
The Precaution Presumption

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Abstract

The precautionary principle is a central, if controversial, feature of international legal argument. I explore this controversy through a pluralist lens. What makes the precautionary principle so controversial is that it prevents us from appreciating risk holistically, particularly when appraising responses to policy trilemmas. Instead, claims of precaution focus only on some risks to the exclusion of others. I argue that we can overcome this problem by treating precaution as an evidentiary principle. This approach translates competing precautionary claims into a holistic appreciation of risk in its full factual context. I analyse that existing evidentiary conceptions of precaution (precaution as burden shift and precaution as standard-lowering) do not adequately achieve this goal. I submit that these problems can be overcome when treating precaution as an evidentiary presumption and develop how to formulate it.

... statit illa tremens, uteroque recusso
insonuere cavae gemitumque dedere cavernae.

The spear stood quivering and with the cavity's reverberation the vaults rang hollow, sending forth a moan.

Virgil, *Aeneid*, Bk 2, ll. 52–3¹

1 Introduction

Opening a newspaper is to be confronted with urgent pleas for precaution. During the Covid-19 crisis, we live through narratives of ‘flattening the curve’.² We understand

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¹ Virgil, *Aeneid*, in Virgil, *Eclogues, Georgics, Aeneid, Books 1–6*, trans. G. H. Fairclough, rev. G. P. Good (Harvard University Press, 1999), 318–319 (hereinafter ‘Virgil, *Aeneid*’).

² Oltermann, ‘Germans Urged to Stay at Home Amid Fears Covid-19 Infection Rate Is Rising Again’, *Guardian*, 28 April 2020, available at <https://bit.ly/3lPcZDz>.

that precaution currently justifies measures that infringe fundamental rights to stave off the epidemic.³ Meanwhile climate policy raises equally urgent issues.⁴ There, too, arguments about actions needed to combat climate change are premised on similar precautionary rhetoric of tipping points and carbon neutrality.

If one asks whether such precautionary measures are consistent with international law, one will likely land on a precautionary principle. While it is unclear whether the principle is part of customary international law, it does form part of many international treaty regimes.⁵ Despite different formulations used in treaties, it is generally understood to comprise three elements. First, it has a threat element: it is applicable when there is a certain kind of threat, typically a threat of serious or irreparable damage.⁶ Second, it has an uncertainty element: a state may not or should not use scientific uncertainty as a reason for postponing action.⁷ Third, the first two elements are operationalized by means of a precautionary measure: the state adopts measures in order to anticipate, prevent or minimize the relevant threat.⁸

The second element is at the heart of the precautionary principle. It limits the legal significance of scientific uncertainty. The lack of our scientific knowledge as to the nature, extent or probability of a threat is legally irrelevant as long as the threat is sufficiently grave. Think of the precautionary principle as a kind of box of our scientific limitations. The precautionary principle tells us we cannot open and look inside the box to say ‘that might not be so bad. Why are you worried?’. Instead, the precautionary principle tells us to react to the box as such without looking inside to form a probabilistic assessment during our decision-making.

It is easy to see why the precautionary principle is controversial. Normally, it is irrational to make decisions without regard for the probability of outcomes. It may be true that there is a 95% chance of dying if a plane crashes. But when deciding whether to get on a plane, one *should* care whether there is a 50% chance the plane will crash or only a 2% chance. The precautionary principle appears to lock away this information. As Cass Sunstein argues, our perceived need to take precautionary measures in the face of such uncertainty is governed by fear heuristics.⁹ This suggests that the precautionary principle encourages fear-based, rather than rational decision-making.

The problem gets worse. Different treaties protect different values. That is, international human rights treaties protect human dignity, international environmental treaties the environment, international economic law treaties world trade and investment and so on. The precautionary principle in any treaty regime naturally looks to

³ See Marotta, ‘Germany Constitutional Court Upholds Freedom of Assembly Despite COVID-19 Restrictions’, *Jurist.org* (17 April 2020), available at <https://bit.ly/36VWVcU>.

⁴ Harvey, ‘Tackle Climate Crisis and Poverty with Zeal of Covid-19 Fight, Scientists Urge’, *Guardian* (28 March 2020), available at <https://bit.ly/3IPRK15>.

⁵ P. Sands and J. Peel, *Principles of International Environmental Law* 240 (4th ed. 2018).

⁶ *Ibid.*, at 230.

⁷ *Ibid.*

⁸ United Nations Framework Convention on Climate Change, 9 May 1992, 1771 UNTS 107, Art. 3 (hereinafter ‘UNFCCC’).

⁹ C. Sunstein, *Laws of Fear* (2005), at 13–35.

anticipate and prevent only those threats to persons, objects or activities the treaty regime values – environmental treaties use the precautionary principle to guard against environmental threats, etc. Precaution in one treaty regime may, and frequently does, threaten values protected by another. For example, environmental precautionary measures might do real harm to international economic activity protected by international economic law regimes.

How should we deal with situations in which states adopt precautionary measures permitted by one regime, which arguably violate international legal obligations in another? At first blush, this is a familiar question. Traditionally, one would use conflict rules to adopt one solution over another (*lex specialis derogat legi generali*, etc.). If such conflict rules cannot decide the issue, the law of treaties provides for systemic integration.¹⁰ But as the legal pluralist literature has shown, conflict between different legal regimes has become so fierce and entwined that these techniques provide an illusion of coherence in international law only. The reality is a pluralist cohabitation between different legal regimes that is marked by competition as much as it is marked by integration.¹¹ So far, a clash between regimes due to a precautionary measure would seem a commonplace outgrowth of the fragmentation phenomenon. But as I will argue in this article, and as pluralists have noted, there is something meaningfully different about precaution.¹²

This difference is a direct result of the second element of the precautionary principle – the strongbox of scientific uncertainty. Typically, parties in a regime clash scenario can fully justify or challenge policies by reference to record facts. The second element of the precautionary principle deprives parties in regime clash scenarios of such a means fully to articulate the basis for the policy in question. Precaution thus lends itself with difficulty to direct factual contestation.¹³ This means that precaution must be challenged on what there is – the political value battles that rage behind the scenes.¹⁴

The problem is that political decisions based on a combination of fear heuristics and abstract value are precisely the thing law *should* constrain to avoid tragedy. To understand why, one need only consider a patron saint of unheeded precaution in the Trojan War, Laocoön, Troy's priest of Neptune/Poseidon. He, too, faced a strongbox of uncertainty – the Trojan horse, assertedly a shrine to Minerva/Athena.¹⁵ His now idiomatic exclamation 'beware of Greeks bringing gifts' was a plea to the Trojans to destroy the horse. Tellingly, the verb 'beware' in Virgil's Latin is not '*caveo*' – 'I guard against'. It is

¹⁰ McLachlan, 'The Principle of Systemic Integration and Article 31(3)(C) of the Vienna Convention', 54 *International & Comparative Law Quarterly (ICLQ)* (2005) 279.

¹¹ N. Krisch, *Beyond Constitutionalism: The Pluralist Structure of Postnational Law* (2010), at 189–222; Fischer-Lescano and Teubner, 'Regime Collisions: The Vain Search for Legal Unity in the Fragmentation of Global Law', 25 *Michigan Journal of International Law* (2004) 999, at 1045–1046; Berman, 'Global Legal Pluralism', 80 *Southern California Law Review* (2007) 1155.

¹² Krisch, *supra* note 11, at 193–194; Perez, 'The Institutionalization of Inconsistency', in O. Perez and G. Teubner (eds.), *Paradoxes and Inconsistencies in the Law* (2005) 119, at 133–134.

¹³ Krisch, *supra* note 11, at 193–194; Perez, *supra* note 12, at 133–134.

¹⁴ Krisch, *supra* note 11, at 219.

¹⁵ Virgil, *Aeneid*, *supra* note 1, at 318–319, bk II, l. 39 (references to the Latin version of the *Aeneid* are by book and verse as reproduced in the Loeb edition edited by Jeffrey Henderson).

'*timeo*' – 'I fear'.¹⁶ Laocoön's contestation of the horse was thus fear-based. His countrymen only made up their minds against Laocoön's plea when Laocoön was torn apart by powerful serpents.¹⁷ But their decision, too, was fear-based – fear of committing blasphemy against Minerva/Athena. Virgil's tightly wound scene artfully layers the complexities of our dilemma. It plays on the identity-based antipathy between Athena and Poseidon. It superimposes the juxtaposition between Laocoön's fear and Minerva/Athena's craftiness/wisdom. It shows how the Trojans' reaction in engaging with the unknown goes tragically wrong: it falls prey to fear heuristics and questions of value and identity. Precaution and fear thus have a mythically tragic relationship with judgment: once fear and uncertainty meet, calamity is almost pre-programmed.

In this article, I argue that one can in fact overcome the problem created by the uncertainty element of the precautionary principle if the precautionary impulse is translated into a premise that can meaningfully be contested *within* the boundaries of international legal discourse.¹⁸ I argue that one must re-focus the precautionary principle in terms of judgment. To do so, I argue with Caroline Foster and others that one should treat the uncertainty element of the precautionary principle as an evidentiary principle.¹⁹ I depart from existing approaches by arguing that the only evidentiary principle which can overcome the problem created by the uncertainty element is the creation of a presumption, as opposed to a burden shift or standard lowering device, as submitted in the literature so far. I argue that as a presumption, the uncertainty element makes more plainly visible what legal values are triggered by which specific factors and why. I further argue that translating the uncertainty element into a presumption also allows one to contest the uncertainty element on the facts in a legally (as opposed to politically) meaningful way.

Of course, even this approach does not allow us fully to unlock the Trojan horse. Uncertainty remains uncertain. What a presumption approach to uncertainty *does* do is to replace the evidence we miss due to uncertainty with *different* evidence to appraise what precautionary measures to take. The presumption approach allows us to articulate our fears in a manner that becomes contestable in its specific context. It therefore allows us to make discerning judgments in the face of uncertainty in a way that was not previously possible. Concretely, a presumption might not allow us to look inside the Trojan horse. The only thing it can do is establish worst-case scenarios. However, a rational assessment of worst-case scenarios would have allowed the Trojans to conclude that there is a middle ground between burning the horse and bringing it into the city that reasonably accounts for all threats: venerating the horse where the Greeks had left it.²⁰

¹⁶ *Ibid.*, at 318–319, bk II, l. 49.

¹⁷ *Ibid.*, at 330–332, bk II, ll. 199–234.

¹⁸ Krisch, *supra* note 11, at 282; Koskeniemi, 'The Fate of Public International Law: Between Technique and Politics', 70 *Modern Law Review* (2007) 1, at 5.

¹⁹ C. Foster, *Science and the Precautionary Principle in International Courts and Tribunals, Expert Evidence, Burden of Proof and Finality* (2011), at 240–280; Sands and Peel, *supra* note 5, at 249.

²⁰ Virgil, *Aeneid*, *supra* note 1, at 328, bk II, ll. 162–194.

