

Governing Risk-Risk Tradeoffs

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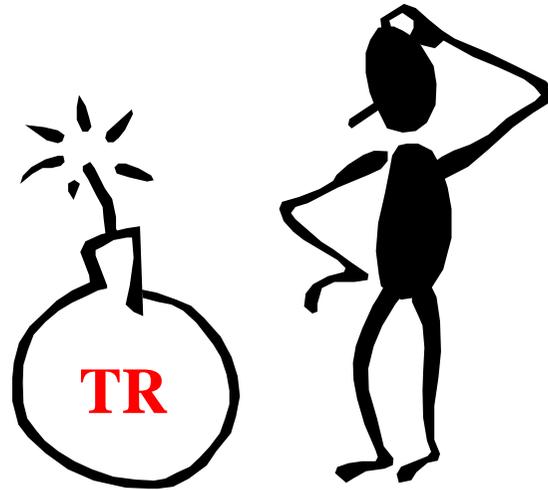
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Outline of the presentation

1. From single risk to multi-risk
2. Risk-Risk tradeoffs: analysis and examples
3. Full portfolio impact analysis
4. Why do Risk-Risk tradeoffs occur? Causes
5. Solutions for governing risk-risk? Progress and challenges
6. Risk-Risk and Precaution: normative and comparative

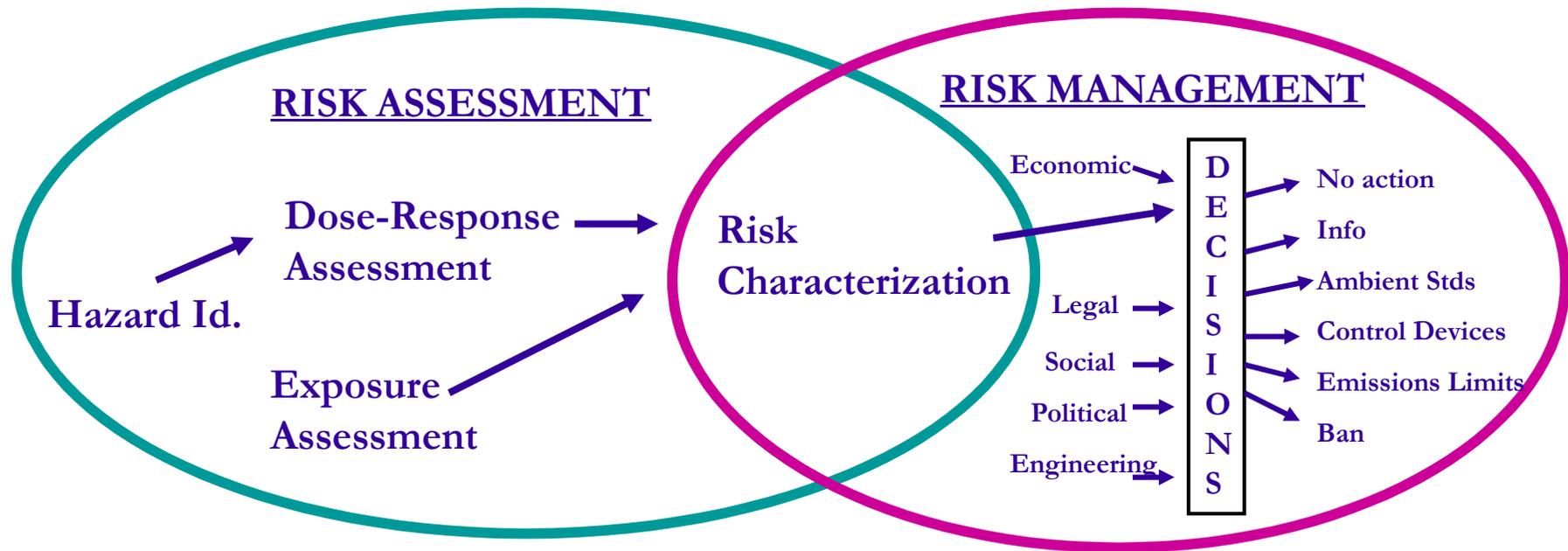
Traditional Approach: one Target Risk (TR)



Key questions in risk analysis of the TR

1. How serious is the risk? Risk Assessment (RA): *Forecasting* of probability, impact, uncertainty.
2. What should be done about the risk? Risk Management (RM): *Policy making* including comparing costs, benefits, uncertainties, etc. of alternative policy options.
3. How well will (or did) the policy work? Review and Evaluation. *Oversight, learning, updating.*

