ENVIRONMENTAL REGULATION GOING RETRO: LEARNING FORESIGHT FROM HINDSIGHT

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I. INTRODUCTION

Environmental law demands foresight. Much environmental law seeks to prevent dangers that "may reasonably be anticipated,"[1] invoking precaution against future risks before they occur.[2] Even

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1. *E.g.*, Clean Air Act, 42 U.S.C. § 108 (2004).
2. *E.g.*, Ethyl Corp. v. United States, 541 F.2d 377, 377 (D.C. Cir. 1976). For a recent review of precaution in environmental law, *see* Jonathan B. Wiener, *Precaution and Climate*

environmental laws that seek to remedy past damage and restore ecological systems still depend on foreseeing the future effects of such measures. Environmental Impact Assessment (EIA)—the flagship of modern environmental law, now adopted around the world—calls for foresight before taking action.[3] Similarly, Regulatory Impact Assessment (RIA)—required by every United States (U.S.) President of the past four decades, and increasingly adopted in other countries—has emphasized prospective ex ante assessment of the future impacts of proposed new rules or rule revisions.[4] Each of these impact assessment (IA) tools incorporates, to some degree, the analytic methods of risk assessment (RA) and cost-benefit analysis (CBA).

Yet foresight is inevitably imperfect. Humans may be unusual among species in trying to make decisions via foresight, by envisioning hypothetical scenarios of future consequences (and how they will feel about them),[5] but humans also tend to be flawed forecasters.[6] Choosing among options is challenging, because anticipating the consequences of alternative actions involves foreseeing future outcomes with and without each option and furthermore foreseeing future preferences about these outcomes.[7] Even when making decisions with the best intentions, humans are susceptible to biases and heuristics. The future scenarios that the human brain constructs tend to be made of collages of memories, which helps explain why humans tend to overemphasize events that they recall as more salient (the availability heuristic).[8] Humans may overstate the importance of their current state of affairs as a reference point

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Change, in THE OXFORD HANDBOOK OF INT'L CLIMATE CHANGE LAW (Cinnamon Carlarne et al., eds., Oxford Univ. Press, 2016).

3. The U.S. National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 et seq., requires federal agencies to stop and think ahead about the reasonably foreseeable significant environmental impacts of their major actions. On the international adoption of EIA, *see* NEIL CRAIK, INTERNATIONAL LAW OF ENVIRONMENTAL IMPACT ASSESSMENT (Cambridge Univ. Press, 2008). On EIA as policy foresight and its international diffusion, *see* Jonathan B. Wiener & Daniel L. Ribeiro, *Impact Assessment: Diffusion and Integration*, *in* COMPARATIVE LAW AND REGULATION: UNDERSTANDING THE GLOBAL REGULATORY PROCESS (Francesca Bignami & David Zaring eds., 2016).

4. *See* Wiener & Ribeiro, *supra* note 3.

5. *See* DANIEL GILBERT, STUMBLING ON HAPPINESS 81-106 (Vintage Canada ed. 2009).

6. *Id.*; LEONARD MLODINOW, THE DRUNKARD'S WALK: HOW RANDOMNESS RULES OUR LIVES (Vintage Books 2008); PHILIP E. TETLOCK & DAN GARDNER, SUPERFORECASTING: THE ART AND SCIENCE OF PREDICTION (Crown 2015); DANIEL KAHNEMAN, THINKING, FAST AND SLOW (1st ed. 2011); NASSIM NICHOLAS TALEB, FOOLED BY RANDOMNESS: THE HIDDEN ROLE OF CHANCE IN LIFE AND IN THE MARKETS (Random House 2005).

7. GILBERT, *supra* note 5.

8. Daniel T. Gilbert & Timothy D. Wilson, *Prospection: Experiencing the Future*, 317 SCIENCE 1351 (2007); D. L. Schacter, D. R. Addis & R. L. Buckner, *Episodic Simulation of Future Events: Concepts, Data, and Applications*, 1124 ANN. N. Y. ACAD. SCIENCE 39 (2008).

(status quo bias); they may find it difficult to appreciate randomness, expecting to see a cause behind every event; they may attribute patterns when there is only noise; and they may overstate the skills or errors of the decision maker.[9]

Benjamin Franklin understood both the need for foresight and its inescapable imperfection when he advised his friend, the British scientist Joseph Priestley, who was considering whether to accept a job offer made by Lord Shelburne to work as the librarian and tutor of Shelburne's children.[10] Franklin proposed a process of envisioning and weighing "all the Reasons pro and con" for each decision option, recognizing that:

> tho' the Weight of Reasons cannot be taken with the Precision of Algebraic Quantities, yet, when each is thus considered … and the whole lies before me, I think I can judge better, and am less liable to make a rash Step; and in fact I have found great Advantage from this kind of Equation, in what may be called Moral or Prudential Algebra.[11]

Taking Franklin's advice, Priestley considered his objectives and collected information on Lord Shelburne and his offer.[12] He sought to foresee and weigh the possible consequences of his alternatives and make his decision.[13] Yet, as Franklin noted, even such foresight is inevitably imprecise.

Foresight can be improved, notably through astute hindsight: learning from the past.[14] The key is to reassess past foresight in light of experience and thereby increase the accuracy of our

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9. MLODINOW, *supra* note 6, at 9 (mentioning examples of how adverse outcomes can be misperceived as indicative of bad decisions or bad decision skills).

10. JOHN TOWILL RUTT, LIFE AND CORRESPONDENCE OF JOSEPH PRIESTLEY: VOLUME I 180 (1831).

11. Benjamin Franklin, Letter to Joseph Priestley (September 19, 1772), *in* BENJAMIN FRANKLIN: REPRESENTATIVE SELECTIONS, WITH INTRODUCTION, BIBLIOGRAPHY AND NOTES 348-49 (Frank Luther Mott & Chester E. Jorgenson, eds., New York: American Book Company). The context and influence of Franklin's letter on the development of CBA is discussed in Jonathan B. Wiener, *The Diffusion of Regulatory Oversight*, *in* THE GLOBALIZATION OF COST-BENEFIT ANALYSIS IN ENVIRONMENTAL POLICY (Richard L. Revesz & Michael A. Livermore eds., 2013); RUTT, *supra* note 10, at 182-183. The discussion of Priestley's decision making process before and after Franklin's advice is also mentioned in CHIP HEATH & DAN HEATH, DECISIVE: HOW TO MAKE BETTER CHOICES IN LIFE AND WORK (2013).

12. *See* RUTT, *supra* note 10, at 178, 181, 183, 185, 188.

13. *Id.*

14. TETLOCK & GARDNER, *supra* note 6, at 13 ("Forecast, measure, revise. Repeat. It's a never ending process of incremental improvement that explains why weather forecasts are good and slowly getting better. . . . [W]ithout revision, there can be no improvement.").

foresight methods.[15] Informing foresight from hindsight is an essential inferential method of science. From hypothesis testing through experimentation and observation, to the Bayes-Laplace Theory of updating prior beliefs, the essence of scientific inquiry is that additional information can enable us to test past assumptions and predictions and improve our ability to foresee.[16]

In this sense, environmental law needs to learn[17] to improve its foresight via hindsight—it needs to couple prospection with retrospection. The point of such retrospection is not to return to a past state of the world; it is not a reactionary nostalgia, but rather a reflective (at times bittersweet) process of learning.[18] Measuring past forecasts against policy performance can promote learning and improvement in subsequent decisions. Such a forecast-revise-adapt approach is a central feature of the new wave of developments in artificial intelligence and deep learning.[19] It can be part of our legal institutions as well.

IA, developed in the U.S. and diffused throughout the world, has become the institutional and legal mechanism for policy foresight.[20] As noted, EIA and RIA have both been adopted widely as prospective ex ante procedures for policy foresight, seeking to foster environmental quality and better regulation.[21]

The emphasis of both RIA and EIA over the past five decades has been prospective: estimating the future consequences of a policy decision.[22] Researchers have observed that these ex ante forecasts may, understandably, exhibit significant uncertainties

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15. *See generally id.*

16. SHARON BERTSCH MCGRAYNE, THE THEORY THAT WOULD NOT DIE: HOW BAYES' RULE CRACKED THE ENIGMA CODE, HUNTED DOWN RUSSIAN SUBMARINES, AND EMERGED TRIUMPHANT FROM TWO CENTURIES OF CONTROVERSY (Reprint ed. 2012); MLODINOW, *supra* note 6.

17. For an early call to incorporate learning into environmental law, including through experimentation and review, *see* Daniel A. Farber, *Environmental Protection as a Learning Experience*, 27 Loy. L.A. L. Rev. 791 (1994).

18. SVETLANA BOYM, THE FUTURE OF NOSTALGIA (Basic Books 2008).

19. Nicola Lettieri, *Computational Social Science, the Evolution of Policy Design and Rule Making in Smart Societies*, 8 FUTURE INTERNET 19 (2016); *Rise of the Machines*, ECONOMIST (May 2015), http://www.economist.com/news/briefing/21650526-artificial-intelligence-scares-peopleexcessively-so-rise-machines.

20. Wiener & Ribeiro, *supra* note 3.

21. Wiener, *supra* note 11. *See* Wiener & Ribeiro, *supra* note 3.

22. *See* Jos Arts, Paula Caldwell & Angus Morrison-Saunders, *Environmental Impact Assessment Follow-up: Good Practice and Future Directions—Findings from a Workshop at the IAIA 2000 Conference*, 19 IMPACT ASSESS. PROJ. APPRAIS. 175, 175-85 (2001); JOSEPH ALDY, LEARNING FROM EXPERIENCE: AN ASSESSMENT OF THE RETROSPECTIVE REVIEWS OF AGENCY RULES AND THE EVIDENCE FOR IMPROVING THE DESIGN AND IMPLEMENTATION OF REGULATORY POLICY 7 (2014); EUR. COMM'N, *Smart Regulation in the European Union,* COM (2010) 543 final, at 3 (Oct. 8, 2010) [hereinafter EC, *Smart Regulation*].

and inaccuracies.[23] Several studies have found that only a plurality of ex ante IAs turn out to be accurate (even defined loosely as +/- 25%), with errors of both overestimation and underestimation of actual impacts, for reasons including: industry overestimation of costs, assumptions of static technology followed by actual innovation, and mis-projection of compliance rates.[24] In some cases, the ex ante IA may appear inaccurate because the policy was changed after the ex ante IA was prepared on a prior version of the policy.[25] Yet there have still been "only . . . a handful" of retrospective studies of prospective accuracy,[26] and they have examined only partial samples which may not be representative of the broader universe of policies and IAs.[27]

Governments have increasingly called for regular conduct of retrospective review or ex post IA, chiefly to secure cost savings or other gains from revising older regulations.[28] Retrospective review of existing regulations was the objective of section 5 of President Bill Clinton's Executive Order (EO) 12,866 (1993)[29]; section 6 of President Barack Obama's EO 13,563 (2011)[30]; President Obama's EO 13,579 (2011) calling on independent agencies to conduct similar reviews[31]; President Obama's EO 13,610 (2012) giving further details on the review process[32]; and

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23. *See* Adam Finkel, *The Cost of Nothing Trumps the Value of Everything: The Failure of Regulatory Economics to Keep Pace with Improvements in Quantitative Risk Analysis*, 4 MICH. J. ENVTL. & ADMIN. L. 91 (2014).

24. *See* Winston Harrington, Richard D. Morgenstern & Peter Nelson, *On the Accuracy of Regulatory Cost Estimates*, 19 J. POL'Y ANALYSIS & MGMT. 297 (2000); OFFICE OF MGMT. & BUDGET, 2005 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES (2005) [hereinafter OMB 2005 REPORT]; Winston Harrington, *Grading Estimates of the Benefits and Costs of Federal Regulation: A Review of Reviews*, RESOURCES FOR THE FUTURE (2006); Richard D. Morgenstern, *The RFF Regulatory Performance Initiative: What Have We Learned?,* RESOURCES FOR THE FUTURE (2015) [hereinafter Morgenstern, *RFF*].

25. Such changes could occur during the legislative/rulemaking process after the ex ante IA is prepared, or during implementation after adoption of the policy. One of the main criticisms of ex ante IA expressed by some officials from Directorates-General of the European Commission is that the proposed policy action examined in the ex ante IA gets significantly amended after the proposal leaves the Commission and traverses the European Parliament and Council—without an update to the IA to assess the impacts of the final policy action. Interview with Two Officials from Directorates-General of the European Commission (2015), on file with authors.

26. Finkel, *supra* note 23, at 118.

27. *See id.*

28. *See infra* Section III.

29. Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993). Previously, President Jimmy Carter's Exec. Order 12,044 (1978) addressed review of existing regulations in §§ 2(d)(8) and 4; and President Ronald Reagan's Exec. Order 12,291 (1981) addressed review of existing regulations in § 3(i).

30. Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 18, 2011).

31. Exec. Order No. 13,579, 76 Fed. Reg. 41,587 (July 11, 2015).

32. Exec. Order No. 13,610, 77 Fed. Reg. 28,469 (May 10. 2012).

the Organization for Economic Co-operation and Development's (OECD) recommendation number 5 on regulatory policy and governance (2012).[33] The Regulatory Flexibility Act (RFA) requires agencies to review within 10 years of issuance those regulations that have "a significant economic impact upon a substantial number of small entities."[34] Some statutes require reviews every few years.[35] The Administrative Conference of the United States (ACUS) endorsed the call for retrospective review as early as 1995 (just after the Clinton EO),[36] commissioned an expert appraisal in 2014 by Joseph Aldy of retrospective review efforts to date (soon after the Obama EO),[37] and adopted a set of recommendations in late 2014 for strengthening retrospective review.[38] Countries around the world have been adopting versions of retrospective review (whether called ex post IA, follow up policy evaluation, post-implementation review, retrospective review, or otherwise).[39]

Yet, these government measures to require retrospective review have not yet fulfilled the goal that we emphasize here: using retrospective review to learn to improve prospective review—using hindsight to improve foresight. Calls for retrospective review have yielded only partial and slow progress in practice. After his term at the helm of Office of Information and Regulatory Affairs (OIRA), where he was a key architect of the Obama administration's retrospective review orders and supervised their implementation, Cass Sunstein wrote that "[i]t is an astonishing fact that until very recently, there has been no sustained effort to gather, let alone act on, that information [about what regulatory policies actually do]—and

33. ORG. FOR ECON. CO-OPERATION & DEV., RECOMMENDATION OF THE COUNCIL ON REGULATORY POLICY AND GOVERNANCE (2012).

34. 5 U.S.C. § 602(a)(1) (2012).

35. *E.g.,* 42 U.S.C. § 7409(d) (requiring reviews of national ambient air quality standards [NAAQS] every five years).

36. Admin. Conference of the U.S., Recommendation 95-3, Review of Existing Agency Regulations, 60 Fed. Reg. 43,108, 43,109 (Aug. 18, 1995).

37. ALDY, *supra* note 22.

38. Admin. Conference of the U.S., Recommendation 2014-5, Retrospective Review of Agency Rules, adopted December 4, 2014, at 79 Fed. Reg. 75,114, 75,114-117 (Dec. 17, 2014). ACUS Recommendation 5(c) notes that one factor in selecting rules for retrospective analysis is "[u]ncertainty about the accuracy of initial estimates of regulatory costs and benefits." *Id.* at 75,116. Retrospective review was also advocated by the American Bar Association. SECTION OF ADMIN. LAW AND REGULATORY PRACTICE, AM. BAR ASSOC., IMPROVING THE ADMINISTRATIVE PROCESS: A REPORT TO THE PRESIDENT-ELECT 12-13 (2016), http://www.americanbar.org/content/dam/aba/administrative/administrative_law/Final%20POTUS%20Report%2010-26-16.authcheckdam.pdf.

39. ORG. FOR ECON. CO-OPERATION & DEV., REGULATORY POLICY OUTLOOK § 5 (2015) [hereinafter OECD, POLICY OUTLOOK].

that existing efforts remain highly preliminary and partial."[40] The Aldy report found that the Obama administration's measures generated retrospective reviews of several hundred specific rules, and helped build a culture of retrospective review; however, the track record remained "mixed" and very few of the administration's newly issued rules were revisions based on a retrospective review or required a future retrospective review.[41] Cary Coglianese observed that "retrospective review is today where prospective analysis was in the 1970s: ad hoc and largely unmanaged."[42] OECD remarked: "ex post evaluation by [U.S.] federal agencies remains patchy and unsystematic."[43]

It is understandable that agencies told to conduct retrospective reviews may see this task as low priority compared to issuing the new policies demanded by Congress, the President, and the public; an agency may hesitate to conduct reviews that might cast doubt on its own past analyses, or subject its policies to revision or rescission. Hence, there is a need for presidential exhortation (or another institutional mechanism) to promote retrospective review. The Obama Administration continued to seek and report additional retrospective reviews by agencies each year.[44]

So far, government retrospective review has mainly been aimed at assessing each regulatory policy individually, with a view to revising that specific policy, often to reduce its cost burden.[45] In this article, we argue that the retrospective review effort should be broader, assessing the comprehensive scope of important impacts (not only costs, but also benefits and ancillary impacts, with a view not just to reducing burdens, but also to increasing net

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40. Cass R. Sunstein, *The Regulatory Look-Back*, 94 B.U. L. REV. 579, 588 (2014).

41. ALDY, *supra* note 22, at 4-6. Similarly, Sofie Miller studied twenty-two rules promulgated in 2014 and found that very few included plans for future retrospective review. Sofie E. Miller, *Learning from Experience: Retrospective Review of Regulations in 2014* (Geo. Wash. U. Regulatory Studies Ctr., Working Paper, 2015), https://regulatorystudies.columbian.gwu.edu/learning-experience-retrospective-review-regulations-2014.

42. Cary Coglianese, *Moving Forward with Regulatory Lookback*, 30 YALE J. ON REG. 57, 59 (2013).

43. OECD, POLICY OUTLOOK, *supra* note 39, at 123; *see also* Randall Lutter, *Regulatory Policy: What Role For Retrospective Analysis and Review?*, 4 J. BENEFIT-COST ANALYSIS, 17-38 (2013) (similar).

44. *See, e.g.,* Howard Shelanski, *Making All Levels of Government More Efficient and Effective Through Retrospective Review*, THE WHITE HOUSE (Mar. 4, 2016), https://www.whitehouse.gov/blog/2016/03/04/making-all-levels-government-more-efficient-and-effective-through-retrospective (reporting on "more than 50 new retrospective initiatives" and stating that the administration's "regulatory lookback effort to date [since 2011] has achieved an estimated $28 billion in net 5-year savings"). Howard Shelanski was the Administrator of OIRA during President Obama's second term.

45. *See infra* Section II.

benefits).[46] Furthermore, we argue that retrospective review should emphasize learning—by assessing larger and representative samples of multiple ex post IAs compared to ex ante IAs, in order to improve foresight through more accurate ex ante IA methodologies and to learn about better policy designs.[47] Under EO 13,563, "each agency is directed to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible"[48]—which should include using retrospective review to test and improve the accuracy of prospective IA. Cary Coglianese recommends "rigorous retrospective review [of multiple rules sharing common estimation issues] to evaluate their benefits and costs retrospectively [and] help validate or improve prospective estimation techniques applicable to other rules."[49] Aldy likewise notes the value of using retrospective review (ex post IA) to test and improve the accuracy of methodologies for prospective ex ante IA.[50]

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46. Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 18, 2011), recognizes the possibility that retrospective review will find that a rule is "insufficient" as well as that it is "outmoded, ineffective . . . or excessively burdensome" (section 6), but the emphasis so far has been on reducing costs; *see* Shelanski, *supra* note 44 (noting large cost savings, but also an example of expanding federal policy on hearing aids). A useful analogy may be to outcomes studies in medical care, the objective of which is not necessarily to reduce (or increase) medication, but to improve patient health outcomes; similarly, retrospective review should be aimed evenhandedly not at reducing (or increasing) regulation, but at improving societal outcomes. *See* Jonathan B. Wiener, *Managing the Iatrogenic Risks of Risk Management*, 9 RISK: HEALTH SAFETY & ENV'T 39, 78-79 (1998) (proposing national outcomes studies of regulation, akin to outcomes studies in medicine).

47. OIRA appears to agree with this goal of using retrospective IA to enhance the accuracy of prospective IA:

> Prospective analysis may overestimate or underestimate both benefits and costs; retrospective analysis can be important as a corrective mechanism.[9] Executive Orders 13563 and 13610 specifically call for such analysis, with the goal of improving relevant regulations through modification, streamlining, expansion, or repeal. The aim of retrospective analysis is to improve understanding of the accuracy of prospective analysis and to provide a basis for potentially modifying rules as a result of ex post evaluations. Rules should be written and designed to facilitate retrospective analysis of their effects, including consideration of the data that will be needed for future evaluation of the rules' ex post costs and benefits.

OFFICE OF MGMT. & BUDGET, 2015 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND AGENCY COMPLIANCE WITH THE UNFUNDED MANDATES REFORM ACT 6 (2016) (with footnote 9 citing Michael Greenstone, *Toward a Culture of Persistent Regulatory Experimentation and Evaluation*, in NEW PERSPECTIVES ON REGULATION (David Moss & John Cisternino, eds., 2009)). However, in response to two commenters on the 2015 draft report who suggested that OMB should report the findings of retrospective reviews alongside OMB's reports of agencies' prospective IAs for major rules over the past decade, OMB replied that it hopes the agencies and outside researchers will do so. *Id.* at 109.

48. Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 18, 2011).

49. Coglianese, *supra* note 42, at 65.

50. ALDY, *supra* note 22, at 22-26. *See also* Adam J. White, *Retrospective Review, for Tomorrow's Sake,* YALE J. ON REG.: NOTICE & COMMENT BLOG (Nov. 28, 2016),

President Obama declared in his 2009 inaugural address that "[t]he question we ask today is not whether our government is too big or too small, but whether it works."[51] Regulations can protect environmental quality and public health, but if poorly designed or if conditions change, they can also induce new problems.[52] If policy makers try to foresee the expected consequences of proposed policy actions, then efforts should be undertaken to validate these forecasts and improve their accuracy over time. Without a mechanism to learn what really works and how well (or poorly), it will be unknown if government policies are achieving their intended or optimal outcomes, and the government will not be able to improve its foresight for subsequent policy decisions. Without ex post review, ex ante IA can err in foreseeing impacts, and can more easily be used to justify a policy choice already taken, rather than to learn about actual impacts.[53]

Sections II and III of this article trace the evolution of IA, first the rise and diffusion of ex ante analysis and then the more limited emergence of ex post review, including EIA, RIA, and other related tools intended to improve policy decisions and increase accountability. Section IV offers an original contribution to the literature with a new empirical analysis of agency reporting data on the extent to which U.S. environmental regulation—in particular, regulation by the Environmental Protection Agency (EPA)—is going retro, in the sense of incorporating a learning mechanism by which hindsight can improve foresight. We find low levels of implementation of ex post EIA and RIA, and a focus on reducing the cost burden of each policy taken individually, rather than evaluation of a comprehensive scope of impacts or multi-policy retrospective to test and learn to improve the accuracy of prospective IA. Section V comments on the possible causes of

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http://yalejreg.com/nc/retrospective-review-for-tomorrows-sake-by-adam-j-white/ ("retrospective review's greatest virtue actually has nothing to do with repealing regulations. Rather, retrospective review's greatest value is forward-looking . . . to confront how accurate or inaccurate the agencies' own projections were in forecasting the rules' impacts in the first place.").

51. Barrack Obama, INAUGURAL ADDRESS BY BARACK OBAMA, Jan. 21, 2009, http://www.inaugural.senate.gov/swearing-in/address/address-by-barack-obama-2009 (last visited Jan. 21, 2017).

52. Wiener, *supra* note 11, at 124; JOHN D. GRAHAM & JONATHAN B. WIENER, RISK VS. RISK: TRADEOFFS IN PROTECTING HEALTH AND THE ENVIRONMENT (Harvard Univ. Press, 1995). As regulatory impacts affect different people, further analysis is needed to assure a fair distribution of welfare. *See* MATTHEW D. ADLER, WELL-BEING AND FAIR DISTRIBUTION: BEYOND COST-BENEFIT ANALYSIS (Oxford Univ. Press, 2012).; Matthew D. Adler, *Cost-Benefit Analysis and Distributional Weights: An Overview* (Duke Envtl. & Energy Econ., Working Paper EE 13-05, 2013), http://scholarship.law.duke.edu/faculty_scholarship/3110.

53. *See* Claudio M. Radaelli, *Rationality, Power, Management and Symbols: Four Images of Regulatory Impact Assessment*, 33 SCANDINAVIAN. POL. STUDIES 164-188, 171 (2010) (mentioning the de-coupling of the "talk" and practice of regulatory assessment instruments).

and remedies for the shortcomings we have observed, and makes recommendations for future research and for institutional reforms to improve the implementation of ex post IA, so better foresight can evolve from better hindsight.

II. ENVIRONMENTAL POLICY FORESIGHT

U.S. environmental law has evolved by progressively incorporating analytical tools and methods of policy foresight. Four such tools gained importance as not only methods for improving regulation and other policy decisions, but also as measures to increase accountability and better communicate decisions to the public. The early application of CBA to government infrastructure projects laid the methodological basis for the subsequent deployment of prospective EIA and RIA. Similarly, formal methods of prospective RA were developed to inform policy decisions.