2 Problematic Precaution

The controversial nature of precaution becomes apparent in concrete examples. This section analyses how the precautionary principle can create problems in two different settings: first, when a treaty regime expressly codifies the precautionary principle (climate law) and, second, when a treaty regime relies upon the precautionary principle by implication (health law). This section will use a climate law example to demonstrate the problems the precautionary principle creates in a regime-clash scenario. It will use a health law example to foreground problems of conflicting claims made in the face of scientific uncertainty in the same regime.

The precautionary principle is expressly part of the United Nations Framework Convention on Climate Change (UNFCCC).²¹ Article 3.3 provides that:

The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.²²

The Paris Agreement adopted pursuant to the UNFCCC does not include an independent precaution provision. Instead, it includes in its recitals a recognition of ‘the need for an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific knowledge’.²³ This recital is potentially relevant treaty practice for the UNFCCC.²⁴

An interpretation of Article 3.3 establishes important baselines for the precautionary principle in the climate regime, consistent with the three elements of precaution. Article 3.3 codifies a threat element, namely ‘threats of serious or irreversible damage’.²⁵ Other than linking damage to climate, it does not limit the type of ‘damage’ covered (ecological, human rights-based, economical, etc.).²⁶ Article 3.3 codifies an uncertainty element, namely ‘lack of full scientific certainty’.²⁷ Finally, it operationalizes the precautionary principle through precautionary measures.²⁸ These measures must ‘anticipate, prevent or minimize’ climate change causes or effects.²⁹ There is no limitation on precautionary measures, noting merely that cost-effectiveness be taken into account.³⁰ Finally, the verb used throughout is the conditional ‘should’. This means that precautionary measures are entirely permissive.³¹

²¹ UNFCCC, *supra* note 8.

²² *Ibid.*, Art. 3.3.

²³ Paris Agreement of the United Nations Convention on Climate Change, 13 December 2015, adopted 29 January 2016, UN Doc. FCCC/CP/2015/10/Add.1, recital 4 (hereinafter ‘Paris Agreement’).

²⁴ R. Gardiner, *Treaty Interpretation* (2nd ed. 2015), at 255.

²⁵ UNFCCC, *supra* note 8, at, Art. 3.3(2).

²⁶ *Ibid.*, Art. 3.3(1–2).

²⁷ *Ibid.*, Art. 3.3(2).

²⁸ *Ibid.*, Art. 3.3(1).

²⁹ *Ibid.*, Art. 3.3(1).

³⁰ *Ibid.*, Art. 3.3(3).

³¹ See Gardiner, *supra* note 24, at 195 (distinguishing between ‘shall’ and ‘may’). See also D. Bodansky, J. Brunnée and L. Rajamani, *International Climate Change Law* (2017), at 53.

The Paris Agreement recital narrows the uncertainty element.³² It refers to measures being taken ‘on the basis of the best available scientific knowledge’.³³ Arguably, the uncertainty element requires a foothold in the best available scientific knowledge. The recital also arguably modifies the precautionary measures element by referring to the effectiveness and progressive nature of measures.³⁴ This new formulation removes reference to costs, suggesting that cost-efficiency is a less important factor to be taken into account.³⁵ Instead, the new formulation ties measures to their anticipated climate outcomes and human rights repercussions, arguably substituting cost-effectiveness for climate- and human-rights effectiveness.³⁶

The upshot of the UNFCCC, in conjunction with the Paris regime, is that a state is at least permitted, if not encouraged, to take significant precautionary measures. This permission and encouragement extends to cases in which there is scientific uncertainty, so long as there is a basis for the taking of a precautionary measure in the best available science. Given the near universal adoption of the UNFCCC and the Paris Agreement, as a matter of law the precautionary climate principle would have to be taken into account in interpreting any potentially conflicting treaty regime.³⁷ Further, it is an arguable state practice to consent to the adoption of such measures in derogation of earlier signed treaties. The precautionary principle, if properly invoked as a matter of climate law, could thus be advanced as a facially complete defence to pleas of wrongfulness in other international law regimes even in the face of significant scientific uncertainty.³⁸

The literature on climate precaution suggests that the precaution principle may play an even greater role.³⁹ This literature surmises that there is an international legal obligation to take precautionary measures.⁴⁰ This obligation, the argument goes, extends, or projects, the no-harm principle into the future.⁴¹ These precautionary measures are obligatory, even in the face of the uncertainty element of the precautionary principle. This strong precautionary principle then becomes an integral part of a robust obligation of due diligence, which now must act diligently even in the face of the

³² Paris Agreement, *supra* note 23, recitals.

³³ *Ibid.*

³⁴ *Ibid.*

³⁵ This would mirror the Oslo Principles Expert Group on Global Climate Change Obligations, ‘Oslo Principles on Global Climate Change Obligations’ (1 March 2015), available at <https://globaljustice.yale.edu/sites/default/files/files/OsloPrinciples.pdf>. See A. Zahar, *Climate Finance and International Law* (2017), at 59.

³⁶ But see Bodansky et al., *supra* note 31, at 128 (discussing the reasons for inclusion of cost-effectiveness in the UNFCCC formulation); Castillo-Winkels, ‘Why “Common Concern of Humankind” Should Return to the Work of the International Law Commission on the Atmosphere’, 29 *Georgetown Environmental Law Review* (2016) 131, at 143–144.

³⁷ Krisch, *supra* note 11, at 197.

³⁸ See Silecchia, ‘Conflicts and Laudato Si: Ten Principles for Environmental Dispute Resolution’, 33 *Journal of Land Use and Environmental Law* (2017) 61, at 79.

³⁹ Dernbach, ‘Creating Legal Pathways to A Zero-Carbon Future’, 46 *Environmental Law Reporter News and Analysis* (2016) 10780, at 10783.

⁴⁰ B. Mayer, *The International Law of Climate Change* (2018), at 94; Bodansky et al., *supra* note 31, at 43–44.

⁴¹ Mayer, *supra* note 40, at 71–72; Bodansky et al., *supra* note 31, at 43–44.

future uncertainty of potential harm, so long as that harm threatens to be serious and irreparable.⁴²

The invocation of the precautionary principle can spark a clash between climate/human rights regimes, on the one hand, and international economic law regimes, on the other. For example, the Philippines Constitutional Commission on Human Rights announced in December 2019 that oil and gas majors, including BP, could be held liable for human rights violations relating to climate change.⁴³ The logic of the decision appears consistent with a violation of the strong version of the precautionary principle, as transposed to the human rights realm.⁴⁴ In fact, that strong principle was expressly invoked by the petitioners when they argued that ‘fossil fuel companies had the opportunity to avoid or reduce those harms decades ago’.⁴⁵ ‘Decades ago’ is when a risk triggering the precaution climate principle first started to materialize.⁴⁶ To say that companies should have acted then is to require them to have had a risk sensitivity consistent with a mandatory uncertainty element of the strong precautionary principle, i.e. that they *must* act when there is a threat of serious harm, even if there is scientific uncertainty as to whether the threat will materialize.

Should an action consistent with the Commission’s determination be taken in the Philippines, oil companies may well be in a position to commence proceedings against the Philippines under bilateral investment treaties.⁴⁷ In such proceedings, the companies might even request that domestic proceedings be stayed pending the outcome of the arbitral proceeding.⁴⁸ On the merits, the companies almost certainly would submit that the conduct by the Philippine government in granting oil and gas licences created reasonable expectations that past oil and gas activities were at least lawful.⁴⁹ In fact, this conduct would support the Philippines’ goals of energy security.⁵⁰ The scenario might lead to an arbitrary reversal in Philippine policies.

The Philippine government in turn could readily point to the precautionary principle as a defence in much the same way that the European Union attempted to use

⁴² See Roy, ‘Urgenda II and Its Discontents’, 13 *Carbon and Climate Law Review* (2019) 130, at 137 (noting that this strong version of precaution played a significant role in the Urgenda litigation); Bodansky et al., *supra* note 30, at 43–44.

⁴³ See Greenpeace, Press Release, ‘The Climate Change and Human Rights Petition’ (9 December 2019), available at <https://bit.ly/2ji2eeh> (hereinafter ‘Greenpeace Press Release’).

⁴⁴ Mayer, *supra* note 40, at 94.

⁴⁵ Memorandum for the Petitioner, In re *National Inquiry on the Impact of Climate Change on the Human Rights of the Filipino People and the Responsibility Therefor, if any, of the Carbon Majors*, Docket no. CHR-NI-2016-0001 (19 September 2019), at 155, available at <https://bit.ly/2V53HaG>.

⁴⁶ Mayer, *supra* note 40, at 94.

⁴⁷ United Nations Conference on Trade and Development (UNCTAD), Philippines Investment Treaties, Investment Policy Hub, available at <https://bit.ly/36d7t8t> (last visited 20 January 2021).

⁴⁸ ICSID, *City Oriente v. Ecuador – Provisional Measures*, 19 November 2007, ICSID Case no. ARB/06/21.

⁴⁹ See Dolzer, ‘Fair and Equitable Treatment, Today’s Contours’, 12 *Santa Clara Journal of International Law* (2014) 7.

⁵⁰ Chang, ‘Running out of Gas: Philippine Energy Security and the South China Sea’, *Foreign Policy Research Institute* (16 September 2019), available at <https://bit.ly/2HJYMcg>.

the principle in the *Beef Hormones* dispute.⁵¹ The Philippine measures could satisfy all three elements of the UNFCCC's precautionary principle. They would respond to the threat element as human rights from climate change are included in actionable threats. The Philippine measures expressly rest on and incorporate the uncertainty element. And the Philippine measures seek to anticipate future harm and minimize existing harm, meeting the third element of the precautionary principle.

The human rights measures thus would fall within the precautionary principle in international climate law even as they also more than likely would violate international economic law obligations.⁵² In contrast to *Beef Hormones*, the Philippine government could point to treaty norms permitting precaution to which all of its bilateral investment treaty (BIT) partners adhere. And in the case of the Philippines–United Kingdom BIT at least, the UNFCCC benefits from the *lex posterior* principle.⁵³ So precaution now becomes a jurisdictional cudgel.⁵⁴ Given the uncertainty element of precaution, this invocation of precaution is not readily contestable on the facts. Precaution becomes an argument about the primacy of values (human/climate rights versus economic rights) in international law in the abstract.

The case is exemplary for a deeper problem. Global policy must answer to an energy trilemma that is subject to regulation by different international legal regimes.⁵⁵ This trilemma rests on the competing needs of energy security, energy equity/affordability and environmental sustainability.⁵⁶ As the example shows, heavy-handed invocations of the environmental precautionary principle run headlong into the other two limbs of the trilemma. Particularly in the strong version of precaution, precaution risks creating conflicts by permitting states to block other actors from advancing values represented by the other two limbs of the trilemma. And yet, precaution as formulated in the constitutive treaties appears relatively insensitive to this need for balance.