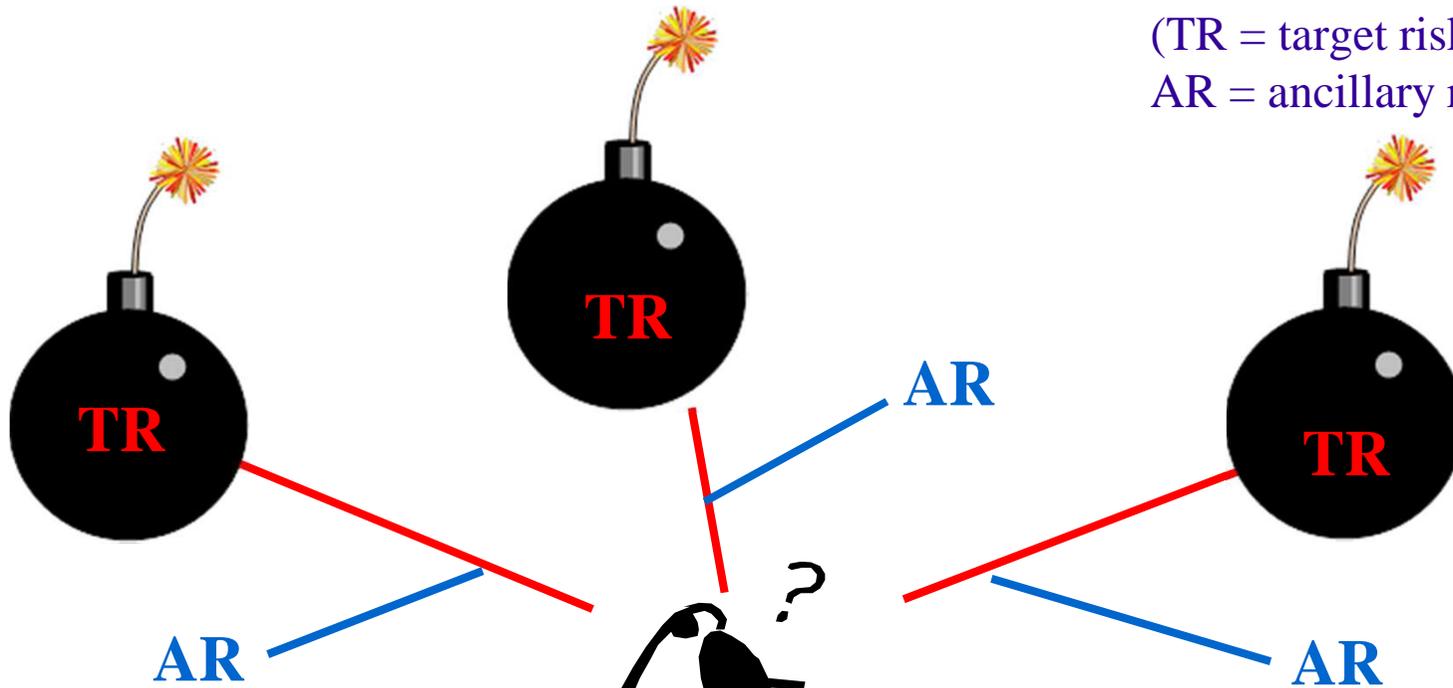
Risk policy cycle, 1983



(Source: US National Academy of Sciences, *Risk Assessment in the Federal Government*, 1983 (the “Red Book”))

Reality: Multiple Risks

(TR = target risk,
AR = ancillary risk)

