The European Journal of International Law Vol. 24 no. 3

Book Reviews

Caroline Foster. ***Science and the Precautionary Principle in International Courts and Tribunals. Expert Evidence, Burden of Proof and Finality***. Cambridge: Cambridge University Press, 2011. Pp. 400. £74. ISBN: 9780521513265.

Caroline Foster's book constitutes an important addition to the literature on international tribunals and the inter-linkage between science and law in the international domain. The book includes a detailed analysis of the place of scientific evidence in international disputes, the role of adjudicators and experts, and the way in which these issues are influenced by the precautionary principle. The book addresses a wide range of disputes and venues, ranging from the World Trade Organization (WTO) to the International Court of Justice and the International Tribunal for the Law of the Sea. The detailed analysis of the different methods through which varied international tribunals deal with scientific evidence (e.g., party-appointed independent experts, cross examination, site visits, court-appointed experts) advances our understanding of the function and dynamics of international tribunals. To give one example, Foster describes the system that was devised by WTO panels for taking expert evidence even though the WTO dispute settlement understanding (DSU) is silent about this issue (at 114–123). One innovative mechanism that was created by the panels is the 'joint meeting' (at 115–116). Joint meetings with experts are generally held between the two substantive meetings between the Panel and the parties, take place over a 1 to 2 day period, and are attended by the panel members, its experts, and the parties and their experts. While these meetings do not constitute a full-blown adversarial process they offer the parties and the panel the opportunity to put the opposing scientific views to deliberative scrutiny.

The book advances three recommendations in relation to how the precautionary principle is to be accommodated within international adjudicatory processes (at xvii, 343–44). First the author argues that we should welcome the precautionary influence wielded through expert scientific evidence (whether this be scientific evidence from parties' appointed experts or evidence from court-appointed experts). Secondly, international courts and tribunals should give consideration to modifying the way they apply the rules on burden of proof in order to accommodate the precautionary principle in exceptional cases. This could be achieved, Foster argues, through the exercise of courts' and tribunals' inherent powers, and would best take the form of a precautionary *prima facie* case approach (lightening the load of the party whose case relies on the precautionary principle through a reversal of the burden of proof). Finally, Foster argues that international courts and tribunals should make provision within the decisions for the reassessment of cases where it is asserted that subsequent scientific developments may affect the basis of a decision.

[1] See, e.g., Von Bogdandy and Venzke, 'Beyond Dispute: International Judicial Institutions as Lawmakers', in A. von Bogdandy and I. Venzke, *International Judicial Lawmaking* (2012); Venzke, 'The Role of International Courts as Interpreters and Developers of the Law: Working Out the Jurisgenerative Practice of Interpretation', 34 *Loyola of LA Int'l & Comp L Rev*, (2011) 89; Ginsburg and Shaffer, 'How Does International Law Work?: What Empirical Research Shows', in P. Cane and H. Kritzer (eds), *Oxford Handbook of Empirical Legal Studies* (2010), at 753.

While the detailed analysis of court practice regarding expert evidence provides a valuable contribution to the literature,[1] the normative recommendations promulgated in the book are less convincing and do not give justice to the theoretical complexity underlying the science–policy nexus and the precautionary principle. Consider first Foster's theoretical approach to expert evidence (discussed in Chapter 3). Foster rightly notes that the complexity of the scientific issues that are being discussed in international disputes requires heavy consultation with experts and creates considerable dependence on their testimony (at 77). But to what extent is such reliance epistemologically warranted? She notes in this context the general scepticism towards expert witnesses operating in an adversarial context. The pressures associated with the adversarial process may lead an expert even subconsciously to adopt approaches that are consonant with those of the appointing party (at 77). This problem reflects what the literature on expert evidence has termed 'commissioning bias'.[2] This bias reflects both the desire (which may be subconscious) of the expert to serve the interest of the client who pays his or her fees and selection bias, which reflects the fact that the litigants are looking for experts whose position corresponds to their needs; expert selection is thus not necessarily determined by scientific merit or academic status in the scientific community. At the extreme the commissioning bias may reflect the complete subjugation of the expert to the strategic needs of his team.[3]

However the commissioning bias does not exhaust the list of biases that could influence expert evidence and undermine its epistemological robustness. A second problem concerns the susceptibility of experts to *hindsight bias* and *outcome bias*. Hindsight bias reflects the fact that finding out that an outcome has occurred increases its perceived likelihood.[4] Outcome bias refers to the influence of outcome knowledge upon evaluations of decision quality and the potential responsibility or culpability of the decision-maker for the outcome.[5] The difference between the two biases lies therefore in the fact that hindsight bias relates to retrospective estimates of predictability of an event and not to judgment of responsibility. Both biases can undermine the epistemic robustness of an expert's evidence.

