Are All Plausible Versions of the Precautionary Principle Trivial?

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1 Introduction

The *precautionary principle*, roughly, is the idea that it is better to be safe than sorry.[1] It recommends that action may or even should be taken to reduce potential harms even if these are scientifically uncertain.[2] For example, the development of nanotechnology could lead to a catastrophe in which the technology turns the entire universe into itself.[3] Should action be taken to prevent this harm from happening even though it is scientifically uncertain?

There are many other catastrophic scenarios that can be imagined, which are extremely unlikely, very harmful, and hard to quantify.[4] Proponents of the precautionary principle believe that other tools cannot adequately deal with scenarios like these.[5] Critics, however, respond that the precautionary principle is either trivial or contradictory.[6]

The structure of my essay is the following. In section 2, I analyze what versions of the precautionary principle are plausible, object to strong versions of the principle, and

[1]Cass R. Sunstein, "The Precautionary Principle as a Basis for Decision Making," *The Economists' Voice* 2, no. 2 (April 25, 2005): 1, https://doi.org/10.2202/1553-3832.1079.

[2]Sunstein, 1.

[3]Steve Clarke, "Future Technologies, Dystopic Futures and the Precautionary Principle," *Ethics and Information Technology* 7, no. 3 (September 1, 2005): 121, https://doi.org/10.1007/s10676-006-0007-1.

[4]Johanna Thoma, "The Precautionary Principle" (Philosophy and Public Policy lecture, London School of Economics, March 9, 2020).

[5]H. Sterling Burnett, "UNDERSTANDING THE PRECAUTIONARY PRINCIPLE AND ITS THREAT TO HUMAN WELFARE," *Social Philosophy and Policy* 26, no. 2 (July 2009): 379, https://doi.org/10.1017/S0265052509090281.

[6]Daniel Steel, "The Precautionary Principle and the Dilemma Objection," *Ethics, Policy & Environment* 16, no. 3 (October 1, 2013): 321, https://doi.org/10.1080/21550085.2013.844570.

defend weak versions of the principle. In section 3, I offer an argument that claims that the weak version of the precautionary principle is trivial. In section 4, I respond to the objection that there is a version of the precautionary principle that is plausible but not trivial.

2 Which versions are plausible?

In this section, I analyze different versions of the precautionary principle and assess which ones are plausible.

Different versions offered in the literature can be categorized as *strong* or *weak* versions of the precautionary principle. Strong versions state that new technologies should not be used unless it is shown that they pose no harms to humans and the environment.[7] Weak versions state that scientific certainty of a potential harm is not required in order to act.[8]

An influential formulation of the strong version says, "When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically."[9] It is a strong version, because it recommends regulation even if the activity is expected to bring about larger benefits than harms. It focuses solely on the harms.

The strong version is not plausible, because when implemented it would increase harms, which the strong version itself cautions against. The strong version would advocate against every activity, because everything is to some extent risky.[10] Since proponents of the strong version would consider some acts permissible, they would be inconsistent. My coverage of the strong version, however, is necessarily limited due to space constraints.[11]

An influential formulation of the weak version says, "Where there are significant risks of damage to the public health, we should be prepared to take action to diminish those risks, even when the scientific knowledge is not conclusive, if the balance of likely costs and benefits justifies it."[12] It is a weak version, because it recommends reducing risks only in the case that it is justified after evaluating costs and benefits.

The weak version is plausible, because it does not suffer from inconsistency. What it asks does not rule out every activity. It merely recommends to take precautionary

[7]Burnett, "UNDERSTANDING THE PRECAUTIONARY PRINCIPLE AND ITS THREAT TO HUMAN WELFARE," 378.

[8]Clarke, "Future Technologies, Dystopic Futures and the Precautionary Principle," 122-123.

[9]Sunstein, "The Precautionary Principle as a Basis for Decision Making," 11.

[10]Per Sandin et al., "Five Charges against the Precautionary Principle," *Journal of Risk Research* 5, no. 4 (October 1, 2002): 290, https://doi.org/10.1080/13669870110073729.

[11]An interested reader can see responses to the objection that the strong version is inconsistent here: Per Sandin et al., "Five Charges against the Precautionary Principle," *Journal of Risk Research* 5, no. 4 (October 1, 2002): 293, https://doi.org/10.1080/13669870110073729.

[12]Clarke, "Future Technologies, Dystopic Futures and the Precautionary Principle," 122.

measures even if there is no scientific certainty about potential harms. It would then consider whether taking the precautionary measures is better than not taking them based on the available evidence.

