global scope for calculating the SCC ensures that we are not committing an act of aggression against the rest of the world.

When we perform cost-benefit analysis of regulations, and when the benefits of those regulations accrue in the future, we discount our estimates of the benefits so that we can quantify what should be spent today in order to avoid future damage.⁶ Regulation of carbon dioxide is a prime example. It persists in the atmosphere over many decades and causes global warming, which is itself a slow process with many effects having time lags of decades.

⁵ Jean-Robert Tyran. *Voting When Money and Morals Conflict: An Experimental Test of Expressive Voting* 19 (University of St. Gallen, Discussion Paper 2002-07, 2002).

⁶ Adam Hayes, *Discount Rate*, INVESTOPEDIA (Aug. 29, 2021), <https://www.investopedia.com/terms/d/discountrate.asp>.

The SCC is measured using a discount rate that purports to estimate the current value of future impacts, thereby allowing regulators to compare today's costs more directly to tomorrow's benefits. The Trump Administration's likely increase in the discount rate from 2.5 percent to 5 percent could reduce the 2020 SCC from \$62 to \$12 per metric ton of carbon dioxide.⁷ A lower SCC, which suggests a lower value placed on preventing future damages, would imply that many current regulations appear to have costs that exceed their benefits.

What is the correct discount rate? I cannot answer that, but I can comment on the implications of some proposed reasons for discounting that are suggested by the large literature on this question in economics and philosophy. Further analysis of the arguments could lead to a more justified estimate of what the rate should be.

One reason that has been offered for discounting is that people in the future will be richer than we are now. Because money has "declining marginal utility," people in the future, being richer, will value money less than we do.⁸ We must spend a larger proportion of our money on "necessities" that make a big difference in our lives, like food and shelter, while people in the future will spend more of it on "luxuries" that improve their well-being only a little. Thus, by discounting, we reduce the SCC and keep more money for ourselves, which does more good than by giving it to those who need it less.

But this assumption of increasing wealth could be incorrect. We cannot assume that the trend of only the last few centuries will always continue, and we have some reasons to think it will not, due to increasing population, a reduction in land area for farming, over-fishing, reduced supply of fresh water, sharply declining biodiversity, and global warming itself, which will lead to reduced land area for everything, among other problems.⁹ The argument from increasing wealth is thus weak, and the same line of reasoning could lead to the opposite conclusion if we are more pessimistic about the future.

Another argument for discounting is that we need to compare expenditures on some program, such as carbon regulation, to an alternative in which the money is invested in a way that helps those who would one day be hurt by climate change. In theory, we could set aside and invest money today and make sure that the proceeds go to those in need when the time comes. Or, instead of regulating carbon, we could take other steps to improve the economic development of poor countries, so that they could better prepare to deal with the effects of global warming. If the benefits of such alternative investment accrued over time at the rate of 5 percent, then regulation without such accrual over time would lose value over time at

⁷ Malakoff et. al., *supra* note 1.

⁸ See Joshua Greene & Jonathan Baron, *Intuitions About Declining Marginal Utility*, 14 J. BEHAV. DEC. MAKING 243 (2001).

⁹ *Climate Impacts on Agriculture and Food Supply*, ENVTL. PROT. AGENCY, https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-agriculture-and-food-supply_.html.

about that rate, by comparison with these alternatives. Using a 5 percent discount rate for the SCC thus ensures that we do not over-invest in regulation, relative to these alternatives.

A reply might be, “Why not do both?” In other words, let us regulate carbon and promote development, even if regulation is less efficient. Should we focus on one approach only? The argument for discounting answers this question: Any allocation to a less efficient approach would reduce overall efficiency.

