Risk Regulation and Future Learning

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I am delighted to contribute to this celebration of the *European Journal of Risk Regulation* and its future at Cambridge University Press. It is a fitting moment to congratulate the editors and to ponder risk regulation and the future – including both the need for risk regulation to foresee the future, and the future of risk regulation. These are linked by the core role of learning in risk regulation: learning from each other, from variation across policies and jurisdictions, from past experience, from experimentation, from the unfolding future.

The editors asked the contributors to this symposium to discuss our personal paths into this field, and our perspectives on where it is going. These personal notes seem uncomfortably self-referential; but perhaps they can be useful to others in illustrating career options, and as a kind of full disclosure of the priors shaping the author's views on risk and regulation. For me they underscore the key role of learning.

My own path to risk regulation has been about past and future, and about my roots in Europe and America. As a boy in the 1960s, I learned of my family's history of surviving risks, including escaping from Odessa and the Bolsheviks in 1920, and escaping from Vienna and the Nazis in 1938.[1] My grandfather then became an economic historian, studying societies' struggle to prosper and the key role of institutions.[2] My mother, a refugee from Vienna, grew up in America, where she married a man whose ancestors from Ukraine had coincidentally been named "Wiener" (from Vienna) when they had earlier immigrated to America. My mother became a psychologist, helping people overcome psychosis and disturbance. My father went to law school, but became a futurist who studied what the world would be like decades ahead, using expert judgment to integrate multiple trends; he helped start a think tank, advised clients around the world on topics from business strategy to education to defence to space exploration, worked in the White House, and taught management of technological change.[3] His 1967 book on foreseeing the world in the year 2000 made numerous predictions, but its real aim was to develop better methods of comparing alternative scenarios of complexity and change, in

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[1] These stories are recounted in the vivid and poignant biographical history of our grandfather written by my cousin, Nicholas Dawidoff, *The Fly Swatter* (New York: Pantheon, 2002).

[2] E.g., Alexander Gerschenkron, *Bread and Democracy in Germany* (Ithaca: Cornell University Press, 1943); Alexander Gerschenkron, *Economic Backwardness in Historical Perspective* (Cambridge: Harvard University Press, 1966).

[3] Douglas Martin, "Anthony J. Wiener, Forecaster of the Future, is Dead at 81," *NY Times*, 27 June 2012, p. B16, at <http://www.nytimes.com/2012/06/27/us/anthony-j-wiener-forecaster-of-the-future-is-dead-at-81.html> (accessed 24 January 2017).

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order to avoid undesirable consequences and enhance the likelihood that the future really would be better.[4]

During my childhood, my family travelled and lived in New York, New England, California, Colorado, Wyoming, Norway, France, Italy, and Austria, so I felt at home in diverse settings on both sides of the Atlantic – comparing and learning. I began to face my own risks and decisions. I took boxing lessons. My first exposure to environmental policy came at age 12 through a state-wide student environmental legislature. In 1977 my mother died suddenly (at age 48; I was 14 and my sister was 6); soon after, we also lost several other family members.

From this upbringing I learned that the past was no picnic, that human psychology deserves inquiry and empathy, that the world is deeply complex, that choices pose tradeoffs among multiple objectives, and that creating a better future demands careful thinking and good institutions. I grew conscious of both the struggle for survival amidst mass calamity, and yet the fragility of a single life on any ordinary day.

I competed in policy debate throughout high school and college (university); when I was a senior (4th year) in college, the national debate topic was environmental policy, and a young professor and former debater named John Graham helped our team build a case on regulating hazardous air pollution. In college and then law school, I studied economics (including workplace safety, risk premia and collective action problems in labour markets[5]) and regulation (including courses from Paul Weiler and Cass Sunstein). I was privileged to clerk for federal judges Jack Weinstein (including on the Agent Orange mass tort case) and Stephen Breyer (who was writing a book on risk regulation[6]).

