Epistemic Subsidiarity – Coexistence, Cosmopolitanism, Constitutionalism

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Harmonization is an essential instrument of international risk governance. It is the process through which disparities among national regulatory standards are ironed out, producing uniform outcomes that all participants in a regime can accept and that facilitate the free exchange of regulated goods in commerce. Contrary to conventional belief, however, harmonization requires not only technical but also political cooperation, since standards themselves are not direct mirrors of reality but are co-produced responses to technoscientific and political uncertainty. Attempts to harmonize standards across national borders therefore pit alternative political cultures and their systems of public reasoning against one another. Put differently, harmonization calls into question the underlying models of subsidiarity that provide the foundation for robust international regimes. This paper examines three models of epistemic subsidiarity – coexistence, cosmopolitanism, and constitutionalism – and discusses each scheme's capacity to protect a nation's fundamental political commitments while advancing the goals of international risk governance.

I. Introduction

Risk governance has long been recognized as a hybrid process requiring the joint resolution of matters of fact and matters of value. Though official policy discourses still speak in terms of "sound science" as a basis for policy, as if science is accountable only to its own endogenous criteria of validity, the production of expert knowledge and its incorporation into policy decisions are known to be value-laden in many respects. Science advisers function in effect as policymakers[1] and regulatory standard-setting involves significant measures of political choice and judgment.[2]

Cross-national divergences in chemical risk assessment provide dramatic evidence that the incorporation of science into policy is in no way value-neutral. A widespread presumption in the 1970s was that nations with broadly similar economic and political systems, and equivalent commitments to scientific and technological development, would converge in their evaluation of the risks of hazardous products and processes, such as industrial chemicals, pesticides and food additives. National authorities would, after all, be relying on the same science, and the risks of injury to human health and the environment would also be commensurable everywhere, leading to similarly protective standards and measures. Instead, it emerged that the "same science" did not produce the same assessments of risk across national or supranational agencies.[3] Politics mattered. Differences in the structured relationships between governments and major interest groups influenced the substantive focus, intensity and outcomes of scientific debates in risk-based standard-setting. A conclusion emerged from the first generation of cross-national comparative research in the 1980s that the adversarial U.S.

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1 Sheila Jasanoff, *The Fifth Branch: Science Advisers as Policymakers* (Cambridge, MA: Harvard University Press, 1990)

2 Geoffrey C. Bowker and Susan Leigh Star, *Sorting Things Out: Classification and Its Consequences* (Cambridge, MA: MIT Press, 2000); Lawrence Busch, *Standards: Recipes for Reality (Infrastructures)* (Cambridge, MA: MIT Press, 2011).

3 Ronald Brickman, Sheila Jasanoff, and Thomas Ilgen, *Controlling Chemicals: The Politics of Regulation in Europe and the United States* (Ithaca, NY: Cornell University Press, 1985); David Vogel, *National Styles of Regulation: Environmental Policy in Great. Britain and the United States* (Ithaca, NY: Cornell University Press, 1986).

policy process led, on the whole, to closer scrutiny of scientific evidence and (in many cases) earlier, if not stricter, regulation than the more corporatist and cooperative political cultures of Europe.

Times change and new issues appear on the agendas of policy and scholarship. The fall of the Iron Curtain in 1989 accelerated a worldwide push toward deregulation and use of market incentives to achieve policy objectives. Not coincidentally, the era of privatization brought with it scandals in risk governance accompanied by loss of trust in governmental bodies and rising concern with public and private irresponsibility. The "mad cow" crisis afflicting Britain from the mid-1980s to the mid-1990s offers a paradigm case. Widely blamed on lowered standards and lax supervision in agriculture and food production,[4] that event led to major shifts in UK risk governance, including the dissolution of the Ministry of Agriculture, Fisheries and Food, the formation of a new Food Standards Agency, and increased calls for public engagement in decisions involving science and technology. At the same time, innovation became a policy buzzword as post-industrial economies sought to generate new ideas to jump start a new era of productivity. In turn, rapid developments in the life and information sciences created new ethical worries alongside older concerns about physical and environmental health and safety. The Human Genome Project, launched in the 1990s and declared roughly complete in 2000,[5] triggered the formation of programs to review Ethical, Legal and Social Implications/Aspects (ELSI/ELSA) of developments in biomedicine. Turn-of-the-century controversies involving new and emerging technologies, such as nanotechnology and synthetic biology, also called attention to the fact that policy is not just a matter of making decisions from the top down but a matter of getting publics to accept those decisions from the bottom up. Risk governance, in consequence, demands attentiveness not only to the production of policy-relevant knowledge but also to its public reception.