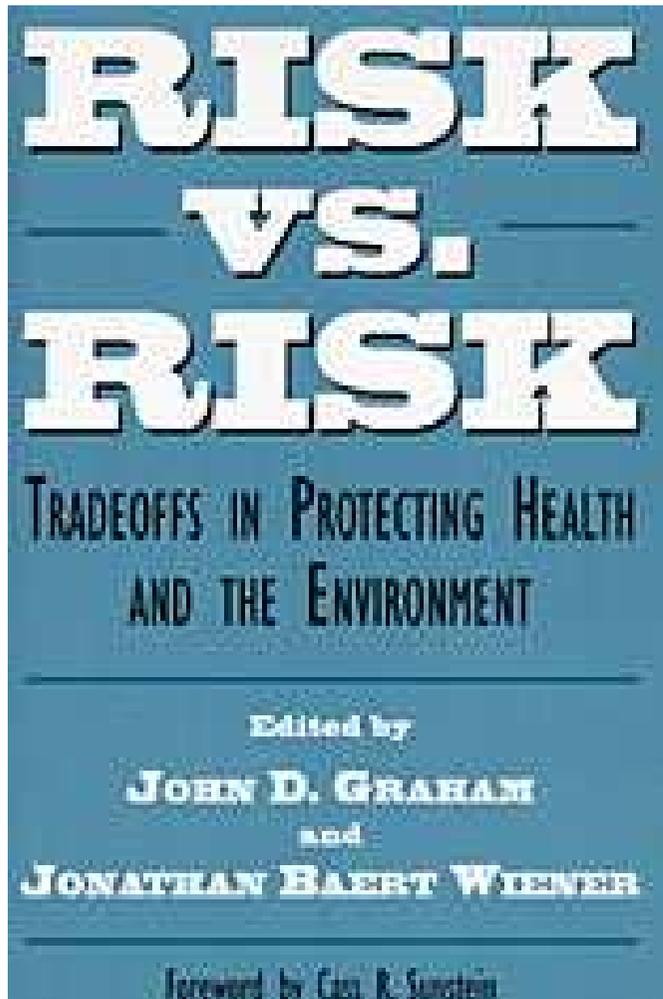


- Not just 1 risk at a time
- The world is a web of multiple interconnected risks
- Uncertainties on all sides

Multiple risks means:

- Priority-setting: triage
- Ancillary risks: iatrogenic
 - co-benefits
 - countervailing harms

Multiple actors ...



(Harvard University Press, 1995)

Risk-Risk: through history and across disciplines

- Odysseus confronts Scylla vs. Charybdis
- Medicine: side effects (iatrogenic injury)
 - Hippocrates, 400 B.C.: *“First, do no harm”* (too strict?)
 - Ignatz Semmelweiss, 1840s: exhorts doctors to *wash their hands*
 - Joseph Lister, 1860s: *antisepsis* for surgery
- Ecology: interconnectedness
 - John Muir, 1869: *“When we try to pick out any one thing, we find it hitched to everything else in the universe.”*
- Economics: externalities
 - A.C. Pigou, 1920: *Harms of decisions that neglect full social impacts*
- Systems analysis
 - Applied to policy: Lester Lave, *The Strategy of Social Regulation*, 1981
- Impact assessment: *Consider impacts before acting*
 - Environmental IA, Regulatory IA. US: EIA 1969, RIA 1978/1981/1993/2003 ...
- Military strategy: Collateral damage, blowback
 - Barbara Tuchman: *The March of Folly*



(From brianragle.com, 29 April 2011)

Risk-Risk: an emerging regulatory tool

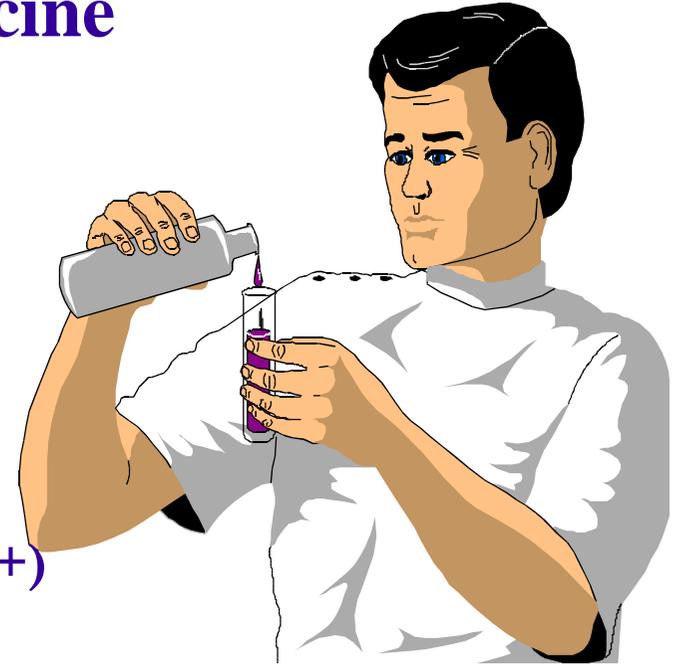
- Chauncey Starr & Chris Whipple, *Risks of Risk Decisions*, 1980
- Lester Lave, *The Strategy of Social Regulation*, 1981
- Martin Janicke, *State Failure*, 1990
- Daniel Patrick Moynihan, *Iatrogenic Government*, 1993
- Stephen Breyer, *Breaking the Vicious Circle*, 1993
- John Graham & Jonathan Wiener, *Risk vs. Risk*, 1995
- Cass Sunstein, *Health-Health Tradeoffs*, 1996
- Jonathan Wiener, *Managing the Iatrogenic Risks of Risk Management*, 1998
- Jonathan Wiener, *Precaution in a Multirisk World*, 2002
- OMB Circular A-4, section on “Ancillary Impacts,” 2003
- Richard Revesz & Michael Livermore, *Retaking Rationality*, 2008
- Graham & Wiener debate with Hansen, Krauss & Tickner in JRR, 2008
- World Bank, *World Development Report 2014: Managing Risk for Development* (October 2013)

Key points:

