Article

Existing Railroad Oversight and Proposed Policy Change: An Application of "Results-Based Regulation"

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I. INTRODUCTION

For 50 years, US railroad behaviors were tightly controlled by regulatory processes that eventually emerged as the dominant federal model for other network industries.[1] However, by the 1970s many US railroads had either failed financially or were near failure.[2] Faced with the economic implications of this possible collapse, policy-makers replaced traditional rail regulation with oversight that relies on federally established benchmarks, third-party enforcement, broader agency input, and reduced regulation of other railroad activities.[3] This reformed regulatory regime has changed little for 35 years.[4]

Even though rail industry oversight has not changed appreciably, it has constantly been tended to. In conjunction with the economic freedoms granted to railroads, industry outcomes, including pricing, service availability, service quality, and financial performance have been continuously scrutinized. Further, this oversight has come through a widened range of agencies and jurisdictions including congressional committees,

1. *See* Paul Dempsey, *The Rise and Fall of the Interstate Commerce Commission: The Tortuous Path from Regulation to Deregulation of America's Infrastructure*, 95 MARQ. L. REV. 1151, 1163 (2012); John Mayo, *The Evolution of Regulation: Twentieth Century Lessons and Twenty-First Century Opportunities*, 65 FED. COMM. L.J. 119, 121 (2013).

2. *See* ROBERT GALLAMORE & JOHN MEYER, AMERICAN RAILROADS: DECLINE AND RENAISSANCE IN THE TWENTIETH CENTURY 130-58 (2014); RUSH LOVING, THE MEN WHO LOVED TRAINS: THE STORY OF THE MEN WHO BATTLED GREED TO SAVE AN AILING INDUSTRY 1-24 (2006) for extensive discussions of the Post-WWII rail industry collapse.

3. *See infra* p. 24, the benchmarks were established by statute within the Railroad Revitalization and Regulatory Reform Act of 1976, Pub. L. No. 94-210, §§ 101(a)(2)-(3), (5), 101(b)(6), 202(c)(9)-(d), 90 Stat. 31, 33-36 (1976) and Staggers Rail Act of 1980, Pub. L. No. 96-448, §§ 2(4), 101(a), 302(a), 94 Stat. 1895, 1895-98, 1934-35 (codified as amended in scattered sections of 49 U.S.C. (2015)). As an example of third-party enforcement, shippers continue to pursue antitrust enforcement in relation to fuel surcharges levied by railroads. *See In re* Rail Freight Fuel Surcharge Antitrust Litigation, 725 F.3d 244, 247 (D.C. Cir. 2013). Similarly, federal agencies other than those charged by statute with rail industry economic oversight now periodically involved in rail issues. For example, the U.S. Dep't of Justice played a major role in the proposed (but rejected) merger between the Southern Pacific and Santa Fe Railroads. *See* Russell W. Pittman, *Railroads and Competition: The Santa Fe/Southern Pacific Merger Proposal*, 39 J. INDUS. ECON., Sept. 1990, at 25.

4. *See* GALLAMORE & MEYER, *supra* note 2, at 159-90 and 218-56 (several earlier pieces of legislation concluded with the passage of the Staggers Act in 1980. The only substantial statutory changes to federal railroad regulation came through the passage of the Interstate Commerce Termination Act of 1995, which eliminated the Interstate Commerce Commission and transferred its responsibilities to other federal agencies or to the newly created Surface Transportation Board).

executive branch investigations, Interstate Commerce Commission (ICC) and Surface Transportation Board (STB) proceedings, and through private litigation adjudicated under US antitrust law.[5] Through these actions, policy-makers have routinely evaluated rail industry outcomes and also considered proposals to modify the more general regulatory framework.[6]

The most recent federal effort in the ongoing series of rail industry reviews was performed at the direction of Congress by a select committee of academic economists under the supervision of the National Academies of Science (NAS).[7] Committee members were directed to study and make recommendations regarding (1) service quality, availability and pricing, (2) future demands for railroad services and capacity, (3) the effectiveness of policies that balance the need for railroad investment with the rates paid by shippers, and (4) the future role of the STB.[8]

In response, the NAS committee report provides extensive statistical analyses in each of these areas and also includes recommendations for significant changes in the methods of economic oversight.[9] These recommendations include changes to the gate-keeping mechanism through which shippers access the rate appeal process, the substitution of binding arbitration in place of the current method of rate adjudication, and the transfer of future merger evaluation responsibilities from the STB to the U.S. Department of Justice.[10]