Out of this history, new questions emerged. Why were Europeans apparently less risk averse than Americans with respect to nuclear power, chemicals and cancer in the 1970s but more risk averse with respect to genetically modified organisms (GMOs) in the 1990s? Why did the precautionary principle find a warmer welcome in European law and policy than in the US regulatory environment? Standard narratives point to differences in the relative maturity of political debates on the two sides of the Atlantic, noting that technical controversies had something of a head start in the United States.[6] Others have suggested that the objection to GMOs in particular could be attributed to a whole range of factors, such as European protectionism, public ignorance or media hype. These explanations, however, do not hold up against careful empirical scrutiny. For example, the protectionism argument fails to note that European governments were often solidly supportive of GMO imports but met with intransigent public resistance. Nor is there persuasive evidence that publics were significantly better or worse informed across Western countries; indeed, survey research at the turn of the century indicated that the majority of American consumers remained unaware of the widespread presence of GMOs in staple foods derived from corn and grain.[7] It was not until 2013 that Wholefoods, a major American retailer, announced that it would label all GM foods.[8]

A more promising explanatory strategy focuses on the divergent processes by which policy-relevant knowledge is translated into regulatory decisions. Nations differ systematically in their strategies of public reasoning[9] – that is, how policy-relevant knowledge is generated, how it is evaluated for policy purposes, how scientific disputes are resolved, and how lay publics are engaged in decision-making. These public epistemic practices, which constitute an important (if often overlooked) dimension of political culture,[10] have a significant impact on citizens' perceptions of the reliability of the state's regulatory actions. Indeed, one can argue that public opposition to risky

4 Report, evidence and supporting papers of the inquiry into the emergence and identification of bovine spongiform encephalopathy (BSE) and variant Creutzfeldt-Jakob Disease (vCJD) and the action taken in response to it up to 20 March 1996 (The BSE inquiry) (London: The Stationery Office, 2000), available on the Internet at <http://www.bseinquiry.gov.uk> (last accessed on 18 April 2013).

5 Nicholas Wade, "Scientists Complete Rough Draft of Human Genome", New York Times, 26 June, 2000.

6 Dorothy Nelkin (ed.), *Controversy: Politics of Technical Decisions*, 3rd ed. (Thousand Oaks, CA: Sage Publications, 1992).

7 PEW Charitable Trusts, "Pew Initiative on Food and Biotechnology Finds Public Opinion About Genetically Modified Foods 'Up For Grabs'", Washington, DC, 26 March, 2001, available on the Internet at <http://www.pewtrusts.org/news_room_detail.aspx?id=33482> (last accessed on 18 April 2013).

8 Stephanie Strom, "Major Grocer to Label Foods With Gene-Modified Content", New York Times, 8 March 2013, p. A1.

9 Sheila Jasanoff, *Science and Public Reason* (Abingdon, Oxon: Routledge, 2012).

10 Sheila Jasanoff, *Designs on Nature: Science and Democracy in Europe and the United States* (Princeton: Princeton University Press, 2005).

technologies is never a matter of whim or ignorance. Far more, such resistance signals a failure of public reason – or, put differently, a breakdown in the processes through which citizens are persuaded of the governability of technological hazards. Investigating such events in detail leads to better understanding of what polities value not only about living with particular risks but also about how to choose which risks are worth accepting.

Including the processes of public reasoning within the scope of risk governance studies carries significant implications for scholarship and, potentially, for policymaking. This move tends to broaden attention from a primary focus on the risks of relatively familiar and widely distributed technologies, such as pesticides or pharmaceuticals, to risks surrounding new and emerging technologies. It allows us to explore not only differences in risk perception but also different approaches to governance and their implications for national and transnational innovation trajectories. The products and processes that nation states choose to promote through biotechnologies, nanotechnologies, synthetic biology, and even computer science and technology relate back in complex ways to the social goods their publics feel they need and want, and can accept without intolerable cost. Technology, in this sense, operates as the material manifestation of collective preferences, shaped and governed by what we may term national sociotechnical imaginaries.[11]