A. CBA of Infrastructure Projects

The conceptual elements of CBA were evident in Benjamin Franklin's letter to Joseph Priestley in 1772, quoted above.[54] There is some evidence that these ideas then influenced pivotal thinkers in late 18th century Paris, notably Jeremy Bentham and French engineer-economists such as Jules Dupuit (professor at the Ecole des Ponts et Chaussées), and the French military engineers later brought these ideas back to America to train the U.S. Army Corps of Engineers (Army Corps).[55] CBA in U.S. policymaking first appeared as a practice of the Army Corps in selecting projects.[56] With the beginning of the professionalization of the civil service in the 1880s, the Army Corps began to develop a systematized planning process for designing and choosing priorities for infrastructure projects based on economic analysis of anticipated costs and benefits.[57] The longstanding use of CBA by the Army Corps' archetype, the French Corps des Ponts et Chaussées, was a direct influence.[58] Since 1807, the French Corps had been quantifying and monetizing the social costs and benefits of infrastructure projects as a method of measuring their "public

54. Franklin, *supra* note 11.
55. *See* Wiener, *supra* note 11.
56. *See* THEODORE M. PORTER, TRUST IN NUMBERS ch. 7, at 148 (Princeton Univ. Press, 1996).
57. *Id.* at 151.
58. *Id.* at 148, 150.

utility" and ranking different projects competing for public funds.[59] French influence—starting with engineers assisting the Americans during the Revolutionary War—combined with the distinct political setting under which the U.S. Army Corps developed, stimulated the gradual adoption and implementation of CBA.[60]

The U.S. Congress played a major role in formalizing and routinizing CBA in the 20th century by making it a legal requirement preceding funding decisions for public water projects—first in the Rivers and Harbors Act of 1902 (RHA) and then in the Flood Control Act of 1936 (FCA).[61] The main policy motivations for the two Acts were to improve governance and promote stronger accountability in public spending; to enhance the perception of fairness in the selection of water projects; and to control "pork barrel" politics.[62] The RHA and the FCA employed different approaches to improving the rationality of water project funding decisions. The RHA's approach was mainly institutional, creating an advisory body—a national-level advisory Board of Engineers for Rivers and Harbors—but also procedural/ methodological, i.e., creating the possibility of a CBA before the approval of a water project.[63] The FCA, on the other hand, built upon the RHA to transform CBA into a binding normative standard for Congressional approval of funds for every public water project.[64] The standard introduced by the FCA for Congressional approval was "if the benefits to whomsoever they may accrue are in excess of the estimated costs, and if the lives and social security of people are otherwise adversely affected."[65] For the two types

59. *Id.* at 120.

60. Wiener, *supra* note 11, at 134; PORTER, *supra* note 56; *See infra* note 67; JOE N. BALLARD, THE HISTORY OF THE U.S. ARMY CORPS OF ENGINEERS 17 (1988) (on the participation of French engineers in the Revolutionary War).

61. 33 U.S.C. §§ 541-579 (1902); 33 U.S.C. §§ 701-709 (1936).

62. BEATRICE HORT HOLMES, A HISTORY OF FEDERAL WATER RESOURCES PROGRAMS, 1800-1960, at 8 (1972); PORTER, *supra* note 56, at 149, 155.

63. According to the Rivers and Harbors Act of 1902 (RHA):

> [I]n the consideration of such works and projects the board shall have in view the amount and character of commerce existing or reasonably prospective which will be benefited by the improvement, and the relation of the ultimate cost of such work, both as to cost of construction and maintenance, to the public commercial interest involved, and the public necessity for the work and propriety of its construction, continuance, or maintenance at the expense of the United States.

33 U.S.C. § 541. The Act also stipulated that "all facts, information, and arguments which are presented to the board for its consideration in connections with any matter referred to it by the Chief of Engineers shall be reduced to and submitted in writing, and made a part of the records." Still, the board acted in an advisory board capacity, since only the projects referred to it by the Chief of Engineers underwent a CBA analysis. *Id.*

64. *See* Flood Control Act of 1936, 33 U.S.C. §§ 701-709 (1936).

65. *Id.* § 1(a), 33 U.S.C. § 701(a).

of studies, forecasting the positive and negative, direct and indirect, effects of public projects worked as a preceding step to the calculation of its net benefits.[66]

The next period of significant methodological and institutional developments of CBA, as a method for informing and promoting accountability for policy decisions, occurred between the 1940s and the late 1960s. To a remarkable extent, the standardization of CBA methods was a product of American demand for transparency in government decision-making.[67] To resolve disputes over how to conduct CBA analyses, the Bureau of the Budget—the predecessor of the Office of Management and Budget (OMB)—used powers vested by EO 9,384 of 1943 and, in 1952, issued Circular A-47 with the first set of interagency guidelines for CBA of water projects.[68] Circular A-47 consolidated years of evolution and methodological debate about CBA, transforming CBA of water and related land programs and projects into a process of sequential decisions, from problem definition to the calculation of net benefits.[69] CBA became "an essential part of the process of formulating and selecting projects."[70] The forecasting nature of CBA was once again evident, now in the guidelines ("a concise but complete estimate of all the benefits and all of the economic costs. Because any long-term

66. In the RHA, the idea of forecasting, with its inevitable uncertainty, is explicit in the use of expression "reasonably prospective" to refer to the estimation of benefits. *See id.* § 3, 33 U.S.C. § 541.

67. A. R. Prest & R. Turvey, *Cost-Benefit Analysis: A Survey*, 75 ECON. J. 683-735, 684 (1965); PORTER, *supra* note 56, at 149, 162 (explaining how the most powerful advocates for standardized methods of CBA were the opponents of the Army Corps, namely utilities, railroads, the Soil and Conservation Service of the Department of Agriculture, and the Bureau of Reclamation, in the Department of the Interior). Attitudes toward transparency and access to information differed in France and the U.S., while decisions by the French Conseil général about alternative programs—all backed by economic quantification—were made in closed session and the Corps des Ponts protected itself by withholding information, the U.S. Army Corps of Engineers was compelled to disclose its findings. *Id.* at 116, 144. In Porter's view, this transparency was one of the key factors explaining why CBA evolved in the U.S., surpassing the French approach in methodological sophistication. *Id.*

68. BUREAU OF THE BUDGET, CIRCULAR A-47, REPORTS AND BUDGET ESTIMATES RELATING TO FEDERAL PROGRAMS AND PROJECTS FOR CONSERVATION, DEVELOPMENT, OR USE OF WATER AND RELATED LAND RESOURCES (1952). Circular A-47 established minimum criteria that would be used by the Executive Office of the President when reviewing proposed water project reports and budget estimates, with the goal of promoting "more uniform agency policies and standards," and to inform better priority setting among projects competing for funds. *Id.* Circular A-47 was preceded by a series of studies by the Subcommittee on Benefits and Costs, established in 1946 at the Inter-Agency Committee on Water Resources (IACWR), with the goal of formulating uniform principles and procedures for CBA of water resources projects. Executive Order 9,384 of 1943 required agencies to submit to the Bureau of the Budget reports relating to or affecting Federal public works and improvement projects.

69. INTER-AGENCY COMM. ON WATER RESOURCES, PROPOSED PRACTICES FOR ECONOMIC ANALYSIS OF RIVER BASIN PROJECTS 3, 11, 18, 22 (1958); John F. Timmons, *Economic Framework for Watershed Development*, 36 J. FARM ECON. 1170, 1173 (1954).

70. INTER-AGENCY COMM. ON WATER RESOURCES, *supra* note 69, at 11.

estimates are subject to wide margins of error, the results should be expressed in ranges rather than in single figures").[71]

Influenced by the developments in welfare economics, the use of CBA expanded from water projects to inform project decisions in other areas, such as health, recreation, and land use.[72] Soon, planners overseas began to advocate the use of ex ante "evaluation in planning" centered on CBA as the ideal approach to making rational and transparent planning choices.[73] Even with methodological limitations, CBA was seen as an improvement compared to open-ended concepts of the time (e.g., "best use of land in the public interest," "a pattern of land use that is reasonably convenient, pleasing and cheap," or "advantages and disadvantages").[74]

CBA would soon become a key component of IA—in particular in the U.S.[75] During and after the 1970s, several U.S. environmental statutes incorporated CBA for agency decisions or regulations, independent of an IA.[76]

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71. BUREAU OF THE BUDGET, *supra* note 68, at 5; *See also* INTER-AGENCY COMM. ON WATER RESOURCES, *supra* note 69, at 17. When discussing the treatment of risks in CBA, the IACRW Report mentions:

> Risks in the form of uncertainties for which no appropriate basis is available for prediction include the probability of errors in estimating benefits and costs due to such factors as fluctuations in levels of economic activity, technological changes and innovations, and other unforeseeable developments adversely affecting the cost of value of project services.

INTER-AGENCY COMM. ON WATER RESOURCES, *supra* note 69, at 23.

72. Nathaniel Lichfield, *Cost-Benefit Analysis in Plan Evaluation*, 35 TOWN PLAN. REV. 159, 163 (1964); ROBERT DORFMAN, MEASURING BENEFITS OF GOVERNMENT INVESTMENTS; PAPERS PRESENTED AT A CONFERENCE OF EXPERTS HELD NOVEMBER 7-9, 1963, at 7-9 (1965); PORTER, *supra* note 56, at 187 ("The new welfare economics presupposed that all pleasures and pains in life were commensurable under a single, coherent, quantifiable utility function. It seemed both intellectually serious and practically useful to try to work this out for such difficult issues as recreation, health, and the saving or loss of life").

73. Lichfield, *supra* note 72.

74. *Id.* at 161, 168.

75. CBA is often a key part of RIA. *See* RICHARD L. REVESZ & MICHAEL A. LIVERMORE, RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH (Reprint ed. 2011). But RIA can be undertaken without full CBA (for example, if RIA takes a goal as given and employs cost-effectiveness analysis).

76. For example, the Toxic Substances Control Act (TSCA) of 1976, § 6(c); the Safe Drinking Water Act (SDWA) Amendments of 1996, authorizing EPA to determine whether the benefits justify the costs before setting drinking water standards; or the Amended Gas Pipeline Safety Standards of 1996, requiring CBA before setting safety standards. *See* Robert W. Hahn, *State and Federal Regulatory Reform: A Comparative Analysis*, 29 J. LEG. STUD. 873, 889 (2000).

B. EIA

The creation of EIA in the U.S. was a landmark in the evolution of normative frameworks of ex ante IA systems and policy foresight. The National Environmental Policy Act (NEPA) (1969) was a response to the countervailing environmental risks of government actions by mission oriented-agencies, such as in the transportation and energy sectors.[77] EIA became by far the most operational and significant of NEPA's provisions, covering policy decisions of different scales, including permits, projects, programs, plans, regulations, and legislative proposals submitted by the Executive Branch to Congress.[78] The logic of EIA is to improve the environmental outcomes of government decisions via analysis, transparency, and public participation in the policy decision process before implementation.[79] EIA works as both a precautionary and evidence-based tool with the potential of avoiding unintended consequences and unnecessary environmental harms.[80]

Foresight is at the core of EIA. Agencies must undertake EIA to foresee the environmental impacts of their actions, as the language of foresight in the guidelines issued under NEPA by the Council on Environmental Quality (CEQ) explicitly indicates.[81] Regarding uncertainty, CEQ guidelines require

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77. 42 U.S.C. § 4321; Jonathan B. Wiener, *Managing the Iatrogenic Risks of Risk Management*, 9 RISK 39, 42-43 (1998). NEPA was a reaction against agencies neglecting environmental impacts. In the early NEPA case of *Calvert Cliffs Coordinating Committee v. AEC*, 449 F.2d 1109 (DC Cir. 1971), Judge Skelly Wright saw in NEPA a requirement of CBA to include the environmental costs of federal agency projects. *See* A. Dan Tarlock, *The Story of Calvert Cliffs: A Court Construes the National Environmental Policy Act to Create a Powerful Cause of Action*, *in* ENVIRONMENTAL LAW STORIES, 84 (Richard J. Lazarus ed., 2005); Robert L. Rabin, *Federal Regulation in Historical Perspective*, 38 STAN. LAW REV. 1189, 1279 (1986). Agencies that did not have to prepare CBA analysis of their own projects and major policy decisions under their own statutes, such as the Atomic Energy Commission and the Department of Transportation, were most in need of this broader CBA incorporating environmental impacts. *Id.* at 1299; JOANNA L. GRISINGER, THE UNWIELDY AMERICAN STATE: ADMINISTRATIVE POLITICS SINCE THE NEW DEAL 12, 246 (2014); Tarlock, *supra* note. In the first 8 years of implementation of NEPA, the Department of Transportation was the agency most frequently involved in NEPA litigation, with 211 cases. COUNCIL ON ENVTL. QUALITY, THE NINTH ANNUAL REPORT OF THE COUNCIL ON ENVIRONMENTAL QUALITY (1978). Later, the U.S. Supreme Court held that NEPA did not impose a substantive CBA requirement, only a procedural stop and think requirement. *See* Strycker's Bay Neighborhood Council v. Karlen, 444 U.S. 223, 228 (1980).

78. National Environmental Policy Act of 1969, § 102(c)(i)-(ii), 42 U.S.C. § 4332 (2012).

79. *See* Craik, *supra* note 3.

80. The required EIS must be prepared and submitted early in the policy process. 40 C.F.R. § 1501.2. EISs should be based "upon the analysis and supporting data from the natural and social sciences and the environmental design arts." 40 C.F.R. § 1502.8.

81. Sections 102(c)(i) and (ii) of NEPA includes the core content of EIA, requiring its report (i.e, the "detailed statement" prepared by the responsible agency official) to include environmental impacts and adverse environmental effects from the action, without language

agencies to be clear about the lack of sufficient information "when an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement."[82] When defining which cumulative impacts and indirect impacts EIA must consider, the guidelines also mention "reasonably foreseeable" impacts and future actions.[83] In other countries, EIA regulations and guidelines employ language denoting foresight at the core of EIA.[84]

From its concise formulation in section 102 (C) of NEPA, EIA evolved through the 1970s into a sophisticated and detailed set of guidelines resulting from repeated interactions among Congress, the President, courts, non-governmental actors, and the CEQ.[85] From the U.S., the concept of EIA diffused throughout the globe and reached over a hundred countries.[86] Also, many states in the U.S. adopted their versions of NEPA (or "little NEPAs"). In less than nine years, over 10,000 environmental impact statements (EIS) had been filed before federal agencies in the U.S., and many times this number of environmental assessments.[87] In most countries that have adopted EIA, it only applies to project level decisions—perhaps because it remained unclear, at least until the 1978 CEQ regulations, which kinds of agency policy decisions would be considered "major federal actions" to trigger an EIA under

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denoting uncertainty, such as "estimates" or "potential." National Environmental Policy Act of 1969, § 102(c)(i)-(ii), 42 U.S.C. § 4332 (2012).

82. 40 C.F.R. § 1502.22 (1978). The expression "reasonably foreseeable significant adverse impacts" is repeated in other provisions of the rule.

83. 40 C.F.R. § 1508.7 (1978).

84. In the U.K., for instance, EIAs should include "an estimate, by [the] type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc[.]) resulting from the operation of the proposed development." Town and Country Planning Regulations 2011, No. 1824, Schedule 4, Part 1(c). In Canada, EIAs should consider "environmental effects . . . that may occur in connection with the designated project and any cumulative environmental effects that are likely to result from the designated project . . . ." S.C. 2012, ch. 19, s. 52, § 19(1)(a). In Australia, a controlled action for which an environmental assessment may be required should consider as relevant impacts those that the action "(a) has or will have; or (b) is likely to have." Environmental Protection and Biodiversity Conservation Act 1999, Compilation No. 51 (2016), Div. 2, 821(1).

85. Herbert F. Stevens, The *Council on Environmental Quality's Guidelines and Their Influence on the National Environment Policy Act,* 23 CATH. U. L. REV. 547, 556 (1973). One year after CEQ passed its 1978 regulation, the Supreme Court validated its legal force. Andrus v. Sierra Club, 442 U.S. 347, 357-58 (1979); *accord.* Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 348-53 (1989); Marsh v. Oregon Natural Resources Council, 490 U.S. 360, 377 (1988); Warm Springs Dam Task Force v. Gribble, 417 U.S. 1301, 1309-10 (1974).

86. Craik, *supra* note 3, at 23; Wiener & Ribeiro, *supra* note 3.

87. COUNCIL ON ENVTL. QUALITY, *supra* note 77, at 407. In the U.S. federal process, environmental assessments are preliminary studies aimed at informing the agency decision whether to conduct a full EIS. *See* 40 C.F.R. § 1508.9 (1978).

NEPA.[88] Expanding the scope of EIA to cover programs and plans, the European Union (EU) and its Member States passed legislation creating the Strategic Environmental Assessment (SEA).[89]

C. RIA

RIA was also set up in the U.S. during the 1970s, partly to help the Executive Branch oversee the flow of rules emanating from the new environmental and other social legislation passed by Congress during this period, and modeled in part on EIA.[90] When Congress enacted NEPA in 1969, commentators were discussing the expansion of CBA from water projects, programs, and budget planning to agency regulations.[91] Responding to concerns over the compliance costs of new environmental regulations, President Nixon created the National Industrial Pollution Control Council and transformed the Bureau of the Budget into its current form of the OMB.[92] The first formulation of what became the RIA in the U.S. was issued by a memorandum from the OMB Director in May 1971, creating the Quality of Life Review (QLR).[93] Under the QLR requirement, every agency had to submit proposed rules to OMB for review and clearance before publishing a notice

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88. Jerry B. Edmonds, The *National Environmental Policy Act Applied to Policy-Level Decisionmaking,* 3 ECOL. L.Q. 799, 799 (1973) (explaining how at first there were doubts on whether the EIA should cover policy decisions at levels other than the project-level).

89. The creation of SEA as a supposedly distinct tool from EIA can be seen as a rebranding effort, compared to the option of simply expanding the scope of EIA, as it has been in the U.S. at least since 1978. "Policies," a category that is usually used to include legislation, regulation, and policy documents, has not been covered by SEA, except by the 2003 SEA Protocol to the Espoo Convention, which focuses on transboundary effects. One possible reason is the overlap with RIA. *See infra* Section II.D.

90. NEPA was a source of inspiration for the development of the Quality of Life Review, which responded to the perceived need for an "Economic Impact Statement." Joe Conley II, *Environmentalism Contained: A History of Corporate Responses to the New Environmentalism* 162 (2006).

91. ALLAN SCHMID, EFFECTIVE PUBLIC POLICY AND THE GOVERNMENT BUDGET: A UNIFORM TREATMENT OF PUBLIC EXPENDITURE AND PUBLIC RULES 579-91 (1969). According to one participant, the tools of benefit-cost analysis and centralized review used at the Army Corps of Engineers (discussed in Section II.A., *supra*) were then promoted by Allan Schmid as a way to oversee regulation generally, and adopted by the Nixon Administration. *See* Jim Tozzi, *OIRA's Formative Years: The Historical Record of Centralized Regulatory Review Preceding OIRA's Founding*, 63 ADMIN. L. REV. (special ed.) 37, 41-43 (2011).

92. Christopher S. Yoo, Steven G. Calabresi & Anthony J. Colangelo, *The Unitary Executive in the Modern Era, 1945-2004*, 90 IOWA L. REV. 601, 658 (2005); William H. Rodgers Jr, *National Industrial Pollution Control Council: Advise or Collude,* 13 BC INDUS. COM. REV. 719 (1971).

93. OFFICE OF MGMT. & BUDGET, OMB PAPERS: QUALITY OF LIFE REVIEW #1, AGENCY REGULATIONS, STANDARDS, AND GUIDELINES PERTAINING TO ENVIRONMENTAL QUALITY, CONSUMER PROTECTION, AND OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY 2 (1971); *see* Tozzi, *supra* note 91, at 44-45.

of proposed rulemaking (NPRM).[94] Agencies had to prepare a summary description containing the principal objectives, alternatives considered, costs and benefits of each alternative, and the reason for selecting the preferred alternative.[95] In practice, the QLR was applied almost exclusively to environmental regulation from the EPA.[96]

Since the 1970s, every American president of both major political parties has maintained or expanded the ex ante RIA framework. In 1978, President Carter issued EO 12,044 and created the "Regulatory Analysis" requirement, overseen by a "Regulatory Analysis Review Group."[97] In 1980, Congress enacted and President Carter signed the Paperwork Reduction Act (PRA), creating OIRA within OMB.[98] In 1981, President Reagan issued EO 12,291, replacing Carter's EO and giving the tool its current name, the "Regulatory Impact Analysis," as well as giving OMB/OIRA the authority to oversee RIAs.[99] In 1993, President Clinton issued EO 12,866, replacing and improving upon Reagan's EO; subsequent presidents have maintained EO 12,866 in effect.[100] In 2011, President Obama issued EO 13,563, supplementing without rescinding EO 12,866,[101] notably by requiring retrospective review as discussed above.[102] In 2003, OIRA issued Circular A-4,

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94. *Id.*

95. *Id.*

96. *Id.*

97. Exec. Order No. 12,044, 43 Fed. Reg. 12,661 (1978). Earlier, in 1974, President Ford (while maintaining the QLR requirement) issued EO 11,821, creating the Inflation Impact Statement (IIS) (renamed in 1976 "Economic Impact Statements") as an additional requirement to executive agency rulemaking. Exec. Order No. 11,821, 39 Fed. Reg. 41,501 (1974); Exec. Order No. 11,949, 41 Fed. Reg. 23,663 (1976).

98. Pub. L. No. 96-511, 94 Stat. 2812 (1980) (codified at 44 U.S.C. §§ 3501-3521).

99. Exec. Order No. 12,291, 3 C.F.R. § 127 (1981).

100. Exec. Order No. 12,866, 3 C.F.R. § 638 (1993).

101. Exec. Order No. 13,563, 76 Fed. Reg. 3821 (2011). The scope of impacts to be covered has evolved across these EOs. EO 12,044 referred to the "economic consequences" of the proposed rule, EO 12,044, § 3(b)(1) (not using the word "benefits"). EO 12,291 used the language of costs and benefits, but without a specific mention of environmental and social impacts (section 3(d)(1)). Under EOs 12,866 and 13,563, RIA must assess costs and benefits, including impacts on the environment, public health and safety, and on discrimination or bias (section 6(a)(3)(C)(i) of EO 12,866 and section 1(b)(3) of EO 13,563). Moreover, EO 12,291 called for benefits to "outweigh" costs, whereas EO 12,866 changed this language to call for benefits to "justify" costs. *See* Exec. Order No. 12,044, 43 Fed. Reg. 12,661 (1978); Exec. Order No. 12,291, 46 Fed. Reg. 13,193 (1981); Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (1993).

102. *See supra* notes 29-32. The current RIA framework in the U.S. is comprised mainly of EOs 12,866, 13,563, and 13,610. But in addition to these basic requirements applicable to significant rulemaking actions of executive agencies (and EO 13,579 regarding independent agencies), the overall picture of RIA in the U.S. is more complex and fragmented. In addition to the RIA, agencies are subject to RIA-like requirements focusing on specific classes of stakeholders or kinds of impacts, such as on takings of private property (EO 12,630 of 1988), Indian tribal governments (EO 13,175 of 2000), children (EO 13,045 of 1997), health and environmental impacts on minorities (EO 12,898 of 1994), and energy (EO 13,211 of 2001). In 1980, drawing inspiration from the same political and economic circumstances of the late-

which continues to serve as the main RIA guidelines in the U.S.[103] These EOs use language calling for foresight in RIA.[104] Similarly, the foresight nature of RIA is evident in Circular A-4's provisions related to uncertainty.[105] In addition to using the same language of the EOs denoting forecasting (e.g., "anticipate and evaluate the likely consequences of rules"), Circular A-4 has detailed sections on the uncertainty elements involved in foreseeing the effects of rules.[106]

Similarly, but less rapidly than EIA, the concept of RIA has diffused throughout other national and subnational jurisdictions. At the state level in the U.S., ex ante RIA was adopted by many states, under different names and with different scopes, also figuring in the Model State Administrative Procedure Act.[107]

1970s, Congress passed two statutes: the Regulatory Flexibility Act (RFA) and the Paperwork Reduction Act (PRA) of 1980, both calling for ex ante analysis—the RFA, for impacts on small businesses; and the PRA, for impacts resulting from information requirements. In addition to the RFA and the PRA, Congress also passed the Unfunded Mandates Reform Act (UMRA) of 1995, requiring ex ante RIA of any proposed agency rule that may result in the expenditure by a state, local, tribal government, or by the private sector, in the aggregate, of more than $1 million in any one year. *See* Wiener & Ribeiro, *supra* note 3, at 175.

103. OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, REGULATORY ANALYSIS 1 (2003) [hereinafter OMB, A-4].

104. "[T]he *expected* benefits or accomplishments and the costs," OFFICE OF MGMT. & BUDGET, *supra* note 93, at 2 (emphasis added); "an *estimate* … of the new reporting burdens or recordkeeping requirements," Exec. Order No. 12,044, § 2(d)(6), 43 Fed. Reg. 12,661 (1978) (emphasis added); "an *estimate* of the number of small entities to which the proposed rule will apply," and "the *projected* reporting, recordkeeping and other compliance requirements," 5 U.S.C. § 603(b)(3)-(4) (2012) (emphasis added); "*estimate* of the burden that *shall* result from the collection of information" and "a description of the *likely* respondents and proposed frequency of response to the collection of information," 44 U.S.C. § 3507(a)(D)(ii)(V)-(IV) (2012) (emphasis added); "[a] description of the *potential* benefits [and costs] of the rule . . . and the identification of those *likely* to receive the benefits [and bear the costs," Exec. Order No. 12,291, § 3(d)(1), 3 C.F.R. § 127 (1981) (emphasis added); "assessment of the *potential* costs and benefits of the regulatory action" and "[a]n assessment . . . of benefits [and costs] anticipated from the regulatory action." Exec. Order No. 12,866, § (6)(a)(3)(B)(ii), -(C)(i), 3 C.F.R. § 638 (1993) (emphasis added); and "to quantify *anticipated* present and future benefits and costs." Exec. Order No. 13,563, § (1)(c), 3 C.F.R. § 13,563 (2011) (emphasis added).

105. OMB, A-4, *supra* note 103.

106. *Id.* Some key examples are stipulating and measuring the baseline ("what the world would be like if the proposed rule is not adopted") and dealing with uncertainty (with emphasis on identifying key uncertainties and conducting sensitivity analysis, as a way of anticipating the effect of changing forecasting assumptions). *Id.* at 2. In one section, Circular A-4 stipulates: "[y]our estimates cannot be more precise than their most uncertain component. Thus, your analysis should report estimates in a way that reflects the degree of uncertainty and not create a false sense of precision." *Id.* at 40.