While not envisioned as such, the pattern of rail industry governance, including the most recent NAS activity largely adheres to the tenets of an analytical construct formalized by John Mayo in 2013.[11] This framework, which Professor Mayo refers to as "results-based regulation," or RBR, describes a regulatory process that is, in principle, insulated from philosophical or political influence and which places reduced emphasis on theoretical ideals.[12] Instead, RBR relies heavily on data-driven observation as the foundation for policy choice sets and predicted economic outcomes.[13] By design, RBR is concentrated on the *attainable*.[14]

The current paper explicitly links the ongoing course of railroad in-

5. *See supra* text accompanying note 3.

6. *See supra* text accompanying note 3.

7. *See* Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, Pub. L. No. 109-59, § 9007, 119 Stat. 1145, 1925 (2005).

8. *See* TRANSP. RESEARCH BD., SPECIAL REPORT 318: MODERNIZING FREIGHT RAIL REGULATION vii (2015).

9. *Id.*

10. *Id.* at 3-11.

11. *See generally* Mayo, *supra* note 1, at 137-138, 140-141.

12. *Id.* at 121 and 135.

13. *Id.* at 122.

14. *Id.* at 155-56.

dustry governance to the notion of results-based regulation with three goals. The first is to demonstrate that the seeming lack of policy activity related to freight railroading does not represent policy neglect. Instead it has resulted from the very regular evaluation of available empirics and from caution regarding the gains attainable through alternative policies. Second, through a further application of the RBR construct, the current analysis evaluates the NAS committee's proposals for improving this oversight on a forward-going basis. Finally, this analysis provides a rich opportunity to consider the ease and usefulness of applying results-based regulation and, as such, may instruct the use of this framework in other settings.

The remainder of the paper is organized as follows: Section 2 briefly revisits *the railroad problem* – that is the institutional history, technological characteristics, and firm behaviors that, in combination, have vexed policy-makers since the late 19th century. It also summarizes the history of rail industry regulation, the events that led to regulatory change, and the structure of the post-Staggers regulatory environment. Section 3 offers a general description of results-based regulation and compares the post-Staggers regulatory course to what might be expected under an explicitly designed results-based regime. This is followed in Section 4 by the development of a results-based scorecard that evaluates post-Staggers outcomes based, in part, on the empirics provided within the recent NAS analysis. Section 5 provides a brief evaluation of the NAS committee's proposals for regulatory modernization. Concluding thoughts are offered in Section 6.

II. Background

At various times, the "railroad problem" has taken on many meanings.[15] However, specific railroad policy issues have most often been symptoms of a set of perennially troublesome technological and institutional characteristics.[16] Three attributes in particular pose the greatest challenges.[17] First, the persistent influence of economies of density makes it impossible for some rail-served route segments to efficiently support more than a single rail carrier.[18] Second, the reliance of otherwise distinct

15. In the 19th century, debilitating railroad rate instability and industry safety were the principal rail-related issues. By the turn of the 20th century, these concerns had been more or less replaced as the foremost policy concern by the still-pervasive use of confidential customer rebates. Like most industries, rail carrier financial solvency was of paramount concern during the Great Depression, and financial viability, this time as a result of intermodal competition, re-emerged during the 1960s and 1970s. *See* Gallamore & Meyer, *supra* note 2.

16. *See* William G. Waters, *Evolution of Railroad Economics*, 20 Res. Transp. Econ. 11, 22, 31 (2007).

17. *Id.* at 49.

18. *Id.*

freight-rail routes on common or shared network elements and services produces common or shared costs that cannot rationally be made incremental to any particular service.[19] Finally, the historical reliance on integrated private sector development, ownership, and operation of freight railroad facilities constrains the set of institutional alternatives available to policy-makers.[20]

The 19th century response to the "railroad problem" was to undertake what was then the little-used practice of economic regulation.[21] Formally, the process began with the passage of the Interstate Commerce Act in 1887 and included the creation of the Interstate Commerce Commission.[22] The authority and scope of the nascent ICC was soon bolstered by an early 20th Century set of progressive era antitrust and regulatory statutes that resulted in a larger, more powerful ICC.[23] By the midpoint of the 20th century, ICC rate governance had grown into a colossal process.[24]

