A Uniform Precautionary Principle Under EU Law

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ABSTRACT

The precautionary principle is a legal and political theory that strengthens a government’s hand in protecting health and the environment. It is especially powerful in the context of European Union law because it is incorporated into the Treaty on the Functioning of the European Union (TFEU). Thus, the significant jurisprudence of the precautionary principle under EU law has become a leading example to legal regimes worldwide. Because the interpretation of the principle is so important, it has made fertile ground for debate and speculation. The purpose of this article is to dispel a few critical misunderstandings about the principle, basing its analysis on well-established legal fundamentals. It is particularly important that the law moves forward with a clear and uniform interpretation. The reputation and viability of the precautionary principle around the world will depend on how effectively it develops in the European Union.

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I. INTRODUCTION

The precautionary principle is a foundational concept in international environmental law. It is a partly legal and partly political theory that lets governments regulate risks, even when the scientific justifications are not completely clear. In the field of environmental protection, where scientific evidence is often compelling but rarely complete, the precautionary principle is a crucial tool for effecting regulations that would otherwise get bogged down for lack of scientific certainty.

The precautionary principle provides a mandate for organisations ranging from the UN to the WTO.¹ It was incorporated by the 1992 Maastricht Treaty of the European Union and thereby elevated to constitutional status under EU law.² Hence, it has gained a large body of jurisprudence from European Court of Justice. The legal theories established by Europe will undoubtedly lead the development of the principle worldwide. But unfortunately, the principle remains muddled in practice; it has suffered speculation and misunderstanding as people have dutifully tried to parse its every detail through the court judgements. Much of the criticism, I think, is misplaced.

As with all legal concepts, the precautionary principle needs to be logically coherent, internally consistent, and intellectually appealing.³ Some authors may not think this is the reality, but I believe differently. Precaution in the EU is built on a few fundamental doctrines, from which all of its technical rules are derived. The doctrines are, essentially, to provide a high level of protection in a well-reasoned, proportionate, and non-discriminatory way. These are the same basic requirements that underpin all good governance and all of EU law. Understanding these doctrines, as they apply to precaution, can dispel certain

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² Id. at 371.
misconceptions that have long persisted in the academic scholarship.

In this article, I offer a basic introduction to the precautionary principle. I interpret it through European court judgements and other EU publications and show that it is consistent with the principles of EU law. I then deduce answers to some of the most debated questions in the literature, including: (1) what level of precaution exists in EU law; (2) what level of scientific uncertainty triggers precaution; and (3) what is the role of scientific evidence in the principle? In response to the second question, I propose a new “trivial uncertainty” test as an improvement to the current “hypothetical risk” test, which is a threshold test for implementing precaution. The trivial uncertainty test uses the same logic as the hypothetical risk test but addresses more diverse situations.

Finally, I give a brief account of the most serious challenge to the precautionary principle: the lack of perceived legitimacy. Legitimacy is related to the broader EU problem of democratic deficit. The precautionary principle will not gain full acceptance unless it earns the public trust. In the short to medium term, that might require more involvement of the European Parliament, because the democratic influence of the Parliament will make precautionary actions more palatable to the public.

II. WHAT IS THE PRECAUTIONARY PRINCIPLE?

A. Introductory Background on the Precautionary Principle

Normally, before a government takes an administrative action, it is expected to put forward a justification. For example, if the government wants to ban a certain product for being hazardous to health, it will usually establish, by credible evidence, that there is a genuine and serious danger. If the evidence has not been vetted by experts, or proves to be unconvincing, the ban can be annulled by a court of law. Indeed, to put forward evidence with a level of scientific certainty might be understood as a trait of good lawmaking. However, scientific certainty is not always possible. When it comes to environmental issues in particular, where sometimes scientific studies can only look at lagging indicators, consensus is not available when decisions need to be made. Therefore, we recognise in those situations that it might be desirable to
impose a more relaxed standard of justification. The precautionary principle states that protective measures can be taken in dangerous situations, even when evidence is less than concrete.

A poignant example in recent years comes from the global warming debate in the United States. The US federal government has famously failed to ratify the Kyoto Protocol, the foremost international effort to reduce greenhouse gas emissions. To rationalise such inaction, some US lawmakers have claimed that there is uncertainty as to whether global warming is caused by humans at all. This is despite the fact that the science of the last decade has long since put such claims into disrepute. The precautionary principle is meant to counter this kind of inaction.4

The principle was first defined by the 1992 UN Conference on Environment and Development in Rio de Janeiro. The Rio Declaration states:

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.5

In other words, when faced with serious dangers from global warming, be it rising sea levels or severe weather patterns, a relatively minor uncertainty, arising from mostly discredited science, should not impede action. The Rio Declaration was intended to give world governing organizations a broad mandate to protect the environment without having to justify their actions to a scientific certainty. The Rio Declaration suggests, as a matter of policy, that governments should favour preventative, cost-effective measures before environmental damage becomes permanent.

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4 David Michaels points out that the so-called climate change denial is a disingenuous strategy on the part of entrenched interest groups to discredit good science. If this were true, then the precautionary principle would be a valuable tool to defeat deliberate obstruction. See David Michaels, Doubt Is Their Product: How Industry’s Assault on Science Threatens Your Health 198 (2008).

B. Precautionary Principle in the European Union

In the same year as the Rio Summit, the precautionary principle was incorporated by the Maastricht Treaty into what is now Article 191 of the TFEU. Although the precautionary principle is written under the Title on Environment, it actually applies to EU action in all areas of health and safety. In fact, as explained below, it was prevalent in EU law long before it was formalised in any international instrument.

Prior to the Maastricht Treaty, the fundamental freedom of the free movement of goods was qualified by an exception for protection of human health. In Sandoz, the question arose whether the Netherlands government could restrict the sale of vitamin-fortified foods. It was known that excessive intake of vitamins A and D was harmful to health, but the science at the time could not say what amounts were dangerous. The Court of Justice ruled that in this condition of uncertainty, the member state had discretion to protect its citizens, as long as its actions were proportional to the attainment of a real need. This was, of course, the precautionary principle without the name.