The situation is no less delicate in international health law. By contrast to climate law, international health law does not expressly include a requirement of precaution in its analogous constitutive documents, the World Health Organization (WHO)

⁵¹ Krisch, *supra* note 11, at 190–193; cf. Offshore Energy Today, 'Oil Firms Get More Time to Apply for Exploration Blocks in the Philippines' (16 May 2019), available at <https://bit.ly/2V10tmK>. See also WTO, *EC-Measures Concerning Meat and Meat Products (Hormones) – Report of the Appellate Body*, 16 January 1998, WT/DS25/AB/R, para. 124.

⁵² On the potential for regulatory arbitrage to avoid the application of precautionary principle arguments in the investment arbitration, see Desierto, 'Shifting Sands in the International Economic System: "Arbitrage" in International Economic Law and International Human Rights', 49 *Georgetown Journal of International Law* (2018) 1019, at 1057–1058.

⁵³ United Kingdom–Philippines BIT, 3 December 1980, art. 3(2). See also M. Villiger, *Customary International Law and Treaties* (1985), at 36.

⁵⁴ See Fengan, 'Can Public International Law Play a Role in China: Raw Materials II', 7 *Journal of WTO and China* (2017) 52, at 72.

⁵⁵ For a recent discussion of the energy trilemma in the legal context, see Leal-Arcas, 'Sustainability, Common Concern, and Public Goods', 49 *George Washington International Law Review* (2017) 801, at 823–824.

⁵⁶ *Ibid.*

Constitution and the 2005 International Health Regulations (IHR).⁵⁷ To conclude that this treaty regime is devoid of the precautionary principle would be too quick.⁵⁸

The IHR includes two provisions that mirror the three familiar elements of the precautionary principle. The first concerns additional health measures. Article 43 codifies a threat element – ‘public health risks or public health emergencies of international concern’.⁵⁹ This threat element is assessed in light of an uncertainty element, i.e. when scientific evidence of a risk to human health is insufficient.⁶⁰ It permits states to adopt precautionary measures – additional health measures beyond those recommended by the WHO to achieve a greater level of health protection than WHO recommendations so long as it communicates its health rationale to affected parties.⁶¹ One such measure, criticized at the time, was travel restrictions imposed by the United States on Chinese international traffic to the United States in late January 2020.⁶²

Second, the IHR similarly imposes reporting obligations to permit the WHO and third states to act with precaution.⁶³ The threat element under this second implicit precautionary principle is the same threat of a ‘public health emergency of international concern’.⁶⁴ This threat is assessed again in light of an uncertainty element, namely the presence of evidence of unusual or unexpected health developments as opposed scientific evidence of a public health emergency of international concern.⁶⁵ The IHR impose an obligation of precautionary measures, namely reporting.⁶⁶ This reporting obligation is coupled with a capacity-building obligation to develop a health surveillance infrastructure that would meet an international minimum standard of diligent warning.⁶⁷ It is at the very least arguable that a state would violate an implicit precautionary principle as operationalized in the IHR if it fails to notify of a threat that a reasonable, like-situated state with the required monitoring capabilities would have detected. One such failure apparently was the People’s Republic of China’s (PRC) ‘underreporting of the virus’s spread’ in the current Covid-19 pandemic.⁶⁸

The IHR fares slightly better than the climate regime in its treatment of precaution between regimes. International health law similarly responds only partially to the

⁵⁷ Constitution of the World Health Organization, 22 July 1946, in World Health Organization Basic Documents (49th ed., 2020) 1, available at https://apps.who.int/gb/bd/pdf_files/BD_49th-en.pdf; *International Health Regulations* (3rd ed. 2005), available at <https://bit.ly/2KzXhhE> (hereinafter ‘IHR’).

⁵⁸ See Laowonsiri, ‘Application of the Precautionary Principle in the SPS Agreement’, 14 *Max Planck Yearbook of United Nations Law* (2010) 565, at 574 (‘the precautionary principle as a general principle of law subsists in the IHR of the WHO’, and citing to Article 43).

⁵⁹ IHR, *supra* note 57, Art. 43(1).

⁶⁰ *Ibid.*, Arts 1, 43(1)(a), 43(2)(b).

⁶¹ *Ibid.*, Arts 43(1)(a), 43(2)(b), 43(3)–(8).

⁶² Pillinger, ‘Virus Travel Bans Are Inevitable But Ineffective’, *Foreign Policy* (23 February 2020), available at <https://bit.ly/33k2ukk>.

⁶³ Heath, ‘Pandemics and other Health Emergencies’, in A. Gheciu & W. C. Wohlforth (eds), *Oxford Handbook of International Law and Global Security* (forthcoming 2021).

⁶⁴ IHR, *supra* note 57, Art. 7.

⁶⁵ *Ibid.*

⁶⁶ *Ibid.*

⁶⁷ *Ibid.*, Arts 5, 6.

⁶⁸ Heath, *supra* note 63, at 21.

trilemma of health safety, economic development and respect for human rights.⁶⁹ In principle, the IHR balances two of the three limbs – health safety and economic development – as part of its treatment of implied precaution when it balances health-based responses against their impact on international traffic.⁷⁰ However, even this approach is not fully cognizant of the trilemma as such, as it tilts the regime in favour of the health limb and on its face brackets out human rights concerns, at least where precaution is concerned.⁷¹

The deeper problem, however, arises in the context of balancing precaution obligations within the IHR itself. The question is likely to become contentious in the Covid-19 context. James Kraska claimed that China incurred state responsibility for its failure to notify the WHO about the novel coronavirus as soon as it knew of its public health threat and through its continued failure to share information about the virus transparently.⁷² Peter Tzeng has outlined how such a plea might in fact land before the International Court of Justice.⁷³

The core question in an eventual United States–PRC proceeding would turn on duelling precaution arguments. Thus, the United States may argue that China's failure to report the Covid-19 threat in a timely manner violates the second implied IHR precautionary principle outlined above.⁷⁴ A Chinese defence could submit that the United States itself failed to take sufficient precautionary measures under both implied precautionary principles.⁷⁵ China might even raise a counterclaim for re-infections in China allegedly due to such inadequate US precautions.⁷⁶ The same facts ground inconsistent precautionary claims. The IHR can address such overlapping assertions with difficulties, if at all.

This problem again can be traced to the uncertainty element of the precautionary principle. In the context of contradictory claims arising from shared facts, the uncertainty element encounters a version of Schrödinger's cat indeterminacy problem.⁷⁷ While scientific uncertainty remains locked in its box, it supports two inconsistent results at the same time. In Schrödinger's case, the cat in the box is both alive and dead.⁷⁸

⁶⁹ James, 'Navigating the Pandemic Trilemma', Project Syndicate (6 April 2020), available at <https://bit.ly/3fAN1kR>.

⁷⁰ IHR, *supra* note 57, Art. 43.

⁷¹ The IHR do provide an overarching human rights principle in Article 3. This principle does not figure in the relevant reporting and health measure provisions in Articles 5, 6, 7 and 43. Human rights thus are bracketed here rather than completely ignored.

⁷² Kraska, 'China Is Legally Responsible for Covid-19 Damage and Claims Could Be in the Trillions', War on the Rocks (23 March 2020), available at <https://bit.ly/33kxalt>.

⁷³ Tzeng, 'Taking China to the International Court of Justice', EJILTALK (2 April 2020), available at <https://bit.ly/3m8q0lk>.

⁷⁴ Deubner, 'Chronologie einer Vertuschung', *Süddeutsche Zeitung* (3 April 2020), available at <https://bit.ly/33jBdyq>.

⁷⁵ Fidler, 'An Abuse of Presidential Authority and American Power: Halting U.S. Funding for the World Health Organization', Just Security (15 April 2020), available at <https://bit.ly/3fEXKuq>.

⁷⁶ Cohen, 'Blame Game Escalates Between US and China Over Coronavirus Disinformation', CNN (25 March 2020), available at <https://cnn.it/3lg8uAU>.

⁷⁷ J. Gribbin, *In Search of Schrödinger's Cat, Quantum Physics and Reality* (1984), at 2–3.

⁷⁸ *Ibid.*

In the United States–China scenario, the United States took all appropriate actions to stop the spread of the pandemic and recklessly exposed China to risk for failing to act. Until the box is opened, both inconsistent accounts are simultaneously true. The only way to resolve the indeterminacy appears to open the box and look inside; but this precisely is what the uncertainty element prevents us from doing.

In sum, the uncertainty element of the precautionary principle creates serious problems. It means that regimes employing it become insensitive to factual contestation in the context of the policy trilemmas. Or it yields indeterminate results when the same facts lead to rival invocations of precaution in the same regime.

If one leaves off here, the best one can do is to submit that invocation of the precautionary principle signals a need for political action.⁷⁹ This political action can play out on the negotiation stage.⁸⁰ But it can also play out in the judicial politics of interactions between different courts and tribunals.⁸¹ These courts and tribunals will soften their stance to address the value claims raised by means of precautionary arguments.⁸² And negotiated instruments will similarly further such an agenda of adaptation and communication in the face of indeterminacy.⁸³ And the rest is left to the good offices of global elites.

Such a conclusion is deeply unsatisfying.⁸⁴ It gives in to the proposition that in a pluralist setting one is doomed to endure ‘the absence of a legal and institutional framework to regulate disputes between sub-orders’.⁸⁵ This problem is amplified by the indeterminacy created by the uncertainty element of precaution in its own right. Law becomes paralysed when we need it the most.⁸⁶ Moreover, it is far from clear how politics can fairly resolve value conflicts and indeterminacy problems when law cannot.⁸⁷ In fact, pluralist philosophers like Philip Pettit convincingly argue that politics cannot serve this role and that law remains the last best hope.⁸⁸

This rejoinder is close to fatal. The point of the rule of law in a pluralist society is that it provides for a non-arbitrary space for civic contestation.⁸⁹ If this ideal of civic contestation is to remain possible, there must be a way legally to weigh risks even, or especially, in the face of significant uncertainty: Cass Sunstein rightly warns that to do otherwise is to fall back into the realm of arbitrariness.⁹⁰ In a society driven by technological innovation and environmental degradation, this imperative is all the more acute. But then law must be able to do what pluralists say it cannot: make

⁷⁹ Krisch, *supra* note 11, at 296.

⁸⁰ *Ibid.*

⁸¹ *Ibid.*

⁸² *Ibid.*, at 290.

⁸³ *Ibid.*, at 295.

⁸⁴ De Boer, ‘The Limits of Legal Pluralism’, 25 *Leiden Journal of International Law* (2012) 543.

⁸⁵ Krisch, *supra* note 11, at 241.

⁸⁶ Sunstein, *supra* note 9, at 26–34.

⁸⁷ De Boer, *supra* note 84.

⁸⁸ P. Pettit, *Republicanism, A Theory of Freedom and Government* (1997), at 92–93.

⁸⁹ *Ibid.*, at 39; Krisch, *supra* note 11, at 271.

⁹⁰ Sunstein, *supra* note 9, at 26–34; Pettit, *supra* note 88, at 36.

available a means of contesting precaution *legally* and not politically. Otherwise, the pluralist project is in serious jeopardy of dressing up arbitrary decision-making in fulsome sounding phrases.