Methodologically, cross-national comparison offers one of the most powerful techniques for discerning the frameworks of public reasoning that underlie risk governance. Comparative research illuminates how regulatory systems, and the actors who perform them, frame and weigh the risks and benefits of technological developments. Comparative case studies of actual regulatory practices make visible alternative political strategies for imagining futures and coping with uncertainties. Through comparison, we get a clearer picture of the institutional designs that nation states have adopted in assessing and allocating the risks and costs of technological development. These design features include explicit and tacit rules for producing evidence, soliciting expert advice, and securing public participation. Comparison thus underscores a fundamental finding with regard to risk governance: that risk policy is never a purely technical exercise but rests instead on deeply value-laden choices with respect to how a polity wishes to be governed, especially in an era when invention and progress demand the sacrifice of absolute certainty.

II. Epistemic subsidiarity

The foregoing analysis underlines the need to revisit the principles of subsidiarity in risk governance. Most generally, subsidiarity is a device adopted in systems of constitutional governance – whether national or transnational – in order to protect spaces for the expression of local values and local autonomy. Subsidiarity requires political decisions to be made at the lowest feasible level of governance so as not to override deep-seated communal sensibilities, such as those concerning religious preferences, lifestyle choices and intra-familial dynamics. In liberal states, top-down interventions, whether through command and control regulation or the softer device of nudging,[12] are felt to be inappropriate for such matters. Yet, as the continuing debates surrounding the teaching of "creationism" in American public schools vividly demonstrate, science is regarded by modern societies as a valid basis for overriding even highly personal claims of religious freedom in the public sphere. Public schools are not allowed to teach creationist doctrines because they surreptitiously import private religious belief into what should be value-neutral public space.[13] Similarly, interventions grounded in science are accepted as justified even when they entrench on bodily privacy, for example requiring vaccination of schoolchildren or taking DNA samples from suspected criminals.[14]

Turning to the international system, I have argued that the ways in which nation states organize their administrative law, or more broadly their modes of public reasoning, reflect precisely the kinds of time-tested communal norms that the principle of subsidiarity seeks to protect.[15] In this sphere, there is

11 Sheila Jasanoff and Sang-Hyun Kim, "Containing the Atom: Sociotechnical Imaginaries and Nuclear Regulation in the U.S. and South Korea", 47 *Minerva* (2009), pp. 119 *et sqq*.

12 Richard Thaler and Cass Sunstein, *Nudge: Improving Decisions about Health, Wealth, and Happiness* (New Haven: Yale University Press, 2008).

13 *Tammy Kitzmiller, et al. v. Dover Area School District, et al.*, 400 F. Supp. 2d 707 (2005).

14 David E. Winickoff, "Judicial Imaginaries of Technology: Constitutional Law and the DNA Round Up", in Sheila Jasanoff (ed.), *Reframing Rights: Bioconstitutionalism in the Genetics Age* (Cambridge, MA: MIT Press, 2011).

15 Jasanoff, *Designs on Nature*, *supra* note 10.

a special need to recognize a principle of "epistemic subsidiarity," one that respects the "how" (and not merely the "what") of risk governance. A polity's commitment to particular policy styles reflects complex judgments about how to authorize rulership when of necessity many governmental decisions are highly technical and hence not accessible to the public as a whole. There are strong reasons to respect these historical settlements in administrative law and practice, and not to supersede them through homogenized procedural routines founded on mistaken beliefs about the scientific purity of risk assessment. In an increasingly secular age, people's preference for styles of reasoning ought to be accorded the same kind of protection that we accord, for example, to a state's constitutional choices regarding how to organize the branches of government or how to vote in popular elections. At the very least, there should be good grounds for replacing national processes of risk governance with harmonized approaches premised on the faulty presumption that the assessment of hazards is a matter of science alone. Epistemic subsidiarity is the principle that protects legitimate local and national preferences for institutionalized modes of public reasoning.

Some examples may clarify the argument. It is well recognized that America has a pluralist political system, in which policy-relevant facts are typically developed through adversarial proceedings, whereas Germany operates with more of a corporatist system, in which such knowledge is arrived at through negotiation among major political interests.[16] But those structural dissimilarities translate in turn into hosts of lower level epistemic choices and strategies. Thus, the US policy process takes considerable pains to produce objective knowledge and "sound science" in support of regulatory decisions.[17] German advisory procedures, by contrast, are geared more toward producing a kind of reasoning that is in German terms "nachvollziehbar," that is "transparently repeatable." That is not a recognized concept in American administrative law, where the goal is sooner to get to the truth of the matter than to achieve "communicative reason" in the sense elaborated by the German political philosopher Jürgen Habermas.