Eager to learn more about how risk regulation works in government, I served at Resources for the Future (RFF),[7] the Department of Justice,[8] the Office of Science and Technology Policy, the Council of Economic Advisers,[9] and the Americorps National Service program, across two presidential administrations. I helped draft the first IPCC report (1990), the UN Framework Convention on Climate Change (1990–92), the section on risk regulation in the Economic Report of the President (1993), an Executive Order on risk assessment (unissued), and Executive Order 12866 on regulatory review (1993). I learned a great deal about how risk regulation actually operates. John Graham invited me to join the advisory board of his new Harvard Center for Risk Analysis, and we published a book on the unintended "risk-risk tradeoffs" that could arise from narrow decisions and the potential for more holistic "risk-superior moves" that could reduce

[4] Herman Kahn and Anthony J. Wiener, *The Year 2000: A Framework for Speculation on the Next Thirty-Three Years* (New York: Macmillan, 1967) 1–5, 262–264, 386–413.

[5] E.g., I worked on the book by Richard Freeman and James Medoff, *What Do Unions Do* (Basic Books, 1984), and the American Law Institute report on Enterprise Liability (1991) (directed by Richard Stewart and Paul Weiler).

[6] Stephen G. Breyer, *Breaking the Vicious Circle: Toward Effective Risk Regulation* (Cambridge: Harvard University Press, 1993).

[7] On the Hazardous Air Pollutant Strategy Group project, chaired by Paul Portney and John Graham.

[8] As special assistant to the Assistant Attorney General for the Environment and Natural Resources Division of DOJ, Richard Stewart.

[9] As senior staff economist for environmental and regulatory issues, for CEA member David Bradford in 1992 and then for chair Laura Tyson and members Alan Blinder and Joseph Stiglitz in 1993.

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multiple risks in concert.[10] I married the most wonderful woman, dedicated to serving others,[11] and we raised three marvellous children.

Joining Duke University, the Society for Risk Analysis (SRA), the International Risk Governance Council (IRGC), and related organisations, I was seeking a collaborative multidisciplinary community to study risk regulation. I was convinced that understanding risks and responses requires continuous mutual learning among multiple skills and perspectives. To me, risk regulation is both analytic and creative: comprehending complex systems, confronting difficult tradeoffs, conversing widely and wisely, and devising better ways to a better future. Risk is about foresight – probabilities and consequences, uncertainties all around, diverse impacts on diverse populations. Risk regulation is one set of instruments and institutions to shape those outcomes toward a better future.

I take "risk regulation" to be the regulation of risks to health, safety, environment, and security, as contrasted to economic regulation (of market entry, prices, transactions). The term "regulation" can mean the governance function of using laws/rules/policies to shape outcomes (whether prescriptive or incentive-based; legislative, administrative or judicial; public, private or hybrid); or it can mean the type of administrative agency action that issues such rules (i.e. regulation as contrasted to legislation); or it can refer to a specific rule issued by an agency ("a regulation"). Risk regulation as a governance function is not new – it did not start in the 1970s or "late modernity" with nuclear power or genetically modified foods, but long earlier, with food safety laws and workers' compensation systems since at least 1900, air pollution law since William Aldred's case in 1611, and water pollution law in England and France dating back to the 1300s.[12] The notion that technology offers both promise and risk is as old as Promethean fire. People have always been dying of risks, so people have always tried to assess and manage risks to survive.[13] Experts have long recognised the need to compare the pros and cons of alternatives.[14] Perhaps new in risk analysis since the 1970s are, among other things, more quantitative analytic and empirical methods, deeper understanding of human psychology, greater appreciation of interconnectedness, better understanding of policy design, and the spread of oversight institutions.

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[10] John D. Graham and Jonathan B. Wiener (eds), *Risk vs. Risk: Tradeoffs in Protecting Health and the Environment* (Cambridge: Harvard University Press, 1995).