Luckily, there is a way out. As to indeterminacy, one does not need to fully open the box to see which submission about its content is more plausibly supported. Although some indeterminacy scenarios may in fact leave one with two conclusions in absolute equipoise (live cat/dead cat), many scenarios allow one to conclude what is less likely to be the case. Thus, it is highly unlikely that Schrödinger's cat is alive but has lost an ear. Legal reasoning therefore should permit one to distinguish whether the inferences from the uncertainty element proposed by either of the two parties are more plausible than the other. After all, the law of inferences suggests that we can inductively recreate what happened even when we do not have an eyewitness with direct personal knowledge of the events.⁹¹

As to value conflicts, law very much does have frameworks for dealing with disputes between competing, and apparently absolute, *parallel* rights, namely the lens of correlative rights.⁹² Correlative rights arise when persons have a facially absolute ownership claim to, and possessory interest in, part of a common pooled resource, such as wells drawing from a shared water reservoir. Within their own absolute ownership right, the owner is, of course, sovereign. And yet, one person's use of her right might very well interfere with another's use of their rights. The rights of the different persons are correlative to one another as they can only enjoy their own right when everyone maintains and does not overuse the common right.⁹³ The correlative rights logic and the sustainable development reasoning it recalls might very well inform us how to regulate disputes between sub-orders.⁹⁴ Legal rationales for parallel ordering are thus available.

Pluralism tantalizingly appears to admit of both possibilities.⁹⁵ Thus, 'the inductive nature of much of legal reasoning makes it easier to avoid questions of principle and hierarchy'.⁹⁶ Such inductive reasoning is already at work when we resolve indeterminacy problems in other evidentiary settings. Further, as correlative rights holders are networked and not hierarchical, such an inductive frame is helpful. If reframed in this way, it is possible to 'challenge [. . .] existing normative convictions, largely through reframing issues in a new light'.⁹⁷ This new light makes it possible to understand the relative merit of value claims – and the dynamics among these claims – as

⁹¹ See D. Sandifer, *Evidence Before International Tribunals* (1975), at 217.

⁹² Carol Rose is the leading property law theorist of correlative rights. See especially Rose, 'The Several Futures of Property: Of Cyberspace and Folk Tales, Emission Trades and Ecosystems', 83 *Minnesota Law Review* (Minn. L. Rev.) (1998) 129.

⁹³ *Ibid.*

⁹⁴ See Som, Hilty and Koehler, 'The Precautionary Principle as a Framework for a Sustainable Information Society', 85 *Journal of Business Ethics* (2009) 493; see also J. McAdam, *Climate Change, Forced Migration and International Law* (2012).

⁹⁵ Fischer-Lescano and Teubner, *supra* note 11, at 1045–1046.

⁹⁶ Krisch, *supra* note 11, at 293.

⁹⁷ *Ibid.*, at 257.

opposed to their inherent or absolute value.⁹⁸ Such reasoning, in short, would point one in the direction of a discerning legal judgment.⁹⁹

3 The Evidentiary Move

The best way to refocus the precautionary principle away from absolute value claims and towards judgment is to treat it as a rule of evidence. If one treats precaution in an evidentiary fashion, the claims and contestations about precaution can be examined in a specific, context-rich setting. Rather than setting up a binary political choice, precaution then can serve as a bridge for legal decision between the contested values and regimes. Precaution becomes a matter of ‘how’ – how should law appreciate the effect of uncertainty across legal regimes and exercise discerning judgment on *how* legal rules are then taken into account and applied to resolve a dispute rather than *which* legal rules are applied wholesale.¹⁰⁰

The evidentiary approach on its face appears to assume a legal dispute before an international court or tribunal. It is fair to ask how such an approach might assist policymaking at either the international or domestic level. The first answer, albeit banal, is that international legal compliance is always conditioned, at least to a point, on liability concerns.¹⁰¹ Evidentiary principles affect liability determinations, and thus affect compliance strategies.

Less cynically, a good evidentiary principle assists a decision-maker, in that case a judge or arbitrator, to make the best possible factual determination after the fact to establish whether a state has violated a legal obligation.¹⁰² A good evidentiary principle should thus also guide good decision *before* the fact. In the context of precaution, it should allow a policymaker, faced *ex ante* with the same underlying scientific uncertainty as the judge or arbitrator is *ex post*, to make sense of a legally appropriate assessment of the risk to be addressed.

The precautionary principle is particularly well suited to this kind of reframing. If one looks at precaution not as a naked value claim, but considers its underlying context and motivation, precaution is about the appreciation of the multifaceted consequences of our actions in the world.¹⁰³ We are concerned that emissions will have an irreversible environmental impact and irrevocably destroy a good or value. The precautionary principle tells us that we may respond to such a potential environmental threat in the face of a lack of scientific certainty, as scientific uncertainty is not a reason for

⁹⁸ Zumbansen, ‘Transnational Legal Pluralism’, 1 *Transnational Legal Theory* (2010) 141, at 188.

⁹⁹ Burnyeat, ‘Enthymeme: Aristotle on the Rationality of Rhetoric’, in A. Rorty (ed.), *Aristotle’s Rhetoric* (1996) 88, at 88–110.

¹⁰⁰ See Farber, ‘Coping with Uncertainty: Cost-Benefit Analysis, the Precautionary Principle, and Climate Change’, 90 *Washington Law Review* (2015) 1659, at 1721.

¹⁰¹ Gadnis and Miazad, ‘The Hidden Power of Compliance’, 103 *Minn. L. Rev.* (2019) 2135, at 2139.

¹⁰² G. I. Hernández, *The International Court of Justice and the Judicial Function* (2014), at 58.

¹⁰³ See J. Peel, *Science and Risk Regulation in International Law* (2010), at 131.

inaction.¹⁰⁴ Precaution thus directs us to take cognizance of facts in a certain way; for example, the emissions should be treated as harmful even in the absence of definitive scientific proof. But as Cass Sunstein insists in his critique of precaution, we must bear in mind the consequence of precautionary policies themselves.¹⁰⁵ Harkening back to the energy trilemma of energy security, energy equity/affordability and environmental sustainability, there are other legitimate concerns that policymakers must bear in mind and balance when acting to protect environmental sustainability.¹⁰⁶ These are *evidentiary* points. They are not points of *responsibility* in the first instance.

In light of this discussion, it should not be surprising that the precautionary principle has been cast as an evidentiary doctrine in two different ways. First, Sands and Peel in their authoritative *Principles of International Environmental Law* note approvingly that one of the views of the precautionary principle is to understand it as a reversal of the burden of proof.¹⁰⁷ The approach has also been exhaustively theorized by Caroline Foster upon whom Sands and Peel rely.¹⁰⁸ This approach is at the heart of the reception of precaution under the Paris Agreement.¹⁰⁹ The burden of proof is, needless to say, a quintessential evidentiary rule.¹¹⁰

As Sands and Peel also discuss, however, the evidentiary move to use the precautionary principle as a burden-shifting device has so far been reasonably unsuccessful.¹¹¹ Courts and tribunals have refused to follow such arguments in the past.¹¹² One leading example of such a rejection of the burden-shifting approach is the treatment of precaution by the International Court of Justice in the *Pulp Mills* case.¹¹³ Pace Sands and Peel's hope to the contrary, this jurisprudence makes it unlikely – path dependence being what it is – that courts and tribunals will change course on the idea of precaution as a burden-shifting device in the future.¹¹⁴

Second, Birnie, Boyle and Redgwell, in their authoritative *International Law and the Environment*, argue that, in the context of Rio Declaration Principle 15, precaution should 'function to lower the standard of proof of risk'.¹¹⁵ They explain that '[w]here there is some evidence of a risk of serious or irreversible harm, even if uncertainty exists, appropriate action may be called for'.¹¹⁶ This assessment is significantly less

¹⁰⁴ Rio Declaration on Environment and Development, UN Conference on Environment and Development, 46th Session, UN Doc. A/CONF.151/26 (Vol. 1) (12 August 1992), principle 15, available at <https://bit.ly/3o3hSsT> (hereinafter 'Rio Declaration').

¹⁰⁵ Sunstein, *supra* note 9, at 48.

¹⁰⁶ Leal-Arcas, *supra* note 55, at 823–824.

¹⁰⁷ Sands and Peel, *supra* note 5, at 234, 249.

¹⁰⁸ *Ibid.*, at 251; Foster, *supra* note 19, at 240–280.

¹⁰⁹ Hanekamp and Bergkamp, 'The "Best Available Science" and the Paris Agreement on Climate Change', 7 *European Journal of Risk Regulation* (2016) 42, at 43; Roy, *supra* note 42, at 137.

¹¹⁰ Ridell, 'Evidence, Fact-Finding, and Experts', in C. Romano, K. J. Alter and Y. Shany (eds), *The Oxford Handbook of Adjudication* (2014) 858, at 858–859.

¹¹¹ Sands and Peel, *supra* note 5, at 234.

¹¹² *Ibid.*

¹¹³ *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, 20 April 2010, ICJ Reports (2010) 14, at 71.

¹¹⁴ Hathaway, 'Path Dependence in the Law', 86 *Iowa Law Review* (2001) 601.

¹¹⁵ P. Birnie, A. Boyle and C. Redgwell, *International Law and the Environment* (3rd ed. 2009), at 157.

¹¹⁶ *Ibid.*

extreme than the reversal of burden – a party wishing to rely upon precaution must still muster ‘some evidence of risk or serious or irreversible harm’, rather than requiring its counterparty to prove the absence of risk.¹¹⁷ It gives precaution its due, however, by permitting parties to submit less evidence than would ordinarily be required to carry their burden of proof. In practice, this would mean that a party could succeed by proving risk and serious and irreversible harm by potentially less than preponderance of the evidence.¹¹⁸

Neither strategy ultimately assists in overcoming the precaution problem. A reversal of the burden of proof does little to defuse regime clashes. Take the example of precaution in the BIT claim scenario described earlier. In that scenario, oil majors, affected by the hypothetical implementation of the Constitutional Commission on Human Rights’ finding them liable for human rights violations, bring a BIT claim against the Philippines.¹¹⁹ The Philippines in turn invoke climate precaution as a defence. What does a reversal of the burden of proof achieve in this scenario? First, a tribunal would need to establish whether there is *prima facie* evidence supporting the invocation of precaution.¹²⁰ Given this low threshold, a tribunal would likely make a finding that the Constitutional Commission on Human Rights’ conclusions are not facially absurd. Then, the oil majors would have the burden to disprove the gravamen of the Commission’s finding in addition to making out a claim for a violation of a provision of the BIT to make out their claim on the merits.