Since Sandoz, the precautionary principle has become a basis for regulating all sorts of industry and consumer products, from pharmaceuticals to genetically modified organisms. The TFEU, however, makes reference to the principle but does not define it, so the institutions have been left to fill in the gaps. The most important case law of recent times has been the Pfizer judgement. It restated much of the existing law on the precautionary principle. In particular, it specified a procedure for handling scientific evidence prior to law making. It also defined the con-

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6 Article 191(2) of the TFEU reads: “Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay.” Consolidated version of the Treaty on the Functioning of the European Union art. 191(2), May 9, 2008, 2008 O.J. (C 115) 47 [hereinafter TFEU].


10 Id. ¶ 20.
cept of hypothetical risk, an evidentiary threshold for applying precaution. I will discuss both aspects of Pfizer in the following sections, but first, I must lay out a few assumptions that I use throughout this article.

1. The precautionary principle is a discretionary rule

Although the Rio Declaration reads as a negative rule, it has a powerful positive corollary: lack of scientific certainty per se cannot prevent a decision maker from taking protective actions.\(^{11}\) In fact, discretion is integral to the precautionary principle. The gap between scientific uncertainty and protective action can only be bridged by human discretion. The Commission agrees that precaution is “an eminently political decision.”\(^{12}\) It can include any action or no action at all, if that suits the political situation.\(^{13}\) The ECJ also recognises the political quality of precaution and gives wide deference to the Commission. For example, in ex parte Fedesa, the court stated that the standard of review of Commission decisions would be for manifest error or misuse of powers.\(^{14}\) That standard has since been confirmed in other cases. The court clearly acknowledges that political decisions such as precautionary actions are not very amenable to judicial review.\(^{15}\)

2. The precautionary principle is grounded in fundamental doctrines of law

Even though precautionary actions are political decisions, they still have legal constraints. The Commission has identified some doctrines that govern the precautionary principle. These are: (1) that precaution must not be misused for corrupt purposes and (2) that precautionary decisions must follow general principles of EU law-making. From these doctrines, there derive a host of rules,


\(^{13}\) Id.


\(^{15}\) Case T-13/99, Pfizer, 2002 E.C.R. II-03305, ¶¶ 447, 468, 480 (referring to the “political choice” and “broad discretion” of the Council).
which form a nuanced and comprehensive precautionary principle.\(^\text{16}\)

The first doctrine embodies a fear that raw political discretion leads to corruption. A precautionary decision, often a limitation on marketing or manufacturing of a product, could well be a kind of protectionism in disguise.\(^\text{17}\) In a real life example, it seems that one of the initial motives for banning rBST hormone in milk was to prevent an oversupply of milk in Europe.\(^\text{18}\) What was supposed to be a health and environment measure was influenced by an economic interest to keep milk prices high for EU producers. The rBST ban had the effect of blocking imports from major foreign sources, though that was not a stated purpose of that particular legislation.\(^\text{19}\)

The second doctrine, to follow general EU legal principles, stands for the value that precautionary decisions must constitute good governance. Simply put, precaution should be informed, reasoned, and non-arbitrary. It should respect the common principles of proportionality, non-discrimination, and legal certainty.\(^\text{20}\) The decision maker must consider all of the available scientific evidence,\(^\text{21}\) so as to gain a full knowledge of known facts. Furthermore, there should be a holistic cost-benefit analysis of economic and non-economic factors, in the short and long term, and there should be periodic on-going reviews.\(^\text{22}\) Finally, decisions should not be reactions to hypothetical dangers that are purely abstract and have no objective probability of occurring.\(^\text{23}\) Such ground rules make the precautionary principle judicially reviewable, at least in procedure if not in substance. Political actions are difficult to scrutinise as a matter of law, but procedural requirements can bring enough transparency to allow political checks to do their work.


\(^{18}\) Weiner, supra note 16, at 324.

\(^{19}\) Id.

\(^{20}\) *Communication on the Precautionary Principle*, supra note 12, §§ 6.3.1–6.3.3.

\(^{21}\) Id. § 5.1.2.

\(^{22}\) Id. §§ 6.3.4–6.3.5.

\(^{23}\) Case T-13/99, Pfizer, 2002 E.C.R. II-03305, ¶ 143.
So far, I have described but a few essential features of the precautionary principle. I hope they have been fairly uncontentious. In the following sections, I will explain how the basic structure of the principle supports a fairly comprehensive policy. Furthermore, by following the apparent logic of the principle, I will offer answers to some outstanding questions in the academic literature.

III. What Level of Precaution Exists at EU Law?

Precaution generally comes in two varieties: weak and strong. Weak precaution is the approach that follows most logically from the face of the Rio definition. That is to say, a lack of scientific certainty should not preclude action. Preventative measures are valid, so long as they are cost-effective solutions to potentially serious problems. It would seem that weak precaution is similar to an ordinary cost-benefit analysis.

Strong precaution is a more conservative approach. It presumes that protective measures should be implemented unless and until evidence proves that it is not necessary. The essential difference between weak and strong precaution is in the burden of proof. Weak precaution defaults to inaction whereas strong precaution defaults to action. In-between the two varieties, there is a spectrum of possible approaches, of differing strengths of precaution. It is important, when we are applying a legal standard under EU law, to know where on the spectrum we are.

Elen Stokes has complained that different evidentiary thresholds are being used in different ECJ cases. She compares the relatively weak approach in Fornasar with the very strong approach in the British BSE case and interprets the discrepancy as an unresolved conflict in the law. She even goes so far as to say that these arbitrary differences threaten to break down the integrity of the precautionary principle. Stokes seems to imply that there should be one standard for all European cases.

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27 Stokes, supra note 24, at 496–97.
I think this issue as presented is something of a false dilemma. While it is true that the court applies many levels of precaution, it does not mean that the application is arbitrary or wrong. The TFEU itself contains nothing about the strength of precaution, other than a general injunction to “aim at a high level of protection.”

Under EU law, the strength of precaution is an ad hoc political decision. In many cases, authorities in different member states are free to apply different risk tolerances to similar situations, to fit the needs of their own populations. In other cases where the level of precaution is harmonised at the EU level, the intent will be written in the secondary legislation. Therefore, differences in practice at the EU level are not arbitrary because the standards are clearly set out in the various directives. We can demonstrate this by comparing two cases, Pfizer and Cockle Fishers.