Further, though all democratic societies provide for some form of public participation in risk governance, the basis for participation varies from state to state. Thus, US regulation typically seeks to involve "stakeholders," a term conventionally associated with holding a personal interest, often economic, in the matter at hand; accordingly, American regulatory statutes often grant participatory rights to "interested and affected parties." In other political cultures, the right to participate derives more from a designated position in the social order than from having a personal stake in an issue – for example, through membership in a labour union, business organization, professional society, or relevant public interest group. Risks and benefits, too, are framed and balanced in disparate, culturally conditioned terms, leading to divergences in policy. A salient example occurred in the early history of biotechnology regulation, when US policymakers deemed that the *process* of genetic modification posed no new risks and only *products* had to be assessed for safety.[18] European countries took a different position, regarding the process itself as uncertain and risky enough to require more precautionary regulatory approaches.

It is against this backdrop of national particularities that we can talk about three possible modes of achieving epistemic subsidiarity: coexistence, cosmopolitanism and constitutionalism. These are not hypothetical frameworks but are empirically grounded in actual, current regulatory practices. Each one is concerned with the protection of local specificity in a world of connections, networks and flows, but each represents a different approach to the management of frictions between systems. Coexistence is a regime in which disparate epistemic and political settlements are permitted to exist side by side, without subordination of one to another. Policy attention then focuses on border management, to ensure that unauthorized cross-border movements do not occur. Cosmopolitanism, as understood in the legal and political literatures,[19] requires a greater reciprocity of obligations. It is a regime of mutual recognition or mutual acknowledgement, raising questions about what needs to be harmonized and what can be left divergent. Constitutionalism locates difference within an overarching normative structure, which specifies duties and obligations across jurisdictions. The source and nature of these norms then becomes

16 Brickman et al., *Controlling Chemicals*, *supra* note 3.

17 Jasanoff, *The Fifth Branch*, *supra* note 1.

18 Sheila Jasanoff, "Product, Process, or Programme: Three Cultures and the Regulation of Biotechnology", in Martin Bauer, ed., *Resistance to New Technology* (Cambridge: Cambridge University Press, 1995), pp. 311–331.

19 Ulrich Beck, *The Cosmopolitan* Vision (Cambridge: Polity Press, 2006).

the regime's central problem. Let us turn now to the articulation of these three regimes in the context of risk governance.

1. Coexistence

Coexistence is the policy adopted in the European Union (EU) to ensure that growers and consumers remain free to choose between GMOs and non-genetically modified agricultural products – a choice that would be precluded if GMOs infiltrated non-GM crops. The framework of coexistence does not permit different levels of risk to exist for authorized GMOs but rather allows for the parallel existence of different agricultural and dietary preferences across the EU. Coexistence is a regime of minimal mutual obligation: it merely requires states to ensure that their risk governance choices do not compromise those of any other nation.

In effect, however, the very idea of coexistence accommodates a kind of epistemic subsidiarity with respect to risk governance, since each member state's balancing of GM and non-GM agriculture rests on national assessments and national political settlements regarding the risks, costs and benefits of GM technology. Such balancing can result in quite different pathways of technological development. The UK response to the GMO debate of the 1990s, for example, addressed uncertainties that were substantively different from those that preoccupied the United States and other EU member states. Policy uncertainty focused not only on the health and environmental risks presented by the products themselves but also on questions about how to govern risks such as those posed by GMOs democratically. *GM Nation?* (the question mark is significant), a nationwide public consultation conducted in 2003, was a substantial innovation in the British regulatory process, which previously tended to limit consultation to pre-selected members of the public. In turn, *GM Nation?* opened up a series of downstream debates about how best to get publics engaged in sociotechnical decision-making.[20] A specific debate arose, for instance, about the relative merits of "invited" and "uninvited" participation.[21]