This result means that a BIT tribunal would subordinate the BIT regime to the climate regime. Only if the climate precaution defence is first disproved can a BIT claim advance. This conclusion simply restates the original problem of regime clashes. Reversals of the burden of proof create a binary choice in a regime-clash scenario as to which regime should primarily regulate the underlying conduct and ask the court or tribunal to defer to an external regime. As jurisprudence has shown, regime-internal courts or tribunals are unlikely to abdicate or curtail their own competence quite so drastically.¹²¹ But then there is no way in which the precautionary claim could still be taken into account and factually balanced. Reversals of burden are all-or-nothing axiomatic propositions for a problem requiring finesse and inductive judgments. They do not accept that law responds to an energy trilemma with conflicting values represented to a greater or lesser extent in different international legal regimes.¹²² They are thus the wrong tool to resolve the regime-clash problem.

A lowering of the standard of proof, on the other hand, cannot test competing precautionary claims. Here, the example of potential Covid-19-related claims, defences and counterclaims between the United States and China provides a helpful illustration. As outlined above, such a scenario involves claims by the United States that China

¹¹⁷ *Ibid.*

¹¹⁸ See R. Kolb, *The Elgar Companion to the International Court of Justice* (2014), at 251.

¹¹⁹ Greenpeace Press Release, *supra* note 43.

¹²⁰ See Sands and Peel, *supra* note 5, at 234, 249.

¹²¹ Krisch, *supra* note 11, at 193.

¹²² Leal-Arcas, *supra* note 55, at 823–824.

failed adequately to warn about the virus.¹²³ It further involves defences and counterclaims alleging that the United States' own allegedly inadequate response to the virus independently violated the IHR.¹²⁴ What happens if one lowers the standard of proof? As discussed above, both claims and defence/counterclaims are precautionary in nature, so both should benefit equally from a lower standard of proof.¹²⁵ This would make it easier for each side to prove their own respective factual claim.¹²⁶ One of the main points of contention will be causation – a point on which both theories are likely to contradict each other.¹²⁷ With a lowered standard of proof, however, both contradictory factual accounts of causation may pass muster. How then should the parties contest breach and/or causation? We are thus no further than we were before: competing claims of precaution cannot be tested. And if they contradict each other, it is not possible to decide a dispute without deciding who ought to win the case without *any* appraisal of the facts as a matter of law only (i.e. whose claim of precaution is legally apposite). Such a result is hardly ideal.

In short, both existing approaches use an evidentiary turn as a means of avoiding searching scrutiny of the underlying record. This is obviously the case in the reversal scenario. But it is also the case when lowering standards of proof. We therefore must look onward for a way to balance and integrate claims of precaution.

4 The Precaution Presumption

The best option to integrate precaution in legal decision-making involving multiple legal regimes, while making it factually contestable, is to consider a different evidentiary approach: fashioning a precaution presumption. Presumptions in the law of evidence operate to allow a certain kind of inference to be drawn as a matter of course from a specific predicate, all else being equal.¹²⁸ The legal consequences of the newly established factual state of affairs can then be used as an input for inductive legal reasoning and contestation. For example, it is a presumption that a state acts in a lawful manner.¹²⁹ This means that one needs to prove only the fact of an act and attribute the act to the state. Once these two facts are proven, the lawfulness of the conduct is inferred by operation of the presumption.

Importantly, presumptions do not themselves resolve questions of responsibility – the fact that a state lawfully exercised its power does not mean that it did not also violate a specific *lex specialis* rule (in fact, most instances of state liability in the investor–state context assume that state conduct was not in bad faith and generally

¹²³ Kraska, *supra* note 72.

¹²⁴ Fidler, *supra* note 77.

¹²⁵ Birnie et al., *supra* note 115, at 157.

¹²⁶ Compare Kraska, *supra* note 72 and Fidler, *supra* note 75.

¹²⁷ Plakokefalos, 'Causation in the Law of State Responsibility and the Problem of Overdetermination: In Search of Clarity', 26 *European Journal of International Law* (2015) 471.

¹²⁸ F. G. Sourgens, K. A. N. Duggal and I. Laird, *Evidence in International Investment Arbitration* (2018), at 293.

¹²⁹ B. Cheng, *General Principles of Law as Applied by International Courts and Tribunals* (2006), at 305.

lawful, but that it still gives rise to liability vis-à-vis a specifically situated claimant, due, for example, to representations that lawful authority would be exercised in a different manner).¹³⁰ Nor does it mean that the question cannot be rebutted by probative evidence.¹³¹ The presumption instead sets the stage for us to appraise, prove or contest the salience of specific treaty obligations to the claim or defence at bar.

Presumptions differ from a shift in the burden of proof. In fact, the international law of evidence expressly states that presumptions do not *reverse* the burden of proof;¹³² they may at best relax the burden of proof from absolute to relative.¹³³ A presumption is an evidentiary tool available to any party to discharge its burden of proof.¹³⁴ It does not shift the burden of proof any more than adducing the direct evidence would.¹³⁵

Presumptions also differ from a lowering of the standard of proof. Presumptions do not require *less* evidence to prove a fact; they require *different* evidence.¹³⁶ Presumptions allow a party to prove a fact indirectly by establishing a different set of predicate facts and then drawing an inference from that predicate.¹³⁷ A party relying on a presumption still must prove the predicate and the propriety of the inference from the predicate to the same standard of proof as before.

Consequently, a party that is confronted by an attempt to prove a fact by presumption can rebut the presumption without having to carry the burden of proof.¹³⁸ One can simply attack the invocation of the presumption on its own terms. The party relying on a presumption may adduce a presumption that does not, in the final analysis, apply to the case. Or it could fail to prove predicate facts in order to trigger the presumption suggesting that an inference would be inappropriate.¹³⁹ Neither defence against the presumption requires one to produce probative evidence independently in order to establish that the underlying allegation is demonstrably false.

This means that presumptions are more flexible than burdens or standards. One can focus on the predicate for a presumption or the propriety of drawing a particular inference without requiring proof of an alternative, affirmative fact. Further, the only thing a presumption provides is a specific fact as opposed to a legal conclusion about facts. This provides one room to manoeuvre, which is critical in the context of a more flexible, context-driven decision-making process.

How then should one construct a precaution presumption? Here, it is useful to consider other international law presumptions for help. These presumptions typically identify a specific predicate and then link the predicate to an inference.¹⁴⁰ For example,

¹³⁰ E. Sipiorski, *Good Faith in International Investment Arbitration* (2019), at 182–183.

¹³¹ Sourgens et al., *supra* note 128, at 293.

¹³² A. Riddell and B. Plant, *Evidence Before the International Court of Justice* (2009), at 110.

¹³³ *Ahmadou Sadio Diallo (Guinea v. Democratic Republic of Congo)*, Judgment, 30 November 2010, ICJ Reports (2010) 639, at 650–661.

¹³⁴ Sourgens et al., *supra* note 128, at 293.

¹³⁵ Kolb, *supra* note 118, at 243.

¹³⁶ Sourgens et al., *supra* note 128, at 116.

¹³⁷ *Ibid.*

¹³⁸ See Riddell and Plant, *supra* note 132, at 110.

¹³⁹ Sourgens et al., *supra* note 128, at 292.

¹⁴⁰ *Ibid.*, at 112.

the existence of a certificate of nationality duly issued by the responsible authorities implies that its holder has the nationality in question.¹⁴¹ The certificate of nationality is the predicate.¹⁴² The holding of nationality is the inference the presumption permits one to draw from the predicate.¹⁴³

The precautionary principle, by implication, looks to nascent scientific research as its predicate. As we have seen, formulations of the precautionary principle typically refer to, and excuse, the lack of scientific certainty or consensus.¹⁴⁴ As the precautionary principle establishes, this lack of scientific certainty or consensus should not be used as an impediment or reason to take cognizance of an environmental threat.¹⁴⁵ This implies that scientific research is ongoing. At a minimum, the precautionary principle therefore requires the beginnings of scientific research being conducted.¹⁴⁶

The predicate for the precaution presumption therefore ought to be that reasonable, ongoing scientific research relates to the specific activity at the bar. Further, this research must have articulated reasonable grounds for suspicion that the specific activity subject to research is harmful. These reasonable grounds for suspicion would typically be formulated in a scientific hypothesis or research question to be verified by a specific, future line of experiments, modelling, trials or study or other empirically testable inquiry.¹⁴⁷ Whether scientific research is reasonable will depend on the context in each case. However, such an assessment can make reference to objective criteria, such as the qualifications of researchers proposing the hypothesis, their training, peer review of their hypothesis and its reception or adoption in the field.¹⁴⁸

In the alternative, it is also possible to construct a predicate for the precautionary presumption out of ordinary obligations of scientific diligence or best practices as a matter of best risk-management practices.¹⁴⁹ If the deployment of a process, product or technology requires a level of scientific and regulatory review to be deemed safe, the absence of such diligence can also serve as a predicate for the precaution presumption.¹⁵⁰ Such diligence is now a generally accepted requirement for projects posing a threat for transboundary environmental harm.¹⁵¹

An important caveat is needed even at this early stage. As Daniel Sarewitz posited, scientific projects are not value neutral.¹⁵² They respond to value demands, and

¹⁴¹ ICSID, *Soufraki v. United Arab Emirates – Annulment*, 5 June 2007, ICSID Case no. ARB/02/7, ¶¶ 60–63.

¹⁴² *Ibid.*

¹⁴³ *Ibid.*

¹⁴⁴ See Peel, *supra* note 103, at 129–130.

¹⁴⁵ Rio Declaration, *supra* note 104, principle 15.

¹⁴⁶ See Case C-333/08, *European Commission v. Republic of France*, Judgment, 28 January 2010, ECLI:EU:C:2010:44, ¶ 96.

¹⁴⁷ See Peel, *supra* note 103, at 140, 143–144.

¹⁴⁸ See Cheng and Yoon, 'Does Frye or Daubert Matter? A Study of Scientific Admissibility Standards', 91 *Virginia Law Review* (2005) 471.

¹⁴⁹ See Peel, *supra* note 103, at 99–105.

¹⁵⁰ *Ibid.*, at 88–92.

¹⁵¹ Sands and Peel, *supra* note 5, at 680.

¹⁵² Sarewitz, 'How Science Makes Environmental Controversies Worse', 7 *Environmental Science and Policy* (2004), at 389.

value demands shape their respective perspectives.¹⁵³ Lucas Bergkamp, in particular, has warned on multiple occasions that this makes science an uneasy guide for legal decision-making.¹⁵⁴ Similar warnings have come from the field of sustainable development about post-normal science.¹⁵⁵ In the climate context, Bergkamp warns that current scientific programmes study anthropogenic influence on climate systems rather than climate systems in their own right, thus potentially limiting needed scientific insight.¹⁵⁶ Responding to Philippe Sands, Bergkamp particularly strongly cautioned against the judicial use or validation of climate science *qua* science to wage value battles about precaution and appropriate climate policy.¹⁵⁷

Sarewitz's and Bergkamp's point apparently leaves us with more questions than answers. Science is not neutral or a counterpoint to pluralism. Scientific inquiry is rather a different outgrowth of pluralism, as it, too, responds to incommensurable value demands. How then can nascent scientific research help answer value questions about precaution as opposed to simply repeating them?