The remarkable decline of the US railroad industry between 1950 and the early 1970s is attributed to many causes.[25] Without evaluating these explanations, it is sufficient here to note that rail's share of intercity freight fell by more than one-third (62 to 40 percent) between 1940 and 1970 and railroad returns on investment fell by more than one-half (4.2 to 2.0 percent) over the same period.[26] By the early 1970s, bankrupt railroads accounted for more than 21 percent of total rail trackage.[27] This free-fall was punctuated by the 1970 bankruptcy of the Penn Central.[28]

The federal response to the unfolding railroad crisis included four major legislative acts spread over a decade that culminated with the pas-

19. *Id.* at 54.

20. *Id.* at 14-15, 19-20.

21. *See* Edward Glaeser & Andrei Shleifer, *The Rise of the Regulatory State,* 41 J. ECON. LIT. 401, 401-08 (2003).

22. Interstate Commerce Act of 1887, Pub. L. No. 49-41, § 4, 24 Stat. 379 (1887).

23. For a summary of progressive era legislation affecting the ICC's powers *see* Dempsey, *supra* note 1, at 1163-66.

24. For an analysis of the ICC rate-making processes between World War II's end (1945) and the first influences of deregulation (1975), *see* James MacDonald, *Railroads and Price Discrimination: The Roles of Competition, Information, and Regulation,* 43 REV. INDUS. ORG. 85, 93-96 (2013).

25. JOSEPH DAUGHEN & PETER BINZEN, THE WRECK OF THE PENN CENTRAL 48-49 (2d ed. 1999).

26. For data compiled by the Association of American Railroads, *see* ASS'N OF AM. R.R.S, THE IMPACT OF THE STAGGERS RAIL ACT OF 1980 1 (May 2015), http://www.aar.org/BackgroundPapers/Impact%20of%20the%20Staggers%20Act.pdf. For further data *see* Marc Scribner, *Slow Train Coming? Misguided Economic Regulation of U.S. Railroads Then and Now,* 1 COMPETITIVE ENTERPRISE INST. 16 (2013), http://cei.org/sites/default/files/Marc%20Scribner%20-%20Slow%20Train%20Coming.pdf.

27. ASS'N OF AM. R.R.S., *supra* note 26.

28. DAUGHEN & BINZEN, *supra* note 25, at 12.

sage of the Staggers Act in 1980.[29] These policy changes were not philosophically driven.[30] Instead, they were simply anxious actions taken to avert a seemingly inevitable industry collapse that might have otherwise led to the nationalization of US railroads.[31] Regulatory reform largely abandoned the ideal of thoroughgoing federal control.[32] Nonetheless, the new regulatory environment retained the promise of effective competition through residual oversight.[33] Still, Staggers' muted allegiance to competition or expression of other concerns was eclipsed by an unmistakable desire for a financially viable, self-sustaining private sector rail system.[34]

The Staggers Act mandated more expeditious handling of both railroad mergers and service or route abandonments, but its most consequential provisions were contained in the Title II language that relaxed federal rail rate governance.[35] Staggers dismantled the existing ICC ratemaking structure and replaced it with a process wherein railroads are largely free to establish both published and confidential freight rates with little *direct* federal involvement except in response to shipper complaints.[36]

In exchange for rate-setting freedoms, the railroads were largely stripped of their ability to collaborate when setting rates.[37] In application,

29. The Rail Passenger Service Act of 1970, Pub. L. No. 91-518, §§ 301, 401, 84 Stat. 1327, 1330, 1334 created Amtrak and freed freight railroads of most passenger obligations. The Regional Rail Reorganization (3R) Act of 1973, Pub. L. No. 93-236, §§ 701(b), 716 (a)-(d), 87 Stat. 985, 986, 994 (codified as amended at 45 U.S.C. §§ 741-797), which provided interim funding for bankrupt northeastern railroads, formed the United States Railway Association ("USRA") to create the system plan that would be Conrail, and provided for the disposition of non-Conrail railroad assets. The Railroad Revitalization and Regulatory Reform Act of 1976, Pub. L. No. 94-210, §§ 801(a)(2)-(3), 802(4), 822(h)(3)(A), 90 Stat. 33 (codified as amended at 45 U.S.C. §§ 801-856), implemented the final Conrail plan, provided Conrail and Amtrak funding, and began the process of deregulating surviving freight railroads. Finally, Staggers Rail Act of 1980, Pub. L. No. 96-448, §§ 201, 208, 228, 402, 94 Stat. 1895, 1898, 1908, 1931-34, 1941-45 (codified as amended in scattered sections of 49 U.S.C.), substantially relaxed federal governance of railroad rates, contracting, mergers, and abandonments.