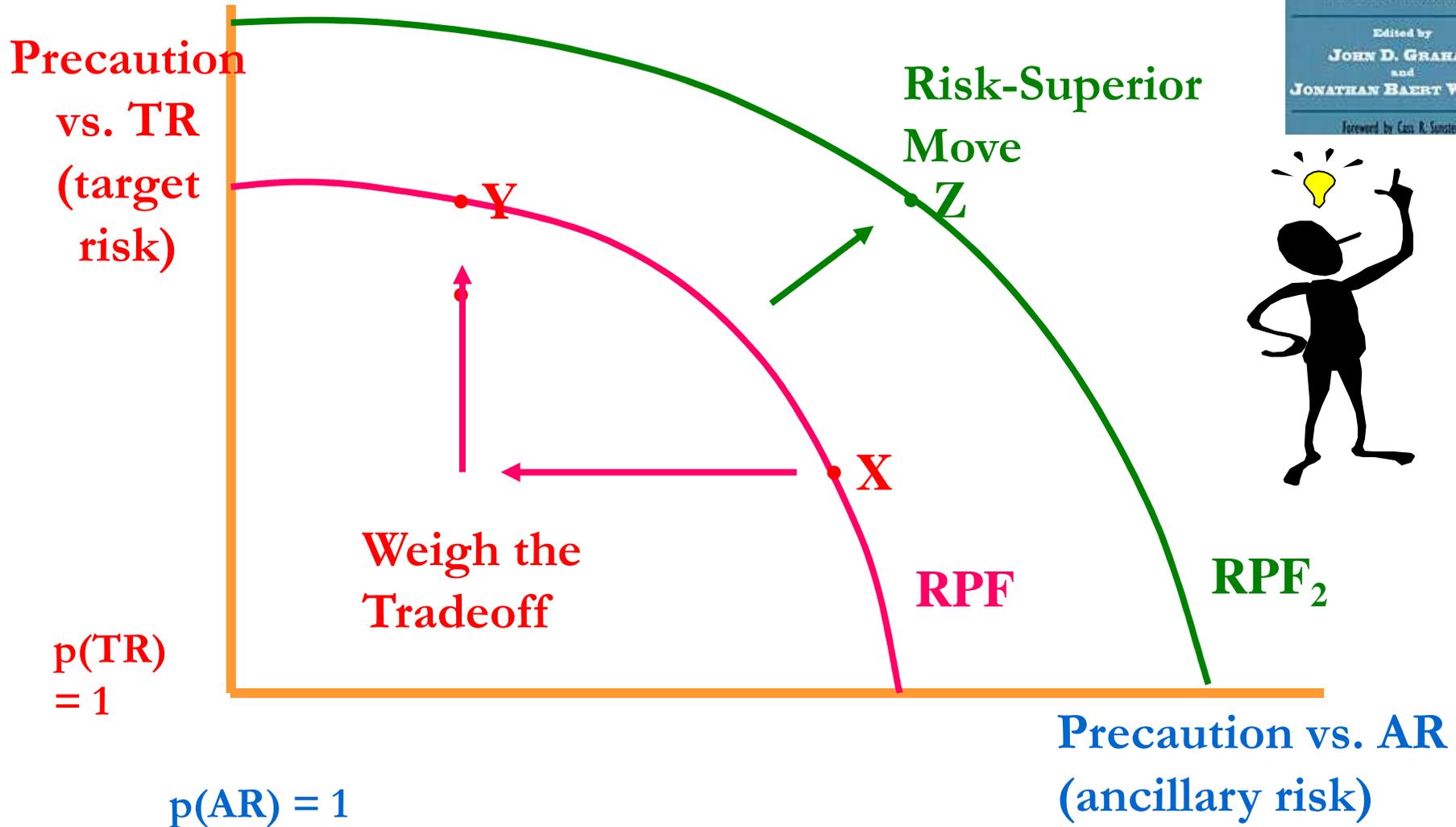
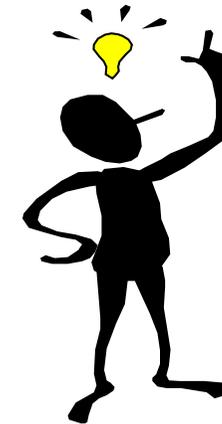
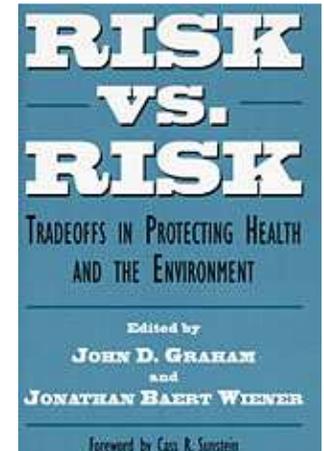
- Governments are endogenous, imperfect institutions (as are markets)
- We live in a complex web of multiple interconnected risks
- Policy interventions can both reduce risks and create risks