To begin with, the precaution presumption takes Bergkamp's point that lawyers are poor judges of scientific disputes.¹⁵⁸ The precaution presumption therefore does not seek to have lawyers settle them. Rather, it has lawyers take these projects as they are once it has been established that the projects are at least minimally defensible within scientific discourse. Lawyers are very much able to make such determinations – and do so on a regular basis in domestic settings.¹⁵⁹

To provide two examples, one for available science and one for relevant lack of diligence, a lawyer could easily exclude purported scientific evidence showing that climate change is not *affected* by anthropogenic greenhouse gas emissions. While Bergkamp posits that the *extent* of anthropogenic impact on climate change remains a live scientific issue, the point is not that there is a complete absence of such impact.¹⁶⁰ In fact, companies like Eni, which participated in human rights proceedings in the Philippines, did not claim that anthropogenic climate change was a hoax. Rather, they claimed that fossil fuel development was necessary to protect other values in the energy trilemma, chiefly energy security.¹⁶¹ Companies like Chevron claim that, in general, Paris Agreement-compliant emissions scenarios can still include 48% oil and

¹⁵³ *Ibid.*

¹⁵⁴ Bergkamp, 'The Paris Agreement on Climate Change: A Risk Regulation Perspective', 7 *EJRR* (2016) 35; Hanekamp and Bergkamp, *supra* note 109.

¹⁵⁵ Tickner, 'The Precautionary Principle in Sustainable Environmental Management', in K.S. Bawa & R. Seidler (eds), *Encyclopedia of Life Support Systems: Dimensions of Sustainable Development*, Vol. 2, (2009) 48.

¹⁵⁶ Hanekamp and Bergkamp, *supra* note 109, at 44.

¹⁵⁷ Bergkamp, 'Adjudicating Scientific Disputes in Climate Science: The Limits of Judicial Competence and the Risks of Taking Sides', 3 *Environmental Liability* (2015) 80.

¹⁵⁸ *Ibid.*, at 84–85.

¹⁵⁹ Champod and Vuille, 'Scientific Evidence in Europe: Admissibility, Evaluation and Equality of Arms', 9 *International Commentary on Evidence* (2011) 5.

¹⁶⁰ Hanekamp and Bergkamp, *supra* note 109, at 48.

¹⁶¹ Darby, 'Carbon Majors Respond to Human Rights Inquiry', Climate Home News (27 October 2019), available at <https://bit.ly/369jWKe>.

gas make-up of the primary energy mix in 2040.¹⁶² Given the general acceptance of some anthropogenic impact on climate change, a research project outright denying it would, to use a euphemism, be fringe science.

Similarly, it is not possible, on the basis of current science, to claim that Covid-19 is a bioweapon purposefully released by the PRC.¹⁶³ What can be submitted is that (a) there is credible scientific research that the outbreak in China occurred in September 2019, not November,¹⁶⁴ and that (b) China was and remains less than transparent as to the course and timing of the disease in China.¹⁶⁵ Taken together, there is thus a predicate for a precautionary inference from the apparent absence of diligence, even though there is currently no predicate for an affirmative inference of a purposeful biological attack.

But even so, how can lawyers use contested science to assist decision-making when precaution, too, is contested on legal grounds? The answer to this question is that values inform scientific and legal contestation in helpfully compatible ways. Pluralism suggests that legal processes need to balance values against one another.¹⁶⁶ It submits further that this is only possible inductively.¹⁶⁷ Such inductive balancing requires concrete bridges between values for inductive reasoning to be able to grab a foothold.¹⁶⁸

Here, scientific inquiry is helpful in two ways: scientific inquiry itself operates inductively in translating value claims into hypotheses.¹⁶⁹ It then devises methods – again inductively – to test these hypotheses against the real world.¹⁷⁰ Scientific projects therefore provide an inductive anchor for legal assessments of precaution not because they are absolutely objective. They do so because they make value conclusions inductively contestable in a different way, namely by exploring the limits of inferences from scientific projects themselves.

Further, scientific projects do so by creating a different, concrete and factual bridge to contest values – namely, our appreciation of different perspectives which allows us to make sense of the world we live in. We can thus understand value differently by embedding it in our appreciation of facts, rather than ranking the importance of norms in the abstract. It is one thing to value biodiversity in the abstract; it is another to say that current greenhouse gas emissions trajectories and mitigation plans will lead to long-term degradation of two-thirds of global coral reefs and the loss of a quarter of fisheries revenues of developing nations.¹⁷¹ Such concrete claims of grave

¹⁶² Chevron, 'Climate Change Resilience, A Framework for Decisionmaking', Climate Home News (March 2018), at 11, available at <https://bit.ly/3mem6h4>.

¹⁶³ Lee, 'No, COVID-19 Coronavirus Was Not Bioengineered: Here's the Research That Debunks That Idea', *Forbes* (17 March 2020), available at <https://bit.ly/3l11DpT>.

¹⁶⁴ Forster et al., 'Phylogenetic Network Analysis of SARS-CoV-2 Genomes', 117 *Proceedings of the National Academy of Science* (2020) 9241, at 9241–9243, available at www.pnas.org/content/117/17/9241.

¹⁶⁵ 'Australia, China Tensions Up Over Virus Inquiry Call', *Straits Times* (29 April 2020), available at <https://bit.ly/3fHhmOG>.

¹⁶⁶ Krisch, *supra* note 11, at 293.

¹⁶⁷ *Ibid.*

¹⁶⁸ Fischer-Lescano & Teubner, *supra* note 11, at 1045–1046.

¹⁶⁹ T. Kuhn, *The Structure of Scientific Revolutions* (2012), at 81, 96–105, 108.

¹⁷⁰ *Ibid.*

¹⁷¹ Jean-Pierre Gattuso et al., 'Coral Reefs', Intergovernmental Panel on Climate Change (2018), at 97, 99, available at <https://bit.ly/2JlwyVn>.

risk of extinction have led even otherwise reticent international economic law regimes to permit states to take precautionary extraterritorial measures.¹⁷² Other, more abstract, arguments did not fare as well.

There is thus a positive feedback loop between legal balancing of values on a normative scale and scientific balancing of values on a factual scale that can meaningfully help form a fuller picture. As we evaluate scientific conclusions, we see concretely why we value what we value. The concrete pull of the value is now apparent (protecting coral and related fisheries concretely versus protecting biodiversity in the abstract). And at the same time, as we ask value-based questions about the science of climate change, we can see where the science is on a reasonably thinner ground to inform sweeping value propositions; that is, where its factual conclusions do not reach as far as value advocates would think, or reveal potential adverse impacts of proposed action to support the value at issue. Both pluralist perspectives are intertwined to permit more granular means of contestation and reconstruction of value perspectives than either alone could provide.

In short, scientific projects are helpful not because they lend objectivity as to which value should be defended and which abandoned. On the contrary, precautionary presumptions use the pluralism inherent in scientific research to their advantage to make more informed choices about values. Science and legal decision-making helpfully illuminate each other's blind spots and help us to discover new concrete ways to understand value claims and the consequences of (not) heeding them:

- (1) Ongoing scientific research, which gives rise to reasonable grounds for suspicion that an activity, process, product or technology is environmentally harmful, permits the inference that _____.
- (2) The absence of scientific research that would be conducted in the ordinary course of business to investigate, develop or license an activity, process, product or technology permits the inference that _____.

This leaves the inference to be drawn from the predicate of the precaution presumption. This inference differs for each of the two prongs of the presumption outlined above.

The first prong of the presumption looks to ongoing scientific research. It is therefore most in the spirit of the precautionary principle to credit the hypothesis as correct as far as possible.¹⁷³ Thus, the inference from the first prong of the presumption is that the scientific research will reasonably validate existing data upon which the ongoing research is based:

- (1)(a) Ongoing scientific research, which gives rise to reasonable grounds for suspicion that an activity, process, product or technology is environmentally harmful, makes it possible to infer that future scientific research will reasonably validate existing models of environmental harm and existing data upon which the ongoing research is based.

¹⁷² Howse, 'The Appellate Body Rulings in the Shrimp/Turtle Case: A New Legal Baseline for the Trade and Environment Debate', 27 *Columbia Journal of Environmental Law* (2002) 489, at 500.

¹⁷³ Peel, *supra* note 103, at 99–105.

This inference most closely tracks the function of the precautionary principle. It does not admit scientific uncertainty as a reason for inaction.¹⁷⁴ On the contrary, the presumption allows the inference, for the sake of the present argument, that existing research will in fact be borne out in the future and result in scientific consensus that existing hypotheses are accurate. The precaution presumption approach therefore does not admit scientific uncertainty but assumes that current modelling is correct and that it must be treated as correct by the international community.

The inference does not limit which kind of potential future harm is at issue – harm to human health and safety, harm to human prosperity or harm to the ecosystem. The presumption can be marshalled to establish any fact that would ordinarily be proven by means of scientific evidence when such scientific proof is marred by uncertainty. Precaution, in other words, is merely a means to resolve factual uncertainty. Whether a governmental response to the newly resolved uncertainty is lawful is a question to be addressed by applicable primary rules of international law.

This inference must be further refined to account for the possibility of multiple, ongoing competing research projects. The precautionary principle seeks to anticipate a reasonable worst-case scenario.¹⁷⁵ This means that it should project the worst-case scenarios generated by each of these ongoing research projects.¹⁷⁶ It must then adjust this aggregate worst-case scenario for the level of scientific acceptance – or crudely, the number of scientific supporters. This adjustment is necessary to best anticipate future worst-case scenarios in scientific research, while at the same time allowing for the fact that the outlier research will prove to be correct by including this outlier research as a discounted element of the inference to be drawn from ongoing research.¹⁷⁷

The Intergovernmental Panel on Climate Change's (IPCC) research again is instructive.¹⁷⁸ IPCC's research relies upon and aggregates different research models of how climate change progresses.¹⁷⁹ As the IPCC report notes, the 'number of studies projecting impacts at 1.5°C or 2°C of global warming has increased in recent times', suggesting a continuing uncertainty in climate projections.¹⁸⁰

One example is loss of sea ice. IPCC observed a 'mismatch between the observed and modelled sensitivity of Arctic sea ice'.¹⁸¹ This mismatch between aggregate modelling and observation underestimated the loss of sea ice.¹⁸² Discovering this mismatch allowed climate scientists to develop a bias adjustment for existing studies to account for the mismatch and therefore update their respective findings. According to these new

¹⁷⁴ Rio Declaration, *supra* note 104, principle 15.

¹⁷⁵ Sunstein, 'Irreversible and Catastrophic', 91 *Cornell Law Review* (2006) 841, at 847.

¹⁷⁶ *Ibid.*

¹⁷⁷ See Peel, *supra* note 103, at 94–95 (discussing Kuhnian scientific constructivism and risk of paradigm conformance).

¹⁷⁸ V. Masson-Delmotte et al. eds., *Global Warming of 1.5°C* (2019).