[11] See <http://bookharvestnc.org/about/founders-message/> (accessed 24 January 2017). One of our first community service projects together was: <www.washingtonpost.com/archive/local/1991/10/17/prenuptial-gathering-a-true-garden-party/f459084d-08f5-4e57-a00c-581d3328eeb0/> (accessed 24 January 2017).

[12] See e.g. Richard Andrews, *Managing the Environment, Managing Ourselves* (2nd edn, New Haven: Yale University Press, 2006) (reviewing the history of environmental regulation over the past four centuries).

[13] Peter Bernstein, *Against the Gods: The Remarkable Story of Risk* (New York: John Wiley, 1996). The past was not safer: risks to human life have declined over time, yet with important inequalities, see Angus Deaton, *The Great Escape: Health, Wealth, and the Origins of Inequality* (Princeton University Press, 2013). Both new and old technologies have posed risks, and regulation itself is a kind of technology for modulating social activities and outcomes, see Jonathan B. Wiener, "The Regulation of Technology, and the Technology of Regulation" (2004) 26 *Technology in Society* 483–500.

[14] Benjamin Franklin, "Letter to Joseph Priestley" (19 September 1772), in Frank Luther Mott and Chester E. Jorgenson (eds), *Benjamin Franklin: Representative Selections, with Introduction, Bibliography and Notes* 348–49 (New York: American Book Company, 1936). Franklin's early version of cost-benefit analysis appears to have contributed to its subsequent development by Jeremy Bentham and the French engineer-economists, and eventually to government policy making in the US and Europe, see Jonathan B. Wiener, "The Diffusion of Regulatory Oversight," in Richard L. Revesz and Michael A. Livermore (eds), *The Globalization of Cost-Benefit Analysis in Environmental Policy* (Oxford University Press, 2013).

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Among the many insights we have learned about risk regulation in the past few decades, several stand out to me now. First: multiplicity. Contrary to conventional depictions and policy making, we do not face risks one at a time, but rather we live in a multi-risk world, a web of multiple nodes and links and simultaneous stressors.[15] Every technology, solution, and institution is imperfect.[16] Hence every policy choice represents a vector of multiple impacts, intended and unintended, that may reduce some risks but increase others.[17] Focusing narrowly can induce countervailing risks and harm the disregarded;[18] focusing more broadly can avoid such ancillary harms while also promoting ancillary co-benefits.[19] Uncertainty is not the key problem, because all risks are uncertain (on all sides of a decision); rather the key problem is multiplicity. We need to embrace a more holistic view of the full portfolio of impacts in the multi-risk world.

Second: interconnectedness. The increasing interconnectedness of societies means that risks can propagate more rapidly and more globally (think of disease, pollution, terrorism, and financial crashes). We need better monitoring and preparedness. But interconnectedness also means that policy measures to reduce one risk may yield multiple ancillary impacts across the web of risks. And, interconnectedness means that we may be able to learn from each other's varying experiences through networks of policy diffusion and borrowing.[20]

Third: precaution. Waiting to act can incur risks.[21] But precaution that is hasty or poorly designed can also induce risks.[22] The key is to think through the outcomes in a full portfolio impact assessment, and design policies to promote risk-superior moves that reduce multiple risks in concert.[23] Better versions of precaution incorporate

[15] See Jonathan B. Wiener, "Precaution in a Multi-Risk World" in Dennis Paustenbach (ed.), *Human and Ecological Risk Assessment: Theory and Practice* 1509–31 (New York: John Wiley and Sons, 2002).

[16] See Neil K. Komesar, *Imperfect Alternatives: Choosing Institutions in Law, Economics, and Public Policy* (University of Chicago Press, 1994); Charles Wolf, *Markets or Governments: Choosing Between Imperfect Alternatives* (MIT Press, 1986).