Pfizer presents a fairly typical example of precaution under EU law. The case concerned the use of the antibiotic Virginiamycin in animal feed. The antibiotic was banned by the Commission when Pfizer applied for a re-evaluation. The Council passed a regulation to deny authorisation, citing concerns that overuse of the antibiotic might cause drug resistance in humans. Pfizer sued for annulment, and the court dismissed the application. The Pfizer judgement stands for many points of law, but for now, the important thing to understand is the legal basis for the Virginiamycin ban. The authority came from the Feedstuffs Directive, which controlled the use of additives in animal feed. It provided that antibiotics should be approved only if “for serious reasons concerning human or animal health its use must not be restricted.” Thus, the language of the directive required a presumption against approval, and the burden to rebut that presumption was fairly high. The directive favoured a strong level of precaution and a broad discretion for the decision maker, which

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28 TFEU, supra note 6, art. 191(2).
29 Vilaca, supra note 1, at 372 (citing Case 174/82, Sandoz BV [1983] ECR 2445). Also, the precautionary decision can change when public perception changes, without an accompanying change in science. See id. at 375.
33 Council Directive 70/524, art. 6(2)(e), 1970 O.J. (L 270) 1, 3 (EC).
was consistent with long-standing practice under the Common Agricultural Policy. The court gave deference to the Council in this case.

By contrast, *Cockle Fishers* presents an example of extremely strong precaution. In the case, the Netherlands government had granted seasonal licenses to dredge for cockles in the Waddenzee. The area was protected under the Habitats Directive. Environmental groups sued to stop the dredging of certain shorebird feeding grounds. Unlike *Pfizer*, the *Cockle Fishers* judgement called for certainty of scientific evidence. The court ruled that fishing must stop, unless it could be proven to cause zero harm to bird habitats. The opinion did not consider the weighing of obligations, political choices, costs and benefits, or any number of other factors that usually go into precautionary decision making. Rather, an extremely strong precautionary approach seemed to have a near absolute presumption for protection.

The level of precaution in *Cockle Fishers* goes beyond what is required by Article 191 TFEU. It actually comes from the language of the Habitats Directive, which says that, for projects likely to have significant effects on designated habitats, member states “shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned.” Therefore, as long as there is reasonable scientific doubt, “the competent authority will have to refuse authorisation.” Now, it must be said that extreme precaution is generally undesirable as a matter of policy. Even the EU institutions agree that there is no such thing as “zero risk” and that it is impossible to prove an absence of risk. That will be the subject of a later section. Nevertheless, it is easy to see that this instance of very

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34 Case T-13/99, Pfizer, 2002 E.C.R. II-03305, ¶ 166.
35 “[T]he competent national authorities . . . are to authorise such activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects.” Case C-127/02, Cockle Fishers, 2004 E.C.R. I-07405, ¶ 59.
37 Case C-127/02, Cockle Fishers, 2004 E.C.R. I-07405, ¶ 57 (emphasis added).

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strong precaution has been explicitly required by secondary legislation.  

Pfizer and Cockle Fishers teach us at least two things. First, the level of precaution under EU law is set by secondary legislation. Second, within a range of variation, precaution is likely to be on the strong end of the spectrum. It makes sense for the EU to have stronger precaution because weak precaution, with no presumption for or against action, is too much like an ordinary cost-benefit analysis. If the precautionary principle is to have any added value, it must be of a stronger variety. That is presumably what the TFEU means when it calls for a “high level of protection.”

Stokes has raised a concern that having varying levels of precaution blurs an important distinction between “precaution” and “prevention,” as those terms are used in Article 191 TFEU. I disagree. The difference between precaution and prevention is that the first applies in situations where risk is uncertain and the second applies where risk is certain. Certainty or uncertainty is a totally independent question from the level of precaution. As explained later in this article, certainty is determined as a result of a risk assessment, and only after undertaking such risk assessment can precaution, at any level, be discussed. I also disagree with Stokes that varying levels of precaution diminishes the value of risk assessment.


40 Veerle Heyvaert, Facing the Consequences of the Precautionary Principle in European Community Law, 31 EUROPEAN L. REV. 185, 188 (2006) (“[Weak precaution is] hardly distinguishable from the general preventative, risk-based principles for decision-making.”).

41 Case C-127/02, Cockle Fishers, 2004 E.C.R. I-07405, ¶ 44.

42 Stokes, supra note 24, at 496 (“Inconsistency in the interpretation of evidential thresholds triggering regulatory intervention erodes the boundary between responses categorised as either ‘precautionary’ or ‘preventive.’”).

43 Id (“Whereas the principle of prevention operates in relation to hazards whose scale and impact can be statistically predicted, the precautionary principle is employed in the face of scientifically uncertain threats.”).


45 Stokes, supra note 24, at 496 (“[T]his inconsistency renders ambiguous the role of risk assessment in governing precautionary conduct.”).
knowing the proportionality of an action, and proportionality, being a general principle of EU law, must always be present.

IV. WHAT LEVEL OF UNCERTAINTY TRIGGERS PRECAUTION?

The Rio definition of the precautionary principle states that a lack of scientific certainty is not to be an excuse for inaction. Clearly, the principle presupposes a level of scientific uncertainty. Elsewhere in the academic literature, uncertainty has been discussed as a sort of legal prerequisite for precautionary action. In that case, what level of uncertainty triggers precaution?

One non-authoritative suggestion comes from the pleadings in Danielsson. The case concerned the testing of nuclear weapons in French Polynesia. The petitioners argued that the Commission must ban tests “as soon as there is a strong suspicion of potential harm to health and environment.” This argument has since been speculatively repeated in the literature, partly because, I think, it appeals to a desire to find a clear-cut rule for when the precautionary principle applies. However, the argument cannot be correct for at least two reasons.

First, the argument ignores all evidence on the other side that favours inaction. The Rio Declaration militates against improper excuses for inaction, like laziness or political bias, but it allows that inaction can be a valid response, so long as there is legitimate evidence to support it. The Commission, too, says that political discretion includes the choice not to act. Even in the strongest example of precaution, the Habitats Directive, at issue in Cockle Fishers, acknowledged opposing evidence, since pros and cons would have been discussed when deciding which habitats should be covered.