¹⁷⁹ Hoegh-Guldberg et al., 'Impacts of 1.5°C Global Warming on Natural and Human Systems', in V. Masson-Delmotte et al., *supra* note 178, at 175, 185.

¹⁸⁰ *Ibid.*

¹⁸¹ *Ibid.*, at 205.

¹⁸² *Ibid.*

findings, IPCC could conclude that according to such modelling, ‘there will be at least one sea ice-free Arctic summer after approximately 10 years of stabilized warming at 2°C, as compared to one sea ice-free summer after 100 years of stabilized warming at 1.5°C above pre-industrial temperatures’.¹⁸³

The presumption approach differs somewhat from IPCC’s, as IPCC’s sea ice projection did not seek to establish an aggregate *worst-case* scenario projection but rather to project likely outcomes. Given the precautionary nature of the presumption, the precaution presumption instead infers a *worst-case* scenario. It changes the question from ‘at least’ to ‘at most’: what is the *highest* number of ice-free Arctic summers after approximately 10 years of stabilized warming at 2°C supported by the models as opposed to the ‘at least’ measure in the report.¹⁸⁴

The sea ice example illustrates why a precaution presumption errs on the side of such a *worst-case* scenario. Modelling in fact *underestimated* the effect of climate change on sea ice.¹⁸⁵ The example illustrates why a *worst-case* approach is justified despite the potentially low level of probability assigned to these *worst-case* scenarios in current research.

Precaution differs from sound-science-based approaches in that it anticipates the future trajectory of sound science in the face of scientific uncertainty in a certain way.¹⁸⁶ If there is no current scientific uncertainty – and probabilistic assessments are strong – there is no need for precaution, and sound science and precaution essentially converge.¹⁸⁷ But if there is scientific uncertainty, an approach is precautionary only to the extent that it follows the *worst-case* scenario as a check against such modelling errors.¹⁸⁸ This does not allow policy responses to be set in stone. Precaution-based policy must be dynamic and requires governments to adjust their policies if it becomes clear that *worst-case* scenarios exaggerated risk. Until such time, precaution would suggest to infer the *worst*.

Further, it will be necessary to adjust the results for potential conflicts of interest.¹⁸⁹ IPCC again provides an instructive example. IPCC does not conduct its own research.¹⁹⁰ Rather, it reviews existing research.¹⁹¹ This research includes reports from industry among other potentially self-interested actors.¹⁹² For this reason, ‘[a]uthor teams using literature of this kind have a special responsibility to ensure its quality and validity’.¹⁹³ Such a task will establish whether the research in question

¹⁸³ *Ibid.*

¹⁸⁴ *Ibid.*

¹⁸⁵ *Ibid.*

¹⁸⁶ Peel, *supra* note 103, at 129.

¹⁸⁷ *Ibid.*, at 150–154.

¹⁸⁸ *Ibid.*, at 129.

¹⁸⁹ See Krinsky, ‘The Funding Effect in Science and its Implications for the Judiciary’, 13 *Journal of Law and Policy* (2005) 43.

¹⁹⁰ IPCC, ‘IPCC Factsheet: What Literature Does IPCC Assess?’ (30 August 2013), available at <https://bit.ly/3mgAVzN>.

¹⁹¹ *Ibid.*

¹⁹² *Ibid.*

¹⁹³ *Ibid.*

has in fact become authoritative (generated citations and agreement in the literature) or whether it is truly an outlier. The extent of discounting will be a question for the decision-maker's discretion guided by the principles of scientific bodies such as IPCC (and likely assisted by expert evidence suggesting an appropriate range of potential discount factors):

- (1)(b) To the extent that the same activity, process, product or technology is the subject of multiple contemporaneous research projects, the inference of the scope of environmental harm must aggregate the respective worst-case scenarios of each research project and adjust the aggregated result
 - (i) for the up-to-date scientific consensus, by assigning weight to each project per number of members of the relevant scientific community; and
 - (ii) according to a discount taken for conflict of interest concerns due to the sources of funding for the research in question.

This leaves the issue of what inference to draw from the absence of scientific data when such data would typically have been generated in an investigation or required for the deployment or licensing of a particular potential environmental threat. Precaution again points to risk aversion.¹⁹⁴ Precaution suggests that we project a worst-case scenario by reference to existing research to establish a comparative worst-case scenario.¹⁹⁵ This again would place the lack of data in its relevant scientific context:

- (2) The absence of scientific research, that would be conducted in the ordinary course of business to investigate, develop or license an activity, process, product or technology, permits the inference that the activity, process, product or technology would have a reasonably similar worst-case scenario environmental impact as the closest analogue for which data exists, adjusting for additional potential harms that could reasonably be expected to flow from the activity, process, product or technology for which the presumption is invoked.

We considered above what to do about the lack of transparency by China on investigating or communicating data about the Covid-19 outbreak. What remains to be established is what inference to draw from the absence of transparent communication and investigation. The precaution presumption does not operate in a binary fashion – that is, it does not impose a burden of proof on the party that should have done the investigating and researching as to what it knew when and how threatening the underlying event was. Rather, it looks for the most closely analogous case comparator for which there is data and infers that the worst-case scenario from that comparator can be used to gauge the worst-case scenario here. This again places fact-finding in a broader context and provides the greatest level of factual sensitivity possible under the circumstances.

¹⁹⁴ Peel, *supra* note 103, at 154–155.

¹⁹⁵ See *ibid.*, at 148–149.

In the context of the Covid-19 epidemic, the likely closest analogue is the SARS epidemic. Like Covid-19, SARS was spread by a coronavirus.¹⁹⁶ Like Covid-19, SARS originated in China.¹⁹⁷ A main difference between SARS and Covid-19 is that SARS transmission peaked at a time when patients were already symptomatic.¹⁹⁸ One might thus need to adjust for this factor to establish knowledge of risks of transmission.

If one compares the SARS outbreak to the current outbreak, there is a further parallel, namely the reticence on the part of the Chinese government to communicate early on about the spread of the virus due to fear about the economic fallout of transparent information.¹⁹⁹ Subsequent investigations revealed that the government had received warnings in early January 2003, and that on 27 January 2003 the Health Ministry had been informed of the early spread and symptoms of SARS. The governmental response was a virtual news blackout.²⁰⁰ The government eventually responded to rumours of the disease on 11 February with some accurate reporting about the lack of treatment for SARS but also spread misinformation about the disease.²⁰¹ Very little information was shared with the WHO until an investigative trip taken by the WHO to China on 28 March, or some two months after the government first became aware of the disease and three months after issues were first reported.²⁰²

A ready inference is that the Chinese government would have been aware of Covid-19 at an earlier date, and had knowledge about the threat it represented, than its first communication to the WHO on 31 December 2019 might suggest. Worst-case scenarios from the SARS comparison are that Chinese authorities knowingly failed to communicate to the WHO for a period of two months (27 January 2003 to 28 March 2003 for SARS, and 1 November 2019 to 31 December 2020 for Covid-19). This inference is consistent with the alleged existence of governmental documents dated 17 November 2019 acknowledging the spread of Covid-19 in China.

5 The Precaution and Contestation

How, then, does the precaution fare in remedying the problem it set out to resolve? Precaution was problematic because it did not provide clear means of contestation. The first part of this article showed that precaution frequently appears when law responds to policy trilemmas, such as the energy trilemma (energy security, energy equity, environmental sustainability) or the pandemic trilemma (health safety,

¹⁹⁶ World Health Organization, 'Severe Acute Respiratory Syndrome (SARS)' (2020), available at www.who.int/ith/diseases/sars/en/ (last visited 20 January 2021).

¹⁹⁷ *Ibid.*

¹⁹⁸ *Ibid.*

¹⁹⁹ Huang, 'The SARS Epidemic and its Aftermath in China: A Political Perspective', in S. Knobler et al. (eds), *Institute of Medicine (US) Forum on Microbial Threats* (2004), available at www.ncbi.nlm.nih.gov/books/NBK92479/.

²⁰⁰ *Ibid.*

²⁰¹ *Ibid.*

²⁰² World Health Organization, 'Update 13: China Joins WHO Collaborative Network' (28 March 2003), available at www.who.int/csr/sars/archive/2003_03_28/en/.

economic development, human rights). Precaution proved singularly rigid in regime clash scenarios, seeking to displace norms protecting competing limbs of the respective trilemmas. Precaution also faced limitations when multiple parties mutually assert a failure by other parties to take necessary precautions. The reason for this was that precaution lacked a means to contest and appraise the relative merit of precautionary claims or defences.

Treating precaution as a presumption opens significant new avenues for contestation. The first is factual: it is possible to rebut presumptions without having to carry a burden of proof. The second is legal: one can contest precaution with precaution, one limb of trilemma with another limb of trilemma. Yet, by treating precaution as a presumption, one now does so by projecting concrete factual worst-case scenarios to be balanced in legal decision. One thus opens up new means for inductive legal decision-making about precaution, holistically conceived.

A *Factual Contestation*

The central benefit of a presumption approach is that a party faced with a presumption can seek to rebut it.²⁰³ When there is a burden shift or a lowering of the standard of proof, a party wishing to rebut precaution has no choice but to meet the burden shifted to it or to provide more evidence of the ultimate safety of its proposed conduct to meet the lowered standard of proof in favour of precaution.²⁰⁴ The use of a presumption, therefore, materially improves the quality of justice by allowing a more searching analysis of the underlying evidence of environmental harm.²⁰⁵

The rebuttal of a presumption can draw on three different evidentiary strategies. First, one can argue that the presumption is inapplicable to the facts at the bar.²⁰⁶ This strategy focuses on the evidentiary predicate presented by the party invoking the presumption. One would submit that the underlying scientific information upon which the moving party relies is not what it appears to be. One could show that a peer-reviewed article on which the moving party relies has been retracted by the journal originally publishing it. This famously happened to a study purporting to link vaccines to a heightened risk of autism published in the prestigious *Lancet*.²⁰⁷ It is fair that a party seeking to rely on the *Lancet* article as a predicate for a precaution presumption that vaccines are environmentally harmful be prevented from doing so by the later retraction by the *Lancet* of the article in question.²⁰⁸ This submission impeaches the evidence supporting the presumption.²⁰⁹ Impeachment would show that the predicate for the drawing of a presumption is simply not present.

²⁰³ Sourgens *et al.*, *supra* note 127, at 123–124.

²⁰⁴ Cheng, *supra* note 128, at 327.

²⁰⁵ Contini, 'Quality of Justice and Judicial Reasoning in Italy', 69 *Ius Gentium* (2018) 123, at 125.

²⁰⁶ Kolb, *supra* note 118, at 243.

²⁰⁷ Eggertson, 'Lancet Retracts 12-Year Old Article Linking Autism to MMR Vaccines', 182 *Canadian Medical Association Journal* (2010) E199.

²⁰⁸ See *ibid.*

²⁰⁹ Sourgens *et al.*, *supra* note 128, at 153, 197.