107. *See* Russell S. Sobel & John A. Dove, *Analyzing the Effectiveness of State Regulatory Review*, 44 PUB. FIN. REV. 446 (2016); JASON A. SCHWARTZ, 52 EXPERIMENTS WITH REGULATORY REVIEW 87 (2010) (with a detailed view of each state, finding that "45 states require[d] some form of [ex ante] economic impact analysis, besides specialized reviews like regulatory flexibility analysis."); *see also* Stuart Shapiro & Deborah Borie-Holtz, Regulatory Reform in the States: Lessons from New Jersey, (March 24, 2011) (available at http://papers.ssrn.com/abstract=1794172). In another 2011 study, Shapiro and Borie-Holtz classified the states of New York, Virginia, Michigan, and Pennsylvania with a maximum

Internationally, ex ante RIA became the cornerstone of the Better Regulation movement in Europe, and was adopted by every OECD member country.[108] The United Kingdom (U.K.) and the EU represent two jurisdictions in which ex ante RIA has been making significant advances, leading to innovative institutional transformations in recent years.[109] In the latest version of its guidelines, the U.K. RIA system mentions the use of sensitivity analysis, while also discussing how to report the uncertainty of parameters assessed in RIA.[110] In 2015, the European Commission also issued a new set of guidelines for its IA system, with similar language and provisions revealing the forecasting basis of IA.[111]

D. Risk Assessment

Alongside or within CBA, EIA, and RIA, ex ante risk assessment (RA) has been a key analytical tool for foreseeing future potential harms of pollutants and other stressors.[112] EPA has employed

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score of stringency of RIA requirements. STUART SHAPIRO & DEBORAH BORIE-HOLTZ, INSTITUTE FOR POLICY INTEGRITY, DOES PROCESS MATTER: REGULATORY PROCEDURE AND REGULATORY OUTPUT IN THE STATES 8 n.13 (2011), http://policyintegrity.org/publications/detail/does-process-matter; NAT'L CONFERENCE OF COMM'RS ON UNIF. STATE LAWS, REVISED MODEL STATE ADMINISTRATIVE PROCEDURE ACT § 305 (2010) (suggesting implementation comparison of alternatives on the basis of CBA of a proposed rule, and a determination that the benefits of the proposed rule justify its costs).

108. Jonathan B. Wiener, *Better Regulation in Europe*, 59 CURRENT LEGAL PROB. 447 (2006); Wiener, *supra* note 11, at 126-28. OECD has been a major supplier of information and experiences on regulatory quality improvement, helping to spread RIA. *Id.* at 130. *See also* FABRIZIO DE FRANCESCO, TRANSNATIONAL POLICY INNOVATION: THE OECD AND THE DIFFUSION OF REGULATORY IMPACT ANALYSIS (Dario Castiglione et al. eds., 2013) (documenting the influence of OECD on the diffusion of RIA); OECD, POLICY OUTLOOK, *supra* note 39.

109. For recent developments in the U.K. and EU systems, respectively, *see* DEP'T FOR BUS. INNOVATION & SKILLS, BETTER REGULATION FRAMEWORK MANUAL (2015), and EUR. COMM'N, *Better Regulation Guidelines*, COM (2015) 215 final (April 19, 2015) [hereinafter EC, *Better Regulation Guidelines*].

110. DEP'T FOR BUS. ENERGY & INDUS. STRATEGY, BETTER REGULATION FRAMEWORK MANUAL § 2.2.5 (2015). The Manual is also explicit when discussing the estimate levels and underlying uncertainty of compliance with the proposed regulation. *Id.* at § 2.3.50. It has a specific topic for "Key assumptions, sensitivities and risks" in which the foresight nature of RIA becomes evident: "[i]n order to reflect the inherent uncertainty of costs and benefits estimates, you may need to provide a range for your costs and benefits estimates. Highlight the factors determining the outcome within any range and how any risks will be mitigated." *Id.* The Better Regulation Framework Manual refers to the Green Book as the main source of detailed methodological guidelines. *Id.* at § 1.5.5.

111. EC, *Better Regulation Guidelines*, *supra* note 109 (mentioning "assumptions," "uncertainty," "estimates," and "sensitivity" in many parts of the document). For example: "When quantifying [all relevant impacts], spurious precision should be avoided and ranges provided . . . . Whenever an assumption is particularly important or uncertain, sensitivity analysis should be used to check whether changing it would lead to significantly different results." *Id.* at 27.

112. *See* Alon Rosenthal, George M. Gray & John D. Graham, *Legislating Acceptable Cancer Risk from Exposure to Toxic Chemicals*, 19 Ecology L.Q. 269 (1992) (documenting

formal RA practices since its early days, having issued its first RA document at least as early as 1975.[113] The National Academy of Sciences (NAS) encouraged federal agencies to conduct RAs and outlined guidelines for best practices.[114] In some cases, environmental statutes incorporate RA as a requirement for agency decision or rulemaking—either independently or combined with EIA, RIA, and CBA.[115] The Clean Air Act (CAA), for instance, requires EPA to make findings that a pollutant "may reasonably be anticipated to endanger public health or welfare" for setting national ambient air quality standards, and to conduct residual RAs after setting emissions standards for major sources of hazardous air pollutants;[116] the Resource Conservation and Recovery Act (RCRA) mandates that EPA make findings of endangerment to public health or the environment to regulate hazardous waste sites;[117] the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) stipulates a risk/ benefit analysis for the registration of pesticides.[118] Many other environmental statutes impose criteria or standards without formally requiring (but in practice leading to) RA processes.[119]

Forecasting is at the center of RA, because RA attempts to characterize the likelihood and severity of future adverse events with the purpose of informing decisions marked by

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requirements for RA in many environmental laws); RICHARD L. REVESZ, ENVT'L L. & POL'Y 51 (3d ed. 2015) ("Risk assessment is generally recognized as the first step in the regulatory process—a regulatory agency must first analyze the magnitude of an environmental risk before it can intelligently decide on whether and how much risk should be regulated—a process known as risk management").

113. U.S. ENVTL. PROT. AGENCY, EPA/100/B-04/001, AN EXAMINATION OF EPA, RISK ASSESSMENT PRINCIPLES & PRACTICE 4 (2004) [hereinafter EPA, 2004 EXAMINATION]; *see also* CARNEGIE COMM'N ON SCI., TECH., & GOV'T, RISK AND THE ENV'T 27 (1993).

114. NAT'L RESEARCH COUNCIL, RISK ASSESSMENT IN THE FEDERAL GOVERNMENT: MANAGING THE PROCESS 57-58 (1983); NAT'L RESEARCH COUNCIL, SCIENCE AND DECISIONS: ADVANCING RISK ASSESSMENT 26 (2009); *see also* Junius C. McElveen, Jr., *Risk Assessment in the Federal Government: Trying to Understand the Process*, 5 TUL. ENVTL. L.J. 45, 53 (1991); EPA, 2004 EXAMINATION, *supra* note 113, at 3 (describing the use of risk assessment as a routine activity by EPA for making multiple kinds of decisions).

115. RA of pollutants or other stressors should, in principle, provide the information for the harm estimates in EIA and for the risk reduction benefits estimates in RIA. *See* Alan L. Porter & Frederick A. Rossini, *Integrated Impact Assessment*, 6 INTERDISC. SCI. REV. 346 (1981); Fred Anderson et al., *Regulatory Improvement Legislation: Risk Assessment, Cost-Benefit Analysis, and Judicial Review*, 11 DUKE ENVTL. L. & POL'Y F. 89, 93 (2000); Hossein Mahmoudi et al., *A framework for combining social impact assessment and risk assessment*, 43 ENVTL. IMPACT ASSESS. REV. 1 (2013).

116. 42 U.S.C. §§ 7408(a)(1)(A), 7412(f)(1) (2012); *see also* U.S. ENVTL. PROT. AGENCY, EPA-453/R- 99-001, RESIDUAL RISK: REPORT TO CONGRESS (1999).

117. McElveen, *supra* note 114, at 48 n.3.

118. *See* GOV'T ACCOUNTABILITY OFFICE, GAO/RCED-91-52, EPA'S USE OF BENEFIT ASSESSMENTS IN REGULATING PESTICIDES 9 (1991).

119. Rosenthal et al., *supra* note 112; McElveen, *supra* note 114.

uncertainty.[120] The NAS's National Research Council has acknowledged that risk assessors rely on assumptions and make use of "inferential bridges" in order to conduct ex ante RA in the face of uncertainty.[121] The analytical steps of RA (hazard identification, dose-response assessment, exposure assessment, and risk characterization) are necessarily inferential, resulting in estimates with ranges of uncertainty.[122]

III. FROM FORESIGHT TO HINDSIGHT: THE RISE OF RETROSPECTIVE REVIEW

The development of prospective analytical tools for policy foresight—such as ex ante RA, CBA, EIA, and RIA—has enabled important advances in protection of public health, environment and security against uncertain future risks, but it has also prompted the question whether these ex ante tools are generating accurate foresight. There is growing interest in developing evidence-based tools to enable retrospective, ex post, or look-back reviews of past policies.[123] The precautionary approach underlying ex ante IA tools ("look before you leap") also suggests the value of revisiting earlier estimates in light of data on actual experience: prudent precaution is provisional, to be revised as knowledge improves.[124] Different forms of retrospective, ex post, and periodic reviews have gained ground in the literature and have gradually been adopted by governments, supplementing ex ante RA, CBA, EIA, and RIA tools. This Section describes these developments. A key finding of our inquiry is that retrospective reviews have more

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120. For a historical account of the evolution of risk analysis from probability theory, see PETER L. BERNSTEIN, AGAINST THE GODS: THE REMARKABLE STORY OF RISK (1996). On deep uncertainty in RA, *see* Robert J. Lempert & Myles T. Collins, *Managing the Risk of Uncertain Threshold Responses: Comparison of Robust, Optimum, and Precautionary Approaches*, 27 RISK ANALYSIS 1009 (2007). On RA and management of extreme catastrophic risks, *see* Nick Bostrom, *Existential Risk Prevention as Global Priority*, 4 GLOB. POL'Y 15 (2013); Jonathan B. Wiener, *The Tragedy of the Uncommons: On the Politics of Apocalypse*, 7 GLOB. POL'Y 67 (2016).

121. NAT'L RESEARCH COUNCIL, RISK ASSESSMENT IN THE FEDERAL GOVERNMENT, *supra* note 114, at 3, 28. By contrast, RIA fits into the NRC's definition of risk management: "the process of weighing policy alternatives and selecting the most appropriate regulatory action, integrating the results of risk assessment with engineering data and with social, economic, and political concerns to reach a decision." *Id.* at 3; *see also* Anderson et al., *supra* note 115, at 91. *See* NAT'L RESEARCH COUNCIL, RISK ASSESSMENT IN THE FEDERAL GOVERNMENT, *supra* note 114, at 7 (stressing the importance of communicating uncertainty and variability in the results of RA).

122. *See* M. Granger Morgan, *Risk Analysis and Management*, 269 SCI. AM. 32, 34 (1993) (explaining the different uncertainties inherent to risk analysis and, consequently, the need to represent them with probability distributions).

123. *See* ALDY, *supra* note 22; Coglianese, *supra* note 42.

124. *See* Wiener, *supra* note 2.

often been aimed at reducing the cost of individual rules, and less often at learning from experience to improve the accuracy of ex ante foresight.

A. Ex Post RIA in the U.S.

Ex ante analysis of regulatory impacts of proposed rules, and ex post evaluation of existing rules, developed as intertwined ideas since the early years of RIA in the U.S.[125] While addressing Congress in 1974, President Ford asked Congress to "undertake a long-overdue total reexamination of the independent regulatory agencies" as part of a joint effort to "identify and eliminate existing federal rules and regulations that increase costs to the consumer without any good reason in today's economic climate."[126] But soon after, when he issued EO 11,821, Ford's Inflation Impact Statement (IIS) focused only on proposals for legislation or promulgation of new regulations and rules by executive agencies.[127] In 1978, President Carter's EO 12,044 not only expanded the ex ante RIA requirement to address all economic impacts, but also innovated significantly by introducing ex post RIA.[128] Carter's EO had a specific section on "Review of Existing Regulations," requiring agencies to "periodically review their existing regulations to determine whether they are achieving the policy goals of this Order."[129] In addition to this central mandate, EO 12,044 also stipulated procedural/methodological rules, as well as selection criteria, communication and participation requirements of such regulatory reviews.[130] Methodologically, regulatory reviews should "follow the same procedural steps outlined for the development of

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125. Nixon's QLR, however, focused only on the estimated impacts of new regulation, given its predominant focus—the recent new wave of environmental regulation. OFFICE OF MGMT. & BUDGET, *supra* note 93, at 1.

126. Gerald Ford, "WHIP INFLATION NOW" SPEECH (OCTOBER 8, 1974), MILLER CENTER, UNIVERSITY OF VIRGINIA (Oct. 8, 1974), http://millercenter.org/president/ford/speeches/speech-3283 (last visited Jan. 21, 2017).

127. *See* OMB, A-4, *supra* note 103. Exec. Order No. 11,821, Preamble, 39 Fed. Reg. 41,501 (1974). The Council on Wage and Price Stability, created in 1974 by Congress, to which EO 11,821 allowed OMB to delegate its oversight functions related to the IIS, employed broad language to describe its role, which could potentially include reviewing the performance of existing programs and activities. Council on Wage and Price Stability Act, Pub. L. No. 93-387, § 3(A)(7), 88 Stat. 750, 750 (1974).

128. *See* Exec. Order No. 12,044, 43 Fed. Reg. 12,661 (1978).

129. *Id.* at § 4. The goals of the EO are stipulated in section 1, according to which "[R]egulations shall be as simple and clear as possible. They shall achieve legislative goals effectively and efficiently. They shall not impose unnecessary burdens on the economy, on individuals, on public or private organizations, or on State and local governments." *Id.* at § 1.

130. *Id.* at § 4.

new regulations,"[131] i.e., ex ante regulatory analysis.[132] The criteria developed by each agency for selecting rules for review—based on the general criteria stipulated by the EO—and the list of regulations selected for review were to be published and included in the semiannual agency agendas.[133] EO 12,044 also required that new regulations include "a plan for evaluating the regulation after its issuance has been developed"[134]—a prospective provision for retrospective review.

After Carter's EO, every other EO issued on RIA included a provision regarding retrospective reviews of existing regulation, although typically with a less comprehensive framework than in EO 12,044. For example, section 3 of EO 12,291, issued by President Reagan in 1981, included a subsection requiring agencies to "initiate reviews of currently effective rules in accordance with the purposes of this Order, and perform Regulatory Impact Analyses of currently effective major rules."[135] The provision requiring agencies to include in ex ante RIA a plan for future review disappeared, as well as mentions of selection criteria for review.[136] On the other hand, OMB was given express authority to designate currently effective rules for review and establish schedules for reviews and analyses under the EO.[137] Then, in 1993 with EO 12,866, President Clinton included section 5 on ex post evaluation of existing regulations, requiring publication of regulations selected for review in each agency's annual plan and regulatory agenda, empowering the Vice President to identify rules for review, and instructing agencies to conduct reviews to make existing rules "more effective in

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131. *Id.*

132. Including, in the case of significant regulations with major consequences, "a careful examination of alternative approaches" and a "succinct statement of the problem; a description of the major alternative ways of dealing with the problem that were considered by the agency; an analysis of the economic consequences of each of these alternatives and a detailed explanation of the reasons for choosing one alternative over the others." *Id.* at § 3(b)(1).

133. *Id.* at § 2(a).

134. *Id.* at § 2(d)(8).

135. Exec. Order No. 12,291, § 3(i), 46 Fed. Reg. 13,193 (Feb. 17, 1981).

136. *See id.*

137. In 1985, President Reagan issued EO 12,498, once again addressing the need to reduce the burdens of "existing and future regulations." It created a requirement that agencies should annually state their regulatory policies, goals, and objectives for the coming years, including "information concerning all significant regulatory actions underway or planned." Exec. Order No. 12,498, § 1, 50 Fed. Reg. 1036 (Jan. 4, 1985). In 1992, President Bush announced in his State of the Union Address a 90-day moratorium on new regulation, and a review of federal regulations, which was then directed to agencies via a memorandum on the same day. The memorandum defines the standards for review, mirroring much of the process applicable to ex ante RIA under EO 12,291. Neil R. Eisner et al., *Federal Agency Reviews of Existing Regulations*, 48 ADMIN. L. REV. (AM. BAR ASS'N) 139, 142 (1996). President Clinton followed the same approach and mandated another one-time review effort of existing regulations via memorandum issued to federal agencies in 1995. Hahn, *supra* note 76, at 887.

achieving the regulatory objectives, less burdensome, or in greater alignment with the President's priorities."[138]

President Obama supplemented EO 12,866 with three additional EOs, all with rules for retrospective review of existing regulations.[139] Like EO 12,866, EO 13,563 dedicates one section to what it calls "Retrospective Analysis of Existing Rules."[140] By reaffirming the provision in section 5 of EO 12,866, President Obama signaled that at least some agencies had not complied with it so far, requiring them again to submit to OIRA "a preliminary plan . . . under which the agency will periodically review its existing regulations . . . ."[141] In the following year, President Obama issued EO 13,610, on "Identifying and Reducing Regulatory Burdens."[142] This new EO added to the ex post RIA system a provision on public participation, and created a complementary duty requiring agencies to report semiannually to OIRA "on the status of their retrospective review efforts,"[143] describing "progress, anticipated accomplishments, and proposed timelines for relevant actions . . . ."[144] EO 13,610 also stipulated in section 3 a set of factors that agencies should consider when setting priorities and selecting rules for review.[145] OIRA has issued a series of memoranda pressing

138. Exec. Order No. 12,866, § 5(a), 58 Fed. Reg. 51,735 (Sep. 30, 1993). The goal of such review is defined in the same provision as "to determine whether any such regulations should be modified or eliminated so as to make the agency's regulatory program more effective in achieving the regulatory objectives, less burdensome, or in greater alignment with the President's priorities and the principles set forth in this Executive Order."

139. Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 18, 2011); Exec. Order No. 13,579, 76 Fed. Reg. 41,585 (Jul. 11, 2011); Exec. Order No. 13,610, 77 Fed. Reg. 28,469 (May 10 2012).

140. Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 18, 2011).

141. *Id.* at § 6(b). The provision announces the same goal of the review "to determine whether any such regulations should be modified, streamlined, expanded, or repealed so as to make the agency's regulatory program more effective or less burdensome in achieving the regulatory objectives." *Id.* The other operational provision in section 6—this one original—directs agencies to release "[s]uch retrospective analyses, including supporting data, . . . online whenever possible." *Id.* at § 6(a).

142. Exec. Order No. 13,610, 77 Fed. Reg. 28,469 (May 10, 2012). EO 13,610 renames "review of existing regulations" as "retrospective review." The same overall purpose is reaffirmed: "to conduct retrospective analyses of existing rules to examine whether they remain justified and whether they should be modified or streamlined in light of changed circumstances, including the rise of new technologies." *Id.* at § 1.

143. *Id.* at §§ 3-4.

144. *Id.* at §§ 2, 4. EO 13,610 also requires that such semiannual reports be made available to the public, as well as the "retrospective analyses of regulations, including supporting data"—the latter, "wherever practicable." *Id.*

145. The factors are: (a) reviews that will "produce significant quantifiable monetary savings or significant quantifiable reductions in paperwork burdens while protecting public health, welfare, safety, and our environment;" (b) reviews that will "reduce unjustified regulatory burdens or simplify or harmonize regulatory requirements imposed on small business;" (c) reforms that would make "significant progress in reducing those burdens while

the agencies to identify existing rules and conduct reviews, but OIRA has not yet issued a full guideline document for ex post RIA akin to Circular A-4 for ex ante RIA.[146]

In addition to presidents using their executive powers to promote ex post RIA in the U.S., Congress has also created statutory ex post evaluation requirements. For example, the Regulatory Flexibility Act (RFA) provisions on periodic regulatory review require that every regulation with a significant economic impact on a substantial number of small entities must undergo a review within ten years of being issued.[147] The Paperwork Reduction Act (PRA) allowed any interested party to request that OMB review an existing information collection requirement, which could lead to a "remedial" action by OMB and the agency.[148] Also, the PRA called for new regulations to have their information collection requirements reviewed every three years after initial approval; based on the review report, OMB can approve or disapprove the extension.[149] The Unfunded Mandates Act (UMRA) also has a provision regarding review of existing regulations, although with a provisional nature.[150] Several specific laws also require periodic reviews of past policies: examples include the five year reviews of national ambient air quality standards in the CAA, and the six year reviews of drinking water quality standards in the Safe Drinking Water Act (SDWA).[151]

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protecting public health, welfare, safety, and our environment;" and (d) "consideration to the cumulative effects of agency regulations, including cumulative burdens." *Id.* at § 3.

146. Coglianese, *supra* note 42, at 61-62; *see also* Cary Coglianese, *Empirical Analysis and Administrative Law*, 2002 UNIV. ILL. L. REV. 1111, 62 (2002).

147. 5 U.S.C. § 610(a) ("[t]he purpose of the review shall be to determine whether such rules should be continued without change, or should be amended or rescinded, consistent with the stated objectives of applicable statutes, to minimize any significant economic impact of the rules upon a substantial number of such small entities.").

148. 44 U.S.C. §§ 3507(g)-(h)(1) (2000).

149. *Id.*

150. Title III of the Unfunded Mandates Act of 1995 (UMRA) addresses "Review of Federal Mandates," granting the Advisory Commission on Intergovernmental Relations powers to investigate and review the role and impact of existing Federal mandates. As a result of such review—which appears in the Act to be a one-time analysis—the Commission may make a recommendation for "suspending, on a temporary basis, Federal mandates which are not vital to public health and safety and which compound the fiscal difficulties of State, local, and tribal governments, including recommendations for triggering such suspension." 2 U.S.C. § 1552(a)(3)(d) (1995).

151. 42 U.S.C. § 7409(d) (Clean Air Act provision for NAAQS to be reviewed every five years); 42 U.S.C. § 300g-1(b)(9) (1996) (SDWA provision for six year reviews). The Frank R. Lautenberg Chemical Safety for the 21st Century Act of 2016, amending the Toxic Substances Control Act (TSCA), 15 U.S.C. § 2601 et seq., now calls for periodic reviews of policies every five years. Pub. L. 114-182 (June 22, 2016), amending TSCA to insert section 26(l), to be codified at 15 U.S.C. § 2625(l). The Telecommunications Act of 1996 calls for biennial reviews by the Federal Communications Commission. Robert Hahn et al., *Assessing the Quality of Regulatory Impact Analyses*, 23 HARV. J. OF LAW & PUB. POL'Y 889 (2000).

At least since 1996, Congress began to include in appropriations legislation a requirement directing OMB to annually submit reports containing "estimates of the total annual costs and benefits of Federal Regulatory programs, including quantitative and non-quantitative measures of regulatory costs and benefits."[152] Initially, the requirement also stipulated that OMB should include in its report "recommendations from the Director . . . to reform or eliminate any Federal regulatory program or program element that is inefficient, ineffective, or is not a sound use of the Nations' resources."[153] The provisions were annually renewed in appropriations legislation until, in 2001, it became a permanent feature of what is now known as the Regulatory Right-to-Know Act.[154] In 2012, Congress passed the Consolidated Appropriations Act, which also requires OMB to include in its annual report to Congress information on agency implementation of EO 13,563; in particular, it requires OMB to identify "existing regulations that have been reviewed and determined to be outmoded, ineffective, and excessively burdensome."[155]

Following the same pattern of diffusion of ex ante RIA, U.S. states have also adopted requirements for periodic ex post reviews of existing regulations.[156] The 1981 edition of the Model State Administrative Procedure Act (MSAPA) suggests a provision requiring periodic review of all agency regulations in no longer than seven years.[157] In 2000, Robert Hahn reported that nearly one-third

152. OFFICE OF INFO. & REGULATORY AFFAIRS, 1997 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS (1997) [hereinafter OIRA, 1997 REPORT].

153. Treasury, Postal Services and General Government Appropriations Act of 1997, § 645, Pub. L. No. 104-208, 110 Stat. 3009 (codified as amended in 28 U.S.C. § 2241 (2008)).

154. Treasury and General Government Appropriations Act of 1998, § 625, Pub. L. No. 105-277, 112 Stat. 2681 (1998); Treasury and General Government Appropriations Act of 2001, § 624, Pub. L. No. 106-554, 115 Stat. 514 (2001) ("[f]or the calendar year 2002 and each year thereafter…"). Starting in 1999, the language used in the two provisions changed: regarding the recommendations for reform, the new statute directed OMB to only include in its report "recommendations for reform." *Id.*; Omnibus Consolidated and Emergency Supplemental Appropriations Act of 1999, Pub. L. No. 105-227, §§ 683(a)(1)-(3), 112 Stat. 2681 (1999) (requiring that in the accounting statement and associated report submitted by OIRA there should be "recommendations for reform."). Section 638(a)(1) became "an estimate of the total annual costs and benefits (including quantifiable and non-quantifiable effects) of Federal rules and paperwork, to the extent feasible: (A) in the aggregate; (B) by agency and agency program; and (C) by major rule." *Id.*

155. Consolidated Appropriations Act of 2012, Pub. L. 112-74, 125 Stat. 786; OFFICE OF INFO. & REGULATORY AFFAIRS , 2012 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES 56 (2013) [hereinafter OIRA, 2012 REPORT].

156. *See* SCHWARTZ, *supra* note 107, at 46; Hahn, *supra* note 76. *See infra* Section IV.