[17] See Graham and Wiener, *Risk vs. Risk*, supra, note 10; Wiener, "Multi-Risk World", supra, note 15. Such tradeoffs implicate not only quantitative metrics but also preferences and values. See Ortwin Renn, *Risk Governance: Coping with Uncertainty in a Complex World* (London: Earthscan, 2008).

[18] See Graham and Wiener, *Risk vs. Risk*, supra, note 10; Richard B. Stewart, "Remedying Disregard in Global Regulatory Governance: Accountability, Participation, and Responsiveness" (2014) 108 *American Journal of International Law* 211.

[19] See Graham and Wiener, *Risk vs. Risk*, supra, note 10; Richard L. Revesz and Michael A. Livermore, *Retaking Rationality* (Oxford Univ. Press, 2008); Lester Lave, *The Strategy of Social Regulation* (Brookings, 1981).

[20] See Anne-Marie Slaughter, "The Networked Century" (2009) 88 *Foreign Affairs* 94; .Jonathan B. Wiener, "The Real Pattern of Precaution" chapter 20 in Jonathan B. Wiener et al. (eds), *The Reality of Precaution: Comparing Risk Regulation in the United States and Europe* (Washington DC: RFF Press/Earthscan/Routledge, 2011) 522, 541–46.

[21] See European Environment Agency (EEA), *Late lessons from early warnings: The precautionary principle 1896–2000* (Copenhagen, 2001). Risk of irreversible harm may therefore warrant acting and then studying, rather than studying before acting, see Cass R. Sunstein, "Irreversible and Catastrophic" (2006) 91 *Cornell Law Review* 841, 855.

[22] See Graham and Wiener, *Risk vs. Risk*, supra, note 10; Jonathan B. Wiener, "Managing the Iatrogenic Risks of Risk Management" (1998) 9 *Risk: Environment Health & Safety* 39–84; Charles Wolf, *Markets or Governments,* supra, note 16; Jessica Stern and Jonathan B. Wiener, "Precaution Against Terrorism" in Paul Bracken, David Gordon and Ian Bremmer (eds), *Managing Strategic Surprise: Lessons from Risk Management and Risk Assessment* (Cambridge University Press, 2008).

[23] See Graham and Wiener, *Risk vs. Risk*, supra, note 10; Wiener, "Multi-Risk World", supra, note 15; Jonathan B. Wiener, "Precautionary Principle" in the volume Ludwig Krämer and Emanuela Orlando (eds), *Principles of Environmental Law*, of Michael Faure (ed.), *Encyclopedia of Environmental Law* (IUCN and Edward Elgar, forthcoming 2017).

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provisionality – learning and revising over time.[24] Meanwhile, we have also learned that the reality is not greater precaution in Europe than in the US; rather, the reality is selective precaution on both sides.[25]

Fourth: oversight. Good analysis and decision making by regulators can be enhanced by sensible regulatory oversight bodies – central expert units that help assess risk regulation, to learn what works best and to maximise overall well-being (including distribution).[26] Good oversight needs credible comprehensive methods of impact assessment (both ex ante and ex post), healthy transparency, and evenhanded institutional mechanisms that not only restrain unwise policies but also promote wise policies.

Fifth: risk regulation itself is a learning process.[27] A major challenge and opportunity for the future of risk regulation is to cultivate this learning process, across its multiple dimensions and around the world. The real implication of uncertainty (about future risks, technologies and policies) is neither inaction nor moratorium, but learning – investing in better foresight.[28] We can learn from historical experience in general.[29] We can learn from unexpected crisis events – if we create credible institutions to engage in careful study and inference about causes and remedies.[30] We can learn from retrospective regulatory review (ex post impact assessment or policy evaluation) – not just to revise each specific rule, but more broadly to test and improve the accuracy of our ex ante impact assessment methods, and to improve the multi-risk outcomes of alternative policy designs – if we gather and analyse the relevant data for recursive use in regulatory improvement.[31]

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[24] E.g., the European Commission's Communication on the Precautionary Principle and the French constitutional version of precaution both call for provisionality; see Wiener, in *Encyclopedia*, supra, note 23.