These discussions have few close parallels elsewhere. German debate across a wide swath of risk governance decisions focused, by contrast, on the nature and extent of the state's legislative responsibility to articulate clear standards. Much of the German public's historical and contemporary scepticism about risk regulation, whether about air pollution, nuclear power or biotechnology, has focused on understandings about what the state should provide in the way of assurance, certainty and clarity. Legislation, correspondingly, tends to be directed toward ensuring that there are no gaps in the state's responsibility to offer citizens protection against unregulated and indeterminate harms. If Germany has concluded that legislation and clear standards can offer adequate public reassurance with respect to GM agriculture, the Austrian response in the cases of agricultural biotechnology and nuclear power offers a sharp counterpoint. Austrian politics and policy have insisted on that nation's autonomy to decide which technologies are acceptable for Austria, and thus have kept certain technologies out of its territorial borders. Thus, variations in assumptions about democratic governance have shaped the politics of coexistence in the European context and across Western countries more broadly.

Turning to North America, US biotechnology policies did not arise from attempts to accommodate competing preferences, such as pro-GM and GM-free. In the US context, where there are longstanding precedents for social mobilization on risk issues and citizens decide whether or not to participate in regulatory proceedings, there was likewise no need for explicit invitations to public engagement. US risk policy initially bypassed the problem of coexistence by framing the central governance issue as one of containment – that is, keeping hazards within acceptable bounds. This was a device for allowing hazardous technologies to enter the market without harming or unduly alarming the public. The idea of containment dates back to the post-war effort to develop nuclear power ("atoms for peace" in President Dwight D. Eisenhower's language) independently of the weapons program, or atoms for war.[22] Containment was later adapted for GMO regulation at the 1975 Asilomar meeting, where influential molecular

20 Gene Rowe and Lynn J. Frewer, "Evaluating Public Participation Exercises: A Research Agenda", 29 *Science, Technology and Human Values* (2004), pp. 512 *et sqq.*

21 Brian Wynne, "Public participation in science and technology: performing and obscuring a political-conceptual category mistake", 1 East Asian Sci Technol Soc Int J. (2007), pp. 99 *et sqq.*; Peter Wehling, "From invited to uninvited participation (and back?): rethinking civil society engagement in technology assessment and development", 9 *Poiesis and Praxis* (2012), pp. 43 *et sqq.*

22 Jasanoff and Kim, "Containing the Atom", *supra* note 10.

biologists concluded that the risks of GMOs could be regulated through appropriate physical and biological containment measures. Asilomar's regime of containment depended on very specific understandings of both science and policy. Its scientific grounding was in the field of molecular biology, which stressed the specificity of genetic manipulations and the predictability of their consequences.[23] Borrowing the idea of containment from the nuclear sector, where it was already enshrined, then made considerable sense. As long as the risks of release could be predicted in advance, they could be mitigated through end-of-pipe controls, ensuring that novel GM organisms did not escape and cause damage to people or ecosystems.

Coexistence, too, inevitably entails containment, although as the US case illustrates the reverse is not necessarily true. In the absence of credible containment measures, coexistence inevitably breaks down. Javier Lezaun presents the case of European bees and beekeepers as a paradigm example.[24] Honey bees are interlopers that test the limits of coexistence between GM and non-GM crops: bees seeking pollen are not as respectful of the separation measures between the two agricultural technologies as are human beings or GM plants themselves. This poses difficulties for the organic honey industry, which finds itself unable to guarantee that its products are derived from bees fed on only non-GM pollen. Bee-keepers therefore emerged as a new political grouping challenging the very possibility of coexistence. The case illustrates the point that opting for coexistence does not necessarily resolve problems of boundary maintenance but may instead give rise to new claims and conflicts. The more general point here is that regimes of coexistence and regimes of containment both depend on strict classifications, permitting no mixing. Both are oriented to creating leak-proof barriers around particular forms of life and maintaining such barriers presents inevitable difficulties of implementation.

More important for our purposes, however, coexistence and containment are based on different imaginations of what is at stake, with different implications for the politics of participation and expertise. Containment policies presume that a centralized epistemic authority can predict the risks that need to be kept under control and devise regulatory measures accordingly. Coexistence on its face is more modest: it allows for greater leeway in expressions of uncertainty, political preference and choice, permitting societies to assert in effect that risk governance is a matter of local values and local knowledge. Neither strategy, however, can maintain perfect safeguards against release, cross-contamination or other forms of boundary breakdown. As the European honey bee illustrates, coexistence may not be possible in a messy universe where nature, society and technologies of control continually interpenetrate. If coexistence and its pragmatic partner, containment, cannot work perfectly as imagined, then what other models of epistemic subsidiarity present themselves?