Insights from seeing Regulation as Medicine

- Society as patient, Risk as ailment,
Regulation as therapy
- Triage: priority among risks
- Iatrogenesis: therapy can both heal & harm
 - Aspirin, surgery, vaccines . . .
 - Iatrogenic risks are real risks (USA: 100k +)
- “Treat the whole patient” – have a “primary risk manager” to monitor the full “system.”
 - “Full portfolio impact assessment”
 - Council of Risk Analysts, Country risk officer, National Risk Board.
- “Risk-superior moves” to reduce multiple risks in concert
 - Confronting R-R spurs innovation
 - e.g. hand washing, antiseptics, smart airbags, multi-gas climate policy



RTA: Risk-Risk Tradeoffs and Risk-Superior Moves



Risk-Risk Tradeoffs are Pervasive

<u>Intervention</u>	<u>TR</u>	<u>CR</u>	<u>(Risk-superior option?)</u>
• Aspirin	Head	Stomach	(Acetaminophen?)
• Toothpaste	Tooth decay	Fluoride poisoning	(warning label)
• Vaccines	Illnesses	Side effects	
• Hospitals, surgery	Illnesses	Iatrogenic illnesses	(antiseptics...)
• Mammograms, PSA	Cancer	Fear; unnecc. surgery; other cancers	
• Antibiotics	Infections	Resistant bacteria	
• Chlorinate H ₂ O	Pathogens	Carcinogens	(Ozonation?)
• Ban DDT	Wildlife	Malaria	(IRS; vaccine; GM)
• Airbags in cars	Adults	Kids	(Kids in back; smart airbags)
• Reduce trop. O ₃	Lungs	Skin/UV	
• Ban asbestos	Lungs	Highway crashes	(copper brakes?)
• Reduce air pollution	Public	Workers inside factories	(EPA-OSHA)
• Waste cleanups	Public	Workers at cleanup sites	
• Suppress forest fires	Some fires	Worse fires	
• Control floods	Some floods	Worse floods	
• Facility risk disclosure	Accidents	Terrorism	(EPA-FBI)
• Rescue banks (TBTF)	Market panic	Moral hazard	(Dodd-Frank?)