30. The Staggers Act's passage was overwhelmingly bipartisan. *See* Jeffrey Macher, John Mayo & Lee Pinkowitz, *Revenue Adequacy: The Good, the Bad, and the Ugly*, 41 TRANSP. L.J. 86, 94 (2014).

31. For a more complete description of the policy considerations that motivated both the 4R and the Staggers acts, *see* PAUL MACAVOY & JOHN SNOW, RAILROAD REVITALIZATION AND REGULATORY REFORM 4-5 (1977). *See* DAUGHEN & BINZEN, *supra* note 25, for popular insights into the near-collapse of the railroad industry.

32. *See* Mark Burton, *Railroad Deregulation, Carrier Behavior, and Shipper Response: A Disaggregated Analysis*, 5 J. REG. ECON. 417, 417 (1993).

33. *Id.* at 433.

34. The actual language in the statute states: "The purpose of this Act is to provide for the restoration, maintenance, and improvement of the physical facilities and financial stability of the rail system of the United States." Staggers Rail Act § 3.

35. *Id.* §§ 201, 228, 402.

36. *Id.* § 219.

37. *Id.*

Staggers effectively eliminated the rate bureaus through which prices had been collectively negotiated and, to some extent, also reduced the industry's exemption from antitrust enforcement.[38] As Sagers documents, even now, the railroad industry does not fall under the full weight of antitrust enforcement.[39] By far, however, the most relied upon, studied, and litigated protection afforded shippers is found in Title II of Staggers, the section of the Act that provides a regulatory remedy for shippers' rate complaints.[40]

In most cases, the rate adjudication process can only be initiated by an outside complaint[41] Once underway, the overall process hinges on an evaluation of "market dominance" as defined within the statute and applied by the STB (the ICC's successor agency).[42] If the carrier is found to be market dominant, issue rates are then evaluated for "reasonableness."[43] If they are found to be unreasonable, the STB can impose corrective measures.[44]

The evaluation process first involves the calculation of a revenue-to-variable cost ratio (R/VC) based on observed rates and estimated shipment costs.[45] If the resulting ratio (expressed as a percentage) is less than or equal to 180 percent, it is treated as incontrovertible evidence of non-

38. *Id.*

39. Specifically, (a) railroad mergers are under the exclusive jurisdiction of the Surface Transportation Board ("STB") and are not subject to Department of Justice approval; (b) collaboration in the determination of rates is still permitted if directed and approved by the US Secretary of Transportation; (c) private parties may not sue for any antitrust injunction under Section 16 of the Clayton Act and are also barred by the *Keogh* or "filed rate" doctrine from money damages where the gravamen concerns rates regulated by the government; and (d) while Section 5 of the FTC Act applies to railroads, it can only be applied by the STB. *See* Christopher Sagers, *Competition Come Full Circle? Pending Legislation to Repeal the US Railroad Exemption*, GCP: THE ANTITRUST CHRON. 3-4 (2009).

40. Staggers Rail Act § 201.

41. *Id.*

42. *Id.* § 202.

43. *Id.* § 201.

44. As part of an ongoing attempt to expedite rate challenges, the STB has often elected to combine the evidentiary portion of market dominance determinations and the adjudication of rate reasonableness into a single process. *See* Market Dominance Determinations—Product and Geographic Competition, 3 S.T.B. 937 (1998).