[25] See Wiener, "The Real Pattern" supra, note 20; Jonathan B. Wiener et al., "Better Ways to Study Regulatory Elephants" (2013) 2 *European Journal of Risk Regulation* 311–19; Joakim Zander, *The Application of the Precautionary Principle in Practice: Comparative Dimensions* (Cambridge: Cambridge University Press, 2010); International Risk Governance Council (IRGC), *Transatlantic Patterns of Risk Regulation: Implications for International Trade and Cooperation* (Lausanne: IRGC, 2017).

[26] See World Bank, World Development Report (WDR), *Risk and Opportunity: Managing Risk for Development* (2014) 278–79 (recommending that every country establish a national risk board); European Commission, "Better Regulation: Why and How", <http://ec.europa.eu/info/law/law-making-process/better-regulation-why-and-how_en> (accessed 18 January 2017); Alberto Alemanno, "Assessing the Impact of the Better Regulation Package on the European Union – A Research Agenda" (2015) 6 *European Journal of Risk Regulation* 344–56; John D. Graham, "The Evolving Regulatory Role of the US OMB" (2007) 1 *Review of Environmental Economics and Policy* 171–91; Cass R. Sunstein, "White House Review of Regulation: Myths and Realities" (2013) 126 *Harvard Law Review* 1838–78; Wiener, "Diffusion of Regulatory Oversight" supra, note 14; Jonathan B. Wiener and Daniel L. Ribeiro, "Impact Assessment: Diffusion and Integration" in Francesca Bignami and David Zaring (eds), *Comparative Law and Regulation: Understanding the Global Regulatory Process* (2016); Jonathan B. Wiener and Alberto Alemanno, "Comparing Regulatory Oversight Bodies: US OIRA and the EU RSB" in Susan Rose-Ackerman and Peter Lindseth (eds), *Comparative Administrative Law* (2nd edn, Edward Elgar, forthcoming 2017).

[27] See Daniel A. Farber, "Environmental Protection as a Learning Experience" (1994) 27 *Loyola LA Law Review* 791.

[28] See Yair Listokin, "Learning Through Policy Variation" (2008) 118 *Yale Law Journal* 480–553; Wiener, "The Diffusion of Regulatory Oversight" supra, note 14; Gregory E. Kaebnick et al., "Precaution and governance of emerging technologies" (2016) 354 *Science* 710–11.

[29] See Edward Balleisen and Elizabeth Brake, "Historical perspective and better regulatory governance: An agenda for institutional reform" (2014) 8 *Regulation & Governance* 222–45.

[30] See Edward Balleisen et al., *Policy Shock: Recalibrating Risk and Regulation after Oil Spills, Nuclear Accidents, and Financial Crises* (Cambridge Univ. Press, forthcoming 2017). Hasty reactions to "available" crisis events (without careful learning) can spur unwise regulatory responses, see Timur Kuran and Cass R. Sunstein, "Availability Cascades and Risk Regulation" (1999) 51 *Stanford Law Review* 683–768.

[31] See Cary Coglianese, "Moving Forward with Regulatory Lookback" (2013) 30 *Yale Journal on Regulation* 57; Jonathan B. Wiener and Daniel L. Ribeiro, "Environmental Regulation Going Retro: Learning Foresight from Hindsight" (2016) 32 *Journal of Land Use and Environmental Law* 1.