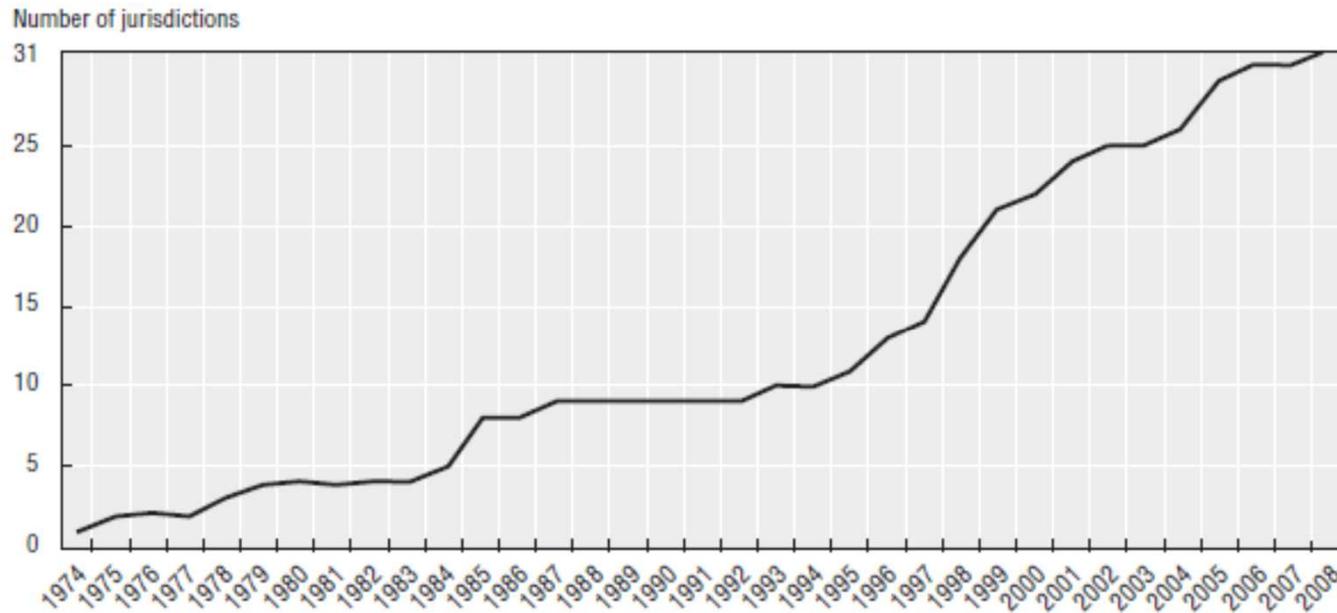
Risk-Risk Tradeoffs on all sides

<u>Intervention</u>	<u>TR</u>	<u>CR</u> (risk-superior move?)
• NH ₃ to CFCs (1930s)	Toxicity	Ozone depletion
• CFCs to HFCs (1990s)	Ozone depletion	Climate change
• Coal to Gas	CO ₂	CH ₄ (= should cover all GHGs)
• Coal to Shale Gas	Air pollution	Water pollution; CH ₄
• Ban nuclear power	Waste; meltdown	Coal = air pollution; CO ₂
• MTBE	Air pollution	Water pollution
• Diesel fuels	CO ₂	PM
• Biofuels (corn ethanol)	CO ₂ ; oil imports	N ₂ O; forests CO ₂ ; food prices
• CFL lightbulbs	CO ₂	Hg (replace with LED bulbs?)
• CCS	CO ₂	Water pollution; seismic
• Geoengineering	Warming	Cooling; ozone depletion; rebound
• Butter to margarine	Saturated fat	Trans-fat (now being banned...)
• Ban foreign blood	BSE/vCJD	Blood shortage
• Feed soy to cattle	BSE/vCJD	Deforestation
• Police chases	Suspects	Bystanders
• War on Drugs	Drug use	Violence
• War on Terror	Terrorism	Terrorism; civilians; privacy; highways

Toward Full Portfolio Impact Analysis

- Simple, single-risk approaches yield errors
 - “Better safe than sorry” vs. “Cure is worse than the disease”
- Real world is complex, interconnected, multi-risk web
 - Confront & weigh the portfolio of Risk-Risk tradeoffs (1, 2, ... n)
 - Both ancillary countervailing risks (CRs) and ancillary co-benefits (ABs)
 - Differences in type, timing, population, etc. = challenge of comparing
 - Seek “Risk-Superior” moves
 - PP: $\text{Max}(\Delta\text{TR})$
 - unless qualified by “cost-effective” or “proportionate”
 - BCA: $\text{Max}(\Delta\text{TR} - \text{Cost})$
 - can worsen risk-risk tradeoffs, if TR and cost are narrowly defined
 - RTA: $\text{Max}(\Delta\text{TR} - \Delta\text{CR})$
 - = reduce overall risk
 - Full portfolio: $\text{Max}(\Delta\text{TR} - \Delta\text{CR} + \Delta\text{AB} - \text{Cost})$ (... all important impacts)
 - But, increases costs of deliberation. How many ripples to assess? ...

Figure 1.1. Trend in RIA adoption across OECD jurisdictions



Note: This represents the trend in the number of OECD jurisdictions with a formal requirement for regulatory impact analysis (beyond a simple budget or fiscal impact).

Source: OECD, RIA as a Tool for Policy Coherence 15 (2009).

Optimal Portfolio Analysis: How Many Ripples?

- Ideally, consider “full risk portfolio”
 - Target Risk (TR), Countervailing Risks (CR), Ancillary Benefits (AB).
 - Toward “general equilibrium” analysis of benefits side.
- But: risks of delay, “paralysis by analysis.”
 - Still, full portfolio analysis can (i) improve decision outcomes (reduce overall risk); (ii) avoid problems & backlash later (reduce overall delay); and (iii) yield more comprehensive regulation (e.g. multipollutant, multirisk).
- Some ancillary impacts are more important than others
 - Some CRs are overstated, or false positives (as are some TRs).
 - CRs deserve more attention: (i) as TRs are reduced, i.e. as society grows safer; and (ii) where CR victims are neglected (omitted voice)
 - CR can affect decision even if $CR < TR$
 - Analyze CR up to point when MB of expected improvement in decision = MC of deliberation; or, $\max(\text{VOI}-\text{COI})$

Why do Risk-Risk Tradeoffs Occur?



Why do Risk-Risk Tradeoffs Occur? Causes

- Like private firms, regulatory agencies have incentives to externalize harms outside their domains/constituencies
 - Hence neglect of countervailing risk increases may be more worrisome than neglect of co-benefit risk decreases
 - But some R-R tradeoffs are within one domain
 - Regulators' incentives are not the same as private firms' incentives
- **Cross-Domain:**
 - Fragmentation; bounded specialization
- **Within-Domain:**
 - Deliberation cost
 - Especially after a crisis: hasty policy design
- Omitted voice; democratic dysfunction
- Cognitive heuristics – e.g. 'availability,' 'mass numbing'
- Solutions? Analytic. Institutional.