46 See Case C-77/09, Gowan, 2010 E.C.R. I-13533, ¶ 75.
47 See, e.g., Stokes, supra note 24, at 493.
49 Id. ¶ 44.
50 Communication on the Precautionary Principle, supra note 12, ¶ 5.
51 The decision to select and designate protected habitats rests initially with the member state governments. Only upon such designation do the protections of the Habitats Directive apply. See Council Directive 92/43, art. 3(2), 1992 O.J. (L 206) 7, 10 (EC) (“Each Member State shall designate . . . sites as special areas of conservation . . . .”).
The second error of the above argument is that it does not weigh the costs of action. There are opportunity costs associated with action, just as surely as there are benefits. Cass Sunstein has written elegantly about the dangers of careless precaution, explaining that opportunity costs can be even greater than the harms avoided.\textsuperscript{52} Therefore, as a “general principle of Community law,”\textsuperscript{53} the precautionary principle cannot have a hairpin trigger as the Danielsson petitioners suggest. Even an extremely strong precautionary approach should give at least some acknowledgement to costs.

I find it misleading to speak of the precautionary principle as having a legalistic “trigger,” as though it operates in some cases and not others. In my view, the precautionary principle is ever present. To understand, I must make clear the distinction between risk and uncertainty.\textsuperscript{54} Risk is a known quantifiable value, which is mathematically calculable. It fits into a conventional cost-benefit equation under the ordinary mode of decision making, which the Commission calls the “prudential approach.”\textsuperscript{55} By contrast, uncertainty is a condition where we have no quantifiable measures. It may arise because we do not know the potential risks or because there is so much divergence of opinion that we cannot reasonably agree on a quantity of risk.\textsuperscript{56} In any case, most real life situations involve some uncertainty. Wherever there is uncertainty, even if it is small, precaution must be there to fill in the gaps.

The important question of policy is, when it is appropriate or inappropriate to act on a precautionary impulse? Even when experts disagree about risk, is the disagreement so small or so

\textsuperscript{52} Cass R. Sunstein, Beyond the Precautionary Principle, 151 U. PA. L. REV. 1003, 1024 (2003). Sunstein illustrates how increased regulation can kill more people on net by depriving people of potential benefits. \textit{Id.} at 1027.

\textsuperscript{53} Case T-74/00, Artegodan, 2002 E.C.R. II-04945, ¶ 184.

\textsuperscript{54} See Stokes, \textit{supra} note 24, at 494.

\textsuperscript{55} \textit{Communication on the Precautionary Principle, supra} note 12, § 5.

\textsuperscript{56} Renn characterises precaution as a type of risk management in which the risk values are not known. Ortwin Renn, \textit{Precaution and Analysis: Two Sides of the Same Coin?}, 8 EUROPEAN MOLECULAR BIOLOGY ORG. REP. 303, 303 (2007) (“Within the frame of precaution, risk is seen from the perspective of pervasive uncertainty, ambiguity and, in particular, ignorance. Precautious risk management therefore aims to ensure prudent decisions in situations where there is a high incertitude about probabilities . . . .”). According to Gowan, uncertainty can arise because of “insufficiency, inconclusiveness, or imprecision of the results [of a risk assessment].” Case C-77/09, Gowan, 2010 E.C.R. I-13533, ¶ 76.
unimportant as to make the uncertainty trivial? To act on a triviality would violate the general EU principles of proportionality and non-arbitrariness. So, if there is no genuine difference of scientific opinion, there can only be one course of action. Any other, by definition, would be disproportionate to the problem. For that reason, triviality is the real dividing line between valid and invalid precaution. Furthermore, the courts have the competence to differentiate between trivial and non-trivial uncertainty.

The courts have already addressed a subset of trivial uncertainty under the name of “hypothetical risk.” *Pfizer* defines hypothetical risk as that which is “founded on mere conjecture which has not been scientifically verified.” That kind of risk cannot be the basis for a precautionary action. Hypothetical risk is a type of trivial uncertainty where all reasonable scientific interpretations agree that risk is at or near zero. In such a case, risk, even if it exists, is very low, and any disagreement over the quantity of risk is, in my terminology, trivial. *Pfizer* also explains a more typical situation “in which there is a risk . . . [that] has not yet been fully demonstrated.” There, scientists may have materially different opinions about how big the quantity of risk is. This would be a condition of non-trivial uncertainty, where it would be perfectly legitimate to make a political choice under the precautionary principle.

The major advantage of the “trivial uncertainty” test, as opposed to the “hypothetical risk” test, is that it can extend *Pfizer* reasoning to situations that the court has not yet addressed. For example, what if scientists agree that there is a low but non-zero,

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57 Case T-13/99, Pfizer, 2002 E.C.R. II-03305, ¶ 162 (“[A]rbitrary measures . . . cannot in any circumstances be rendered legitimate by the precautionary principle.”). The same paragraph seems to stand for the proposition that extremely strong precaution in every case would be undesirable because it would lead to arbitrariness. See also Michaels, supra note 4 (cautioning against the dangers of over-zealous precaution).


59 Id.

60 A real life example can be found in the Case 178/84, Comm’n v. Germany, 1987 E.C.R. 01227. In that case, the German government prohibited the use of the designation “beer” for any beverage not brewed exclusively from barley, hops, yeast, and water. The government cited no scientific health concern except for a general public suspicion of additives. Since the scientific consensus found harm to be non-existent, there was no non-trivial uncertainty, and Germany could not sustain the ban.

non-hypothetical risk? Is it justified to take precautionary action? If the putative risks are sufficiently low, one has only to plug them into a cost-benefit equation and observe, say, that the costs of action outweigh the benefits in every conceivable case. Therefore, the prudential approach would dictate that the only choice is to take no action. Even if politicians were tempted to invoke the precautionary principle to achieve a different result, it is easy to see that such a decision would be arbitrary.\(^{62}\) Observe: that the risk is not hypothetical, but the uncertainty is too trivial to form a valid basis for precautionary action.

Trivial uncertainty can also help us when scientific opinion falls into a rather larger range. Even when risk estimates vary significantly, it does not necessarily mean that there is more than one legitimate result. Authors like Karl-Heinz Lardeur have feared that the precautionary principle gives the decision maker freedom to take any action as long as any disagreement persists.\(^{63}\) But that should not be the case. Suppose that experts come up with a range of risk quantities, but all of them fall into an area that suggests no action. Proportionality requires that the decision maker must not act.\(^{64}\) If the objective science is universally opposed to action, then there can be no action that is proportional to the threat.

A real life illustration of trivial uncertainty occurred in the French BSE case.\(^{65}\) In that case, the French government continued to ban all imports of British beef, even after the Commission and its scientific committees had concluded that some imports were safe. France was concerned that undocumented beef could get into the country through unauthorised channels, but the Commission and the UK promised strict monitoring. France did

\(^{62}\) Communication on the Precautionary Principle, supra note 12, § 6.3 ("Precautionary principle is no excuse for derogating from the general principles of risk management.").