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Even as efforts at international regulatory cooperation understandably seek to reduce policy differences that pose barriers to trade, we can also learn from observing and comparing the variation in policies and outcomes across jurisdictions, such as in the US, Europe, and other regulatory systems – if we enlist or create the institutions to do so.[32] In appropriate circumstances, we can learn from purposive experimentation with alternative policy approaches.[33] Further, we can try to design regulatory policies and institutions to incorporate learning from the outset – "planned adaptive regulation" that is designed to test options, monitor results (across multiple impacts), and update over time.[34] Through all of these learning processes, risk regulation needs to focus not just on risks but on solutions[35] and outcomes.[36]

For the future of risk regulation, the most difficult challenge may be deciding how to act when future learning cannot occur. As societies prosper and reduce familiar risks, they may face more rare catastrophic or existential risks.[37] These extreme risks can pose what I have called "the tragedy of the uncommons": their ultra-low frequency and mega-catastrophic impacts deprive societies of the future opportunity to learn from experience.[38] They may go neglected in public perception and politics because unexperienced risks do not trigger the availability heuristic,[39] and mass impacts may be numbing.[40] Yet if such extreme risks occur, they may be too devastating for institutions or even life to survive and respond afterwards. It is this inability to learn, more than mere uncertainty, that especially warrants precaution (although precaution against such tragedies of the uncommons still faces difficult questions of setting priorities and potential extreme risk-risk tradeoffs).[41] We will need to design, simulate, and deploy wise precautions for remote but extreme risks – learning from both hindsight and foresight to safeguard the future.

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[32] See Jonathan B. Wiener and Alberto Alemanno, "The Future of International Regulatory Cooperation: TTIP as a Learning Process toward a Global Policy Laboratory" (2015) 78 *Law and Contemporary Problems* 103–36; IRGC, "Transatlantic Patterns" supra, note 25.

[33] See Michael Greenstone, "Toward a Culture of Persistent Regulatory Experimentation and Evaluation" in David Moss and John Cisternino (eds), *New Perspectives on Regulation* (2009); Jens Ludwig, Jeffrey R. Kling and Sendhil Mullainathan, "Mechanism Experiments and Policy Evaluations" (2011) 25 *Journal of Economic Perspectives* 17–38; Rob van Gestel and Gijs van Dijck, "Better Regulation through Experimental Legislation" (2011) 17 *European Public Law* 539–553.

[34] See Lawrence E. McCray, Kenneth A. Oye and Arthur C. Petersen, "Planned Adaptation in Risk Regulation" (2010) 77 *Technological Forecasting and Social Change* 951; Wiener and Ribeiro, "Going Retro" supra, note 31; IRGC, "Transatlantic Patterns," supra, note 25.

[35] Policy making requires not just assessing risks, but assessing risk reduction options, i.e. solutions. And stated public perceptions of risks may actually reflect unstated preferences about potential solutions, see Troy H. Campbell and Aaron C. Kay, "Solution aversion: On the relation between ideology and motivated disbelief" (2014) 107 *Journal of Personal and Social Psychology* 809–24; Dan Kahan, "Fixing the communications failure" (2010) 463 *Nature* 296–297.

[36] Because a solution to one risk may induce other risks, as discussed above, learning processes need to encompass the full portfolio of important outcomes. See Wiener, "Managing the Iatrogenic" supra, note 22.

[37] See Nick Bostrom, "Existential Risk Prevention as Global Priority" (2013) 4 *Global Policy* 15–31.

[38] See Jonathan B. Wiener, "The Tragedy of the Uncommons: On the Politics of Apocalypse" (2016) 7 *Global Policy* 67–80 (issue S1, May 2016); Bostrom, supra, note 37, 27.

[39] See Sunstein, "Irreversible and Catastrophic" supra, note 21 at 884; Elke U. Weber, "Experience-Based and Description-Based Perceptions of Long-Term Risk: Why Global Warming does not Scare us (Yet)" (2006) 77 *Climatic Change* 103–120.

[40] See Paul Slovic, "'If I Look at the Mass I Will Never Act': Psychic Numbing and Genocide" (2007) 2 *Judgment and Decision Making* 79–95.

[41] See Wiener, "The Tragedy of the Uncommons" supra, note 38.

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