Progress on Risk-Risk Tradeoffs

- Medical care
 - Studies of patient outcomes. Checklists to avoid surgical errors. Computerized prescriptions with clear spelling, patient information, and drug-drug interactions.
- Automobile highway safety
 - Airbags; smart airbags; kids in back; surround sensors; self-braking/driving...
- Climate
 - Multi-gas scope in FCCC and Kyoto Protocol.
 - FCCC art. 4(1)(f) calls for RTA: “employ appropriate methods, for example impact assessments ... with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken ... to mitigate or adapt to climate change”
 - Research on multiple effects of Geoengineering
 - US Clean Air Act sec. 108: RTA of pollutants (*Amer. Trucking*, DC Cir. 1999)
 - US Clean Air Act sec. 612: RTA of CFC-substitutes
 - IPCC AR5 WGIII: attention to ancillary risks and co-benefits
- Terrorism
 - Integration of diverse agencies into Dept. Homeland Security and Dir. Nat’l Intel.
 - Bush (2002) National Security Strategy applied PP (preemptive action despite uncertainty). Obama (2010) added: “carefully weigh the costs and risks of action against the costs and risks of inaction.”

Solutions for governing risk-risk tradeoffs?

Analysis and Institutions

- Impact Assessment (IA) – growing application. How broad?
 - Environmental Impact Assessment (EIA) – widely applied
 - US Executive Orders (Carter 1978, Reagan 1981, Clinton 1993, Obama ...)
 - US OMB Circular A-4 (Bush, 2003): section on Ancillary Impacts
 - EU Impact Assessment Guidelines (2006, 2009, ...)
- Inter-agency collaboration on cross-domain risks
 - EPA-OSHA on air toxics. EPA-FBI on disclosure of chemical accident risks.
 - Merging agencies? E.g. after 9/11: DHS, DNI. Helpful?
- Needed / challenges:
 - Integrated analysis – optimal ripples? And, assembling diverse expertise.
 - Integrated structure – but too large, clumsy? Specialization vs. integration.
 - Recursive loop from RA (of TRs), to RM, back to RA (of ARs), to full RM.
 - National and international “outcomes studies” to test full portfolio impacts.
 - “National Risk Boards” (World Bank WDR 2014, citing RvR 1995).
 - International learning, diffusion, cooperation (Wiener 2013).
- Toward a holistic culture of complex risk systems

Risk-Risk and Precaution

- Normative – are they at odds?
 - Does risk-risk analysis undesirably delay precaution?
 - Does precaution induce undesirable risk-risk tradeoffs?
- Descriptive / Comparative
 - Do countries differ in their degree of precaution?
 - E.g., USA vs. EU
 - How and Why?

Precautionary Principle and Risk-Risk: normative

(Wiener 2002, 2011)

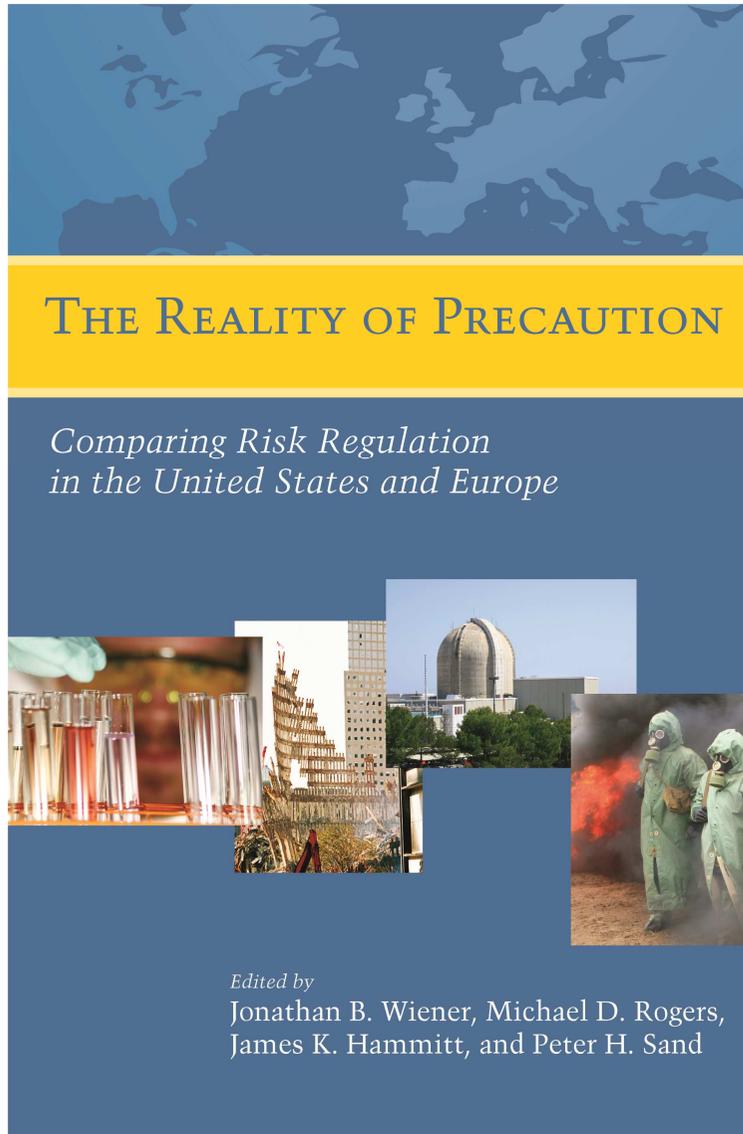
- Some versions of the PP require action to prevent (uncertain) risk, or require the proponent of an activity to prove safety before the activity may go forward.
 - But: precaution can itself yield new risks (R-R).
 - So: the PP can block itself.
- Solution: Confront multi-risk world. Incorporate multi-risk approach into “optimal precaution.”
 - In reality, precaution is often moderated by R-R.
- Emergence of risks with uncertainty, irreversibility, catastrophe: can arise on all sides.
 - Uncertainty analysis must be multi-risk
 - If precaution is warranted, then ancillary risks also warrant precaution.
 - Type and degree of uncertainty may vary across risks.