45. Cost estimates are prepared through the application of the STB's Uniform Rail Costing System ("URCS"). SURFACE TRANSP. BD. INDUSTRY DATA, ECONOMIC DATA: URCS (Oct. 2, 2015), http://stb.dot.gov/stb/industry/urcs.html. ("URCS evolved from the Interstate Commerce Commission's ("ICC") railroad general purpose costing method - Rail Form A ("RFA"). RFA was developed by the ICC in 1938. Congress called for revision to RFA in the 1970's. URCS was developed in the late 1970's and early 1980's and review by the Railroad Accounting Standards Board ("RAPB"). URCS was adopted by the ICC in 1989 in Ex Parte No. 431 as the ICC's general purpose costing system and the ICC termination Act of 1995 retained the provision that the market dominance determination be base on URCS costs.")

dominance and the proceeding is ended.[46] If the R/VC is greater than 180 percent, the process moves to the next stage - the qualitative evaluation of competitive alternatives available to the complainant.[47] Initially, these alternatives included intramodal, intermodal, product, and geographic substitutes.[48] However, in a 1998 decision, the STB eliminated product and geographic substitutes from consideration.[49] If the qualitative assessment further confirms market dominance by the carrier, the process moves to a determination of whether or not the rates for the issue traffic are reasonable or whether they reflect the abuse of market power.[50]

Prior to 1996, the only real basis for evaluating the issue rates was their comparison with fully developed "stand-alone" costs (SAC) estimated for a hypothetical rail operation that includes the transportation of the issue traffic.[51] Baumol and Sidak and Johnstone summarize the economic logic that underpins this evaluative process.[52] Essentially, based on a contestable markets framework, the stand-alone cost, in combination with earnings that do not exceed the competitive cost of capital, represents a would-be competitive threshold.[53] If these constraints are binding, relatively unsupervised carrier pricing will provide outcomes that are equivalent in economic efficiency with regulated prices established through a more rigorous application of Ramsey pricing.[54] This paradigm

46. Staggers Rail Act § 202.

47. *Id.* § 205; *see also* RICHARD D. STONE, THE INTERSTATE COMMERCE COMMISSION AND THE RAILROAD INDUSTRY: A HISTORY OF REGULATORY POLICY 120 (1991).

48. *See* Market Dominance Determinations—Product and Geographic Competition, *supra* note 44, at 1.

49. *Id.* at 8.

50. *Id.*

51. The use of "stand-alone" to describe the costing process typical to these proceedings is, perhaps, misleading. The costs used for comparison are not the stand-alone costs attributable to the issue traffic. Estimating the transportation cost incurred in the movement of this traffic in isolation, would require the specific treatment of cost elements shared with other freight traffic that relies on common facilities or services. To avoid this requirement without ignoring common costs altogether, the issue traffic can be bundled with other system traffic that shares common network elements, so that the resulting "stand-alone" cost is actually the stand-alone cost of the bundled outputs. The STB does not prescribe which traffic is included or excluded from the set of bundled services. That determination is made by the complainant. However, its decision in this regard is subject to challenge by the subject carrier. *See* Coal Rate Guidelines – Nationwide, 1 I.C.C. 2d 520, 544 (1985) aff'd sub nom. Consolidated Rail Corp v. United States, 812 F.2d 1444 (3d Cir. 1987).

52. *See* WILLIAM BAUMOL & J. GREGORY SIDAK, TRANSMISSION PRICING AND STRANDED COSTS IN THE ELECTRIC POWER INDUSTRY 37-39, 95-97 (1995); Anthony Johnstone, *Captive Regulators, Captive Shippers: The Legacy of McCarty Farms*, 70 MONT. L. REV. 239, 248 (2009). The Baumal and Sidak discussion is centered on electric utility industry regulatory reform. Johnstone's explanation is within the context of the famed *McCarty Farms* case. Similar explanations are available within the context of other post-Staggers rate proceedings. *See* PPL Mont., LLC v. Surface Transp. Bd., 437 F.3d 1240, 1245 (D.C. Cir. 2006).

53. BAUMOL & SIDAK, *supra* note 52.

54. *Id.*

was originally developed by the ICC in the form of what it referred to as *Constrained Market Pricing* (CMP).[55]

A fully developed SAC analysis, as specified by the STB, is costly and time consuming.[56] Not surprisingly, shippers complained that these costs and process durations are impediments to statutory enforcement when case values are relatively low.[57] As a consequence, in 1996, the STB adopted a set of simplified procedures that were to be available to shippers in some cases.[58] However, for more than a decade, these simplified procedures went unused.[59] Accordingly, in 2007, the STB adopted a further simplified, three-tiered analytical structure that includes two less demanding processes that may be substituted in place of a full SAC analysis, depending on the size of the petitioner's claim.[60]

To date, shippers have initiated 49 rate reviews since the STB's creation in 1996.[61] Of these, 11 resulted in findings for shippers, ten favored rail carriers, 28 complaints were settled or withdrawn without decision, and three have yet to be resolved.[62] A summary of these rate reviews is available through the STB.[63]

III. Current Rail Industry Governance from a RBR Perspective

Both this paper's title and introduction suggest that the regulatory regime applied to the U.S. railroad industry over the past three decades is an example of what John Mayo has called *Results-Based Regulation* (RBR). RBR is a pragmatic framework for measuring regulatory accom-

55. *See* Coal Rate Guidelines—Nationwide, *supra* note 51, at 521-23.