3 Argument: the weak version is trivial

In this section, I offer an argument that claims that the weak version of the precautionary principle is trivial.

In everyday language, "triviality" means something that is not important. In this discussion, by "triviality" I mean that the weak version of the precautionary principle does not offer anything that current mainstream tools do not already accept. For the sake of simplicity, I assume that the comparison is between the weak version of the precautionary principle and *cost-benefit analysis* (CBA).

The argument that claims that the weak version of the precautionary principle is trivial is the following:

> (1) If the weak version of the precautionary principle does not recommend against CBA for decision-making in the case of low-risk catastrophes, then the weak version of the precautionary principle is trivial.
>
> (2) The weak version of the precautionary principle does not recommend against CBA for decision-making in the case of low-risk catastrophes.
>
> (3) ∴ The weak version of the precautionary principle is trivial.

I have already mentioned that I assume that premise (1) is true, because I am comparing the weak version only against CBA. As a reminder, the weak version just says that scientific certainty of a potential harm is not required in order to act. If CBA already accepts this idea, then the weak version does not add anything new to public policy. What about premise (2)?

CBA, roughly, lists all social benefits and costs of a proposed policy, compares these to alternative policies (including the status quo), and recommends the proposal if it is net beneficial.[13] CBA accepts that a potential cost does not need to be scientifically certain in order to be relevant to decision-making (whether "certainty" is interpreted as probability equals one or a lower threshold). For example, a leading textbook on CBA assesses how to use cost-benefit analysis in the case of alternative asteroid defense policies (and treats the probability of collision as between 0.001 and 0.004).[14] If CBA ignored low-probability events, then this textbook surely would not provide this example to demonstrate the application of CBA to uncertainty. I cover another interpretation of

[13] Anthony Boardman et al., *Cost-Benefit Analysis*, 4 edition (Boston: Pearson, 2010): 1, 7.

[14] Boardman et al, 172.

"scientific uncertainty" later in the essay, which is that there is a serious possibility of a harm but a firm probability to it cannot be assigned.[15]

4 Objection: Steel's version of the precautionary principle is plausible but not trivial

In this section, I address an objection to the argument that the weak version of the precautionary principle is trivial. According to Daniel Steel, a version of the precautionary principle exists that is plausible but not trivial.

Steel's version of the precautionary principle says, "... scientific uncertainty should not be grounds for failing to take precautions in the face of serious environmental threats, where 'uncertainty' is understood to include cases in which it is difficult or impossible to assign well-grounded and informative probabilities to relevant outcomes."[16] He says that this version is not trivial, because it conflicts with decision procedures such as CBA that require probabilistic assessments of harms to act.

The difference between the weak version that I considered above and Steel's version is the definition of "uncertainty." I assumed above that "scientific certainty" meant some probabilistic assessment whether it is probability one or something below that. Steel rejects that definition. He agrees that the precautionary principle would be trivial if it merely recommended to take action in the case where the harm occurs with probability less than one.[17]

I do not think that Steel's version of the precautionary principle is plausible, because it is not impossible to assign well-grounded and informative probabilities to low-probability catastrophes. If it were impossible, then I would agree that his version is plausible and also not trivial. I agree with his point that it is difficult to assign probabilities. The proponents of CBA also acknowledge that it can be difficult.[18] It can even be too costly to use CBA.

For the rest of the essay, therefore, I assume that the claim is that it is impossible to assign probabilities to some outcomes and ignore the difficulty part. It is important to note that Steel does not really cover the topic of how assigning probabilities can be impossible. Instead, he focuses on how it is difficult by listing different contradicting CBA estimates, while stating that there is a scientifically plausible mechanism for a climate catastrophe.[19]

Steel says that sometimes it is impossible to assign well-grounded and informative

[15]Steel, "The Precautionary Principle and the Dilemma Objection," 325.
[16]Steel, "The Precautionary Principle and the Dilemma Objection," 324.
[17]Steel, 325
[18]Boardman et al., *Cost-Benefit Analysis*, 167.
[19]Steel, "The Precautionary Principle and the Dilemma Objection," 329, 333-334.

probabilities to relevant outcomes. I assume that linguistic uncertainties and the problems with excluded middle do not apply here and that the debate is about scientific uncertainty.[20] There are many ways to interpret probabilities, but I assume for simplicity that the two main ways are (i) how frequently an event occurs objectively and (ii) how confident an agent is subjectively that an event is going to occur.[21]

The problem with (i) is that it might be impossible to assign probabilities to some catastrophic events that have never occurred in history. However, (ii) does not suffer from that problem, because it can consider expert opinion instead of event frequencies. It is important to note that even probabilities as frequencies could be assigned, because it is possible to broaden the reference class.[22] As an example, for the probability of human extinction the reference class could be broadened from humans to all mammals in which case there is a lot of historical data to assess.