157. Interestingly, the 2010 edition does not have the same provision. The 1981 version was substituted for another rule creating the possibility of periodic review of agency regulations by a legislative committee. NAT'L CONFERENCE OF COMM'RS ON UNIF. STATE LAWS, *supra* note 107; SCHWARTZ, *supra* note 107, at 34, 37, 115.

of the states had adopted comprehensive review requirements of all existing regulations.[158] The extensive analysis conducted in 2010 by Jason Schwartz of the Institute for Policy Integrity found thirty states in which agencies were either encouraged or required to reevaluate their existing regulations periodically.[159] The trigger for review in these systems is the passage of time from the initial date of when an agency issues a regulation, with the selection of rules to review including, in many states, all regulations.[160]

B. Ex Post RIA Beyond the U.S.

As with ex ante RIA, ex post RIA has also become a global element of regulatory governance. In 2012 OECD published a new set of recommendations from its Council on Regulatory Policy and Governance.[161] Along with recommending adoption of ex ante RIA, it called for member countries to "[c]onduct systematic programme reviews of the stock of significant regulation against clear defined policy goals, including consideration of costs and benefits, to ensure that regulations remain up to date, cost justified, cost effective and consistent, and deliver the intended policy objectives."[162] It directed countries to do this by "[m]aintain[ing] a regulatory management system, including both ex ante assessment and ex post evaluation as key parts of evidence-based decision making."[163]

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158. Hahn, *supra* note 76, at 874, 876 (the study relied on interviews and survey data, sometimes with only one response per state).

159. SCHWARTZ, *supra* note 107, at 86. Another study, published in 2016, found twenty-five states that enacted requirements to review existing regulations, from 2006 through 2013. *See* Stuart Shapiro, Debra Borie-Holtz & Ian Markey, *Retrospective Review in Four States*, 39 REG. 32 (2016) (narrating the recent history and reporting interview data on the adoption and implementation of review of existing regulations in four states: Delaware, Nevada, Florida, and Rhode Island).

160. SCHWARTZ, *supra* note 107, at 115-123.

161. ORG. FOR ECON. CO-OPERATION & DEV., 2012 OECD RECOMMENDATION OF THE COUNCIL ON REGULATORY POLICY GOVERNANCE 3 (2012) [hereinafter OECD, 2012 RECOMMENDATION] (building upon the 1997 OECD Report on Regulatory Reform, the 2005 Guiding Principles for Regulatory Quality and Performance, the 2005 APEC-OECD Integrated Checklist for Regulatory Reform, and the 2009 Recommendation of the Council on Competition Assessment).

162. *Id.* at 4.

163. *Id.* at 6. OECD also said that "[t]he use of a permanent review mechanism should be considered for inclusion in rules, such as through review clauses in primary laws and sunsetting of subordinate legislation." *Id.* at 12. The 2012 Recommendation builds on the 1995 Recommendation, in which no mention to ex post RIA existed. *See* ORG. FOR ECON. CO-OPERATION & DEV., RECOMMENDATION OF THE COUNCIL ON IMPROVING THE QUALITY OF GOVERNMENT REGULATION (1995). It also supplements the 2005 OECD Guiding Principles for Regulatory Quality and Performance, which already suggested that member countries "[a]ssess impacts and review regulations systematically to ensure that they meet their intended objectives efficiently and effectively in a changing and complex economic and social environment . . . ." ORG. FOR ECON. CO-OPERATION & DEV., OECD GUIDING PRINCIPLES FOR REGULATORY QUALITY AND PERFORMANCE 14 (2005). Synthesizing 10 years of work on

OECD reported that by 2011, twenty-four of its member countries had mandatory periodic evaluation requirements of existing regulations.[164] Of the jurisdictions that have adopted ex post RIA, three systems have a distinct level of sophistication and detail: the U.K., the EU, and Australia.[165]

1. United Kingdom

Initially influenced by the U.S. RIA system, the U.K. IA system eventually outpaced its American archetype in its ex post IA framework.[166] From the initial phase of development in the mid-1980s, the U.K. IA system followed a dual approach, targeting both the flow of new regulations and the stock of existing regulations.[167] To address the first, the central government developed the Compliance Cost Assessment (CCA).[168] The CCA was later transformed into the U.K. RIA with the launch of the Better Regulation Initiative in 1998, and rebranded in 2007 as simply "Impact Assessment."[169] On the side of existing

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regulatory reform, OECD published in 2011 a report identifying ex post evaluation as one of the essential tools of regulatory policy alongside ex ante RIA. ORG. FOR ECON. CO-OPERATION & DEV., REGULATORY POLICY AND GOVERNANCE: SUPPORTING ECONOMIC GROWTH AND SERVING THE PUBLIC INTEREST (2011) [hereinafter OECD, SUPPORTING ECONOMIC GROWTH].

164. OECD, SUPPORTING ECONOMIC GROWTH, *supra* note 163, at 31. In 2015, OECD reported that the number was 20 countries plus the European Commission *see* OECD, POLICY OUTLOOK, *supra* note 39; *see infra* Section III, for observations about the methodology of the study.

165. *See infra* Section III.

166. HOUSE OF COMMONS, LIFTING THE BURDEN, 1985, Cmnd. 9571, at 2-3 (UK) [hereinafter HOUSE OF COMMONS, LIFTING THE BURDEN] ("[w]e have considered carefully the work done in other countries, in particular in the U.S.A."). Comparisons with the U.S. regulatory policy appeared in the other reports of the time, such as in a 1986 White Paper:

> The secret of the American experience undoubtedly lies in a more entrepreneurial society. Yet that is not all. If we examine their economy we will see that individuals are far less restricted if they wish to work for themselves, to start a new business, or to employ people. They enjoy a freedom from regulations foreign to most Europeans. Are they too free, or are we too regulated?

HOUSE OF COMMONS, BUILDING BUSINESSES . . . NOT BARRIERS, 1986, Cmnd. 9794, at 1 (UK) [hereinafter HOUSE OF COMMONS, BUILDING BUSINESSES].

167. HOUSE OF COMMONS, LIFTING THE BURDEN, *supra* note 166, at 3.

168. Since the inception of CCA, it had some requirements aimed at enabling a future review of a new proposed regulation to which the CCA applied. *See* HOUSE OF COMMONS, BUILDING BUSINESSES, *supra* note 166, at 12 (stipulating as one of elements of the CCA the clarification of "what steps can be taken to measure the effectiveness of the new regulation in meeting its objectives?"). This was accompanied by a prescription regarding (partial) monitoring, directing departments to "keep adequate records of the effects of regulations—old as well as new—on business." *Id.* at 72. The necessary integration between ex ante and ex post IA was consolidated in further guidance documents. *See* UK HOUSE OF LORDS, THE MANAGEMENT OF SECONDARY LEGISLATION, 2006, HL 149-I, at 13 (UK) (proposing a policy cycle approach to integrated ex ante and ex post IA, and mentioning that officials should "use [ex ante] Impact Assessment of the starting point for the [post-implementation] review").

169. NAT'L AUDIT OFFICE, POST IMPLEMENTATION REVIEW OF STATUTORY INSTRUMENTS: ANALYSIS OF THE EXTENT OF REVIEW BY GOVERNMENT DEPARTMENTS 7 (2009).

regulations, reform initiatives evolved from ad hoc to a sophisticated program of evaluation and reform with two distinct components. One aimed at reviewing the stock of existing regulations, often organized by sectors of policy themes, with the purpose of reducing compliance costs by repealing or improving rules (leading to the creation of an ongoing program called Cutting Red Tape).[170] The second component of reviewing rules included planned ex post evaluations—known as post-implementation reviews (PIR).[171] PIRs would take place after a period of implementation of new proposed regulations in order to measure their performance against goals and decision criteria stipulated in ex ante IAs.[172] After 2011, every regulation imposing regulatory burdens on businesses or civil society had to contain either a sunset or a review clause—both triggering a PIR.[173] The government has published detailed guidelines covering the method PIRs must follow.[174]

There is also ex post evaluation of primary legislation in the U.K.—called post-legislative scrutiny (PLS).[175] In 2001, the Regulatory Reform Act passed by Parliament required legislative proposals to include a description of the "burdens which the existing law . . . has the effect of imposing."[176] In 2004, the House of

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170. HOUSE OF COMMONS, LIFTING THE BURDEN, *supra* note 166, at 1; ROLF G. ALTER ET AL., FROM RED TAPE TO SMART TAPE: ADMINISTRATIVE SIMPLIFICATION IN OECD COUNTRIES 197 (2003); HOUSE OF COMMONS, BUILDING BUSINESSES, *supra* note 166, at 4; HOUSE OF COMMONS, RELEASING ENTERPRISE, 1988, Cm. 512, AT 1 (UK). Starting in 1988, the government committed to adopting a more systematic review of the stock of existing regulations, which would take place as a rolling annual program. *Id.* at 1; *see* HM GOV'T, REDUCING REGULATION MADE SIMPLE 13 (2010) (UK) (mentioning the adopting of thematic reviews); NAT'L AUDIT OFFICE, DELIVERING REGULATORY REFORM 29 (2011) (UK) (chronicling the creation of the first online platform for ongoing review of existing rules based on public input—initially called "Your Freedom").

171. *See* ALTER ET AL., *supra* note 170.

172. Since at least 2003, the RIA guidelines mention the policy cycle approach and underscore necessary links between ex ante and ex post RIA (such as the importance of monitoring and the feedback of the resulting data into the "policy making process"). REGULATORY IMPACT UNIT, BETTER POLICY MAKING: A GUIDE TO REGULATORY IMPACT ASSESSMENT 29 (2003). These developments led OECD to consider the U.K. in the same year a "primary example of the increasing international emphasis on regulatory quality." ALTER ET AL., *supra* note 170, at 196.

173. BETTER REGULATION TASK FORCE, REGULATION – LESS IS MORE 7 (2005). HM GOV'T, *supra* note 170, at 11. In 2015, PIR gained statutory basis with the Small Business, Enterprise, and Employment Act 2015, c. 26.

174. The guidelines are stipulated in the Magenta Book, which is applicable to evaluation of other policy decisions and programs. HM TREASURY, THE MAGENTA BOOK: GUIDANCE FOR EVALUATION 11 (2011).

175. U.K. DEP'T FOR BUS. INNOVATION & SKILLS, CLARIFYING THE RELATIONSHIP BETWEEN POLICY EVALUATION, POST-LEGISLATIVE SCRUTINY AND POST-IMPLEMENTATION REVIEW (2010).

176. Regulatory Reform Act 2001, ch. 6 § (2)(a). Periodic review of existing and future reviews of new legislation were considered in the U.K. since the early 1990s. HOUSE OF LORDS, PARLIAMENT & THE LEGISLATIVE PROCESS, Report, 2003-4, HL 173, at 8 (UK) (also

Lords published a report acknowledging its co-responsibility in making sure legislation was "fit for purpose."[177] For achieving this goal, it proposed the adoption of PLS, which would be triggered after no longer than six years of implementation, by a review clause included in every piece of legislation.[178] The same policy cycle approach that influenced the design of PIR also inspired the framing of PLS by Parliament, which saw PLS as a complementary tool to pre-legislative scrutiny, and pre-legislative scrutiny as a facilitator of PLS.[179] Based on current guidelines, after three to five years after enactment of an Act of Parliament, the department responsible for implementation must submit a memorandum with the results of a preliminary ex post assessment of its performance.[180] Based on this report, a committee from Parliament decides whether to conduct a full PLS.[181]

2. European Union

Since its early years, the EU RIA program also reflected a concern for measuring the performance of existing regulations.[182] Ex ante IA evolved in the European Commission from the Business Impact Assessment adopted in 1986 under the U.K. Presidency and modeled after the U.K. CCA.[183] During the 1990s, the Commission added new tools aimed at implementing ex post assessment of existing regulation.[184] When IA took its shape in the EU during the early 2000s, it implicitly (and, later, explicitly) followed the policy cycle model, with continual learning via integration of ex ante and ex post IA.[185] One decisive step in this direction coincided with the

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highlighting the integration between ex ante and ex post IA, with PLS being able to work as "a means of assessing the utility of pre-legislative scrutiny). *Id.* at 43.

177. HOUSE OF LORDS, *supra* note 176, at 8 (also highlighting the integration between ex ante and ex post IA, with PLS being able to work as "a means of assessing the utility of pre-legislative scrutiny). *Id.* at 43.

178. *Id.* at 27, 44.

179. LAW COMM'N, POST-LEGISLATIVE SCRUTINY, 2006, Cm. 6945, at 9 (UK).

180. U.K. CABINET OFFICE, GUIDE TO MAKING LEGISLATION 288 (2015).

181. *Id.* at 263.

182. *See* ANDREA RENDA, IMPACT ASSESSMENT IN THE EU: THE STATE OF THE ART AND THE ART OF THE STATE 45 (2006).

183. *Id.* at 45-48. The influence of U.S. RIA was also a factor propelling the Better Regulation movement in the EU. *See* Wiener, *supra* note 108, at 451.

184. Such as the SLIM project (Simplification of the Legislation on the Internal Market), the creation of the BEST (Business Environment Simplification Task Force), in 1997; and the creation of the Business Test Panel in 1998, with the aim of acting as a permanent body for consultation of firms affected by EU regulations. ANDREA RENDA, LAW AND ECONOMICS IN THE RIA WORLD: IMPROVING THE USE OF ECONOMIC ANALYSIS IN PUBLIC POLICY AND LEGISLATION 51 (2011).

185. EUR. COMM'N, *Focus on Results: Strengthening Evaluation of Commission Activities,* at 7, SEC (2000) 1051 final (July 26, 2000) (conveying what would later be

2010 rebranding of the Better Regulation agenda to "Smart Regulation."[186] Along with the explicit adoption of the policy cycle approach, the Commission announced in the document an increased emphasis on ex post evaluation.[187] The Commission, implementing the new vision, followed the same strategy as adopted in the U.K., of two distinct programs of reviews of existing regulations.[188] The first focused on the flow of new rules by requiring a review or sunset clause in every new proposed regulation, based on which ex post RIA must take place after a period of implementation (planned ex post evaluation); the second created a program of review of the stock of existing regulation.[189]

Going beyond the U.K. model, the EU added two new features to its RIA system. For the flow of new regulations (or regulatory amendments), the EU added a requirement called the "evaluate first principle," which links the new rule to a prior ex post RIA of the existing rule being revised.[190] For the stock of existing rules, the Commission created the Regulatory Fitness and Performance Program (REFIT), which included two types of review: evaluation

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consolidated and made mandatory as the "evaluate first principle" and mentioning that "[a]s a rule, the preparation of proposals with budgetary and resource implications should include information on: . . . lessons learned from any past intervention, . . . ; plan for monitoring and evaluation during the course of the intervention"). In 2012, with the REFIT Program: "the evaluation process could be designed alongside the policy itself with better monitoring and reporting." EUR. COMM'N, *EU Regulatory Fitness,* at 7, COM (2012) 746 final (Dec. 12, 2012) [hereinafter EC, *EU Regulatory Fitness].*

186. EC, *Smart Regulation*, *supra* note 22.

187. *Id.* In this key white paper, the Commission said: "[s]mart regulation policy will therefore attach greater importance than before to evaluating the functioning and effectiveness of existing legislation." *Id.* at 3.

188. *See* EC, *Better Regulation Guidelines*, *supra* note 109, at 30, 37; *see also supra* notes 176 and 177.

189. *See id.* ("[l]egislative proposals should also foresee when, how and on what basis legislation will be evaluated in the future"); EUR. COMM'N, BETTER REGULATION TOOLBOX 260 (2015) [hereinafter EC, BETTER REGULATION TOOLBOX]. The requirement is less stringent than in the U.K. system, where ex post RIA should take place in no longer than five years of implementation. In contrast, Directorate-Generals (DG) have discretion in the EU to stipulate when ex post RIA will take place. DEP'T FOR BUS. INNOVATION & SKILLS, *supra* note 109, at 31, 33. EC, BETTER REGULATION TOOLBOX 260. The decision about when to conduct an evaluation must be made at the time of the proposal, i.e., early in the policy cycle: "[l]egislative proposals should also foresee when, how and on what basis legislation will be evaluated in the future." By not specifying limits and guidance to this decision, the guidelines give discretion to each DG to define when ex post RIA should take place. The guidelines also mention the use of sunset clauses as a possibility ("may be used"). EC, *Better Regulation Guidelines, supra* note 109, at 37.

190. Also differently from the U.K., the EU system describes not only the methodological details of evaluations, but also the procedure that must be followed. *See* EC, *Smart Regulation*, *supra* note 22, at 6; EC, *Better Regulation Guidelines*, *supra* note 109, at VI. There is a specific guideline document covering the prescribed methods for evaluations. EUR. COMM'N, EVALSED SOURCEBOOK: METHOD AND TECHNIQUES (2013).

and cutting red tape measures.[191] Moreover, within the category of evaluation, it created three different species: evaluation (of individual rules), fitness checks (of a thematic body of rules), and cumulative cost studies (usually focusing on a specific industry sector).[192]

Also in 2010, when the Commission formalized the adoption of the REFIT Program, the European Parliament created its Directorate for Impact Assessment and European Added Value (Directorate).[193] The new Directorate mission was defined as "enhanc[ing] Parliament's capacity to undertake scrutiny and oversight of the executive, particularly through ex ante and ex post evaluation of EU legislation."[194] Now under the umbrella of the European Parliamentary Research Service, one of the services corresponding to units of the former Directorate is aimed at "[e]valuating the results of existing European legislation."[195] The Directorate issued succinct procedural guidelines for conducting supplemental ex ante IA, but not for ex post evaluations.[196]

3. Australia

Beyond the U.S. and Europe, Australia gained the reputation of a having a strong RIA system, considered by OECD as the member country with "the most developed system [of ex post evaluation] in both primary and subordinate legislation."[197] Ex ante RIA was adopted in Australia in 1985.[198] Three decades later, the Australian RIA system had evolved to adopt a multi-track

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191. EC, *EU Regulatory Fitness*, *supra* note 185. Within cutting red tape measures, the REFIT Program includes two other sub-categories: studies and "legislative initiatives"—the latter include "consolidation, simplification, recast, and codification." EC, BETTER REGULATION TOOLBOX, *supra* note 189, at 33.

192. EC, *EU Regulatory Fitness*, *supra* note 185.

193. The creation of the Directorate for Impact Assessment and European Added Value was the Parliament's institutional solution to fulfilling its obligations under the 2003 Inter-Institutional Agreement on Better Law-Making signed with the Commission and the Council. *See* EUR. PARLIAMENT RESEARCH SERV., EUROPEAN PARLIAMENT WORK IN THE FIELDS OF EX-ANTE IMPACT ASSESSMENT AND EUROPEAN ADDED VALUE: ACTIVITY REPORT FOR JUNE 2012 – JUNE 2014, at 5 (2014).

194. EUR. PARLIAMENT RESEARCH SERV., IMPACT ASSESSMENT AND EUROPEAN ADDED VALUE: DIRECTORATE C (2015), http://www.europarl.europa.eu/EPRS/Welcome_to_EPRS-Dir_C-Mar2015.pdf [hereinafter EPRS, IMPACT ASSESSMENT AND EUROPEAN ADDED VALUE]

195. *European Parliament Research Service*, EUR. PARLIAMENT, http://www.europarl.europa.eu/atyourservice/en/20150201PVL00031/European-Parliamentary-Research-Service (last visited Jan. 21, 2017).

196. *See* EPRS, IMPACT ASSESSMENT AND EUROPEAN ADDED VALUE, *supra* note 194, at 9.

197. OECD, POLICY OUTLOOK, *supra* note 39, at 129.

198. AUSTL. PRODUCTIVITY COMM'N, IDENTIFYING AND EVALUATING REGULATION REFORMS: PRODUCTIVITY COMMISSION RESEARCH REPORT XII (2011).

approach addressing both the flow of new regulation and the stock of existing regulations.[199] One of the ten principles disciplining the work of Australian policy makers stipulates that "[a]ll regulation must be periodically reviewed to test its continuing relevance."[200] For new regulations, a PIR must be completed within a period of no longer than five years (in some cases, two years) of rule implementation.[201] All regulatory changes with a substantial or widespread impact on the Australian economy must undergo a PIR within five years of implementation.[202] The system also has links integrating ex ante with ex post RIA, representing the same idea of a policy cycle: the findings from a PIR that concludes that a regulatory change is necessary are used to inform a decision about, and incorporated into a new ex ante RIA of, a proposed regulatory revision.[203] In addition, an ex ante RIA should plan and make arrangements enabling a future ex post evaluation.[204] As to the stock of existing regulations, the Australian system promotes "stock-takes" of regulation by either relying on public input to select rules for review or choosing a specific industry sector or theme to have all regulations evaluated.[205]

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199. The principle is stated in a 2011 report by the Australian Productivity Commission:

> [t]he regulatory system should ensure that new regulation and the existing 'stock' are appropriate, effective and efficient. This requires the robust vetting of proposed regulation; 'fine tuning' of existing regulations and selecting key areas for reform. … There is a range of approaches to reviewing existing regulation and identifying necessary reforms. Some are more 'routine', making incremental improvements through ongoing management of the stock; some involve reviews that are programmed, and some are more ad-hoc. Designed for different purposes, the techniques within these three categories can complement each other, through their usefulness varies.

Id. at X; *see* Lorenzo Allio, *Ex Post Evaluation of Regulation: An Overview of the Notion and of International Practices*, *in* REGULATORY POLICY IN PERSPECTIVE: A READER'S COMPANION TO THE OECD REGULATORY POLICY OUTLOOK 2015 at 191 (2015).

200. DEP'T OF THE PRIME MINISTER & CABINET, THE AUSTRALIAN GOVERNMENT GUIDE TO REGULATION 2 (2014).

201. OECD, POLICY OUTLOOK, *supra* note 39, at 129.

202. OFFICE OF BEST PRACTICE REGULATION, POST-IMPLEMENTATION REVIEWS: GUIDANCE NOTICE 2 (2016) (also mentioning that a PIR is required if a regulatory change that is not minor nor "machinery in nature" had not been preceded by an ex ante RIA). If the ex ante RIA prepared for a regulation is considered inadequate by the Office of Best Practice Regulation (OBPR), a PIR must be completed within two years instead of five. *Id.* at 4.

203. *Id.* at 7.

204. OFFICE OF BEST PRACTICE REGULATION, USER GUIDE TO THE AUSTRALIAN GOVERNMENT GUIDE TO REGULATION 7 (2016). One of the elements OBPR assesses when overseeing ex ante RIA reports (RIS) is whether "it ha[s] a clear implementation and evaluation plan." *Id.* at 11. Implementation and evaluation also correspond to the topic of one of the seven RIS questions agencies must address in ex ante RIAs, according to the guidelines. *See* DEPT. OF THE PRIME MINISTER & CABINET, *supra* note 200, at 5.

205. AUSTL. PRODUCTIVITY COMM'N, *supra* note 198, at XXVIII (referring to this approach as "Principle-based reviews strategies").

C. Ex Post EIA, CBA, and RA

EIA systems have seen some tentative requirements for ex post evaluation, but in a less systematized form when compared to RIA. In the U.S., for instance, NEPA directs CEQ to "review and appraise the various programs and activities of the Federal Government in the light of the policy set forth in title I of this Act."[206] Still, this duty has not been taken by CEQ as a mandate to conduct or require ex post EIA.[207] Neither NEPA nor the CEQ guidelines require agencies to plan and conduct a future review of ex ante EIAs in light of new information gathered from implementing the action that triggered it.[208] Nevertheless, the topic has been adopted by the EIA epistemic community, generating significant literature on what is called follow-up, post-implementation audit of EIAs, and adaptive environmental assessment and management.[209] Commentators

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206. 42 U.S.C. § 204(3). Also, NEPA requires the preparation and submission to Congress of an annual Environmental Quality Report including "a review of the programs and activities (including regulatory activities) of the Federal Government, the State and local governments, and nongovernmental entities or individuals with particular reference to their effect on the environment and on the conservation, development, and utilization of natural resources; and . . . a program for remedying the deficiencies of existing programs and activities." *Id.* at §§ 201(4)-(5).

207. Under EO 13,563, CEQ implemented a series of NEPA pilots, but these were not meant to conduct or promote ex post evaluation of each EIA. Rather, the pilots were meant to (a) review CEQ's own NEPA regulations, and (b) review the evaluation of EIAs by EPA under Clean Air Act section 309. *See* COUNCIL ON ENVTL. QUALITY, COUNCIL ON ENVIRONMENTAL QUALITY PLAN FOR RETROSPECTIVE REVIEW OF EXISTING REGULATIONS (2011). A partial move in the direction of ex post EIA is the requirement issued by CEQ in 2010 and 2011, emphasizing the need for better post-decision monitoring when an agency issues a Finding of No Significant Impact (FONSI) and periodic reviews of categorical exclusions. *Id.* at 3.

208. *See* Farber, *supra* note 17.

209. On follow-up, *see* ANGUS MORRISON-SAUNDERS & JOS ARTS, ASSESSING IMPACT: HANDBOOK OF EIA AND SEA FOLLOW-UP (2004) [hereinafter MORRISON-SAUNDERS & ARTS, HANDBOOK]. On studies of post-implementation audits (not framed and treated under the umbrella of follow-up measures), usually focusing on the accuracy of predictions contained in ex ante EIAs, *see* Angus Morrison-Saunders & John Bailey, Exploring the EIA/Environmental Management Relationship: Follow-up for Performance Evaluation (2000) (presented at IAIA '00 Back to the Future conference, June 19-23, Hong Kong), http://researchrepository.murdoch.edu.au/2443/; *see also* Ronald Bisset, *Problems and Issues in the Implementation of EIA Audits*, 1 ENVTL. IMPACT ASSESSMENT REV. 379, 380 (1980) (identifying the ex post measurement of accuracy against ex ante predictions as one of the approaches to assessing the effectiveness of EIA); Ralf Buckley, *Environmental audit: review and guidelines*, 7 ENVTL. PLAN. L.J. 127 (1990); Ralf Buckley, *Auditing the Precision and Accuracy of Environmental Impact Predictions in Australia*, 18 ENVTL. MONIT. ASSESSMENT 1-23 (1991) (providing an example of results from multi-projects audit, assessing the accuracy of predictions in light of new information from monitoring). On adaptive environmental assessment and management, *see* INT'L INST. FOR APPLIED SYSTEMS ANALYSIS, ADAPTIVE ENVIRONMENTAL ASSESSMENT AND MANAGEMENT (Crawford S. Holling ed., 1978); Craig R. Allen et al., *Adaptive Management for a Turbulent Future*, 92 J. ENVTL. MGMT. 1339, 1339-45 (2011); Bernard T. Bormann et al., *Adaptive management*, *in* ECOLOGICAL STEWARDSHIP: A COMMON REFERENCE FOR ECOSYSTEM MANAGEMENT 505-34 (W.T. Sexton, A.J. Malk, R.C. Szaro, N.C. Johnson 1999

emphasize the role of ex post EIA audits in promoting learning, with the potential for improving the accuracy of future predictions.[210] The main perception, however, is that lack of institutionalized follow-up in EIA frameworks has been a systemic weakness, even though some jurisdictions have incorporated follow-up requirements in their EIA systems.[211] One factor that may explain the relative lack of adoption of ex post EIA is that the typical policy decision to which EIA applies—usually involving a project, e.g., building a highway or permitting the installation of a facility—means that making changes after it has been constructed is often costly or moot.[212]

There tend to be few autonomous and systematic ex post requirements of CBA for infrastructure projects; these analyses tend to be reviewed, if at all, through ex post RIA and ex post EIA. One prominent example of ex post CBA applied to an entire regulatory program—a kind of programmatic ex post RIA—is the requirement included in section 812 of the 1990 Amendments to the Clean Air Act (codified at 42 U.S.C. § 312), requiring EPA to conduct and report to Congress a comprehensive analysis of the impact of major programs under the CAA on the public health, economy, and environment.[213] The law requires EPA to consider "costs, benefits and other effects associated with compliance" with different standards defined under the authority delegated by the CAA.[214]

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eds.); DEP'T OF THE INTERIOR, ADAPTIVE MANAGEMENT: THE US DEPARTMENT OF THE INTERIOR TECHNICAL GUIDE (2009).