If we are talking about small changes, then this argument makes sense. But two additional considerations come into play when we are talking about large changes in policy, at both the national level and especially the global level, where, as I have separately argued, U.S. policy can have a substantial influence on global policy.¹⁰

One such consideration is that each dollar of additional expenditure produces less benefit, the more dollars are already being spent. As regulation becomes more stringent, it becomes increasingly costly to get the same additional benefit, so that the benefit per dollar decreases. This effect is already included in any cost-benefit analysis of regulation, without discounting. The same may be true of development assistance or expenditures for research on negative emissions, a term for removing carbon from the air. In the latter case, the number of researchers who know how to use additional money is limited. Because of these effects, putting the eggs in several baskets—that is, regulation, development assistance, and research—will surely do more good than putting all of them in one basket, especially given the low probability that even all these approaches together will be sufficient to avoid serious harm in the future.

A second consideration for large-scale allocation decisions involves uncertainty about benefits. If we guess wrong about these and put all our eggs in one basket, we may fail completely, which leads to very bad outcomes. Thus, diversification of approaches is also justifiable as insurance against being completely wrong. It is more likely that something will work, if we try many things. Moreover, it does seem that carbon regulation is more certain to have future benefits than either of the other approaches.

In sum, although the benefits of potential alternatives should be considered in the overall decision about allocating resources for dealing with climate change, it would be better to do this explicitly rather than through a discount rate based on questionable assumptions about alternatives. And allocation of additional resources to regulation does not necessarily imply that resources devoted to other approaches need to be reduced.

Another argument for discounting is “pure time preference,” the simple fact that people care less about the future than the present.¹¹ We do this within our own lives, and it is difficult to say that it is irrational. Why should I care as much about my future self as about my present self? If I think of

¹⁰ Baron, *supra* note 2.

¹¹ See Philip A. Trostel & Grant A. Taylor, *A Theory of Time Preference*, 39 *ECON. INQUIRY* 379 (2001).

my future self as another person, then my lack of concern for him could be part of a lack of concern for other people in general, as opposed to my present self. I thus may want to discount the future of humanity because I discount other people more generally. This kind of discounting, too, may not be clearly irrational.

However, when we discuss regulatory policy, we are taking a societal perspective, in which I am just one of many billions who are affected. From this perspective, a preference for present people over future people becomes a form of moral prejudice, such as caring more about white people than black people. The same issue arises if we care more about co-nationals than about foreigners.¹² From a moral and societal point of view, such preferences for unequal treatment are difficult to justify. If we end up doing so because our self-serving preferences express themselves in the behavior of citizens in a democracy, that is not a justification so much as an unpleasant fact.

We do have some good reasons for discounting at the level of policy. Uncertainty about future events gives us such a reason. There could be some technological advance that would solve the problem and make any present sacrifice fruitless. *The Times of London*, in 1894, predicted that New York City would be buried under nine feet of horse manure within about 50 years.¹³ By 1912, most horses had been retired. Or, humanity could be largely or completely wiped out by a nuclear war, an epidemic, or an asteroid. In this case, too, any sacrifice now would be for naught.

Even though uncertainty about future events does permit some discounting, it is difficult to say how much this should be. But it is surely at the low end of the range now being considered. It is hard to imagine what technological advance might quickly alleviate the problem. Even totally carbon-free energy generation would not do it, because of the carbon that is already in the air. And the chance of a civilization-destroying war or epidemic, while difficult to estimate, may also be low.

The sort of discounting justified by uncertainty, small as it may be, also serves to avoid another problem with zero discounting. If we do no discounting at all, we would need to consider irreversible effects of our actions now that would persist forever, such as loss of biodiversity. Biodiversity may or may not have much utility for humans now. But if we consider the fact that its loss is forever, and if we do not discount the future, then we should be putting all of our resources into the protection of biodiversity. This is not a problem we need to worry about, so long as we do some discounting.

¹² Baron, *supra* note 3, at 203; Baron, *supra* note 2.

¹³ Elizabeth Kolbert, *Hosed: Is There a Quick Fix for the Climate?*, THE NEW YORKER, Nov. 8, 2009, <https://www.newyorker.com/magazine/2009/11/16/hosed>.