\(^{63}\) Lardeur, supra note 3, at 1470 ("[T]he Commission could take far-reaching decisions on all kinds of products as long as some experts might continue to argue that a certain risk beyond the merely hypothetical risk cannot be excluded.").

\(^{64}\) The British BSE case tells us that when choosing between several appropriate measures, the decision must always comply with proportionality principle. See Case C-180/96, UK v. Comm’n, 1998 E.C.R. I-2265, ¶ 96. The general principle is also recognised in the Communication on the Precautionary Principle, supra note 12, § 6.3 and in Case C-77/09, Gowan, 2010 E.C.R. I-13533, ¶ 81.

\(^{65}\) Case C-1/00, Comm’n v. France, 2001 E.C.R. I-09989.
not trust the traceability of the beef, so it refused to cooperate. The court found, with few exceptions, that the EC had set up an unquestionably adequate and reliable tracing system, so the French action was not valid.\(^{66}\) Where science uniformly supported some imports, France could not justify a ban on all imports.

To use the language of trivial uncertainty to describe the result of the French BSE case, we would say that uncertainty and valid political discretion lay within a range, but banning all imports was a result that fell outside of that range. As to the appropriateness of a total ban, there was no genuine uncertainty. Thus, the scenario that Lardeur feared, i.e. validating any action as long as France and the Commission disagreed even a little, does not seem to occur. The limiting principle of trivial uncertainty, combined with the principle of proportionality, guides EU law to solutions that are consistent with our instincts and with good policy.

V. What is the Role of Science?

A. Science as a Basic Requirement

Understanding science is crucial to the operation of the precautionary principle. It is scientific study that informs our knowledge of risks, and it is also fuller scientific investigation that allows us to put quantities on otherwise abstract risks. But scientific research forms only one half of the precautionary principle. The political half of the principle lets the law work even when science does not give a definitive answer. In my view, the political contribution is even more significant than the scientific one.

Even so, the role of science is not to be ignored. The courts have laid down a number of rules for its use, with the goal of ensuring reasoned decision making when precaution is exercised. The Pfizer judgement is the most significant authority on this issue. Pfizer elucidates at least two points: first, the proper standard of risk assessment, and second, how to treat scientific advice given by committees. First and foremost, risk assessment is a prerequisite for all precautionary actions.\(^{67}\) Risk assessment

\(^{66}\) Id. ¶¶ 134–35.

requires “the identification and characterisation of a hazard, the assessment of exposure to the hazard and the characterisation of the risk.” The decision maker must act in light of the best available scientific information, based on the most recent results of international research. Then, with a “full knowledge of the facts, [the authority should make] as thorough a scientific risk assessment as possible.” Only having done this can the decision maker choose to take precautionary actions.

B. The Standard of Equal or Better Evidence

At the EU level, risk assessments are done by expert committees that advise the institutions on technical and scientific matters. The committees use the above principles to produce recommendations for or against precaution. The institutions are not strictly bound by the recommendations, but if they disagree, they must support their position with scientific evidence of equal or better quality, as compared to the committee’s. The latter requirement is a way of preventing frivolous concerns (e.g. media hype, in Pfizer) from trumping best available scientific evidence. Only evidence of a sufficient quality can generate genuine uncertainty and precautionary action.

Unfortunately, Pfizer itself was not the best illustration of this rule because it was not a particularly close case. But “equal or better” is probably a rough standard at best because courts are not well qualified to scrutinise the details of scientific studies. Nor are there any good non-technical proxy measures for scientific quality. A court would probably not, for example, look at university league tables and try to compare studies based solely on the ranking of the universities that produced them. These kinds of proxy measures do not get to the essential purpose of the “equal or better” standard.

68 Id. ¶ 156.
69 Id. ¶ 158. The standard of best available scientific information, like the precautionary principle itself, has become a popular principle in international law. For example, it is required for the purpose of sustainable fisheries management in the United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 3.
72 Id. ¶ 190.
The essential purpose of the “equal or better” standard is to force the EU institutions to demonstrate genuine scientific uncertainty. The courts are not so much interested in particular results as ensuring that precaution is always exercised in response to non-trivial uncertainty. This fact is evident from the court opinion in Fedesa.\textsuperscript{73} In that case, the Commission took precautionary measures against the use of certain hormones in livestock. The court did not try to decide whether the hormones were safe, but it did examine whether the Commission had shown a divergence of opinions. For that purpose, the court did not try to rank different pieces of evidence, but it satisfied itself that all of the evidence compared was of the same rough calibre. It is probably reasonable for us to assume that any study of an internationally recognised standard could be deemed “equal” with any other, prima facie. Any more detailed inquiry is not practical or even desirable for a court to perform.

Although Fedesa was decided more than twenty years ago, the courts have continued to view “equal or better” scientific quality at a fairly high level of abstraction. The Pfizer opinion asserted that it was not even necessary for the institutions to consult expert committees about every published study; it was only necessary that the institutions grasp the full scientific value of the studies.\textsuperscript{74} Apparently, the institutions have a lot of self-responsibility when it comes to educating themselves. If consultation of committees is not even required as a matter of procedural formality, then there is no reason to think that the courts will be overly strict about comparing the quality of a committee’s science versus an institution’s science.

Caoimhin MacMaolain, for one, has criticised the court for letting the Commission ignore committee advice. He laments that in the future, one institution study could be enough to counter ten committee studies and invite wide political discretion.\textsuperscript{75} I think MacMaolain may well be right, but the fact alone does not necessarily represent a failure of EU principles. The law is not so much aimed at counting numbers of studies\textsuperscript{76} as it is deciding whether

\textsuperscript{73} Case C-331/88, ex parte Fedesa, 1990 E.C.R. I-04023, ¶ 9.
\textsuperscript{74} Case T-13/99, Pfizer, 2002 E.C.R. II-03305, ¶ 298.
\textsuperscript{76} Lardeur, \textit{supra} note 3, at 1470 (“Science does not imply a majority rule: there is no presumption that the majority is right and the minority is wrong.”).
there is genuine uncertainty. Uncertainty is for the court to decide on an ad hoc basis. If the public is uncomfortable with institutional discretion, that is rather a political problem. This article will discuss how the EU can improve political trust in a later section.