Comparative:

Are some societies more precautionary, or more concerned about risk-risk tradeoffs, than others?

USA vs. EU ?

A ten-year, multi-risk, multi-author research project.



(RFF Press / Earthscan / Routledge, 2011)

Plus symposia in *Reg. & Gov.* (2013) and *EJRR* (2013).

The Reality of Precaution

*Edited by J.B.Wiener, M.D.Rogers, J.K.Hammitt, P.H.Sand
(RFF Press / Earthscan / Routledge, 2011)*

I. Introduction

The Rhetoric of Precaution – Wiener

II. Case Studies of Specific Risks

Genetically Modified Foods – Lex & Cantley

Beef Hormones and BSE – Gray et al.

Smoking Tobacco – Blanke

Nuclear Power – Ahearne & Birkhofer

Automobile Emissions – Walsh

Climate and Strat. Ozone – Hammitt

Biodiversity – Saterson

Marine Environment – Freestone

Chemicals – Renn & Elliott

Medical Errors, new drug approval and patient safety – Miller

Terrorism and WMD – Stern & Wiener

III. Information Systems

Information Disclosure – Sand

Risk Analysis Methods – Rogers & Charnley

IV. Quantitative Empirical Analysis of Comparative US and EU

Precaution – Swedlow, Hammitt, Wiener, Kall & Zhou

V. Explanations?

Political Systems – Majone

Legal Systems – Bergkamp & Smith

Perceptions and Culture – Weber & Ancker

Perceptions and Selection – Sunstein

VI. Conclusions

The Real Pattern of Precaution – Wiener

Comparative Precaution: Parity and Particularity

EU



1970s – 80s:

- **Marine environment**
- **Guns**

1990s - present:

- **Hormones in Beef, rBST**
- **GM foods / crops**
- **Climate**
- **Toxic Chemicals**

US



1970s – 80s:

- **New drug approval**
- **Strat. Ozone (CFCs)**
- **Nuclear power**
- **Endangered species**
- **Lead (Pb) in gas/petrol**

1990s - present:

- **BSE/vCJD in Beef, Blood**
- **Smoking tobacco**
- **Particulate Matter (PM)**
air pollution (esp. diesel)
- **Terrorism**

Implications of *The Reality of Precaution*

- **Reality: complex pattern of Parity and Particularity.**
 - Neither EU nor US is *generally* more precautionary than the other.
 - Comparing broad legal “systems/families” overlooks complex variation
 - Must study wide array of cases (not just rhetoric, or recent visible examples)
 - Large-N study: less than 6% trend toward EU precaution post-1990
 - Selective application: Precautionary particularity, not principle
 - Risk-Risk = selectivity is inevitable in a multi-risk world
- **Multiple explanations for the observed complex pattern**
 - Including: differing public perceptions of TR, crisis events, trade protectionism
 - And: differing views of R-R (e.g., diesel, BSE in blood, terrorism, nuclear)
- **Actual precautionary regulation is often moderated.**
 - False negatives, but also False positives, Costs, Risk-Risk tradeoffs
 - Toward optimal (not maximal) precaution
- **“Better Regulation” in both the US and EU**
 - Regulatory Impact Assessment (IA) and Executive oversight
 - Both Precaution and IA are forms of foresight
- **Diffusion, borrowing: increasingly interwoven “hybridization” of regulatory systems (more than convergence, divergence, reversal).**
 - Opportunity for learning through comparison and exchange.

Thank you.

www.law.duke.edu/fac/wiener