More relevant to the international context is the general phenomenon of motivated reasoning. Motivated reasoning reflects the fact that the process of belief acquisition does not necessarily aim at truth, but rather takes the form of directional reasoning, which is dominated by an attempt (possibly subconscious and emotively charged) to vindicate one's prior opinions. The problem of motivated reasoning was demonstrated in the context of both laypeople's and experts' reasoning.[6] It could be reflected both in confirmation bias and in disconfirmation bias. Confirmation bias refers to 'unwitting selectivity in the acquisition and use of evidence', that is to 'the seeking or interpreting of evidence in ways that are partial to existing beliefs, expectations, or a hypothesis in hand'.[7] Disconfirmation bias refers to the fact that people seem unable to ignore their prior beliefs when processing counter-arguments or counter-evidence.[8] In the international context the problem of motivated reasoning could, for example, hinder the objectivity

2 Hugh and Dekker, 'Hindsight Bias and Outcome Bias in the Social Construction of Medical Negligence: A Review', 16 *J L & Medicine* (2009) 846, at 851; Harris, 'Testimony for Sale: The Law and Ethics of Snitches and Experts', 28 *Pepperdine L Rev* (2000) 1, at 3.

3 Sperling, 'Expert Evidence: The Problem of Bias and Other Things', 4 *Judicial Rev* (1999) 429.

4 Fischhoff, 'Hindsight=/Foresight: The Effect of Outcome Knowledge on Judgment Under Uncertainty', 1 *J Experimental Psychology* (1975) 288.

5 Hugh and Dekker, *supra* note 2, at 849.

6 See Giannelli, 'Confirmation Bias', 22 *Crim Justice* (2007) 60; Giannelli, 'Independent Crime Laboratories: The Problem of Motivational and Cognitive Bias', *Utah L Rev* (2010) 247. For studies looking at lay citizens see Nickerson, 'Confirmation Bias: A Ubiquitous Phenomenon in Many Guises', 2 *Rev General Psychology* (1998) 175.

7 *Ibid.*

8 Taber *et al.*, 'The Motivated Processing of Political Arguments', 31 *Political Behavior* (2009) 137, at 137.

of experts' evidence on environmental issues. A precautionary approach could reflect ideological motivations rather than objectively formulated scientific advice. Further, this bias may well work subconsciously, making it impossible for the expert to neutralize it through introspective reflection.

The problem with the last two biases is that they cannot be countered simply through measures that guarantee the ethical integrity and professional credentials of the expert. This does not mean that experts have no role in adjudicatory processes. Rather, it means that more work should be done on studying and developing potential de-biasing mechanisms. Unfortunately the psychological literature on de-biasing is still in its early days (despite the huge progress that has been achieved in identifying and analysing the varied cognitive biases that affect expert reasoning).[9] Some progress has been achieved in this context in the medical field with the use of various techniques such as Cognitive Forcing Mechanisms and Systemic Changes to the physician–patient interaction.[10] The challenge with using experts in courts seems to lie, therefore, not so much in the intervention of experts in questions of law (as emphasized by Foster at 78, 134), but in the fact that their evidence on questions of fact is closely intertwined with their value commitments, in a way which is not easy to uncover.

My second difficulty with Foster's theoretical framework concerns her articulation of the precautionary principle (PP), and in particular her emphasis on the shift in burden of proof, what she calls 'the practice of precautionary reversal' (at ch. 6, 344). I think that Foster's discussion of the PP understates the theoretical complexities associated with this principle. This is not merely a theoretical issue. It could also undermine the pragmatic appeal of her policy recommendations (at 254–258). The main challenge underlying the PP concerns the need to achieve a balance between the projected risk(s) the PP seeks to prevent (e.g., risks associated with new technology or some other human-induced hazard such as climate change) and the costs (foregone benefits) that would be incurred by society if the PP were used to forestall new technology or to bar economic development.[11] This balancing is made complex by the fact that, by its very nature, the PP applies only to cases of deep uncertainty; that is, cases in which it is not possible to attach probabilities to either the risks targeted by the PP or the costs of the regulatory intervention (costs that reflect either the foregone benefits from banning some novel technology or unanticipated adverse outcome generated by the regulatory intervention itself). In some cases we do not even possess a clear understanding of all possible future trajectories involving certain technologies (regarding both their risks and benefits).[12] This basic dilemma does not receive sufficient emphasis in the book. Further, taken as a legal principle, the PP should, theoretically, provide decision-makers with a consistent set of guidelines which would allow them to take action in situations that fall under the PP. The literature on the PP and the interpretation of the PP in various legal rulings (at both the international and national levels) have failed to provide such a consistent reading of the PP.