2. Cosmopolitanism

A second answer is cosmopolitanism, which as noted above can be viewed as a regime of mutual recognition and acknowledgment. In this model, societies respect not only the outcomes of each other's risk governance choices but seek to understand the disparate bases on which those judgments rest and to respect reasons and regulatory choices that do not jeopardize their own legitimate objectives. Cosmopolitanism, understood in this way, remains attentive to what the anthropologist Clifford Geertz called "local knowledge" and seeks to build a common world through conversation and mutual understanding.

Geertz himself was not sanguine about cosmopolitanism except as an ideal. In his essay on local knowledge, he said:

> "What has been well called the long conversation of mankind may be growing so cacophonous that ordered thought of any sort, much less the turning of local forms of legal sensibility into reciprocal commentaries, mutually deepening, may become impossible. But, however that may be, there is, so it seems to me, no choice."[25]

The obstacle to idealized cosmopolitanism, illustrated over and over again in the history of risk governance, is power, or what Michel Foucault termed "power/knowledge."[26] Conversations are unequal; power gets in the way of understanding, let alone the possibility

23 Jasanoff, *Designs on Nature*, *supra* note 9, at pp.

24 Javier Lezaun, "Bees, beekeepers and bureaucrats: parasitism and the politics of transgenic life," 29 *Environment and Planning D: Society and Space* (2011), pp.738 *et sqq*.

25 Clifford Geertz, *Local Knowledge: Further Essays in Interpretive Anthropology* (New York : Basic Books, 1983), at p.234.

26 Michel Foucault, *Power/Knowledge: Selected Interviews and Other Writings, 1972–1977* (New York: Random House, 1980).

of convergence. The case of the 1984 gas tragedy at a Union Carbide plant in Bhopal, India provides one example. Industrial disaster on such a scale, involving a relatively understudied chemical compound (methyl isocyanate), was unprecedented in India, and it overwhelmed the nation's administrative, juridical and scientific resources. The Indian agrochemical industry had operated with vastly different understandings of risk, regulation and responsibility from its American counterpart. A production process that depended on onsite storage of large amounts of an extremely dangerous chemical compound had been tolerated in West Virginia's relatively sparsely populated Kanawha Valley. It was not designed for a dense urban region in India, one moreover with no experience in handling potentially catastrophic chemical risks.

Lured by the prospect of higher damages in the United States, the Bhopal plaintiffs' lawyers argued that the Indian legal system was not mature enough to handle claims of this magnitude – an argument that a US federal district judge summarily dismissed in a *forum non conveniens* decision that sent the case back to India.[27] Less noted, however, is that fact that Indian lawyers developed some innovative theories of liability that they thought should govern the kind of cross-border risk transfer implicated in Bhopal, such as doctrines of interim relief and enterprise-wide liability.[28] These innovations did not flow back from India to the United States with nearly the ease that the technology of chemical production had travelled in the opposite direction; indeed they were blocked entirely. The power/knowledge relationship, in which a US judge ultimately decided not only the rules of the legal game but also where and by whom that game should be played out, simply did not allow for cross-fertilization between two legal orders.

Put more theoretically, the Bhopal case showed that the international legal system was (and perhaps still is) unprepared to take on board a principle that is foundational to scholars in science and technology studies (STS): that the material and social elements of technological systems are so thoroughly intertwined that regulatory standards in effect incorporate background norms for how accidents should be handled and how injuries should be compensated. Legal and technological orders are in this sense co-produced; particular locally and historically situated sensibilities of rightness and governability are built into the very design of technological systems, including the standards that control their risks. On this reckoning, Union Carbide's technology was developed under conditions that were so dissimilar to India's that an accident in India should not, with justice, have been litigated in accordance with the rules of corporate liability in Union Carbide's home country.