210. Ben Dipper, *Monitoring and Post-auditing in Environmental Impact Assessment: A Review*, 41 J. ENVTL. PLAN. MGMT. 731, 733 (1998); *see also* Daniel A. Farber, *Bringing Environmental Assessment into the Digital Age*, *in* TAKING STOCK OF ENVIRONMENTAL ASSESSMENT (Jane Holder and Donald McGillivray ed., 2007) (advocating collection and analysis of past EIAs).

211. *See* MORRISON-SAUNDERS & ARTS, HANDBOOK, *supra* note 209, at 66, 158, 238-239 (describing the requirements for monitoring and auditing of EIA in Canada, the Netherlands, Western Australia, Hong Kong, and Finland, and for regional planning in the U.K.); Dipper, *supra* note 210, at 735 (reflecting on the consequences of lack of mandatory monitoring requirements by stating that from the project developer's point of view, it really does not matter if predictions *are* accurate: the developer will suffer no consequences, and all that the developer needs ex ante is educated guesswork). There is some degree of overlap in the literature between follow-up and adaptive environmental management. Usually, follow-up measures are referred to as including monitoring, audit, ex post evaluation, and management activities. *See* MORRISON-SAUNDERS & ARTS, HANDBOOK, *supra* note 209, at 3; Jos Arts, Paula Caldwell & Angus Morrison-Saunders, *Environmental Impact Assessment Follow-up: Good Practice and Future Directions—Findings from a Workshop at the IAIA 2000 Conference*, 19 IMPACT ASSESSMENT PROJECT APPRAIS. 175-185 (2001).

212. For a list of EISs submitted to EPA with the description of the policy decision to which they apply, *see Environmental Impact Statement (EIS) Database*, U.S. ENVTL. PROT. AGENCY, https://cdxnodengn.epa.gov/cdx-enepa-public/action/eis/search (last visited Jan. 21, 2017).

213. Clean Air Act, Title VIII, § 812(a), 104 Stat. 2399 (1990) (current version at 42 U.S.C. § 312 (2004)).

214. *Id.*

Ex post reviews of RA sometimes occur through statutory periodic reviews of the scientific basis for regulatory standards (as for national ambient air quality standards and drinking water quality standards, discussed above in Section III.A). One requirement that comes close to an ex ante-ex post system for RA is the post-market evaluation of drugs by the U.S. Food and Drug Administration (FDA). In 2007, Congress amended the Federal Food, Drug, and Cosmetic Act to "enhance the post-market authorities of the [FDA]."[215] The Act, as amended, provides for the possibility of a post-market surveillance system based on performance standards as "rigorous as the ones already developed for premarket review,"[216] and possibly leading to an obligation to conduct and periodically report on post-approval studies or clinical trials of a drug.[217] As a result of the post-approval study, FDA might require safety labeling changes, or other risk evaluation and mitigation strategies.

IV. THE STATE OF PLAY OF RETROSPECTIVE REVIEW IN U.S. ENVIRONMENTAL LAW

Observing the formal adoption of retrospective review or ex post RIA requirements is not the same as assessing their actual implementation. There can be a gap between adoption and implementation. Discussing the diffusion of ex ante RIA, Claudio Radaelli called attention to the idea that RIA can sometimes travel lightly and serve different justification logics.[218] The result can be a common RIA "bottle" but containing different "wines"—or "even no wine at all."[219] This assessment has been confirmed by OECD and other studies of diffusion of ex ante RIA.[220] What is true about

215. Federal Food, Drug, and Cosmetic Act, 121 Stat. 823 (2007).

216. *Id.* at § 910(6).

217. *Id.* at § 901(o)(3)(B). The goal of post-approval studies or clinical trials are: "(i) [t]o assess a known serious risk related to the use of the drug involved; (ii) [t]o assess signals of serious risk related to the use of the drug; (iii) [t]o identify an unexpected serious risk when available data indicates the potential for a serious risk."

218. Claudio M. Radaelli, *Diffusion Without Convergence: How Political Context Shapes the Adoption of Regulatory Impact Assessment*, 12 J. EUR. PUB. POL'Y 924, 924 (2005).

219. *Id.*

220. The adoption-implementation gap issue has been mentioned by several studies. OECD, POLICY OUTLOOK, *supra* note 39, at 103; Radaelli, *supra* note 218; Fabrizio De Francesco, Claudio M. Radaelli & Vera E. Troeger, *Implementing Regulatory Innovations in Europe: the Case of Impact Assessment*, 19 J. EUR. PUB. POL'Y 491 (2012); RENDA, *supra* note 182, at 81. In 2011, OECD itself had reported after surveying the implementation of RIA in member countries: "[e]x ante impact assessment remain a weak area. Nearly all countries are struggling to establish the process so that it is taken seriously by officials and politicians;" but also that "[t]here is growing awareness that this is a key tool." OECD, SUPPORTING ECONOMIC GROWTH, *supra* note 163, at 112, 122.

ex ante RIA can also be said about ex post IA requirements. Different institutional structures in different jurisdictions make it even harder to assess and compare what has been truly implemented. As with ex ante RIA, different systems of ex post RIA of existing regulations might be designed to work with varied institutions and toward different goals.[221]

In the case of RIA, it becomes further complicated to compare systems and assess implementation due to the terminological imprecision of the word "review"—often used in normative requirements, oversight bodies, agency reports and academic literature to address different types of regulatory initiatives. As mentioned in Section III, in some systems, as in the U.K., EU, and Australia, there exist different programs within the broad category of reviews of existing regulation. In others, different variations can be conflated under just a single label.[222] "Regulatory review" can mean revision of an existing rule, i.e., a proposed policy change or repeal, with little or no analysis of the past performance of the rule being "reviewed." In these cases, there might be little or no hindsight and learning. On the other hand, "regulatory review" can also mean a comprehensive ex post evaluation of an existing rule, comparing expected to realized impacts—positive and adverse—before any policy revision is considered.

Where the literature suggests an adoption-implementation gap in ex post RIA, this gap might reflect divergent understandings of what is being implemented under the heading of "ex post RIA" or "evaluation" or "retrospective review." As noted above, Coglianese and OECD have criticized current practice as incomplete and inadequate.[223] After trying to make sense of what kinds of "review"

221. Radaelli, *supra* note 218, at 929 (mentioning that RIA might perform different functions in different countries, and could correspond to the "rebranding" of preexisting and partial tools, with purposes that overlap with the most recent approach explicitly directed to reviewing existing regulations—e.g., administrative burden reduction).

222. OECD's recommendation on ex post RIA attempts to measure more than just one tool or approach to assessing and improving existing regulations, as it calls for member countries to "[c]onduct systematic programme reviews of the stock of significant regulation . . . ." OECD, 2012 RECOMMENDATION, *supra* note 161, at 4 (Recommendation 5). Even under Recommendation 1, it specifies that countries should "[m]aintain a regulatory management system, including both *ex ante* impact assessment and *ex post* evaluation as key parts of evidence-based decision making." *Id.* at 6. Also, under Recommendation 3, it suggests "[c]o-ordinating ex post evaluation for policy revision and for refinement of ex ante methods." *Id.* at 9. Finally, in Recommendation 5 itself, it uses "review" and "revision" to mean different practices, suggesting that "[t]he methods of Regulatory Impact Analysis should be integrated in programmes for the review and revision of existing regulations." *Id.* at 12.

223. *See* Coglianese, *supra* note 42 (finding that retrospective review "is today where prospective analysis was in the 1970s: ad hoc and largely unmanaged."); OECD, POLICY OUTLOOK, *supra* note 39, at 123 ("ex post evaluation by [U.S.] federal agencies remains patchy and unsystematic.").

are actually occurring, the general impression from secondary sources is one of low or spotty implementation of ex post RIA.[224] Governments have only partially implemented retrospective review, focusing on revisions to individual existing rules with the goal of cutting administrative burden (red tape).[225] Often it is difficult to determine from survey responses what, if anything, has really been implemented.[226]

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224. Allio, *supra* note 199, at 196, 221, 240 ("post-implementation evaluations have not yet been systematically implemented in most countries;" "ex post evaluation has remained relatively side-lined;" "systematic ex post evaluation is less common and the number and performance of such reviews are rarely measured systematically;" "very few OECD countries have actually deployed the tool systematically"); ORG. FOR ECON. CO-OPERATION & DEV., ASSESSING PROGRESS IN THE IMPLEMENTATION OF THE 2012 RECOMMENDATION OF THE OECD COUNCIL ON REGULATORY POLICY AND GOVERNANCE 9 (2013) ("few countries are actually doing it systematically;" "some countries have undertaken pilot projects in ex-post assessment, which have not yet been transformed into a systematic approach"); CHRISTIANE ARDNT ET AL., 2015 INDICATORS OF REGULATORY POLICY AND GOVERNANCE: DESIGN, METHODOLOGY AND KEY RESULTS 7 (2015) ("[c]ountries are less advanced in ex post evaluation where only a few countries systematically evaluate the impact of their regulations ex post"); OECD, POLICY OUTLOOK, *supra* note 39, at 112 ("[o]verall, however, very few OECD countries have actually deployed the *ex post* evaluation systematically").

225. Allio, *supra* note 199, at 200. ("few countries assess whether underlying policy goals of regulation have been achieved, whether any unintended consequences have occurred and whether there is a more efficient solution to achieve the same objective . . . . A more frequent practice in OECD countries is partial *ex post* assessments focusing exclusively on regulatory burdens"); OECD, SUPPORTING ECONOMIC GROWTH, *supra* note 163, at 9 ("[a] more frequent practice in OECD countries is partial ex-post assessment, focusing exclusively on regulatory burdens"); OECD, POLICY OUTLOOK, *supra* note 39, at 113-14 ("[m]ost countries have had ex post evaluations based on administrative burden reduction with an assessment of compliance cost using the standard cost model;" "[t]he survey results confirm the findings by Allio (2015) that countries focus on partial *ex post* assessment of regulatory burdens and rarely assess whether underlying policy goals of regulation have been achieved").

226. This is a problem of survey-based studies on both adoption and implementation of ex post RIA. Sometimes well-intended studies contribute to the lack of clarity on what exactly—and at what level—is being implemented. The OECD 2015 Regulatory Policy Outlook study is based on survey data, including responses from government officials. It proposed to measure, among other variables, systematic implementation of ex post evaluation by OECD member countries. The research design is vulnerable, though, in the validity and accuracy of its findings, because it is not clear if the answers truly measure different aspects of ex post evaluation as defined by OECD itself to mean an analysis of how a regulation has performed. The questionnaire on ex post evaluation uses at least seven different terms referring to ex post evaluation ("ex post evaluations," "ex post evaluations by RIA," "major review," "regular reviews to examine complaints and other problems," "internal review an evaluation by the regulator," "reviews of existing regulation," and "ex post evaluations of existing regulation"). The answers to questions using different terms are aggregated. This is particularly worrisome, as the report itself admits that "[t]he experience of conducting *ex post* evaluation varies considerably across countries and also domestically across different Ministries or agencies within governments" and that "[t]his is in part due to the different interpretations and understanding of what *ex post* evaluation means," and "there is the opportunity to develop a broader understanding of ex post evaluation among OECD countries." OECD, POLICY OUTLOOK, *supra* note 39, at 112, 113. Accuracy is also an issue in the study, because responses came from government officials (the study claims that evidence was gathered to verify the answers, but without specifying what evidence it gathered and examined), and also due to the vague character of answers. For example, to the question "do subordinate regulations include automatic evaluation requirements? (3C4b_S)" the responses could be "for some subordinate regulations;" to the question "have ex-post evaluations of

A. Prior Assessments of the Practice of Ex Post RIA in the U.S.

National audit offices have played a major role in investigating and promoting implementation and compliance with RIA systems. In the U.S., the Government Accountability Office (GAO) has since the mid-1990s repeatedly assessed compliance of federal agencies with different ex post RIA requirements, among other analytical evidence-based tools used by federal agencies.[227] In its analysis, GAO also addressed methodological and institutional challenges facing agency practice of ex post RIA explaining its findings.[228] While trying to measure the level and quality of implementation of

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existing subordinate regulations been undertaken in the last three years? (3C1-S)" the response could be "yes, some" or "yes, frequently." The same issue is seen in prior questionnaires used to measure adoption of ex post RIA systems; *see* ORG. FOR ECON. CO-OPERATION & DEV., OECD REGULATORY INDICATORS QUESTIONNAIRE 2008 22 (2008) ("periodic ex post evaluation of existing regulation," "review," "modif[ication of] specific regulations").

227. In its first reports of the kind, the focus of GAO's analysis was agency compliance with the section 610 ex post RIA requirement of the RFA. GOV'T ACCOUNTABILITY OFFICE, REGULATORY FLEXIBILITY ACT: STATUS OF AGENCIES' COMPLIANCE (1994) [hereinafter GAO, REGULATORY FLEXIBILITY]. In the following two decades, GAO reports addressed ex post RIA under different frameworks, including under the EOs 12,866, 13,563, 13,579, and 13,610. Audit institutions of other countries have also followed GAO's example and taken on the task of overseeing ex post RIA practice. *See* NAT'L AUDIT OFFICE, POST IMPLEMENTATION REVIEW OF STATUTORY INSTRUMENTS: ANALYSIS OF THE EXTENT OF REVIEW BY GOVERNMENT DEPARTMENTS (2009); NAT'L AUDIT OFFICE, EVALUATION IN GOVERNMENT (2013); NAT'L AUDIT OFFICE, THE BUSINESS IMPACT TARGET: CUTTING THE COST OF REGULATION (2016).

228. On the methodological side, *see* GOV'T ACCOUNTABILITY OFFICE, ENVIRONMENTAL PROTECTION: ASSESSING THE IMPACTS OF EPA'S REGULATIONS THROUGH RETROSPECTIVE STUDIES (1999) [hereinafter GAO, ASSESSING THE IMPACTS] (determining the baseline, sorting out the effects of external sources on the behavior regulated entities, obtaining valid cost data, quantifying benefits, time lag between realization of costs and benefits, use of "black box models" in ex ante studies); GOV'T ACCOUNTABILITY OFFICE, ECONOMIC PERFORMANCE: HIGHLIGHTS OF A WORKSHOP ON ECONOMIC PERFORMANCE MEASURES 13 (2005) [hereinafter GAO, ECONOMIC PERFORMANCE] (lack of methodological guidance, qualitative instead of quantitative measurements of costs or benefits); GOV'T ACCOUNTABILITY OFFICE, REEXAMINING REGULATIONS: OPPORTUNITIES EXIST TO IMPROVE EFFECTIVENESS AND TRANSPARENCY OF RETROSPECTIVE REVIEWS 7, 11 (2007) [hereinafter GAO, REEXAMINING/REVIEWS] (too short timeframe to conduct for mandatory triggers, lack of methodological guidance by OMB/OIRA).

On institutional aspects, *see* GAO, ASSESSING THE IMPACTS (resource constraints, impartiality and authorship); *Id.* at 12 (misaligned incentives to acknowledge shortcomings in regulatory performance); GAO, ECONOMIC PERFORMANCE, at 7 (lack of resources); *Id.* at 35 (lack of time and resources, information and data limitations, overlapping schedules and review factors, scoping too broad, statutory barriers, limited public participation); GOV'T ACCOUNTABILITY OFFICE, FEDERAL RULEMAKING: REGULATORY REVIEW PROCESSES COULD BE ENHANCED (2014) (competing priorities and limited resources, difficulty in obtaining data); *see also* GOV'T ACCOUNTABILITY OFFICE, REEXAMINING REGULATIONS: AGENCIES OFTEN MADE REGULATORY CHANGES, BUT COULD STRENGTHEN LINKAGES TO PERFORMANCE GOALS 14-268 (Apr. 2014) [hereinafter GAO, REEXAMINING/AGENCIES] (finding rule revisions in more than 90% of agencies' retrospective reviews under EO 13,563, but lack of transparency in the content of ex post RIAs).

ex post RIA requirements, GAO faced the issue of imprecise meaning of "review," leading to different practices by each agency.[229] Evidence in the reports reveal a track record of either full lack of compliance or the simpler type of regulatory "review," i.e., cost-cutting revision of existing rules without evidence of a formal ex post analysis of their past performance—something also perceived by other oversight bodies, such as OIRA.[230] OIRA emphasized the broad aims of its lookback effort, despite limited agency cooperation.[231] When authentic ex post RIAs were found, GAO's perception was that agencies followed an ad hoc approach, in particular to selecting which rules to evaluate.[232] The shortcomings found by GAO throughout the years have been compounded by

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229. GAO, REEXAMINING/REVIEWS, *supra* note 228, at 1 ("there is no one standard definition for the variety of activities that might be considered retrospective regulatory reviews").

230. Reviewing the past practice of ex post RIA under the RFA during the 1980s, GAO mentions absence of follow-up actions on the plans for periodic review formulated (sometimes inadequately) by agencies. GAO, REGULATORY FLEXIBILITY, *supra* note 227, at 12. It also reports an analysis conducted by the Small Business Administration that in 1992 requires agencies to submit "a summary of the results of their regulatory reviews." *Id.* Agencies who responded mentioned follow-up actions adopted after the reviews without specifying whether an ex post review of rule performance had taken place to inform subsequent proposed rule changes. *See id.* at 14-15. In other instances, GAO itself might have contributed to the confusion between review and revisions, such as when in 1997 it published a report measuring revision actions against the normative backdrop of ex post RIA (and without verifying or commenting on whether the revision actions were accompanied by ex post RIA studies). GOV'T ACCOUNTABILITY OFFICE, REGULATORY REFORM: AGENCIES' EFFORTS TO ELIMINATE AND REVISE RULES YIELD MIXED RESULTS 3 (1997) [hereinafter GAO, REFORM/REVISIONS]. In a 1999 report, GAO cited a report from the Senate Committee on Governmental Affairs mentioning that "review of existing rules, as directed by [EO 12,866], 'has met with varying degrees of failure. Clearly, getting agencies to review existing rules is much easier said than done.'" GAO, ASSESSING THE IMPACTS, *supra* note 228, at 1. In 2005, GAO reported the feedback from participants of its workshop participants (from government and academia) observing that "few of the set of regulations has ever been looked at to determine whether they have achieved their objectives, what they actually cost, and what their real benefits are. In fact, the participant added, little is known about the impact of regulations once they are adopted." GAO, ECONOMIC PERFORMANCE, *supra* note 228, at 10; *see also* GOV'T ACCOUNTABILITY OFFICE, REGULATORY REFORM: PRIOR REVIEWS OF FEDERAL REGULATORY PROCESS INITIATIVES REVEAL OPPORTUNITIES FOR IMPROVEMENTS 7 (2005) ("[a]lthough the economic performance of some federal actions is assessed prospectively, few federal actions are monitored for their economic performance retrospectively").

231. In its 1997 report addressing ex post RIA, GAO mentions a memorandum from OIRA to the heads of federal departments and agencies stating:

> It is important to emphasize what the lookback effort is and is not. It is not directed at a simple elimination or expunging of specific regulations from the Code of Federal Regulations. Nor does it envision tinkering with regulatory provisions to consolidate or update provisions. Most of this type of change has already been accomplished, and the additional dividends are unlikely to be significant. Rather, the lookback provided for in the Executive Order speaks to a fundamental reengineering of entire regulatory systems.

GAO, REFORM/REVISIONS, *supra* note 230, at 3.

232. *See,* e.g., GAO, ECONOMIC PERFORMANCE, *supra* note 228, at 10.

a persistent finding (contained in every GAO report): lack of transparency and publication by federal agencies of the results of the analysis and conclusions of each regulatory review and whether, why, and how to revise existing rules.[233]

Environmental regulation from EPA has received special attention by GAO in its reports on ex post RIA.[234] GAO found that in the early 1980s, EPA had established a rule selection process for review based on comments actively sought from interested groups.[235] Still, no evidence was examined to clarify what practical meaning EPA was attributing to regulatory review.[236] In 1999, GAO published a dedicated report on "Assessing the Impacts of EPA's Regulations Through Retrospective Studies."[237] The investigation found that even though EPA had been implementing many rule revisions with the goal of reducing administrative burdens, assessments of the costs and the benefits of EPA's past regulations had rarely been undertaken.[238] The study also revealed

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233. Since its first 1994 report, GAO faced challenges in conducting its analyses of the practice of ex post RIA due to lack of publication of results of such ex post evaluations by agencies. In 1994, for instance, it based its findings predominantly on secondary sources (annual reports by the Small Business Administration on compliance with the RFA requirements). GAO, REGULATORY FLEXIBILITY, *supra* note 227, at 2, 13. Lack of transparency of ex ante RIAs also affected the quality of the few ex post RIA found by GAO. *See* GAO, ECONOMIC PERFORMANCE, *supra* note 228, at 13 (mentioning that attempts to rerun models used in ex ante analyses were impeded by lack of access to the models or the data used in them). In the comprehensive study of 2007, GAO mentions that agencies reported having conducting 1,300 "retrospective reviews" from 2001 to 2006. Yet, GAO could not compile a "complete tally of all review[s]" that agencies said they had completed because "agencies reported that they did not always document reviews that may have followed more informal review processes." GAO, REEXAMINING/REVIEWS, *supra* note 228, at 5. For this reason, GAO could not also confirm whether what agencies reported as "retrospective review" truly meant what GAO itself had defined in the report as having the minimum features of an ex post RIA; *see also id.* at 7 (making as one of its recommendation the incorporation of "minimum standards for documenting and reporting review results"); *Id.* at 14 (reporting that most of "discretionary" reviews conducted by agencies are undocumented); *Id.* at 24, 28 ("[a]gencies also reported that they often do not report the results of discretionary reviews at all, if they did not result in a regulatory change;" and "[w]hile some agencies reported the analysis conducted in great detail in review reports, others summarized review analysis in a paragraph or provided no documentation of review analysis at all. Some agencies did not provide detailed reports because they did not conduct detailed analyses"). GAO, ECONOMIC PERFORMANCE, *supra* note 228 (mentioning that the semiannual progress report became the primary vehicle for agencies to report on the progress and results of their retrospective analyses).

234. In its 1994 report, GAO found that EPA was the only agency with a specific RFA compliance record mentioned in all twelve reports from the Small Business Administration on annual compliance of federal agencies with the RFA. GAO, REGULATORY FLEXIBILITY, *supra* note 227, at 3. In a 1997 report, EPA was one of the four agencies investigated. GAO, REFORM/REVISIONS, *supra* note 230, at 2.

235. GAO, REGULATORY FLEXIBILITY, *supra* note 227, at 12.

236. *See id.*

237. GAO, ASSESSING THE IMPACTS, *supra* note 228.

238. *See id.*

lack of systematic adoption of ex post RIA.[239] "Of the 101 economically significant regulations issued by EPA from 1981 through 1998, only five were the subject of retrospective studies," and all of those were completed between 1997 and 1999.[240] From 2001 to 2006, EPA reported to GAO that it conducted only 14 ex post RIAs under RFA section 610.[241]

In 2007, the GAO published its most comprehensive study of the practice of ex post RIA by U.S. federal agencies, analyzing the period from 2001 to 2006.[242] In the study, GAO found that EPA had "conducted numerous retrospective reviews of EPA existing regulations and standards" during the time period.[243] In addition to examining agencies' implementation of retrospective regulatory reviews, it proposed to report "the results of such reviews."[244] Initially, it intended to "provide insights concerning how agencies assess existing regulations," i.e., ex post evaluation and not simple rule revisions.[245] But due to lack of evidence of the analysis undertaken for each review on whether to revise the existing rule with an amendment or repeal, GAO had to rely on interviews.[246] In

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239. *Id.* at 3.

240. *Id.* at 2. Of non-economically significant rules, the number of retrospective studies was twenty-three in the same period. *Id.* at 3. *Compare with* GAO, REFORM/REVISIONS, *supra* note 230, at 13 (reporting that EPA had implemented 113 rule revision actions between October 1995 and April 1997). Among the retrospective studies was the one mandated by the Clean Air Act (section 812 of the 1990 amendments). GAO, ASSESSING THE IMPACTS, *supra* note 228, at 3.

241. GAO, REEXAMINING/REVIEWS, *supra* note 228, at 86.

242. *Id.*

243. *Id.* at 86. In the same report, GAO depicts the EPA retrospective review process, informing that after a rule is selected for review, the phase when the review occurs includes the publication of notices of review and request for comments in the Federal Register. It is unclear in the report if by the time such notices are published, the review is still ongoing or is already concluded and the report is published for comments. A search for notice of review on the web site of the Federal Register found only six instances. *Id.*

244. *Id.* at 57. The same issue occurred in the most recent GAO report on "retrospective analysis." GAO seemed to have accepted that the initiatives reported by agencies in progress reports were all ex post RIAs, and not simply proposed revisions to existing rules without a full ex post analysis of past regulatory performance. *See* GAO, ASSESSING THE IMPACTS, *supra* note 228, at 9.