C. The Increasing Importance of Science?

Ever since the Pfizer opinion laid out in great detail the procedures for using scientific evidence, scholars have paid increased attention to the new jurisprudence. Some believe that the importance of science is growing.77 However, I think that the sheer detail of the Pfizer opinion is misleading in this way. I have already described how many elements of the Pfizer prescription are no more or less than what was already required by EU law fundamentals. Therefore, the overall importance of science should not be overstated.

The political side of the precautionary principle is still strong. Politics is what takes action when science has no answer. Political discretion is also the most important value that the precautionary principle adds to the ordinary prudential approach. Much is still determined by politics. For example, the EU institutions and the member state governments decide what level of risk is acceptable to their respective constituents.78 Even the most basic of cost-benefit decisions in democratic societies are subject to public opinion.79 Politics remains an indispensable part of the precautionary principle.

The problem with political decisions is that they are not amenable to judicial review. For example, in Fedesa, the court was asked to review a precautionary measure taken under the Common Agricultural Policy, an area where the institutions have traditionally had very wide discretion. The court said that it could

77 See, e.g., id. at 1462 (talking about the “rise of science in the process of risk evaluation and management”).
79 See Communication on the Precautionary Principle, supra note 12, § 6.3.4; Majone has decried the counting of public opinion in cost-benefit analyses, saying that it is “an adjustable peg [that] can justify any measure.” Majone, supra note 17, at 100. While it is true that public opinion can skew rational decision making, it is also unfair to ask the political institutions to ignore public dissent. It is, after all, a government’s job to be attentive to its people.
not verify the accuracy of the science.\textsuperscript{80} It could not even check that the action taken was rational and objective.\textsuperscript{81} The court could only review for manifest error or misuse of powers.\textsuperscript{82} Similar conclusions, not under CAP, were also reached in \textit{Artegodan}\textsuperscript{83} and \textit{Gowan}.\textsuperscript{84}

Where substantive review of political decisions is impossible, it is even more important to have effective procedural reviews.\textsuperscript{85} EU law has long placed emphasis on procedural values, especially on transparency and accountability, in the hope they will build more public trust.\textsuperscript{86} In the context of the precautionary principle, scientific risk assessment is only the most visible and readily reviewable procedure. Through decisions like \textit{Pfizer}, the courts have shown a desire to put limiting principles on political decisions, but it does not necessarily mean that the courts intend to shift the centre of gravity towards science. Science and politics are both important.

\textbf{VI. IS THE PRECAUTIONARY PRINCIPLE GOOD POLICY?}

The most troubling challenges to the precautionary principle are those that question the fundamental wisdom of the principle. Sunstein and Majone have written elegant criticisms arguing that precaution can lead to bad policy. Problems range from ignorant biases to logical fallacies. Not all of them are completely solvable. In the following sections, I describe the most significant of these challenges and some possible solutions based on principles of EU law.

\textbf{A. Ignorance of Opportunity Costs}

\textsuperscript{81} \textit{Id.} ¶ 8.
\textsuperscript{82} \textit{Id.}
\textsuperscript{83} Case T-74/00, Artegodan, 2002 E.C.R. II-04945, ¶¶ 200-01 (concerning the use of an anorectic as a weight loss drug in humans).
\textsuperscript{84} Case C-77/09, Gowan, 2010 E.C.R. I-13533, ¶ 82 (concerning the use of the fungicide fenarimol).
\textsuperscript{85} Case T-13/99, Pfizer, 2002 E.C.R. II-03305, ¶ 171; see also Stokes, supra note 24, at 497.
\textsuperscript{86} For instance, the EU has embraced public consultation, following the Aarhus Convention, as a means toward better decision making. See \textit{Communication from the Commission Towards a Reinforced Culture of Consultation and Dialogue}, COM (2002) 704 final (Dec. 11, 2002).
Precautionary action brings with it a host of opportunity costs because it often acts by limiting or prohibiting the use of a human technology. Giving up potential advantages of technology is obviously costly. Sunstein contends that a sensible approach to precaution should include the opportunity costs in the overall cost-benefit analysis, but under strong precaution, where there is a presumption for bans, opportunity costs are not fully understood before action is taken. To use Sunstein’s example, drugs to treat human diseases are not given market access until all of the side effects are researched. If the side effects turn out to be minor, more harm may have occurred in the meantime from diseases gone untreated. Finally, Sunstein argues that precaution is too often an overreaction to public fear that causes governments to make uneconomical decisions. He cites the example of asbestos, which is not always dangerous but has been aggressively eradicated at great expense.

I take Sunstein’s examples to be accurate, but I do not agree with his interpretation that they necessarily represent bad practice. Side effects of a specific drug may not be known beforehand, but regulators may know statistically that side effects in trial drugs are common and intolerable. Asbestos eradication started because of a genuine danger, although public fear eventually became more serious than the actual danger. I am not convinced that Sunstein’s post hoc criticisms should have changed either of the decisions at the time that they were made. The cost-benefit analysis is always going to be difficult wherever there is uncertainty. The key is to make justifiable decisions within the constraints of limited knowledge. The EU’s procedural requirements, including best possible risk assessment and best available scientific evidence, maximise the chances of a well-reasoned decision.

B. Benevolence of Nature

87 See Majone, supra note 17, at 101.
88 Sunstein, supra note 52, at 1037.
89 See id. at 1024.
90 Id. at 1027.
91 Id. at 1047–48.
92 Id. at 1051.
Another of Sunstein’s criticisms is the unwarranted trust in the “benevolence of nature.” 93 Precautionary action often stops the progress of a human activity, so one may say that it keeps the world in a state of nature. But a state of nature is not necessarily optimal for human well-being. To use Sunstein’s examples again, before modern medicine, people had short and sickly lives. The invention of modern medicines improved the quality of life. Also, the EU’s resistance to genetically modified crops has denied market access to many African farmers, hurting their livelihoods and increasing their poverty. 94 It is impossible to justify a policy that categorically favours a state of nature.

I believe that the precautionary principle takes account of this problem. In fact, the preference for a state of nature is not indiscriminate. The Rio declaration specifies that precaution applies where there are “threats of serious and irreversible damage.” In many cases, nature is especially hard to restore once damaged. To use the terminology of risk analysis, we would say that the losses are unbounded and that we cannot calculate expected values. 95 A conservative approach is warranted if the downside risk is unlimited. Of course, it would also be sensible to have a periodic review to ensure that the initial conservative approach stays relevant.