The world trading regime today seems no better at absorbing and acting upon these insights from empirical cases and academic analyses. A central assumption of free trade that like objects should be treated alike as they move around in commerce. The treaties that formed the World Trade Organization (WTO) were built on that founding principle. Yet detailed investigations of production show that like objects are never alike in every particular, and that a great deal of work and energy are required to establish equivalences between like and like.[29] There are no material ontologies without a highly particular set of social practices that have helped produce them and/or a set of interpretive practices that classify them and shape their cultural meaning. Thus, even something so familiar and concededly hazardous as asbestos fibres may be treated as like or unlike depending on whether a regulatory regime, and its expert advisers, have chosen to classify all forms of asbestos together or to disaggregate the material according to specific fibre types. Equivalence, therefore, is inevitably a social achievement, resting on demarcations between like and unlike that are not given in nature but are created through collective practices and conventions that differ across nations and cultures.

This thinking motivated the so-called "academics brief" that my colleagues and I submitted to the WTO in 2003 in the US-EU dispute over GMOs.[30] In the simplest terms, we wanted to argue that the attempt to harmonize risk governance between the EU and the US involved creating false equivalences in the name of science. We were challenging the argument at the centre of the GMO debate that "risk assessment" is a scientific, and therefore universally applicable, process whose results should be freely transportable across political boundaries. Instead, we

27 *In re: Union Carbide Corporation Gas Plant Disaster at Bhopal, India*, 634 F. Supp. 842 (SDNY 1986).

28 Sheila Jasanoff, "Bhopal's Trials of Knowledge and Ignorance", 42 *New England Law Review* (2008), pp. 679 *et sqq.*

29 Busch, *Standards*, *supra* note 2.

30 David E. Winickoff, Sheila Jasanoff, Lawrence Busch, Robin Grove-White, and Brian Wynne, "Adjudicating the GM Food Wars: Science, Risk, and Democracy in World Trade Law", 30 *Yale Journal of International Law* (2005), pp. 81 *et sqq.*

argued, what counts as an adequate risk assessment has to be judged in accordance with two background variables involved in all risk decision-making: how much is known about the product in question; and how much consensus exists on how to regulate it. GMOs, we further argued, fall in a region of low scientific certainty and low political consensus. We supported these claims with relevant scholarship on risk from the social sciences and with examples demonstrating the limitations of the state of scientific knowledge concerning GMOs. Decisions on their importation and cross-border transfer, we therefore suggested, should not be subordinated to one dominant form of scientific assessment but could legitimately involve more varied, open and public forms of deliberation, themselves constituting a valid, democratic approach to risk governance.

Given the context of global trade in GMOs (i.e., low certainty, low consensus), we concluded that a cosmopolitan approach, respectful of variations in national context, made good sense. We accordingly urged the WTO to adopt a modest view of its own role as a reviewing body, limiting itself to ensuring that process values of adequate deliberation had been respected, and not to enforce a single, one-size-fits-all approach to risk assessment. We did not believe that our arguments would carry the day with the WTO Dispute Settlement Panel, and indeed they did not; but ours was very much an experimental intervention to see whether new ideas could be inserted into a decision-making culture already framed by a discourse that we regarded as too constraining, in order to destabilize the dominant frame. Our failure to import a cosmopolitan outlook into the WTO treaty regime should make us think more seriously about constitutionalism.

3. Constitutionalism

Constitutionalism, our third model of epistemic subsidiarity, is in a sense the most demanding because it calls for recognition, within and between nations, of fundamental decision-making principles that may never have been explicitly articulated in law or policy. These principles have to do with what we may term the constitutional position of science.

Science exercises constitutive power in the modern world, enabling and constraining the actions of states and citizens much as legal constitutions do.[31] The means by which science regulates state action and human behaviour have not been clearly or systematically set forth, certainly not in any textbooks of law. Yet many legal decisions contain embedded theories of how science works, perhaps most explicitly in the US Supreme Court's 1993 decision in *Daubert v. Merrell Dow Pharmaceuticals*,[32] which set forth a new rule of admissibility for scientific evidence. Other illustrations can be found throughout most legal processes. The principles of delegation to experts in administrative law, principles that regulate the production of "regulatory science,"[33] as well as principles of accountability to the public for the exercise of expert judgment, also define the constitutional position of science in national systems of governance.