245. GAO, REEXAMINING/REVIEWS, *supra* note 228, at 57 (emphasis added).

246. *Id.* The report said: "[o]ur assessment of a sample of agency reports review revealed that, even for some reviews that provided a summary of their analysis, we could not completely determine what information was used and what analysis the agency conducted to form its conclusions" and "the content and detail of agency reporting varied, ranging from detailed reporting to only one-sentence summaries of results." It still stated that "[s]ome agencies told us that they typically only document and report the results if their reviews result in a regulatory change." *Id.* at 28. Furthermore, it said that "[b]ecause agencies did not always document discretionary reviews that they conducted, it is not possible to measure the actual frequency with which they resulted in regulatory change." *Id.* at 32. Finally, "in our review of the Federal Register and Unified Agenda, we were not always able to track retrospective review activities, identify the outcome of the review, or link review results to subsequent follow-up activities, including initiation of rulemaking to modify the rule;" and that "[a]gencies' reporting of reviews appears largely ineffective." *Id.* at 44, 50.

the end, the 2007 GAO report did not answer whether in the "numerous retrospective reviews" conducted by EPA there were any ex post RIAs.[247] The predominance of simple rule revisions rather than full ex post RIAs in the counts of supposed "retrospective reviews" was further indicated by the GAO finding that the bulk of reviews were a "response to OMB regulatory reform nominations" (116 for EPA, in total).[248] Similarly, the GAO report acknowledged that many "retrospective reviews" it counted were informal.[249]

The informal nature of "review" as a preceding step of rule revisions, distinct from the analytical rigor (or perhaps indicating the absence) of ex post RIA, was again observed in 2014.[250] To some extent, GAO contributed to this fact.[251] It still could not find evidence of the substance of each ex post analysis leading up to a rule revision due to lack of documented proof (which GAO calls "informal" nature).[252] Still, it decided to assume that each proposed rule revision was preceded by some, even informal, ex post analysis of the prior rule.[253] To make things worse with respect to the terminological confusion of the term "review," the report mentioned the response from interviews in which agency officials said that "when developing new rules, they examine existing regulations related to the rule as a normal course of conducting

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247. *Id.* at 86.

248. *Id.* at 18 (emphasis added). About this category, the report states: "[i]n addition, agencies conducted reviews in response to OMB initiatives to solicit nominations for regulatory reexamination, which were not statutorily mandated reviews or required by a specific executive order, but were a part of executive branch regulatory reform efforts." *Id.* at 13.

249. In addition, the study had some transparency issues. For instance, it describes having assessed in a "more detailed" fashion a "limited sample of retrospective reviews" conducted in the period of analysis. Yet, nowhere does the study identify these retrospective reviews, nor explain the selection criteria. *See* GAO, ASSESSING THE IMPACTS, *supra* note 228, at 4. Also, the study mentions that "it is not possible to compile a complete tally of all reviews that agencies completed, primarily because agencies reported that they did not always document reviews that may have followed more informal review processes." *Id.* at 5. The study also said that even the 1,300 reviews that it found completed during the period "may understate the total because it does not account for all the undocumented discretionary reviews conducted by agencies." *Id.* at 16. Again in 2014, GAO mentioned "agencies' plans updates and progress reports provided only summary information about completed analyses. Agencies did not always provide citations or references in the progress reports that a reader could use to look up published rules that contain more detailed descriptions of agencies' analyses and the underlying data." GAO, ASSESSING THE IMPACTS, *supra* note 228, at 17.

250. *See* GAO, ASSESSING THE IMPACTS, *supra* note 228.

251. *See id.* at 11.

252. *Id.*

253. *Id.* ("225 of the 246 completed analyses we examined (more than 90 percent), the reviews led to agencies amending sections of the CFR to revise, clarify, or eliminate regulatory text").

business."[254] This is also true for EPA.[255] In August 2011, EPA published its Final Plan for Periodic Retrospective Reviews of Existing Regulation, responding to EO 13,563,[256] in which it said that "[i]n fact, of EPA's current workload, almost two-thirds of out activity is a review of an existing regulation."[257] For these reasons, the report also mentions that "[a]gency officials expressed frustration at the misperception that they are not reviewing existing regulations, when in fact most of their regulatory activities involve such reviews."[258] But these "reviews" may be informal or simply proposed rule revisions without an ex post analysis of the prior rule. Whether such reviews are, in fact, ex post RIAs, is a question that GAO could not assess given the lack of publicly available ex post RIAs.[259]

B. OMB/OIRA Reports to Congress

OIRA has played a key role in how ex post RIA has been developing in the U.S. federal government. Complying with the statutory mandate from appropriations legislation, OIRA has annually published and submitted to Congress reports on the costs and benefits of federal regulation—and, starting in 2012, on agency compliance with EO 13,563.[260] Environmental regulation by EPA has figured prominently in the reports, scoring the highest monetized net benefits among all agencies in every year but 2004.[261] The reports follow in general the same format: reporting cost and benefits by aggregating and annualizing the ex ante

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254. *Id.* at 21.

255. *See* U.S. ENVTL. PROT. AGENCY, IMPROVING OUR REGULATION: FINAL PLAN FOR PERIODIC RETROSPECTIVE REVIEWS OF EXISTING REGULATIONS (2011) [hereinafter EPA, FINAL PLAN].

256. *Id.*

257. *Id.* at 4.

258. GAO, ASSESSING THE IMPACTS, *supra* note 228, at 21.

259. *See id.*

260. *See* OFFICE OF INFO. & REGULATORY AFFAIRS, 1997 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS (1997); Sections 645(a)(1) and (4) of the Treasury, Postal Services and General Government Appropriations Act of 1996; Consolidated Appropriations Act of 2012, Pub. L. 112-74. The provisions were annually renewed in appropriations legislation until, in 2001, they became a permanent feature of what is now known as the Regulatory Right-to-know Act. Sections 625(1) and (2) of Pub. L. 105-61 (Treasury and General Government Appropriations Act of 1998); Sections 638(a)(1) and (3) of the 1999 Omnibus Consolidated and Emergency Supplemental Appropriations Act; Sections 628(a)(1) and (3) of the FY2000 Treasure and General Government Appropriations Act; Sections 624A(a)(1) and (3) of Pub. L. 106-554 (Treasury and General Government Appropriations Act of 2001).

261. *See* Art Fraas & Randall Lutter, *The Challenges of Improving the Economic Analysis of Pending Regulations: The Experience of OMB Circular A-4*, 3 ANNU. REV. RESOUR. ECON. 71-85, 73 (2011). The annual OIRA reports to Congress are available at https://www.whitehouse.gov/omb/inforeg_regpol_reports_congress.

RIA estimates of all regulations grouped by the same year of initial adoption.[262] In addition to reporting the ex ante costs and benefits of regulations issued in the year preceding the report, each report also provides these figures for the ten previous years (in total and per each year).[263]

From 1997 to 2002, OIRA reported the estimates of costs and benefits of federal regulations by combining forecasts contained in both ex ante RIAs and ex post studies conducted by academics and agencies.[264] Since its first report, OIRA has emphasized the need to track information about the real impacts from the implementation of federal regulations as a basis for recommendations on regulatory reforms or eliminations.[265] In 2002, OIRA decided to rely solely on forecasts contained in ex ante RIAs in order to comply with the duty of reporting the aggregated costs and benefits of regulations.[266]

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262. The report acknowledges the limitations of omitting information about the streams of benefits and costs during the implementation of each rule (in order to annualize the costs and benefits). The problem of aggregating annualized estimates obscuring the actual timing of benefits and costs was also noticed since early reports. *See* OFFICE OF INFO. & REGULATORY AFFAIRS, 1998 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS 81 (1999) [hereinafter OIRA, 1998 REPORT]. It also mentions the EPA rule for pulp and paper effluent, which included annualized benefit estimates for a stream of benefits over 30 years. *Id.* at 73.

263. *See, e.g., id.*

264. In its 1997 report, for instance, it combined the results of a 1991 study from Hahn and Hird on the costs and benefits of regulations as of 1998, supplemented by a 1990 EPA report on costs of regulations (Cost of a Clean Environment 1990), to which it added forecast information from ex ante RIAs for regulations submitted issued since 1988. OIRA, 1997 REPORT, *supra* note 152, at Introduction. In the 1998 report, it mentioned "[b]ecause there are no studies comparable to the Hahn and Hird or the EPA retrospective studies for the regulations issued after 1998, we use information about costs and benefits from agency prospective regulatory impact analyses (RIAs) to account for the major regulations that have been issued since 1998." OIRA, 1998 REPORT, *supra* note 262, at 4. In 1998, it included the EPA report on including retrospective study of the costs and benefits of the CAA. It mentions "retrospective estimates," meaning that it understood the "estimates" in the statutory provision as including ex post figures. *Id.* at 5. The report also discussed other retrospective studies conducted by the National Highway Traffic Safety Administration (NHTSA) and the Occupational Health and Safety Administration (OSHA). *Id.* at 35, 38-43. OIRA even mentioned in its 1998 report that "[i]n the ordinary course, therefore, the best estimates of the costs and benefits of regulation are likely to be retrospective studies" and "[h]ow well the costs and benefit estimates of prospective studies predict actual costs and benefits is a question that has not been answered." *Id.* at 8, 18.

265. In the 1997 Report, it included in one of its recommendations a measure directed to itself, suggesting that "OIRA work toward a system to track the net benefits (benefits minus costs) provided by new regulations and reforms of existing regulations for use in determining the specific regulatory reforms or eliminations, if any, to recommend." OIRA, 1997 REPORT, *supra* note 152, at ch. IV.

266. OFFICE OF INFO. & REGULATORY AFFAIRS, STIMULATING SMARTER REGULATION: 2002 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES 39 (2002) [hereinafter OIRA, STIMULATING SMARTER REGULATION]. The report mentions the intense reaction that the methodological change caused among reviewers and commenters. In response, OIRA mentioned "many of the underlying studies are old and may no longer be reliable indicators of today's regulatory costs and benefits." *Id.* at 40. As the report said "[w]e plan to expand the

Eventually, the importance of ex post studies was again reflected in the reports, but mostly in the form of caveats to the tables that relied on ex ante information.[267] A prominent exception was the 2005 report, which included a chapter on "[v]alidation of benefit and costs estimates made prior to regulation," in which it summarized "post-regulatory information" and made comparisons with the pre-regulation estimates[268] for several rules subject to ex post analysis.[269] Still, the annual report of costs and benefits relied on the largely untested forecasts of ex ante RIAs.[270]

In its annual reports, OIRA has varied in how it complied with the statutory command to make "recommendations for regulatory reform." Initially, OIRA interpreted the provision to require the nomination of specific rules in need of revision. For

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number of years covered by our estimates of the costs and benefits of major rules to ten from the six-and-a-half currently included," but, at the same time, saying "[w]e do not believe that the estimates of the costs and benefits of regulations issued over ten years ago are reliable or very useful for informing current policy decisions." *Id.* And also, "[o]ne does not need to know full costs and benefits of all regulations to decide that regulatory costs should be held to an increase (or decrease) of a specified amount over the next year." *Id.* at 41.

267. OFFICE OF INFO. & REGULATORY AFFAIRS, 2003 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES 8 (2003) [hereinafter OIRA, 2003 REPORT].

> [T]he total cost and benefits of all Federal rules now in effect . . . could easily be a factor of ten or more larger than the sum of the costs and benefits reported in Table 2. More research is necessary to provide a stronger analytic foundation for comprehensive estimates of total costs and benefits by agency and program.

Starting in the 2013 report, OIRA would add error bands to the charts showing the annual costs and benefits of the preceding ten years. *See* OFFICE OF INFO. & REGULATORY AFFAIRS, 2013 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES 23 (2014) [hereinafter OIRA, 2013 REPORT].

268. Most of these ex post studies were conducted by academics, and none of the studies were prepared by EPA. OFFICE OF INFO. & REGULATORY AFFAIRS, VALIDATING REGULATORY ANALYSIS: 2005 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES 42-43 (2005) [hereinafter OIRA, VALIDATING REGULATORY ANALYSIS].

269. The 2005 OIRA report stated that: "[c]ompared to the overall volume of Federal regulatory activity, it is remarkable how few rules have been subject to validation studies." *Id.* at 47. It also recognized that ex post review can help test the accuracy of ex ante RIAs:

> [i]n order to promote more and high-quality validation studies, reviewer (3) urges more investment in post-rule monitoring and data collection, including integration of data from multiple states and localities involved in implementation of rules. Two reviewers (3, 5) argued it was worth considering a requirement that major rules contain a provision requiring agencies, and possibly the regulated entities, to establish data collection systems that would facilitate ex post analysis of the rule at some point in the future.

Id. at 51. OIRA's reaction to the comment was: "OMB agrees that these suggestions are worthy of consideration." *Id.*

270. *See id.*

this reason, it acknowledged the absence of sufficient data to inform recommendations on major changes in regulatory programs.[271] And it reiterated the recommendation (to itself), set forth in the 1997 report, to develop a system to track the actual net benefits of regulations.[272] Still, OIRA endorsed ongoing regulatory reform initiatives by the agencies, which it listed in the report as proposed rule revisions—without mentioning the existence of any ex post analysis of the prior rules to justify the decision to revise these rules.[273] In 2002, OIRA took a more active stance in using its implied authority to make recommendations for review; it called for and collected public comments and suggestions on regulations that would be candidates for reform (i.e., amendment or repeal), which it ranked according to its view on priority.[274] In subsequent reports, OIRA continued to list and report on the status of such ongoing reform initiatives.[275]

Starting in the 2009 Report, OIRA increased the number of warnings about the possibility of erroneous assumptions in ex ante RIAs and, consequently, the figures it reported as costs

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271. OIRA, 1998 REPORT, *supra* note 262, at 84, 89 ("At this stage we do not believe we have enough information to make definitive recommendations on specific regulatory programs based on the incomplete and uneven data that we discuss at length above."). This was consistent with the realization that data from ex post studies were important to calculate and report on the costs and benefits of regulations.

272. *Id.* at 89.

273. For example, NHTSA proposed to revise the existing standards and regulations for the safety performance of airbags and the reflective marking on heavy truck trailers. *Id.* at 84.

274. In the 2002 report, OIRA mentioned having received suggestions addressing 316 different agency rules and guidance documents as candidates for review, "as well as to add, modify, or rescind regulations." OIRA, STIMULATING SMARTER REGULATION, *supra* note 266, at 4. In a breakdown of suggestions reported in 2002, it is evident that almost all of these suggestions were proposed revisions, and not ex post reviews of the prior rules:

> 52.8 percent of the regulatory nominations sought modifications to existing or proposed rules that would increase flexibility and 7.8 percent recommended rescissions of existing rules. Over a quarter of the nominations advocated extending regulation, either by making existing and proposed rules more stringent (17.4 percent) or by promulgating new regulations (11.5 percent).

Id. at 75. *See also* OIRA, 2003 REPORT, *supra* note 267, at 28.

275. OIRA, 2003 REPORT, *supra* note 267, at 26-50; OFFICE OF INFO. & REGULATORY AFFAIRS, PROGRESS IN REGULATORY REFORM: 2004 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES (2004); OFFICE OF INFO. & REGULATORY AFFAIRS, 2006 REPORT TO CONGRESS ON THE BENEFITS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES 92-134 (2007); OFFICE OF INFO. & REGULATORY AFFAIRS, 2008 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES (2009).

and benefits of federal regulations.[276] OIRA started to mention expressly "retrospective analysis" as "an important way of increasing accuracy" and as "a corrective mechanism."[277] The 2009 report also reflected a change in how OIRA perceived its role in making "recommendations for reform."[278] Instead of spearheading the process of public comments and prompting agencies to initiate revisions based on its classification of priorities, OIRA decided to make broad recommendations on how to improve regulatory policy in general.[279] This new conception of "recommendations for regulatory reform" included "serious consideration . . . given to retrospective analysis of the effects of especially significant regulations."[280] In 2013, OIRA also emphasized the role of rule design and monitoring systems to enable future retrospective analyses—even though it did not mention whether it was reviewing this feature in ex ante RIAs.[281]

In its 2011 report, OIRA discussed the importance of retrospective review to assess "what works and what does not," and its role in informing decisions on how to reform existing rules.[282] In 2012, OIRA started to report specifically on how agencies were implementing EO 13,563, complying with a new statutory mandate from Congress.[283] In the 2012 report, it included a

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276. *See* OFFICE OF MGMT. & BUDGET, 2009 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES 4, 8 (2010) [hereinafter OMB, 2009 REPORT].

277. *Id.* The caveats, present in every subsequent report and in every chart showing the yearly costs and benefits of regulations, mentioned the need to implement retrospective analysis. *See* OFFICE OF INFO. & REGULATORY AFFAIRS, 2010 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES 4, 10 (2011) [hereinafter OIRA, 2011 REPORT] (noting the instrumental role of retrospective analysis "to improve regulations, perhaps by expanding them, perhaps by streamlining them, perhaps by reducing or repealing, perhaps by redirecting them."); *Id.* at 4, 11, 5 ("agencies should promote retrospective analysis of existing significant rules, with careful exploration of their actual effects and, when appropriate, consideration of steps to streamline, modify, expand, or repeal them."). On a related issue, discussing the importance of policy experimentation: *Id.* at 6; OIRA, 2012 REPORT, *supra* note 155, at 4; OIRA, 2013 REPORT, *supra* note 267, at 5; OFFICE OF INFO. & REGULATORY AFFAIRS, 2015 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND AGENCY COMPLIANCE WITH THE UNFUNDED MANDATES REFORM ACT 5, 6, 18, 21 (2016) [hereinafter OIRA, 2015 REPORT].

278. OMB, 2009 REPORT, *supra* note 276, at 4, 35-42.

279. *Id.* at 35.

280. *Id.* at 41. *See* OIRA, 2011 REPORT, *supra* note 277, at 49; OIRA, 2012 REPORT, *supra* note 155, at 5-6 (repeating the same recommendation in the 2011 and 2012 reports).

281. OIRA, 2013 REPORT, *supra* note 267, at 9 ("rules should be written and designed, in advance, so as to facilitate retrospective analysis of their effects, including consideration of the data that will be needed for future evaluation of the rule's ex post cost and benefits").

282. *Id.* at 60 ("retrospective analysis can help show what works and what does not, and in the process can help to promote repeal or streamlining of less effective rules and strengthening or expansion of those that turn out to do more good than harm").

283. *See* OIRA, 2012 REPORT, *supra* note 155.

section on "retrospective review."[284] Nonetheless, similar to GAO, it either glossed over the possible mismatch between ex post RIA and simple rule revisions, allowed by the conceptual vagueness of the term "review"; or it gave credence to agencies' suggestions that every rule revision was preceded by an ex post RIA, notwithstanding the absence of documented evidence of such analyses.[285] OIRA referred to the agency preliminary plans for review, required by EO 13,563, and the "hundreds of reforms, candidate rules for review, and initiatives already underway," as examples of "retrospective reviews."[286] The possible conflation of ex post RIA and rule revision is evident when the report mentions, after listing rule change initiatives, that "[i]n this way, and consistent with Executive Order 13,610, OIRA seeks to create a culture of retrospective analysis, in which existing rules (whether issued in the very recent past or decades ago) are subject to assessment and continuing evaluations, with public input."[287]

Even if OIRA seemed in these reports to conflate ex post RIA with regulatory revision, and did not clarify whether rule revisions were preceded by full ex post RIAs, it did seem to notice that a more rigorous approach would be desirable in the future. In its 2013 and 2014 reports, in the chapter on recommendations for reform and agency compliance with EO 13,563, OIRA made the following statement:

> The early phase of retrospective review implementation, discussed later in this chapter and in the most recent previous Reports, has been characterized by fairly straightforward reforms, such as switches from paper to electronic notifications. Moving ahead, however, OMB expects agencies will progress to more analytically-driven retrospective reviews, where the analyses are akin to currently-conducted RIAs (but have the advantage of post-implementation data) . . . . Agencies would, however, examine all or most aspects of a previous cost-benefit analysis, not just the surprising or analytically novel results that would typically receive attention from

284. *Id.* at 64.

285. *Id.* at 56.

286. *Id.* at 64. In every case, each initiative corresponds to a decision to revise an existing regulation, without any information on whether such decision was informed by a formal ex post assessment of its performance. The report includes two initiatives from EPA, both corresponding to rule revisions: a plan to propose a rule to reduce burdens on hazardous waste generators, and the elimination of an obligation for states to require air pollution vapor recovery systems at local gas stations. *Id.* at 65-66. The 2013 OIRA report also mentions rule revisions as examples of retrospective analyses. OIRA, 2013 REPORT, *supra* note 267, at 9.

287. OIRA, 2012 REPORT, *supra* note 155, at 69.

> academic journals. Perhaps more importantly, agencies have the ability to facilitate retrospective analysis at the time when rules are issued; for example, in some cases, they can require—as a provision of a rule—the submission of data that would be necessary for assessing that rule's effectiveness. OMB recommends that agencies pursue retrospective review in a comprehensive fashion—encompassing continual look-back at administrative procedures; thorough cost-benefit analysis of previously-issued, nonadministrative regulations; and the incorporation of plans for retrospective policy assessment into rulemaking currently underway.[288]

In its 2015 report, OIRA did not seem to follow through on its calls for ex post RIA of agency rules, distinct from the need to propose rule changes.[289] Instead, the report only mentioned retrospective analysis in five of its pages—fewer than in prior reports.[290] In addition to including the same caveats to figures on costs and benefits based on prospective RIA studies, and emphasizing the role of retrospective analysis as a corrective mechanism, the 2015 report adopted a more formal approach when reporting on how agencies are conducting (or not conducting) their ex post RIAs.[291] In the 2015 chapter on recommendations for reform, OIRA did not mention, as it had in the 2012 and 2013 reports, agency compliance with EO 13,563 or examples of retrospective review initiatives.[292] It simply mentioned, in a brief response to a comment, that "[w]e have stated throughout this Report, and through other avenues, that the retrospective review of regulations continues to be a very high priority for OMB."[293]

C. State Experience

If studies of the adoption of ex post RIA by states are rare, even rarer have been those investigating whether and how those states that have adopted it have truly implemented ex post RIA.[294] One

288. OIRA, 2013 REPORT, *supra* note 267, at 56; OFFICE OF INFO. & REGULATORY AFFAIRS, 2014 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES 54 (2015).

289. *See* OIRA, 2015 REPORT, *supra* note 277.

290. *Id.* at 6, 18, 21, 54, 109.

291. *Id.* at 6, 8, 21.

292. *Id.* at 54. Compare with OIRA, 2012 REPORT, *supra* note 155, at 65-66.

293. OIRA, 2015 REPORT, *supra* note 277, at 109.

294. Moreover, the studies of ex post RIA in the states face the same challenge of analyses of ex ante RIA in practice: assuring validity of findings when adopting a research

of the first studies of this kind was published in 2000 by Robert Hahn, in which he found that "[s]tates do not always comply with requirements for reviews of existing regulations."[295] The 2010 study of regulatory review in the U.S. states, conducted by Jason Schwartz, also attempted to assess the extent of implementation of periodic retrospective review of regulations.[296] The investigation found that that of the thirty states where periodic review of regulations was either encouraged or mandatory, only four had active (and, apparently, frequent) periodic reviews of existing regulation (Hawaii, Iowa, Maryland, and Pennsylvania);[297] six showed some evidence of the practice (Florida, Missouri, North Dakota, Oklahoma, Vermont, and Virginia);[298] two had only pro forma systems (Indiana and New Jersey);[299] and two had inconsistent or sporadic practices (Michigan and California).[300] Yet even states with evidence of frequent periodic reviews (and those with only some signs of practice) implemented partial approaches to a full ex post RIA: by either revealing a deregulatory bias (Hawaii and Iowa), restricted focus on impacts on small businesses (Hawaii), or an ad hoc nature (Pennsylvania).[301]

In their 2016 study, Stuart Shapiro et al. reported the findings of the analysis of ex post RIA adoption and implementation in Delaware, Florida, Nevada, and Rhode Island.[302] New developments in the adoption of reviews of existing regulations had occurred in the four states since the 2010 study by Schwartz.[303] With the exception of Rhode Island, governor's EOs were the legal source for

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design that relies on surveys of agency officials and questionnaires vulnerable to the review-revision conceptual mismatch. Another frequent limitation is the lack of precision and specificity regarding which documents the study analyzed in order to supplement the survey data.

295. Hahn, *supra* note 76, at 882.

296. SCHWARTZ, *supra* note 107, at 13. But the questionnaire used by the study did not provide a definition of "reviews of existing regulations" in the question about implementation of ex post RIA. *Id.* at 457 ("does your agency conduct 'ex post' review of existing regulations (e.g., a recurring review every so many years of the efficacy, efficiency, fairness, or legality of existing regulations)?"). For this reason, the question regarding ex post RIA could have been understood by respondents as only pertaining to a program for simple rule revisions, without necessarily reviewing past performance of the rule being revised.

297. *Id.* at 208, 231, 258, 351.

298. *Id.* at 200, 282, 326, 384, 389.

299. *Id.* at 224, 304.

300. *Id.* at 268, 173.

301. *Id.* at 208, 231, 351.

302. Shapiro, Borie-Holtz & Markey, *supra* note 159. The paper mentions that its findings were based on case studies, and that "[i]n each state we reviewed documents on retrospective review. We also interviewed numerous individuals who were involved with their state's lookback efforts." *Id.* at 35. Yet, it does not specify which documents it reviewed, nor the specific role of each interviewee in each state's ex post RIA system.