How does CBA assign probabilities to catastrophic events to determine whether to act? Probabilities can be either historically observed frequencies or subjective assessments by experts or other stakeholders, or both.[23] Sometimes historical data of the frequencies of events might not be available in which case subjective assessments need to be made even though they are made without great confidence.[24]

Can subjective probability assessments be well-grounded and informative? The precautionary principle itself suggests that scientific certainty is not required for action. Hence, "well-grounded and informative probabilities" does not mean scientific certainty. Steel refers to scientifically plausible mechanisms to motivate acting on climate change.[25] This includes knowledge of physical laws and evidence of occurrence.[26] CBA can do the same. When there is a lot of historical data of occurrence, then CBA assigns probabilities closer to one, whereas if there is little to no data of occurrence CBA assigns a probability closer to zero, unless experts suggest otherwise based on scientifically plausible mechanisms. It is beyond the scope of this essay to discuss how exactly it can be done.[27]

If Steel's version focused only on potential harms, then it could suffer from the problems of the strong version of the precautionary principle. Appealing to merely scien-

[20] An interested reader can read whether it is always possible to assign probabilities here: Mark Colyvan, "Is Probability the Only Coherent Approach to Uncertainty?," *Risk Analysis* 28, no. 3 (June 1, 2008): 645–52, https://doi.org/10.1111/j.1539-6924.2008.01058.x.

[21] An interested reader can check whether other interpretations are more plausible here: Alan Hájek, "Interpretations of Probability," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Fall 2019 (Metaphysics Research Lab, Stanford University, 2019), https://plato.stanford.edu/archives/fall2019/entries/probability-interpret/.

[22] Hájek.

[23] Boardman et al., 169-170.

[24] Boardman et al., *Cost-Benefit Analysis*, 170.

[25] Steel, "The Precautionary Principle and the Dilemma Objection," 329.

[26] Steel, 329.

[27] An interested reader can read some Bayesian approaches here: James Joyce, "Bayes' Theorem," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, Spring 2019 (Metaphysics Research Lab, Stanford University, 2019), https://plato.stanford.edu/archives/spr2019/entries/bayes-theorem/.

tifically plausible mechanisms could mean over-regulation. For example, there is a scientifically plausible mechanism for a 10-kilometer asteroid colliding with Earth, but it would not be advisable to take action that costs, for example, 20% of the national budget, because it would create other serious risks by reallocating resources away from more probable harms.

Steel also says that assigning probabilities to unlikely catastrophes could lead to paralysis, because different estimates that are equally justifiable could recommend different actions.[28] If all probabilistic assessments are really equally well-grounded, then the decision-makers are justified to be indifferent between them or wait for more information, unless waiting is too costly.[29]

Furthermore, appealing to vague language such as "scientifically plausible mechanisms" does not suggest whether to act or not, whereas more clear language such as "probability of 1 in 1,000" might motivate serious consideration of action.[30] That is, if acting does not create new and even more probable risks. Using probabilities is important for thinking clearly about the sizes of different risks to be able to set priorities in a scarce environment.[31]

5 Conclusion

All plausible versions of the precautionary principle are trivial. The weak version of the precautionary principle, which is a plausible version, does not recommend against CBA for decision-making in the case of low-risk catastrophes. This means that the plausible versions of the precautionary principle do not offer anything that CBA does not already accept. The objection that CBA cannot deal with low-risk catastrophes properly, because it is unable to assign probabilities to such risks, does not work. If it cannot utilize data about frequencies of such catastrophic events, it can take advantage of other types of data, such as expert and public opinion.

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[28]Steel, 333.

[29]Richard Bradley and Katie Steele, "Making Climate Decisions," *Philosophy Compass* 10, no. 11 (2015): 804, https://doi.org/10.1111/phc3.12259.

[30]Toby Ord, "The Risk Landscape," in *The Precipice: Existential Risk and the Future of Humanity* (New York: Hachette Books, 2020), 165-166.

[31]Ord, 166.

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