TABLE 1: The Three Bodies of Expertise

	United States	United Kingdom	Germany
Bodies of knowledge	Formally grounded knowledge ("sound science")	Empirically demonstrated facts (common knowledge)	Collectively reasoned knowledge (public knowledge)
Embodied experts	Most technically qualified scientists	Experienced "safe hands"	Authorized institutional representatives
Advisory bodies	Pluralistic, interested, but fairly balanced	Members capable of discerning the public good	Representative and inclusive of all relevant views

The preceding table, schematically laying out what I have called the "three-body problem" of expertise,[34] illustrates these propositions. The three bodies are (1) the body of relevant scientific knowledge, (2) the

31 Sheila Jasanoff, "In a Constitutional Moment: Science and Social Order at the Millennium," in Bernward Joerges and Helga Nowotny (eds.), *Social Studies of Science and Technology: Looking Back, Ahead*, Yearbook of the Sociology of the Sciences (Dordrecht: Kluwer, 2003), pp. 155 *et sqq.*

32 *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).

33 Jasanoff, *The Fifth Branch*, *supra* note 1.

34 Sheila Jasanoff, "Judgment under Siege: The Three-Body Problem of Expert Legitimacy," in Peter Weingart and Sabine Maasen (eds.), *Democratization of Expertise? Exploring Novel Forms of Scientific Advice in Political Decision-Making*, Sociology of the Sciences Yearbook (Dordrecht: Kluwer, 2005), pp. 209 *et sqq.*

"body" or person of the individual expert, and (3) the collective bodies that give advice to governments. Understandings concerning the legitimacy and adequacy of each body differ across national political systems, as Table 1 illustrates for the United States, United Kingdom and Germany. In the UK case, for example, much attention is paid to the individual expert's ability to incorporate the public virtues that render the expert's judgment credible. At the same time, what counts as good reason is founded on a commitment to empirical proofs which, in principle, should be evident to everyone, and hence count as common knowledge, a "view from everywhere" that all can agree on. Indeed, the very word "common" plays an important role in constructing public reason in the United Kingdom, where common sense, the "common man," and the House of Commons testify to commonness as a pervasive political resource. Germany, too, creates a view from everywhere in policy formulation, but consensus in Germany is more Habermasian and less empiricist. It is attained through inclusive group representation in advisory committees, ensuring that no important perspective has been left outside of the deliberative forum. In the American legal context, by contrast, procedures are designed to purify science and to position it far outside the field of political interests, thus constituting a transcendental "view from nowhere."

These differences exemplify foundational divergences in the constitutional status of science across broadly similar Western democracies. A robust principle of epistemic subsidiarity requires us to be exceptionally attentive toward such basic principles of political order and to make sure that they are respected in processes of global governance, including the assessment and management of risk.

III. Conclusion

Industrial nations, as we have seen, are far from united in their principles and procedures for linking knowledge to decision-making, especially under conditions of scientific and political uncertainty. Risk governance remains a profoundly value-laden process, from knowledge acquisition through to standard-setting and implementation, a process moreover that is shaped in each nation by specific assumptions concerning the appropriate roles of governments, experts and publics in forming regulatory agreements. Against that backdrop, it is a puzzle why a singular approach to risk governance, premised on a linear model that separates the science of risk assessment from the politics risk management, continues to command such wide transnational allegiance. Behind that discursive unanimity, however, alternative governance practices are continually at work, raising questions about epistemic subsidiarity that this brief paper has sought to illuminate.

The three models of epistemic subsidiarity identified here – coexistence, cosmopolitanism, and constitutionalism – entail different degrees of mutual obligation among nations, both in recognizing the basis for others' judgments and in attempting to accommodate such differences without conflict. Each model represents at best an ideal type, since each rests on conditions that the real world can never fully deliver in practice. Thus, coexistence demands a high degree of containment that cannot be achieved without occasional leaks and cross-contamination. Cosmopolitanism founders on persistent inequalities of power. And constitutionalism remains an elusive goal as long as national regulatory systems maintain their current largely unreflexive positions vis-à-vis the role of science in relation to traditional institutions of governance.

The problem of epistemic subsidiarity, however, is here to stay. Local preferences for how to assess the costs and benefits of risk-taking will not soon be eliminated; nor should they be. Moreover, national institutional arrangements for coupling knowledge and power deserve respect for much the same reasons as national arrangements with respect to federalism or the right to vote. The models of epistemic subsidiarity described here should not be seen as fully fleshed out or exhaustive. They do, however, offer starting points for reflection – for rethinking how to manage the hard task of living together in relative safety and harmony, in the face of incomplete knowledge and global risks, without stamping out diverse ways of knowing and reasoning that mature societies have come to accept as foundational.