303. *See id; compare* with, SCHWARTZ, *supra* note 107.

the obligation to conduct retrospective reviews.[304] In short periods of time, agencies reported having reviewed over a hundred rules (1,600 over 17 months, in the case of Rhode Island).[305] The evidence suggests that the reviews were predominantly "cleaning the books exercises," i.e., another apparent instance of cost-cutting rule revisions being reported as ex post RIA.[306] As the authors of the study say, "[g]iven that most of the reviews in these states (which involved looking at hundreds of regulations) took a year or two, it is reasonable to conclude that there was little careful analysis of the regulations in many states where retrospective reviews were conducted."[307]

D. EPA "Retrospective Reviews" under EO 13,563

Responding to EO 13,563, in August 2011 EPA published its Final Plan for Periodic Reviews of Existing Regulations.[308] When describing the process of retrospective review, it includes two different steps ("conduct retrospective reviews" and "make necessary modifications").[309] In the report, EPA declares that it "has a long history of thoughtfully examining its existing regulations to make sure they are effectively and efficiently meeting the needs of the American people,"[310] suggesting that such examination would amount to ex post RIA. The document did not, however, actually list regulations for ex post RIA; instead, it announced that the "plan describes a large number of burden-reducing, cost-saving reforms, including thirty-five priority initiatives."[311] After publishing its final plan, EPA posted on its website ten semiannual progress reports, complying with section 6 of EO 13,563. An overview of the progress reports show that by retrospective review, EPA considers a process that starts with collecting data and ends with the publication of a final rule revising an existing rule; or with an improvement of an information collection or compliance system related to the implementation of a rule.

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304. *Id.*
305. *Id.*
306. *Id.* at 35.
307. *Id.*
308. EPA, FINAL PLAN, *supra* note 255.
309. EPA describes the last step of the process as: "[a]fter collecting comments from the public and conducting our own analyses, EPA intends to make modifications to any regulation that warrants it, as determined during Step 3." *Id.* at 52.
310. *Id.* at 4.
311. *Id.* at 5.

In examining the retrospective review initiatives in each of EPA's progress reports from January 2012 to January 2016, we found that EPA reported a total of fifty-five different "retrospective review initiatives," of which twenty changed to completed status.[312] Review initiatives that led to new rulemaking processes (rule revisions) were only reported as completed when the final rule was published. Some of the review initiatives EPA included in its reports addressed administrative or information collection aspects of existing rules. These initiatives usually resulted in changes that did not require a new rulemaking process. Of the twenty initiatives that changed status to complete, only four led to a new rulemaking process and one represented a partial ex post RIA. The remaining fifteen initiatives with complete status resulted in the issuance of new guidelines or other policy documents, changes in websites, or even a webinar, mostly intended to reduce administrative burdens.[313]

Of the thirty-five remaining ongoing initiatives (i.e., not reported as completed), sixteen have reached the proposed rule status, with a new rulemaking process and the publication of an NPRM. Many of the retrospective review initiatives, when first reported, already had rule revision as their stated intent.[314] Since, in theory, the conclusion of an ex post RIA informs whether a rule change is required, EPA might have completed a total of twenty-one ex post RIAs in the four year period.[315]

But based on the summary description of each initiative contained in each progress report of the twenty-one retrospective review initiatives, sixteen are measures intended to promote the reduction of administrative burdens, four are other rule change initiatives with the goal of promoting other kinds of improvement, and only one corresponds to an independent (but partial) ex post RIA.[316] Of the nineteen remaining ongoing or planned initiatives that have not reached a proposed rule status, fifteen state a goal of reducing administrative burdens, with the remaining four stating a goal of implementing other types of regulatory improvements.[317]

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312. The total number of retrospective review initiatives reported in EPA's progress reports since Jan. 2012 is 216 (including repetitions).

313. None of these initiatives have an assigned RIN number—with the exception of RIN 2050-AG72, initiated in 2012 and concluded in 2014, leading to the publication of a Notice of Data Availability (NODA).

314. *See, e.g.*, EPA, FINAL PLAN, *supra* note 255 (this intent is evident in the "next steps" section of each planned retrospective review initiative, with many already including mentions of proposed rules).

315. The total of twenty-one corresponds to sixteen ongoing initiatives that already had an NPRM, four completed initiatives leading to new rulemaking processes, and one partial ex post RIA. *See* Figure 1.

316. *See* Figure 2.

317. *See* Figure 3.

Figure 1. Retrospective Review initiatives reported in EPA's progress reports that might have employed ex post RIA

55 Retrospective Review (RR) initiatives	20 RR initiatives with “complete” status	**4 new rulemakings**
		1 ex post RIA
		15 non-rulemaking initiatives
	35 ongoing RR initiatives	**16 initiatives with NPRM**
		19 initiatives without NPRM

Figure 2. Content of review initiatives reported in EPA's progress reports with complete status or with a proposed rule revision leading to a new rulemaking process

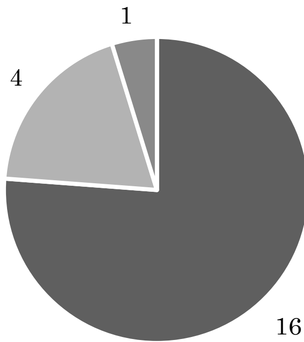
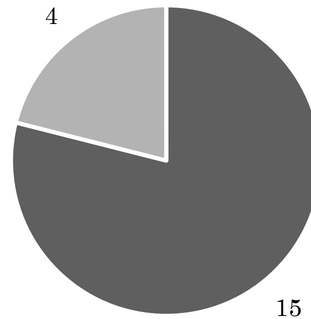


Figure 3. Content of ongoing review initiatives reported in EPA's progress reports that have not reached the NPRM phase



▪ administrative burden reduction
▪ proposed improvements
▪ autonomous ex post RIA

▪ administrative burden reductions
▪ proposed improvements

Confirming the GAO findings, there was no evidence of publication of any report with the findings of ex post RIAs—assuming that they indeed took place—related to the review initiatives that EPA reported as either completed (and leading to

a final rule) or having reached the proposed rule status.[318] The third step of EPA's retrospective review ("conduct retrospective review"), as described in its final plan, remains largely opaque.[319] For the initiatives that resulted in a new rulemaking process, there is no information in the progress reports on whether the resulting new rule triggered a new ex ante RIA requirement. This information can only be found by cross-referencing the RIN number of the retrospective review initiative in the retrospective review progress report with the same number identifying the proposed rule in OIRA's database. Cross-referencing this information reveals that of the twenty initiatives classified as completed with a final rule or at the stage when a proposed rule was already published, eleven were accompanied by new ex ante RIAs. Of these eleven initiatives accompanied by new ex ante RIAs, nine were of non-economically significant rules and only two were of economically significant rules. If complying with EO 12,866, nine of the regulatory reform initiatives could not have been considered a major regulatory action to trigger an RIA.

An examination of the ex ante RIAs submitted to OIRA from August 2011 (date of EPA's final plan on retrospective review) to January 31, 2016 showed, during this time, 217 ex ante RIAs were submitted by EPA to OIRA (41 of economically significant major rules and 176 of non-economically significant major rules). Since eleven of the ex ante RIAs submitted by EPA were preceded by retrospective review initiatives reported in EPA's progress reports on retrospective review, 206 ex ante RIAs of proposed rules or rule revisions were therefore unaccompanied by the same type of retrospective review.[320] No evidence was found of self-standing reports providing the conclusions of each completed retrospective

318. *See* GAO, REEXAMINING/AGENCIES, *supra* note 228. There is no database in the U.S. with data on retrospective review initiatives. All the information is contained in individual electronic files for semiannual progress reports of each agency.

319. *See* EPA, FINAL PLAN, *supra* note 255.

320. *See* Figure 4: Evidence of policy cycle approach in ex ante RIAs submitted by EPA during the same period of reporting of retrospective review initiatives under EO 13,563. One important piece of information is how many of these 206 ex ante RIAs, not preceded by retrospective reviews, corresponded to rule revisions (since new rules could not have been preceded by ex post RIA). Of these 206, at least 45 (43 of non-economically significant major rules and 2 of economically significant major rules) indicate rule revisions in the title (containing either the word "amendment(s)" or "revision(s)"). Still, this probably underestimates the number of proposed rule changes, because rule revisions could also use other words in the title. Of the 11 RIAs resulting from completed retrospective review processes, only 4 had in the title one of the two words mentioned above. If the proportion (4 out of 11) is the same for all RIAs, i.e., if rules with one of the two revision-indicating words in the title correspond only to 36.3% of all the rules that are in reality rule revisions, then the total amount of rule revisions of the 206 ex ante RIAs without following a completed retrospective review process would amount to 123 RIAs, not 45.

review initiative (as EPA publishes for RFA section 610 reviews).[321] Instead, the only documentation available that might contain information related to such analyses is what accompanies the NPRM and ex ante RIA reports of rule revisions that follow a complete retrospective review process. Searching for any such evidence, we examined the eleven ex ante RIAs that followed a formal retrospective review process, as reported in the OIRA database as matching the same RIN numbers of proposed rules or final rules mentioned in EPA's progress reports on retrospective review during the same period.[322] Only two of these eleven ex ante RIAs mention that the proposed rule revision was a result of a preceding retrospective review initiative. Some report the publication of notices before an NPRM, with the goal of inviting comments (e.g., an Advanced Notice of Proposed Rulemaking or a Notice of Data Availability.) Others mention the use of data generated during the period of implementation of the preceding rule as an input to formulate the proposed revision being accompanied by the ex ante RIA. None mentioned any ex post assessments of the accuracy of the predictions made in the ex ante RIA of the rule now being revised.

Figure 4. Evidence of policy cycle approach in ex ante RIAs submitted by EPA during the same period of reporting of retrospective review initiatives under EO 13,563

RIAs	Economically significant	Non-economically significant
Preceded by a retrospective review	2	9
Not preceded by a retrospective review	39	167

Since August 2011, the only retrospective review initiative reported by EPA under EO 13,563 with the features of a true ex post RIA was first identified in the September 2012 progress report, under the title "the costs of regulations: improving cost

321. *See infra* n. 352-54 and accompanying text.

322. The ex ante documentation of these eleven proposed rule changes are related to the following RINs: 2040-AF16, 2060-AQ97, 2060-AQ91, 2050-AG20, 2070-AK02, 2050-AG39, 2050-AG70, 2050-AG77, 2060-AS02, 2060-AQ54, and 2060-AQ86. *See* dataset published at http://bit.ly/2cDOiGt.

estimates."[323] It was eventually published in August 2014 as an ex post study of five regulations, distinct from any proposed rule revisions.[324] The purpose of the study was to compare the ex ante cost estimates with the ex post realized costs during the implementation of these five EPA regulations.[325] The research goal was to look for patterns of overestimation or underestimation of costs and identify the factors that might explain them, thus improving the accuracy of new ex ante studies (and RIAs);[326] and to identify key uncertainties in the ex ante estimates.[327] This study stands out as at least seeking the kind of insights on ex ante RIA accuracy that we argue could come from broader application of ex post RIA to multiple rules. Five economically significant rules were selected for review, organized by environmental media, source categories, and regulatory mechanisms (e.g., performance standard versus prescriptive regulation).[328] EPA intended this study to be one of many, with the subsequent studies adopting a stratified random sampling strategy to define which rules should be evaluated.[329]

The study reached tentative results, given the low availability of compliance cost information, in particular at the facility level.[330] The

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323. U.S. ENVTL. PROT. AGENCY, EO 13563 PROGRESS REPORT, SEPTEMBER 2012, 5 (2012), https://www.epa.gov/sites/production/files/2015-09/documents/eparetro reviewprogressrpt-sept2012.pdf.

324. U.S. ENVTL. PROT. AGENCY, RETROSPECTIVE STUDY OF THE COSTS OF EPA REGULATIONS: A REPORT OF FOUR CASE STUDIES (2014) [hereinafter EPA, RETROSPECTIVE STUDY].

325. *Id.* at vii. The report detailed, "[a] careful assessment of ex post cost drivers could help identify systematic differences between ex post and ex ante compliance cost estimation and, ultimately, allow for improvements in the way in which ex ante analyses are done." *Id.* at 1.

326. *Id.* One interesting feature of the study was the acknowledgment by EPA of the limited number of retrospective analyses. The study was published in 2014, almost three years after EPA had begun to report semiannually its retrospective review initiatives under the mandate of EO 13,563. This fact suggests further evidence that in EPA's perspective, "retrospective review initiatives" correspond predominantly to rule revisions, without necessarily being preceded or informed by an ex post RIA of the rule being revised. *See id.* at Acknowledgements, v, vii.

327. *Id.* at vi-vii. For example, yield losses associated with different alternative pesticides, in the case of the Methyl Bromide critical use exemption rule. *Id.* at 78.

328. *Id.* at vii. The five rules were: (1) the National Primary Drinking Water Regulation for Arsenic (2001/2004); (2) the Integrated National Emission Standards for Hazardous Air Pollutants (NESHAP) and Effluent Guidelines for Pulp and Paper (also known as the Cluster Rule) (1998); (3) the NESHAP for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite and Stand-Alone Semichemical Pulp Mills (2001); (4) the Locomotive Emission Standards (1998); (5) the Methyl Bromide Critical Use Nomination for Preplant Soil Use for Strawberries Grown for Fruit in Open Fields on Plastic Tarps (2004-08). *Id.* at 16.

329. *Id.* at 16. The study criticized the existing literature of ex post cost assessment as "unlikely to form a representative sample of the universe of environmental rules that have been promulgated. Many of the survey articles summarize the same sets of underlying studies, which means that there is substantial overlap." *Id.* at 6. In the concluding chapter of the report, it indicated additional rules for retrospective analysis. *Id.* at 228.

330. *Id.* at 227.

study team had to consult industry compliance experts to gather ex post data for all but one regulation, since publicly available data sources were incomplete.[331] In addition to the challenge of having little or no information, the study also highlighted the difficulty of forming a reasonable counterfactual and disentangling compliance costs from other factors.[332] In conclusion, the study found mixed results in terms of overestimation and underestimation of costs, and overestimation of costs for one rule.[333] Notwithstanding the final report mentioning the intention of conducting future studies of the same kind, in an interview in 2016, one of the authors of the report said that other analyses of the type were not high on the priority agenda of EPA, with no other ex post study of the kind being planned.[334]

At least one of the rules studied by EPA had a subsequent revision (and a new rulemaking process) for which an ex ante RIA was prepared—Protection of Stratospheric Ozone: The 2016 Critical Use Exemption from the Phaseout of Methyl Bromide, with an NPRM published in June 2015.[335] We examined its ex ante RIA report to search for any mention of the prior ex post study and any evidence of a concerted effort to improve monitoring and data collection on input information—one of the main limitations found in the ex post study. But nothing in the ex ante RIA or the NPRM mentions the previous ex post study. In the electronic docket, there is a document in which EPA explains why there was no economically feasible alternative to the use of methyl bromide for the specific use studied in the 2014 report.[336] The 2014 ex post study had identified information on agricultural yield losses associated with alternative fumigants as being key missing data, possibly leading to overestimation of costs.[337] In the 2016 proposed rule, there is no discussion or additional information on that key input to estimating the costs of alternative policy decisions.[338]

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331. *See id.* at viii.

332. *Id.*

333. The ex post review of National Primary Drinking Water Regulation for Arsenic and the 1998 Locomotive Emission Standards found mixed results (ranging from -12% to +69% on capital costs, and -58% to -19% on operation costs for the former). *Id.* at 142, 205. The review of the Cluster Rule found overestimation of capital costs, ranging from 30% to 100%, and a review of the MACT II rule found overestimation of capital costs by 25% and 200+% on annual costs. *Id.* at 52, 205.

334. Anonymous EPA official, on file with authors.

335. 80 Fed. Reg. 33,460 (proposed June 12, 2015) (to be codified at 40 C.F.R. pt. 82).

336. U.S. ENVTL. PROT. AGENCY, 2016 Critical Use Nomination for Strawberries 3-4, (2016), https://www.regulations.gov/document?D=EPA-HQ-OAR-2013-0369-0011 [hereinafter EPA, Strawberries].

337. EPA, RETROSPECTIVE STUDY, *supra* note 324, at 69, 74, 75, 77, 78, 81, 91, 93.

338. EPA, Strawberries, *supra* note 336. There is no specific RIA document for the 2016 Critical Use Exemption Rule in the electronic docket.

EPA has also conducted Section 610 reviews mandated by the RFA. A page of its website lists a total of forty-one ongoing, planned, and completed such reviews since 1997.[339] From August 2011 to January 2016 (the period covered by the Final Plan and progress reports on retrospective review under EO 13,563), the website lists six completed and two ongoing reviews; however, neither the final plan nor the semiannual retrospective review progress reports contain any mention of the Section 610 reviews.[340] The database provides a link to the semiannual agenda, which in turn reports the number of the electronic docket for each review. In contrast to the "retrospective review initiatives" reported under EO 13,563,[341] the Section 610 reviews are not proposed rule revisions. All six reviews concluded between August 2011 and January 2016 have reports distinct from any rule revision, and all six concluded that there was a continued need for the regulation.[342] Only one review conducted additional analysis compared to the preceding ex ante RIA;[343] all others made qualitative claims that it was not necessary to revise the rule, mostly relying on and simply responding (qualitatively) to public comments received during the review process.[344] None of the reports mention the assessment of the accuracy of ex ante data in light of information from costs and benefits from implementation of each rule being reviewed.

Compared to other jurisdictions with dedicated ex post RIA programs—distinct from rule revisions supported by only simplified analyses—the reality of EPA's implementation of ex post RIA is not

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339. *Section 610 Reviews*, U.S. ENVTL. PROT. AGENCY, https://www.epa.gov/reg-flex/section-610-reviews (last visited on Jan. 21, 2017).

340. Even in the Final Plan, EPA mentioned that it intended to "coordinate our small business retrospective reviews, required by Section 610 of the Regulatory Flexibility Act, with other required reviews (e.g., under the CAA). This will aid in meeting EO 13563's directive to reduce or eliminate redundant, inconsistent, or overlapping requirements." EPA, FINAL PLAN, *supra* note 255, at 47.

341. *See* EPA, RETROSPECTIVE STUDY, *supra* note 324.

342. National Primary Drinking Water Regulations: Ground Water Rule, 81 Fed. Reg. 37,373; Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel, 79 Fed. Reg. 76,771; National Emissions Standards for Hazardous Air Pollutants (NESHAP): Reinforced Plastic Composites Production, 78 Fed. Reg. 44,315; National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines Standards for Concentrated Animal Feeding Operations (CAFOs), 79 Fed. Reg. 76,771; Heavy-Duty Engine Emission Standards and Diesel Fuel Sulfur Control Requirements, 79 Fed. Reg. 1216; and National Primary Drinking Water Regulations: Arsenic and Clarifications to Compliance and New Source Contaminant Monitoring, 77 Fed. Reg. 8004.

343. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines Standards for Concentrated Animal Feeding Operations (CAFOs), 79 Fed. Reg. 76,771.

344. Most review reports are short in length, ranging from two to sixteen (average of six) pages. No review—not even the two containing new ex post data—mentioned ex post assessment of the impact of the regulation on large, medium, or small businesses. No review contained any quantitative assessment of benefits.

significantly different.[345] The European Commission database contains reports of thirty-four ex post evaluations of environmental policies, of which fourteen are related to primary and secondary legislation (the remaining address programs and plans).[346] In the U.K., after the first five-year period for triggering review clauses, the results of the first post-implementation reviews have still not been reported in the IA database (so far, there are only five).[347] According to the U.K. DEFRA Better Regulation Team, as of November 2015 no post-implementation reviews had been completed, and most reviews had taken place under the red tape challenge program.[348] In Australia, only four ex post evaluations of environmental primary and secondary legislation have been completed and reported.[349] In these three jurisdictions, as at EPA, there have been many more rule revisions with the goal of promoting simplification and reduction of administrative burdens and far fewer ex post RIAs designed to test the accuracy of ex ante RIAs or to learn about what works in policy design.

V. GOING RETRO: ADVANCING REGULATORY HINDSIGHT

Our review of retrospective review and ex post RIA in U.S. and international environmental regulatory policy illustrates the gap between adoption and implementation. Our findings indicate increasing adoption yet limited implementation of retrospective analysis. Meanwhile, most retrospective review that does occur appears to be aimed at reducing cost or administrative burden through specific rule revisions, while little use of ex post RIA is aimed at a broader scope of impacts or at testing the accuracy of ex ante RIA or the performance of policy design. What EPA has been reporting as retrospective review initiatives are mostly, it seems, revisions of individual existing rules, often without a documented

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345. Admittedly, a proper benchmark should take into account the fact that requirements for periodic review of regulations have been adopted in the U.S. much earlier than in other jurisdictions—at least since 1978. *See supra* Section II.

346. Including only evaluations from the DG Environment and DG Climate Action, from 2001 to the present. *Smart-regulation Evaluation Search*, EUR. COMM'N, http://ec.europa.eu/smart-regulation/evaluation/search/search.do (last visited on Jan. 21, 2017) [hereinafter EC, *Smart-regulation Evaluation Search*].

347. NAT'L ARCHIVES, *UK Impact Assessments Post Implementation Review*, http://www.legislation.gov.uk/ukia.access?stage=Post%20Implementation%20Review (last visited on Jan. 21, 2017).

348. Email on file with authors.

349. Office of Best Practice Regulation, Best Practice Regulation Updates, *List of Post-implementation Reviews Completed and Published*, AUSTRALIAN GOV'T DEP'T OF THE PRIME MINISTER & CABINET (2016), http://ris.pmc.gov.au/sites/default/files/compliance-reporting/pir/list-pir-completed-and-published.pdf (last visited on Jan. 21, 2017).

analysis of the prior rule and its ex ante RIA. The majority of such revisions tend to lead to non-economically significant rule changes, aimed at cutting red tape or implementing minor improvements. And compared to ex post RIA, retrospective review of EIA appears even more scant.

The potential role of retrospective review or ex post IA in learning—as a mechanism to track and compare the performance of existing regulations, and thereby to learn how to improve ex ante IA estimates and ex ante policy design decisions—lies largely unrealized to date. Environmental regulation is going retro more in rhetoric than in reality. While individual rule revisions may help reduce compliance costs, they do not seize the opportunity for broader learning that ex post RIA can offer about the full impacts of the past rule (including not only administrative burden but full social costs, benefits, and ancillary impacts), the accuracy of ex ante RIA methods, and the merits of alternative policy designs.[350] Errors in ex ante estimation methods may persist, leading to lower net social benefits than expected from new and existing policies. Even narrow retrospective review initiatives that yield a revision of an individual rule may be based on inaccurate estimates of cost savings, if they are only comparing the revision to the ex ante cost estimates—and not to the ex post realized costs—of the rule being revised. If regulatory policy continues to be formed by a sequence of largely untested forecasts, human foresight is fallible and learning from hindsight is playing too small a role.

There is also little indication of a policy cycle linking ex ante to ex post RIA. Few new agency rules (and their ex ante RIAs) appear to plan for ongoing data collection and future ex post RIA.[351] Few of the rule revisions by EPA and other agencies (and their ex ante RIAs) appear to draw on ex post RIAs of the prior rules. Although OIRA is prodding agencies to conduct retrospective reviews under EOs 13,563, 13,579, and 13,610, and reporting the agency responses, most of these appear to be individual rule

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350. Our study team at Duke outlined this broader approach to learning from retrospective review, in our peer review comments on the OMB/OIRA 2015 annual report. JONATHAN B. WIENER ET AL., PEER REVIEW OF THE U.S. OFFICE OF MANAGEMENT AND BUDGET DRAFT 2015 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATION 5 (2015), https://www.researchgate.net/publication/286780416_Peer_Review_of_the_US_Office_of_Management_and_Budget_Draft_2015_Report_to_Congress_on_the_Benefits_and_Costs_of_Federal_Regulations.

351. *See* Miller, *supra* note 41. President Carter's EO 12,044, section 2(d)(8), called for new rules to include plans for future retrospective reviews. *See* Exec. Order No. 12,044, 43 Fed. Reg. 12,661 (1978). That type of ex ante planning for future ex post review could be renewed by EO, or it could be mandated by statute; *see* S. 1817, 114th Cong., The Smarter Regulations through Advance Planning and Review Act (July 21, 2015), https://www.congress.gov/bill/114th-congress/senate-bill/1817 (co-sponsored by Sen. James Lankford, R-OK, and Sen. Heidi Heitkamp, D-ND).

revisions rather than ex post RIAs of the performance of the past rule to inform the design of subsequent rule revision. Only a small number of EPA's proposed rule changes in response to EO 13,563 were based on a retrospective review initiative mentioned in EPA's progress reports.

Retrospective review systems in the EU, U.K., and Australia, while similarly generating few full ex post RIAs that test and learn about the accuracy of ex ante RIAs, are putting in place clearer requirements and more sophisticated frameworks for comprehensive and regularized evaluation and learning. Their provisions include mandatory review clauses for most or all regulations, and the duty to prepare, publish, and submit to oversight institutions the findings of each ex post RIA, irrespective of a new ex ante RIA or proposed rule revisions. After the U.S. pioneered ex ante RIA and served as the model for its international diffusion, these other jurisdictions are now moving ahead with ex post RIA, thereby offering opportunities for mutual learning by comparing the unfolding institutional experience across regulatory systems.[352]

Demanding too much or too costly retrospective review could also have perverse consequences. Agencies have limited resources and other priorities including promulgating new rules. Imposing a duty to prepare a full ex post RIA for every rule might be excessive, or just lead to formalistic and symbolic results. Ex post RIA could become just a form of monitoring and reporting indicators during implementation, rather than truly measuring the impacts of the existing rules compared to alternatives.[353] Some process is needed to select the rules warranting ex post review, and to frame the methods of ex post analysis to foster learning about the accuracy of ex ante analysis and improved policy design. Here we offer recommendations for the future of retrospective review.

Several factors may help explain the low levels of implementation that this investigation and other studies have found in retrospective review such as ex post RIA or EIA. First, a key limitation is lack of data. Establishing monitoring arrangements earlier, when conducting ex ante RIA or EIA and promulgating a rule, can be important to the subsequent success of ex post IA.[354] Yet monitoring may be costly to agencies

352. *See* Wiener & Ribeiro, *supra* note 3; Wiener, *supra* note 11; DE FRANCESCO, *supra* note 108.

353. This would be a gain compared to the low levels of transparency over monitoring indicators; but this would still not amount to true ex post RIA.