Second, it is possible to rebut a presumption by submitting that the predicate does not extend to the dispute at bar.²¹⁰ The presumption that climate change contributes to the loss of biodiversity in tropical fish due to the degradation of coral reefs may not apply to Arctic marine life. Assuming that a party's claim concerned the Arctic, the presumption premised on the effect of climate change on coral reefs is arguably inapplicable. This attack therefore would not seek to challenge the evidence submitted in support of a presumption but would address the inferences that can be drawn from it.

It is only in the third and final step that a party may wish to rebut the ultimate inference with different evidence. Thus, one may show that a party withheld critical information.²¹¹ This evidence would make the presumption inapplicable.²¹² This attack, however, relies on evidence that is itself probative of the ultimate issue to be proved to rebut a presumption.²¹³ It is thus a different kind of evidence – evidence a party would submit if it had to discharge a burden of proof on the lack of nationality – from the kinds of evidence that are relevant to the first two steps.²¹⁴

In each instance, precaution as a presumption brings in more evidence and more detail to appreciate risk and risk assessment. It not only looks to evidence relevant to the ultimate issue. It also allows one meaningfully to query predicate evidence and the applicability of the presumption to the predicate evidence submitted. It thus provides a far more context-dependent, and less abstract, answer to the question of what conclusion one can draw about the environmental threat posed in a particular circumstance.

B Legal Contestation

Much ado has been made about contestation as a marker of legitimacy in the pluralist literature.²¹⁵ Pettit submits that the point of contestation is to secure the kind of reasoned decision-making which takes into account the interests and views of those affected by decisions and the power dynamics that give rise to decisions.²¹⁶ The point holds not only for Pettit's civic republican account of freedom. It also applies to the correlative rights of those asserting claims over ultimately shared resources.²¹⁷ The point of those rights is that one may not use one's rights to deprive another of their fair dominion or, just as importantly, to destroy the shared resource altogether.²¹⁸ One must be accountable for one's conduct to others with whom one shares a resource in terms consistent with common use.

It is almost ironic that, as we have seen, claims of precaution have been incapable of overcoming this hurdle. Precaution claims precedence for a single value (say,

²¹⁰ *Ibid.*, at 117.

²¹¹ ICSID, *Siag v Arab Republic of Egypt – Jurisdiction*, 11 April 2007, ICSID Case no. ARB/05/15, ¶ 153.

²¹² *Ibid.*

²¹³ *Ibid.*

²¹⁴ *Ibid.*

²¹⁵ Krisch, *supra* note 11, at 270–274; G.-P. Calliess and P. Zumbansen, *Rough Consensus and Running Code: A Theory of Transnational Private Law* (2010), at 131.

²¹⁶ Pettit, *supra* note 88, at 63.

²¹⁷ Rose, *supra* note 92, at 179.

²¹⁸ See Shackleford, 'The Future of Frontiers', 23 *Lewis and Clark Law Review* (2020) 1331, at 1361–1363.

environmental sustainability) without considering the sustainability of the entire shared normative commons of international and transnational law.²¹⁹ This was in part due to the fact that claims of precaution are contestations in their own right – they seek to warn of the danger posed by legal decision-making in some regimes to the values held dear in others.²²⁰ This was also partly due to the view of normative superiority genuinely held by those raising claims of precaution that their value simply is more morally deserving of protection. In that second claim, precaution slips into arbitrary shadow dominion and a forfeiture by others of their correlative rights to the shared normative enterprise of international law.

Can treating precaution as a presumption still carry the salience of current invocations of precaution while also integrating those invocations in a broader shared normative commons? And if so how?

If the precaution presumption can solve the problem, it is by returning to the virtue of discerning judgment. Loosely to translate Hans-Georg Gadamer, ‘judgment finds itself in the fundamental predicament that no single principle can guide its application. Any such principle itself would again require the use of a different power of judgment’.²²¹ Rather, ‘when we encounter situations requiring us to act, each judgment concerns something that is concrete and embedded in its own individuality; strictly speaking, all judgments are exceptional’.²²² Still, ‘our knowledge of law and custom grows with each [such] single case, in fact it is productively constituted by it’.²²³ To exercise discerning judgment, it is therefore necessary to appreciate each instance in its unique context and use the uniqueness of the context to make finely graded determinations as to how to balance values at home in different legal regimes (e.g. international economic law, international human rights law, international environmental law, international health law) against one another so as to do justice to the peculiarities of the context.

The precaution presumption projects our fears, grounded as far as possible in scientifically contestable terms, about the consequences of our policies and actions. It thus demands any decision-maker to take account of what imposing one set of values will do when the consequences of such a potential decision are viewed through the lens of another value/regime. And it does so not in an abstract way. It does so by confronting

²¹⁹ Sands and Peel, *supra* note 5, at 249.

²²⁰ Krisch, *supra* note 11, at 193.

²²¹ H.-G. Gadamer, *Wahrheit und Methode, Grundzüge einer philosophischen Hermeneutik* (1990), at 36 (‘Gadamer’) (translation by author) (‘Die Urteilskraft findet sich in einer grundsätzlichen Verlegenheit wegen eines Prinzips, das ihre Anwendung leiten könnte. Sie würde für die Befolgung dieses Prinzips selbst wieder einer anderen Urteilskraft bedürfen, wie Kant scharfsinnig bemerkt’). For a full English translation, see H.-G. Gadamer, *Truth and Method* (J. Weinsheimer & D. G. Marshall trans., Continuum 2004), at 27.

²²² Gadamer, *supra* note 221, at 45 (‘Es ist vielmehr stets ein “individueller Fall”, und bezeichnender Weise sagen wir dafür: ein besonderer Fall, ein Sonderfall, weil er von der Regel nicht erfasst wird. Jedes Urteil über ein in seiner konkreten Individualität Gemeintes, wie es die uns begegnenden Situationen des Handelns von uns verlangen, ist streng genommen ein Urteil über einen Sonderfall’). For a full translation, see H.-G. Gadamer, *Truth and Method* (J. Weinsheimer & D. G. Marshall trans., Continuum 2004), at 35.

²²³ Gadamer, *supra* note 221, at 44. For a full translation, see H.-G. Gadamer, *Truth and Method* (J. Weinsheimer & D. G. Marshall trans., Continuum 2004), at 34.

decision-makers with the fate of *specific* animals being pushed to extinction, of *specific* men, women and children being condemned to unendurable privations and of *specific* economic consequences suffered by communities, such as the loss of clearly identifiable livelihoods from fisheries and the like.

Consistent with the use of judgment, treating precaution as presumption thus permits contestation of legal norms by turning every case into an exception. It allows us to see what is special and valuable about a specific choice each time we are asked to act. It also permits us to see what is particularly dangerous and reprehensible about choices we might have made as a matter of abstraction. Only by applying our values (in plural) to the unique complexity of the situation recreated for us through the presumption can we make sense of the exceptional nature of the special case, and the special risks, before us.

Given the inductive nature of legal decision-making, each of these exceptional balances in turn allows us to gain a further, richer understanding of the general norms by which we choose to govern ourselves. We can see how certain contexts force certain values to recede into the background. This is a necessity not because of the arbitrary domination of one value over another. Rather, the specific case requires a withdrawal of value claims, since doing otherwise would violate the correlative jurisdiction of one of the regimes making up international law, shaping our understanding of complex policy trilemmas and giving mutual support to global policy processes. Clashes are lessened and consequences justified in terms intended to address all value concerns and not just some.

For this to function, it must be possible to confront precaution with precaution.²²⁴ For each limb of a given multi-lemma to project its own worst-case scenario to which it seeks to respond in any given circumstance. Such precaution forces policymakers to take seriously competing, factually relevant and supportable worst-case scenarios in their decisions. Precaution does not allow them to point to scientific disagreement to ignore risk. Rather, they must make determinations about value claims in a concrete manner for each individual case, dealing squarely with the value conflict between different scientific projects.

By returning precaution to an articulation about specific consequences of particular choices, one can in fact build bridges. These bridges will be the more effective the more they are travelled in both directions.²²⁵ That is, institutions by and large will be more willing to cooperate in exploring external values when the values those institutions themselves hold dear are subject to contestation in parallel fora.²²⁶ But as a starting point, precaution as presumption can serve to return discerning judgment to assess value claims against each other that otherwise would appear absolute:

- (3)(a) Multiple presumptions may be applicable to the same activity, process and technology.

²²⁴ See Som, *supra* note 94.

²²⁵ Pettit, *supra* note 88, at 67, 252–253.

²²⁶ See *ibid.*

- (3)(b) In weighing potentially contradictory inferences, care must be taken to
- (i) test the relative factual relevance of the scientific research supporting a presumption to the dispute at the bar;
 - (ii) query the relevance of additional research projects or assumptions not yet submitted by the parties; and
 - (iii) appraise the relative evidentiary record supporting each such presumption under (1) and (2).
- (3)(c) If such a comparison is inconclusive, the decision-maker may draw multiple inferences to establish a specific risk, even if the underlying bases appear facially inconsistent with one another. If such a comparison is inconclusive, a decision-maker should not draw an inference that a particular risk is unsubstantiated.

6 Conclusion

Even so, some decisions will be tragic when all available worst-case scenarios are atrocious and yet no easy way presents itself to avoid them. Reactions to Covid-19 and to climate change amply demonstrate the potential for such tragedy, for weighing the loss of lives against the loss of livelihoods. But tragic choices are less so if made with eyes wide open as to all the potential consequences of one's actions, not just the ones one wants to see.²²⁷ The precaution presumption helps to force the value conflict to the open in its full context and thus forces a more thorough engagement with the environmental, health, economic, social and cultural consequences of any possible legal decision. It is in this sense that the diverse and value-laden nature of scientific discourse itself can be turned into an asset for decision-making: ethicists correctly warn that we cannot rely on science and scientific ingenuity to make moral choices for us.²²⁸ By drawing out the values underlying scientific projects and testing their limits in the open in specific contexts, the precaution presumption allows lawyers to heed that warning.

By requiring the decision-makers to take seriously everyone's respective worst-case scenarios, the presumption helps to interweave international law regimes in concrete cases.²²⁹ Such integration is impossible in the abstract. It is possible in concrete application when each regime is conscious of the consequences – and values of those consequences – brought about by its own actions and decisions. While not an easy road to travel, by any means, precautionary presumptions allow a more meaningful engagement between legal regimes, scientific projects and the values they espouse. And it is only in such engagement and bridging that precaution is prudent rather than dogmatic, aware rather than blind or, in its etymological root, a caveat to guard against both the *hubris* of epistemic overconfidence and paralysis of indecision without falling into the 'timeat' (Latin 's/he should fear') of fear-based retrenchment.

²²⁷ Martha Nussbaum, *The Fragility of Goodness, Luck and Ethics in Greek Tragedy and Philosophy* (updated ed. 2001), at 79–82.

²²⁸ C. Hamilton, *Earthmasters: The Dawn of the Age of Climate Engineering* (2013), at 199–210.

²²⁹ McLachlan, *supra* note 10.