C. Re-evaluation and Absence of Time Limitation

An initial excess of caution ought to be accompanied by a periodic re-evaluation. The Commission has said: “[Precautionary] measures should be maintained as long as the scientific data are inadequate, imprecise or inconclusive and as long as the risk is considered too high to be imposed on society.” 96 In other words, if science has progressed enough, precautionary measures should be withdrawn in favour of prudential measures. Notably, says the

93 Id. at 1038.
94 Id. at 1032–33.
95 Renn, supra note 56, at 304 (“[T]he main purpose of precaution is to avoid irreversible decisions . . . . Majone concedes that it does have a role in risk analysis, namely where losses or utilities are unbounded and where it is clearly impossible to calculate expected values.”).
96 Communication on the Precautionary Principle, supra note 12, § 6.3.5.
Commission, “[progress] is not always linked to the time factor, but to the development of scientific knowledge.”

Majone argues that a lack of time limitation is problematic because it creates a vague standard that is hard for judicial bodies to enforce. He says that such a policy was contrived by the Commission to give the EU maximum leeway in the aftermath of an unfavourable WTO ruling in the SPS cases. It is impossible for a court to decide when a science has developed “far enough” or when a risk has finally become “acceptable” to the public. Majone says that the Commission’s policy makes cost-benefit analysis superfluous.

Indeed, it would be very hard for a court to adjudicate progress of science, in the way that Majone has framed it, because it mixes political elements (public perception) and legal elements (genuine uncertainty). The court can succeed if it sticks to the legal questions. Progress of science, as far as the court should be concerned, is nothing more than the evolution from scientific uncertainty to consensus. Thus, the court can reduce Majone’s query into the familiar one about trivial uncertainty, and it can make decisions within the bounds of its established institutional competence. On the whole, the Commission’s communiqué has not changed anything about the existing precautionary principle framework. All the Commission does is to re-emphasise its existing political powers, keeping the court’s power exactly as it is.

97 Id.
98 Majone, supra note 17, at 99–100.
99 See id. at 99. See also Appellate Body Report, European Communities–Measures Concerning Meat and Meat Products, WT/DS26/AB/R, WT/DS48/AB/R (Jan. 16, 1998) (adopted Feb. 13, 1998). In the SPS cases, the US and Canada challenged Directive 96/22/EC for violating the Agreement on the Application of Sanitary and Phytosanitary Measures (the “SPS Agreement”). The directive generally banned the importation of meat from animals that were treated with hormones. The EC lost the case. Among other things, the WTO Appellate Body reaffirmed the version of the precautionary principle that was embodied in the SPS Agreement. Section 5.7 of the SPS Agreement allowed members to exercise precaution in light of scientific uncertainty, but “in such circumstances, Members shall seek to obtain the additional information necessary for a more objective assessment of risk and review the . . . measure accordingly within a reasonable period of time.” (emphasis added). Agreement on the Application of Sanitary and Phytosanitary Measures, § 5.7, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, 1867 U.N.T.S. 154.
100 Majone, supra note 17, at 100.
D. Zero Risk and Minimax Approach

The Commission takes great pains to establish that precautionary actions are well reasoned and objectively justified. But there are two common practices that are incompatible with this ideal: the zero risk approach and the minimax approach.

The zero risk approach is similar to the extremely strong version of the precautionary principle. Under zero risk, the decision maker will not allow an activity until there is proven a total absence of risk. This is problematic as an instrument of policy because it is impossible to prove a negative, so a zero risk approach is tantamount to an outright ban on human activity.\(^\text{101}\) An outright ban is not a proportional response to ordinary risks,\(^\text{102}\) so a zero risk policy is prima facie suspect. The Commission has stressed that a precautionary approach should never be confused with a zero risk policy.\(^\text{103}\)

Nevertheless, some examples of zero risk do exist in EU law. *Cockle Fishers* is one that we have already mentioned. These kinds of cases flatly contradict the EU’s own broader ideals. However, it is important to notice how zero risk is used in limited circumstances under specific conditions. These are: the danger of irreversible damage, lack of alternatives, and a limited time frame. In *Cockle Fishers*, the Netherlands government was worried about unsustainable damage to bird habitat and an inability to manage bird feeding grounds alongside commercial fishing. The beaches of the Waddenzee were so saturated with wildlife during certain seasons that any industrial scale fishing would be very harmful.\(^\text{104}\) It did not appear that anyone offered a good compromise solution. With no ability to do anything more sophisticated, sometimes a ban is the only viable option in the short term.\(^\text{105}\) The *Cockle Fishers* ban was reviewed every year, over fishing seasons of just four months.\(^\text{106}\) Although there are not enough court cases

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\(^\text{101}\) Sunstein, *supra* note 52, at 1023; *see also* Case C-77/09, Gowan, 2010 E.C.R. I-13533, ¶ 69.

\(^\text{102}\) *Communication on the Precautionary Principle, supra* note 12, ¶ 6.3.1.

\(^\text{103}\) *Id.* ¶ 2; *cf.* Majone, *supra* note 17, at 92 (claiming that erring towards a more conservative precautionary approach will always lead to a zero risk policy).


\(^\text{105}\) *Communication on the Precautionary Principle, supra* note 12, ¶ 6.3.1.

\(^\text{106}\) By its decisions in 1999 and 2000, the national authority issued licenses for the period from mid-August through November of the respective year. Case C-127/02, Cockle Fishers, 2004 E.C.R. I-07405, ¶ 11.
to really define the boundaries of the Habitats Directive, we should assume that zero risk approaches are rare exceptions. They should tend to feature unlimited downside risk, no alternative solutions, and frequent re-evaluation.

Finally, the minimax approach might be the most serious pitfall of the precautionary principle. Minimax is the decision process whereby one tries to foreclose worst possible scenarios, no matter how small the actual likelihoods.\(^{107}\) Activities that carry rare but catastrophic risks (a common example being generation of nuclear power) might be categorically ruled out. Minimax is undesirable as a policy because it fails to consider relative probabilities of risk. Without a real cost-benefit calculation, minimax can lead to decisions that are economically inefficient. It panders to public fears in the sense that it targets the most vivid risks that elicit the strongest emotions,\(^ {108}\) yet it does not balance the severity with the actual probability.\(^ {109}\) The minimax approach is not based on a system of objective reason.