354. Studies of adaptive policy management have emphasized the importance of monitoring and reveal how adaptive approaches fail to deliver intended results when

and regulated actors with already constrained budgets.[355] When reducing administrative burdens is a priority, imposing even well-justified monitoring obligations can be difficult. New developments in information and sensing technologies may enable more comprehensive, less costly, and more effective monitoring in the near future.[356]

Second, even with effective monitoring systems, serious retrospective review requires more than just reporting data on what happened under the policy. Measuring policy impacts retrospectively requires comparing the actual policy to a counterfactual scenario of what the world would have been like without the policy. "It is no exaggeration to say that developing a credible counterfactual or baseline analysis is one of the most demanding aspects of a retrospective study."[357] Whenever these techniques are applied, methodological rigor and transparency are essential.

Third, agencies face (perhaps understandable) disincentives to conducting ex post IAs of their own policies. Retrospective review of past policies is time consuming, imposing opportunity costs on busy agency staff who are trying to carry out the new policies demanded by the legislature, executive, courts, and the public. Framing retrospective review more broadly—to study the full scope of impacts, and to learn from multiple policies about the

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monitoring is defective or absent. William H. Moir & William M. Block, *Adaptive Management on Public Lands in the United States: Commitment or Rhetoric?*, 28 ENVTL. MGMT. 141, 141 (2001) (arguing that monitoring is the crux of adaptive management and its weakest point); BYRON K. WILLIAMS ET AL., DEPARMENT OF THE INTERIOR, ADAPTIVE MANAGEMENT: THE US DEPARTMENT OF THE INTERIOR TECHNICAL GUIDE 12 (2d ed. 2009) (stating that "adaptive management is not possible without effective monitoring"). On the need for broad monitoring to ensure learning about full impacts and policy design, *see* Jonathan B. Wiener, *Towards an Effective System of Monitoring, Reporting and Verification, in* TOWARDS A WORKABLE AND EFFECTIVE CLIMATE REGIME 183-200 (Scott Barrett et al. eds., CEPR Press & FERDI ed. 2015), http://www.voxeu.org/content/towards-workable-and-effective-climate-regime.

355. Rebecca J. McLain & Robert G. Lee, *Adaptive Management: Promises and Pitfalls*, 20 ENVTL. MGMT. 437, 444 (1996).

356. Nicola Lettieri, *Computational Social Science, the Evolution of Policy Design and Rule Making in Smart Societies*, 8 FUTURE INTERNET 1, 4-6 (2016); Melanie Swan, *Sensor Mania! The Internet of Things, Wearable Computing, Objective Metrics, and the Quantified Self 2.0*, 1 J. SENSOR & ACTUATOR NETWORKS 217 (2012); Sujan Sarker et al., *Tradeoffs Between Sensing Quality and Energy Efficiency for Context Monitoring Applications*, *in* PROCEEDINGS OF 2016 INTERNATIONAL CONFERENCE ON NETWORKING SYSTEMS AND SECURITY (NSYSS) 73, 73-80 (2016), http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=7400699; Nicholas D. Lane et al., *A Survey of Mobile Phone Sensing*, 48 IEEE COMM. MAG. 140 (Sept. 2010); *Sensors and Sensitivity*, ECONOMIST (July 4, 2009), http://www.economist.com/node/13725679.

357. Morgenstern, *RFF*, *supra* note 24, at 2; *see also* ALDY, *supra* note 22, at 4; EC, BETTER REGULATION TOOLBOX, *supra* note 189, at 270 ("When evaluating EU legislation, it is particularly difficult to identify a robust counter-factual situation"); HM TREASURY, THE GREEN BOOK: APPRAISAL AND EVALUATION IN CENTRAL GOVERNMENT 45, 46-48 (2011); Coglianese, *supra* note 42, at 62-63.

accuracy of ex ante analyses—increases the social benefits of retrospective review but also heightens the cost on agency staff. Moreover, an ex post IA may demonstrate shortcomings in the ex ante IA and the initial policy choice, which may be awkward for the agency.

These considerations point to asking an outside body to conduct the ex post IA, or to conduct the broader learning reviews after the agency reports its own review of each rule.[358] Assigning retrospective review to an outside body would relieve the agency staff of some costs, while enabling the outside body to develop more consistent methodologies for counterfactual scenarios. And the outside body could use ex post analysis to promote learning about ex ante methodologies and about policy designs, by studying multiple policies and IAs from multiple agencies. This outside body might be an interagency working group, an oversight body (such as OIRA, GAO or CBO, or CEQ for EIAs), a panel of the NAS, a think tank, or a university research institute. Yet, it is the promulgating agency that likely has the best information and expertise on each past policy. Thus, there will be some need for ex post analysis of each policy by the agency, as well as for broader multi-impact multi-policy review by an outside body.

One measure to improve current ex post IA is to increase the transparency and access to information regarding both ex ante and ex post IA, so that outside groups can make better use of this information. The ex post RIA framework in the U.S. needs to move beyond the equivocal language in section 6(b) of EO 13,563 that provides: "retrospective analyses, including supporting data, should be released online whenever possible."[359] Publishing online the analytical and procedural steps and results of ex post RIA should be the norm with exceptions only in rare cases. Transparency is a core feature of EIA, and should be as well in RIA. A day after President Obama gave his first inaugural speech, he published a memorandum committing to creating "an unprecedented level of openness in Government."[360] Here, the

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358. We suggested this to OMB/OIRA in WIENER ET AL., *supra* note 350 (peer review comment on 2015 annual report). *See also* Wiener, *supra* note 46 (advocating national regulatory outcomes studies); WORLD BANK, RISK AND OPPORTUNITY: MANAGING RISK FOR DEVELOPMENT 278 (2013) (recommending that each country establish a National Risk Board to assess risks, resolve tradeoffs, and evaluate overall performance of existing policies).

359. (Emphasis added). *See* WIENER ET AL., *supra* note 350, at 3.

360. In the memorandum, Obama said:

> Transparency promotes accountability and provides information for citizens about what their Government is doing. Information maintained by the Federal Government is a national asset. My Administration will take appropriate action, consistent with law and policy, to disclose information rapidly in forms that the

Latin *maxim quod non est in actis non est in mundo* should be adapted and work as the guiding principle to promote accountability of ex post RIA requirements. It is not enough for agencies to report that they conducted a retrospective review; the content of that ex post analysis needs to be published. Outside experts, oversight bodies, and reviewing courts will then be able to assess the relation of the ex post review to full policy impacts, proposed rule revisions, better ex ante methodologies, and better policy designs.

With the same goal of improving transparency, the U.S. should have a central database aggregating information about the status of ongoing, planned, and the results of completed, ex post RIAs and EIAs, rather than obliging researchers to search for each IA separately at each agency. The information could be organized by agency, year, economic significance of the rule reviewed, and links to the online documents of the regulatory actions that precede and follow from the review. Here, the European Commission database offers a good example, including search functions and filters by year and policy domain of completed ex post evaluation.[361] The U.K. also offers a good model to emulate, with an online database containing similar search functions and filters and assembling all the information on ex ante and subsequent ex post RIA of primary and secondary legislation organized by each rule.[362] The U.S. could take a step further by linking to this proposed database the monitoring data that each agency collects throughout its programs and ex post IAs, and by building a continuous timeline of IAs through the policy cycle of project decision or rulemaking.

Another measure to improve ex post RIA in the U.S. system is to rethink and redesign criteria for selecting rules for ex post RIA. The logic informing the selection of which rules undergo a review should be similar to a CBA, assessing the net benefits of not only rule revision but also broader learning. This is intuitively captured by the principle of "proportionate level of analysis" in Europe and, analytically, by methods to calculate the value of information versus

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> public can readily find and use. Executive departments and agencies should harness new technologies to put information about their operations and decisions online and readily available to the public. Executive departments and agencies should also solicit public feedback to identify information of greatest use to the public.

Memorandum from President Barack Obama for the Heads of Executive Departments and Agencies (Feb. 24, 2009) (on file with the White House) (available at https://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment).

361. EC, *Smart-regulation Evaluation Search*, supra note 346.

362. *See U.K. Legislation*, NAT'L ARCHIVES, http://www.legislation.gov.uk (last visited Jan. 21, 2017).

the cost of information in decision science.[363] Thus, just as not every new rule requires a full ex ante RIA, and not every federal action requires a full EIA, so not every rule revision or existing rule should require a full ex post RIA. The point is to select those for full ex post analysis from which we will gain the most net benefits, including in learning how to improve ex ante analysis accuracy and policy design. Implementing simple rule revisions (to reduce the cost of the rule, but without a full ex post RIA) can make sense when the information costs are high and the learning benefits are low. The rules selected for ex post RIA should not necessarily be the same as the rules needing revisions. For ex post RIA to serve its learning function, the rules selected should be those for which the most value can be gleaned from comparing ex post to ex ante RIAs. These might include rules that are apparently successful (not in need of revision) as well as those that need revision. Purposive selection criteria applied to a larger sample of rules would enhance the opportunity to learn how to improve the accuracy of ex ante RIAs and learn which policy designs are associated with which outcomes. This broader learning-based ex post analysis of multiple policies and multiple impacts might then be best handled by an interagency group or other outside body, as noted above.

On the same logic of value of information, a good ex post RIA should take a more comprehensive look at not only administrative costs, but also full social costs, benefits and ancillary impacts (as required for ex ante RIAs under Circular A-4).[364] That said, the depth of analysis should be proportional to the significance of each impact combined with the uncertainty around its estimates and the opportunity to learn to improve such estimates.

Sensitivity analysis can also help in selecting existing rules for review, planning future triggers for review of new rules, and deciding the scope of each ex post RIA. The forecast of the effects of a new rule (or rule revision) and the projected baseline may have different ranges of uncertainty and valuations, influencing the ranking of alternatives in an ex ante RIA. Sensitivity analysis can help assess the relative importance of each input to the final ranking of alternatives across the same scale of valuations.

Agencies and/or other actors conducting ex post RIA could combine the purposeful selection criteria based on value of

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363. *See* Fumie Yokota & Kimberly M. Thompson, *Value of Information Literature Analysis: A Review of Applications in Health Risk Management*, 24 MED. DECISION MAKING 287-98 (2004); GRAHAM & WIENER, *supra* note 52, at 21; Wiener, *supra* note 108, at 477, 482, 487, 491 (on proportionate analysis in Europe); HOWARD RAIFFA, DECISION ANALYSIS: INTRODUCTORY LECTURES ON CHOICES UNDER UNCERTAINTY (1968).

364. *See* OMB, A-4, *supra* note 103.

information with a random selection of a representative sample of all rules.[365] This supplemental rule selection could capture aspects that might be overlooked in a standard value of information selection method, such as unintended consequences (unforeseen ancillary benefits and harms), inaccurate characterization of uncertainty over each input, and other factors that could bias the value of information calculus. A broader sampling approach could also be useful in learning how different policy designs such as instrument choice, implementation methods, and monitoring techniques may affect variation in regulatory success. Learning is central to both approaches, with lessons from ex post RIA leading to improvement in methods of ex ante RIA, more accurate estimates of costs and benefits associated with different policy designs, and hence better design of new rules. Another important advantage of rule selection for ex post RIA informed by calculating the value of information, and by a representative random sampling, is to correct the bias that seems likely to result from a selection based on stakeholder input or public nomination of rules for retrospective review. Although important, stakeholder views might focus agencies' attention on rules with high costs to specific constituencies, but might omit from ex post RIA those other rules that might have been more socially costly (to the diffuse public), more successful (more cost-effective, higher net benefits), and rules that have generated ancillary impacts on populations not organized into stakeholder groups,[366] each of which is quite important in testing and improving the accuracy of ex ante RIA.

Beyond the stages of ex ante and ex post analysis, an even more agile policy cycle can eventually evolve toward continuous adaptive monitoring and updating, at least for the most important impacts and design elements that warrant such an investment in ongoing analysis.[367] The selection of which rules, design elements, and impacts would deserve such continuous monitoring and adaptive re-evaluation will depend on the benefits of costs of obtaining and analyzing this information. Replacing the distinction

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365. For a discussion on the value and methods for studying representative samples of rules (rather than selecting only the costliest or most visible rules, which may yield biased inferences), *see* James K. Hammitt et al., *Precautionary Regulation in Europe and the United States: A Quantitative Comparison*, 25 RISK ANALYSIS 1215 (2005); Brendon Swedlow et al., *Theorizing and Generalizing about Risk Assessment and Regulation through Comparative Nested Analysis of Representative Cases*, 31 LAW POL'Y 236 (2009); Jonathan B. Wiener et al., *Better Ways to Study Regulatory Elephants*, 2 EUR. J. RISK REG. 311 (2013).

366. *See* WIENER ET AL., *supra* note 350, at 5.

367. *See id.* at 6. For a more complete analysis, *see* Daniel L. Ribeiro, *Adaptive Regulatory Impact Assessment: Beyond The Foresight-Hindsight Divide* (SJD Dissertation, Duke University School of Law, forthcoming 2017).

between ex ante and ex post RIA with an ongoing system of adaptive RIA (ARIA) would be an ambitious step. ARIA would work by combining foresight and hindsight as a strategy and tool of continual regulatory management. Core features of ARIA would include the comprehensive quantification of effects, implementation strategies conducive to counterfactual analysis (e.g., with pilot projects and other forms of mechanism experimentation[368]), continuous monitoring systems of indicators selected with the use of sensitivity analysis and value of information calculation, and periodic adjustments. ARIA would provide a dynamic trigger for regulatory adaptation, potentially leading to continually adaptive rules. External audits could add confidence to an ARIA system, randomly selecting rules (stratified by ranges of expected costs and benefits) for validating the analyses—with the same or new information. By embracing uncertainty and adaptation, ARIA could dispel one significant negative incentive of ex post RIA: instead of the idea that a policy was either right or wrong, ARIA would instill the idea that policies are "perpetual betas," always learning about changing conditions and ready to adapt when necessary.[369]

Rethinking ex ante and ex post RIA systems provides a valuable opportunity to reflect on the possibility of integrating different evidence-based tools in a tiered deployment of different degrees of IA to different levels of policy.[370] There is no one-size-fits-all type of IA that must be applied everywhere. Prospective ex ante IA is a major advance over no IA, but ex ante IA needs to be tailored to ensure it yields benefits in policy improvements that justify its costs and delays. Retrospective ex post IA is a major advance to supplement ex ante IA, but again needs tailoring to ensure its net benefits. Retrospective review that focuses only on administrative cost and on one rule at a time is too narrow to gain the benefits of learning to improve ex ante forecasts and policy designs, but that does not mean that full ex post IA must be applied everywhere. Meanwhile, applying IA only to agency rules may be missing opportunities to learn at other stages of the policy cycle, such as downstream IA of enforcement and upstream IA of primary legislation (requiring some selection process for which pending

368. *See* Jens Ludwig, Jeffrey R Kling & Sendhil Mullainathan, *Mechanism Experiments and Policy Evaluations*, 25 J. ECON. PERSP. 17-38 (2011); *see also* Greenstone, supra note 47; Lawrence E., McCray, Kenneth A. Oye & Arthur C. Petersen, *Planned Adaptation in Risk Regulation*, 77 TECH. FORECASTING & SOC. CHANGE 951 (2010).

369. *See* TETLOCK & GARDNER, *supra* note 6, at 190 (explaining how "superforecasters" are perpetual betas, i.e., incorporating a cycle of "try, fail, analyze, adjust, try again.").

370. Wiener & Ribeiro, *supra* note 3.

legislative proposals warrant analysis, and some expert body to conduct this analysis). The concept and practice of tiering, employed in EIA, could be applied to RIA.[371] Governments could experiment with integrated systems of IAs, providing feedback data on the entire policy cycle, from legislation to regulation to enforcement actions.

Regulatory oversight bodies, such as U.S. OMB/OIRA and the EU Regulatory Scrutiny Board, play a key role in ensuring the quality of RIA systems, and in narrowing the gap between formal adoption and implementation of both ex ante and ex post RIA.[372] The task is analytically and institutionally difficult, and agencies can sometimes avoid oversight in various ways.[373] To improve the quality of ex post RIA in the U.S., OIRA could implement several measures. First, it could promote transparency and open access to ex post RIA content and data by requiring that ex post RIAs be made publicly available. Second, OIRA (or the President in a new EO) could require that every important new proposed rule include a plan for how the regulation will be monitored, how data will be gathered and shared, and when a subsequent retrospective review will be undertaken.[374] Third, OIRA could supplement Circular A-4 regarding ex ante RIA with new guidelines on selecting rules for, and methods for conducting, ex post RIA.[375] These OIRA guidelines for retrospective review should highlight the need to assess not only administrative costs but rather a comprehensive scope including full social costs, benefits, and ancillary impacts (unintended benefits and harms). OIRA could follow the same model as the U.K. and EU guidelines and combine in a single document its guidelines for ex ante and ex post RIA. Fourth, OIRA itself could include, in its annual reports to Congress on the costs and benefits of rules, not just the aggregate sum of their ex ante estimates (as OIRA has traditionally reported), but also the findings of ex post analyses on those same rules, how those ex post analyses compare to the ex ante estimates, and what can be learned about the accuracy of ex ante methodology and the history of actual implementation.[376] If the ex

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371. *Id.*

372. *See* Wiener, *supra* note 2; *see also* Jonathan B. Wiener & Alberto Alemanno, *Comparing Regulatory Oversight Bodies in the US and EU: The US Office of Information and Regulatory Affairs and the EU Regulatory Scrutiny Board*, in COMPARATIVE ADMINISTRATIVE LAW (Edward Elgar 2d ed. forthcoming 2017).

373. *See* Nina A. Mendelson & Jonathan B. Wiener, *Responding to Agency Avoidance of OIRA*, 37 HARV. J.L. & PUB. POL'Y 447 (2014).

374. *See supra* note 351 (regarding Carter EO 12,044 and Bill S.1817 in 114th Congress, on prospective plans for retrospective review).

375. *See* Coglianese, *supra* note 42, at 61-62; WIENER ET AL., *supra* note 350, at 7.

376. WIENER ET AL., *supra* note 350, at 2-3; *see also supra* note 47.

post information is unavailable, this itself is valuable to report. Fifth, when exercising its oversight of ex ante RIAs of agencies' proposed rule revisions, OIRA could better scrutinize how agencies report the findings of the ex post RIAs (if any) of their prior rules—which in theory should inform the problem definition and the baseline for the new proposed rule revision.[377] Sixth, OIRA could convene an interagency group, a NAS panel, or another outside group, to conduct broader retrospective reviews of multiple rules and multiple ex ante RIAs (selected using the value of information and representative sampling methods discussed above), in order to test the accuracy of ex ante methodologies and the actual performance of policy designs. OIRA could cooperate with its counterparts in Europe and elsewhere to share learning on ex post evaluation methods. Findings from these broader reviews might be used by OIRA to adjust estimates in ex ante RIAs, and to revise the guidance in Circular A-4. OIRA could seize the opportunity offered by retrospective review to learn from hindsight how to improve prospective foresight.

GAO should continue to play its key role in providing an extra layer of external oversight of the RIA system by investigating the real practice of ex ante and ex post RIA. GAO should not take at face value the agencies' survey responses or the information in progress reports published under EO 13,563; in addition, GAO should seek and report the findings documented in ex post RIA reports (or, at the very least, in the problem definition section of ex ante RIAs of rule revisions), as already called for under EO 13,563. GAO should emphasize the need for transparency, with open and easy access to documentation of ex post RIA processes. In this regard, GAO could also investigate and call attention to how an improved U.S. database of ex ante and ex post RIAs could be developed, borrowing from the EU and U.K.[378]

Independent external research is crucial to promote accountability, transparency, and reduce the adoption-implementation gap in IA systems. Researchers should be alert

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377. *See* WIENER ET AL., *supra* note 350, at 6.

378. In the U.S., there is not, in normative requirements of practice, standardization of a central database of RIA. Part of the RIA information is published in the NPRM or in the Final Rule, in the Federal Register and in a web page in the Regulations.gov website. These web pages are identified by a RIN number, but there are rules without assigned RIN. The remaining RIA information is scattered in a folder of "supporting documents," across different files, with different names (sometimes "economic analysis," sometimes "draft RIA"). There are rules with different files for different types of impacts; and in some cases there are many other RIA files, of other rules, in the same folder. On the other side of the Atlantic, the U.K. and EU have central databases of RIAs, with a single digital file for each RIA. RIAs follow a standardized format (for name and content—at least the executive summary). In the EU database, opinions from oversight bodies are also published in the same database.

to the possible vagueness of terms used to indicate retrospective regulatory "review," and should be careful when designing survey questionnaires to assess implementation of ex post RIA.[379] Surveys used to assess the practice of IA should carefully distinguish the meaning of terms such as "review," "evaluation" and "RIA," and should inquire about the actual content of I. Surveys and interviews, if used, should be complemented by descriptions of what documented evidence was analyzed to validate the survey results.[380]

The evolution of ex post IA systems offers the chance to experiment with, and make relevant comparisons among, different institutional designs. Different approaches to who conducts ex post IA could be tested, both within the U.S. federal government, and through interstate and international variation. As we have suggested above, ex post IA could be performed by agencies, oversight bodies (such as OIRA, GAO and CBO, or CEQ for EIA), interagency working groups, external contractors, panels of the NAS, think tanks, and academics.[381] Agencies and the offices within them that promulgated the original rule may have the most information about the rule's effects, but they may also face incentives to avoid spending their time doing an ex post RIA amidst other pressing demands, and to avoid criticizing their original RIA and rule. External researchers may have better incentives to conduct broader arrays of ex post RIAs on multiple rules and multiple impacts, to test the accuracy of ex ante RIA methods, but they may have less information about the rule's details than would agency staff.

More broadly, the IA system could benefit significantly from the creation of a transnational network of experts with access to key IA data, building toward a global policy laboratory.[382] Testing different approaches across borders would enhance opportunities for comparing the IA methods (ex ante and ex post), counterfactual scenarios, policy designs, and institutional arrangements for the conduct and oversight of such reviews. It would also ease the path for new adopters (in particular developing countries) of ex ante and ex post IA systems by reducing information costs and improving accuracy. If well developed, retrospective review can be a powerful

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379. *See supra* notes 226 and 296.

380. *See* Radaelli, *supra* note 218, at 927. The OECD 2015 study itself acknowledges that in-depth country reviews are necessary to complement the findings. *See also* ARDNT ET AL., *supra* note 224, at 9-10, 12-13.

381. *See* WIENER ET AL., *supra* note 350, at 7-8.

382. Jonathan B. Wiener & Alberto Alemanno, *The Future of International Regulatory Cooperation: TTIP as a Learning Process toward a Global Policy Laboratory*, 78 LAW & CONTEMP. PROBS. 103-36 (2015); Wiener, *supra* note 108, at 516.

tool to promote a learning, adaptive, and more cost-effective path to international regulatory cooperation.[383]

VI. CONCLUSION

Good governance requires both foresight and hindsight. Back in the 1770s, after taking Benjamin Franklin's advice on how to make a good decision, Joseph Priestley decided to accept the offer made by Lord Shelburne, becoming his adviser and tutor of his children.[384] One of the attributes that seemed to matter most to Priestley before his decisions was the degree to which he would be able to conduct his own scientific research while working as a tutor. While working under Lord Shelburne, Priestley published five of the six volumes of his pneumatic chemistry studies, announcing the discoveries of ammonia, sulphur dioxide, nitrous oxide, nitrogen dioxide, and oxygen.[385] The relationship lasted for about seven years, until Priestley decided to leave and move to Birmingham.[386] One cannot help but wonder if Priestley, having used Franklin's Prudential Algebra to make his initial decision, applied the method again to change his plans, and whether Priestley compared the experience ex post with how he had foreseen it ex ante. Evidently, Priestley looked back ruefully, remarking in hindsight that "[r]eflecting on the time that I spent with Lord Shelburne, being as a guest in the family, I can truly say that I was not at all fascinated with that mode of life."[387] Perhaps, from his retrospective review, Priestley learned valuable lessons for making future decisions.[388] In other words, he may have improved his foresight from hindsight.

Today, applying the Franklin-Priestley logic, environmental regulation is going retro. Governments, stakeholders, and researchers are seeking not only good ex ante analysis, but also ex post evaluation. Following the diffusion of ex ante IA systems, ex post IA continues to advance and diffuse across regulatory systems. In our view, retrospective review is needed not just to revise particular rules, and not just to reduce their costs, but to deal with the inevitable march of change and the inescapably uncertain character of forecasting the future effects of policies. The normative criteria for ex ante IA—thinking ahead, considering intended and

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383. *Id.*

384. ROBERT E. SCHOFIELD, THE ENLIGHTENMENT OF JOSEPH PRIESTLEY: A STUDY OF HIS LIFE AND WORK FROM 1733 TO 1773, at 372 (1997).

385. *Id.* at 372.

386. *Id.*

387. RUTT, *supra* note 10, at 205.

388. There is also some evidence that this might have been the case, as Priestley narrates in one of his letters that, after leaving Lord Shelburne, he received a second offer to engage again in his service—which Priestley declined. *Id.* at 207.

unintended consequences, improving accountability, and promoting greater net benefits—should in turn require monitoring and reassessing policy decisions by comparing prospective estimates to retrospective observations. Yet, ex post IA has advanced more on paper than in implementation. Ex post EIA is scant. Ex post RIA is growing, but remains focused narrowly on revising individual rules to reduce specific costs, rather than on learning from multiple rules and multiple impacts to improve the accuracy of ex ante IA and to design better policies. It also remains hidden from full view, as retrospective reviews are often reported but not released.

Complementing ex ante IA with ex post IA has the potential to advance a continual learning process, in which the ability to foresee the future consequences of today's policy decisions becomes stronger via learning from past efforts. Ex post IA has been sought by presidential orders and statutory mandates for decades, yet remains elusive. There are reasons to expect better results with increased transparency, enhancements to analytic approaches, improved roles for oversight bodies, study of multiple impacts and multiple rules to test and improve the accuracy of ex ante IAs and policy designs, a greater role for outside experts, and networks to experiment and compare findings across jurisdictions. Through these and other steps we may yet learn better foresight from hindsight.