[9] Lilienfeld *et al.*, 'Giving Debiasing Away: Can Psychological Research on Correcting Cognitive Errors Promote Human Welfare?', 4 *Perspectives on Psychological Science* (2009) 390.

[10] Croskerry, 'Perspectives on Diagnostic Failure and Patient Safety', 15 *Healthcare Q* (2012) 50; Ely *et al.*, 'Checklists to Reduce Diagnostic Errors', 86 *Academic Medicine* (2011) 307; Pham *et al.*, 'Reducing Medical Errors and Adverse Events', 63 *Annual Rev Medicine* (2012) 447, at 455.

[11] Hansen and Tickner, 'The Precautionary Principle and False Alarms – Lessons Learned', in D. Gee *et al.* (eds), *Late Lessons from Early Warnings: Science, Precaution, Innovation*, EEA Report No. 1/2013, at 49. Sunstein, 'Beyond the Precautionary Principle', 151 *U Pennsylvania L Rev* (2003) 1003; Perez, 'Precautionary Governance and the Limits of Scientific Knowledge: a Democratic Framework for Regulating Nano-Technology', 28 *UCLA J Environmental L & Policy* (2010) 29.

[12] See Langlois and Cosgel, 'Frank Knight on Risk, Uncertainty, and the Firm: A New Interpretation', 31 *Economic Inquiry* (1993) 456.

The attempt to interpret the PP as calling for a shift in the burden of proof does not solve the matter. First, when should the burden be shifted? Foster is aware of the need to specify the conditions under which such shift would be called for, noting that, 'depending on the state of scientific knowledge, a sufficiently well-supported assertion that the alleged pollution or overuse of resources was serious, and might have potential irreversible consequences, could render that party's claim eligible to benefit from a reversal of the burden of proof by virtue of the precautionary principle' (at 255, see also at 344). But this claim is clearly problematic. First, it is vague (what is the meaning of the following phrases: 'sufficiently well-supported', 'serious', and 'irreversible'?). Secondly, its theoretical underpinnings are not clear. What is the basis for focusing on irreversible and serious hazards – does she mean by that limiting the PP to catastrophic risks (a constraint supported by some scholars which is, however, incompatible with current interpretations of the PP)? Further, Foster's interpretation neglects the indirect costs of invoking the PP in terms of benefits foregone (especially in cases of 'false positives').

Thirdly, what exactly is implied by the shift in burden of proof? Suppose that in a dispute in the WTO, the burden is shifted to the country that seeks to export a product (e.g., GMO product) that was banned by the importing country on precautionary grounds because it was deemed unsafe, based on very embryonic scientific research. What are the standards that should be met by the exporting country as it seeks to prove that its product is safe? It is simply impossible to prove that something is 100 per cent safe – but without explicating what the standards are that would govern such exercise the idea of shifting the burden ultimately amounts to an empty doctrinal gesture. For example, for the International Agency for Research on Cancer (IARC) to classify a chemical as 'probably not carcinogenic to humans', there is a need for 'strong evidence that it does not cause cancer in humans'. Only one substance has been listed as such.[13] If the standards of proof were too lenient, the shift would have no impact (since proponents of new technologies would have no problem satisfying them), and if they were set too high, that could exert a heavy price on society in terms of benefits foregone (because it would lead to too many bans on new technology). It seems that in itself the idea of shifting the burden of proof does not take us very far.

Ultimately what this brief discussion may indicate is that the search for a universally applicable interpretation of the precautionary principle is simply futile. What we should aim for are contextual, tailor-made approaches which respond to the peculiarities of the dilemmas that fall under the regulatory radar and deal directly with the various questions underlying the PP. Caroline Foster's book, in its depiction of the diverse approaches of international tribunals to this regulatory challenge, could be seen in effect as a vindication of this approach. Overall, as I noted in the introduction, this book provides an important addition to the literature on international tribunals and on the inter-linkage between science and law. Foster's book succeeds in taking the debate on these difficult issues a step further.

Oren Perez

Faculty of Law, Bar-Ilan University Israel,
Email: oren.perez@biu.ac.il

doi:10.1093/ejil/cht056

[13] See http://monographs.iarc.fr/ENG/Classification/. The substance is Caprolactam. It is used in the manufacture of synthetic fibres. Acute (short-term) exposure to this substance may cause some short-term adverse effects, but no long-term effects. See further www.epa.gov/ttnatw01/hlthef/caprolac.html. Hansen and Tickner, *supra* note 11, at 53.