Courts may be able to control the worst of the minimax cases under the doctrine of hypothetical risk. That is, if a risk is sufficiently remote, the court can rule that it is hypothetical and that it is not appropriate justification for precautionary action. But if a choice falls within the range of valid political discretion, there is nothing in the precautionary principle to prevent minimax reasoning. It will take new jurisprudence to regulate this area of the precautionary principle.

VII. INCREASING PERCEIVED LEGITIMACY OF THE PRECAUTIONARY PRINCIPLE

In this article, I have tried to show that the EU’s approach to the precautionary principle is a scientifically reasoned and logically consistent system of decision making. Most of the questions and criticisms that are directed at the principle can be answered if we interpret the principle in accordance with fundamentals of EU law. There are problems at the fringes, but the precautionary principle on the whole is not as inconvenient as some scholars have feared. Even so, there is lingering uneasiness sur-

\(^{107}\) Sunstein, supra note 52, at 1033.
\(^{108}\) Id. at 1045.
\(^{109}\) Majone, supra note 17, at 102.
rounding the principle, mainly to do with a lack of public trust and the vast political discretion that is still in the hands of the institutions. Political power has not been a major focus of court decisions because it is not easily reviewed, and yet, it is an unmistakable stumbling block for the precautionary principle.

Political discretion appears, for example, in the weighing of non-economic factors. The Commission reserves the power to consider things like public sentiment in addition to traditional economic indicators when making decisions.\textsuperscript{110} There is but one clear limit to political discretion: In a case of hypothetical risk, no precaution is allowed. Otherwise, it is very difficult for legal mechanisms to curb unwise political decisions. As we have said already, overreliance on unquantifiable measures can lead to suboptimal results.

Some authors have complained that there is already too much discretion in play. Left unconstrained, the lawmaker can abuse the precautionary principle by making arbitrary, discriminatory, or corrupt decisions. Heyvaert, for one, argues that the courts have been much too permissive and that they will throw the precautionary principle into disrepute if they fail to strike down an action soon.\textsuperscript{111} I would not disagree that the precautionary principle needs to have visible and meaningful boundaries, however, one can never really escape subjectivity, since even pure risk assessments belie value judgments other than science.\textsuperscript{112} As long as the EU is committed to keeping the precautionary principle, it will have to make citizens comfortable with some inherent subjectivity.

Trust in the EU institutions can be increased. Students of EU law are all familiar with the debates about lack of transparency and accountability in the EU, or what we call the “democratic deficit.” These are problems that need to be fixed in order to increase political legitimacy. One solution in the short to medium term is to give a bigger role to the European Parliament. Because the Parliament is the EU’s sole directly elected body, it responds to a kind of mandate that the other institutions simply do not have. It is better positioned, at least in theory, to resist improper politi-

\textsuperscript{110} Communication on the Precautionary Principle, supra note 12, § 6.3.4.
\textsuperscript{111} Heyvaert, supra note 40, at 201.
\textsuperscript{112} Maria Lee, Beyond Safety? The Broadening Scope of Risk Regulation, 62 CURRENT LEGAL PROBLEMS 242, 248 (2009).
cal influences. The Parliament currently has no role in the implementation of precaution, and I cannot speculate as to what role it may gain in the future, but the Parliament’s legitimising influence has already been seen in other traditionally executive areas.

In late 2009, the Council concluded to the first interim SWIFT agreement, whereby it agreed to pass financial transaction data to the US government to support the on-going hunt for terrorist suspects. It was clear that such sharing of private data was illegal under most member states’ national laws, but national governments were afraid of being blamed by the Americans for security disasters if they did not cooperate.\(^{113}\) Only Germany did not support the final vote in the Council.\(^{114}\) The interim SWIFT agreement became one of the more infamous examples where the EU is said to have failed to defend basic rights of citizens.

In 2011, after the Lisbon Treaty entered into force, the Parliament was asked to vote on a permanent version of the SWIFT agreement. Despite direct and heavy pressure from senior American politicians, the Parliament rejected the agreement.\(^{115}\) The Parliament cited concerns about misuse of private information and violation of the rule of law and personal privacy. The Parliament showed that it could turn aside diplomatic pressures and respond to the concerns of citizens in a way that the Council did not. The Parliament felt free to live up to its reputation as being more democratically accountable, and in doing so, it achieved a result that was more in line with the ideals of EU law.

The Parliament can bring the same legitimising influence to the precautionary principle. The Parliament has been more willing, after Lisbon, to assert its voice. If it were to get involved with the implementation of precaution, there would be more credence to the claim that precautionary actions were working for the benefit of citizens. However, this will not be easy for the


Parliament to do. First, the secondary legislation, as we have discussed before, must be changed to involve the Parliament in decision-making procedures. Then, the Parliament itself will have to acquire the resources and the expertise to be able to make meaningful policy contributions. The Parliament is probably not prepared to do so at the moment,\(^{116}\) but change may come if trust in the precautionary principle reaches a crisis point.

VIII. CONCLUSION

Studying the precautionary principle is like looking at EU law in miniature. Not only is it enshrined in the TFEU, it also implicates important values of EU law, such as proportionality, economy, and reasoned justification. That the precautionary principle has received so much attention shows that there is much at stake in its interpretation.

I think it is most accurate to interpret the precautionary principle as a collection of practices derived from a small set of fundamental principles. The generally strong level of precaution, the dislike of hypothetical risk, and the prescription for role of science all align with our generally accepted ideas of good law-making. Therefore, the precautionary principle is not so hard to understand, at least in its ideal form. Things are more difficult in reality because good policy is not always practicable, either technically or politically. Certain criticisms against the principle are still particularly hard to answer. Of these, the zero risk approach and minimax approach are the most serious. Good governance and strong public scrutiny are needed to ensure that discretionary powers are not abused. Finally, the precautionary principle suffers under the larger problem of the democratic deficit. Neither the precautionary principle nor the EU will improve its legitimacy until it is perceived to put the public first.

\(^{116}\) The Parliament is often the least prepared institution when it comes to technical and legal aspects of EU policy. Chalmers explains this in the context of Trilogue, the increasingly common procedure whereby the Commission, Council, and Parliament get together to hash out compromise legislation. In that setting, the Parliament is mostly unable to make a valuable contribution. Damian Chalmers, *Justifying Institutional Accommodation*, 2008 EUR. L. REV. 455, 455 (2008).