56. Over time, estimates of the cost associated with SAC-based rate challenges have varied. However, the recent NAS report accepts an earlier GAO estimate of "millions" as representative. *See* Phyllis F. Scheinberg, U.S. Gen Accounting Office, GAO/RCED-99-46, Railroad Regulation: Current Issues Associated with the Rate Relief Process, 45-49 (1999).

57. *See* Rate Guidelines - Non-Coal Proceedings, S1 S.T.B. 1004, 1049 (1996).

58. *Id.* at 1048-50.

59. *See* Simplified Standards for Rail Rate Cases, S.T.B. Ex Parte No. 646 (Sub-No. 1), *1, *2 (Sept. 4, 2007).

60. The full SAC analysis is the procedure of choice and is mandated for evaluating the largest of rate reasonableness claims. A "Simplified SAC" analysis is permitted for use in evaluating claims of a lesser monetary value. In cases of the smallest disputes, a "Three Benchmark" methodology that relies primarily on R/VCs and the Revenue Shortfall Allocation Method (RSAM) is allowed. The RSAM measures the carrier-specific markup necessary to account for the difference between actual carrier revenues and the revenues the STB determines to provide an adequate return on capital. *See id.* at *3-4, *6.

61. Surface Transp. Bd., *Summary of Results of Freight Rail Rate Challenges at the Surface Transportation Board,* Surface Transp. Bd. (June 16, 2015), http://www.stb.dot.gov/stb/industry/Rate_Cases.htm.

62. *Id.*

63. *Id.*

plishment and evaluating forward-looking policy alternatives.[64] Toward these ends, it emphasizes observable, commonly valued market outcomes and ongoing vigilance rather than philosophical objectives or adherence to theory.[65]

Professor Mayo's exposition of RBR includes five principles. These principles are reproduced below and accompanied by text that describes how they are reflected in the program of railroad governance pursued under the post-Staggers regulatory program.

PRINCIPLE 1: All market governance mechanisms for resource allocation are, in practice, imperfect.[66]

The implication of this principle is that economic welfare is measured by real-world market outcomes, not by its proximity to an ideological extreme. Given the obvious complexity of the "railroad problem" and the economic circumstances that led to changed rail industry oversight this starting point is fortunate. Seemingly, the regulatory changes of the 1970s and 1980s were not motivated by ideological concerns. The statutory language does not appear to reflect theoretically attainable optima available in textbook versions of perfectly functioning markets nor similar outcomes attainable through perfect and costless regulatory control of markets. This language does, however, stipulate a number of practical economic goals that provide flexibility in market governance.

PRINCIPLE 2: In the presence of advancing technology and evolving legal institutions, regulators must be vigilant to the possibility of improved regulatory or deregulatory designs.[67]

Both the basic need for regulatory oversight and the effectiveness of available policy alternatives can be affected by new technologies.[68] This would seem particularly true when technological advances are coupled with changes in public-sector investments. The effectiveness of oversight programs can also change as legal institutions mature.[69] These concerns suggest that competing regulatory alternatives be compared frequently if not continuously.[70]

The failure to adhere to this principle helps explain the regulatory dam that burst in the 1970s and 1980s and the form of the regulatory oversight that has emerged since. In the case of railroads, post-war tech-

64. Mayo, *supra* note 1, at 135-36, 140.
65. *Id.* at 120-21.
66. *Id.* at 137.
67. *Id.* at 138.
68. *Id.* at 138-39.
69. *Id.*
70. *Id.* at 139-40.

nological advances and federal investment in non-rail infrastructure led to precipitous changes in transport-related commerce.[71] Ultimately, the growing pressure from these changes pressed with sufficient force against the policies and practices of a monolithic ICC so that the Commission's effectiveness succumbed to an irrepressible need for reform.[72] Indeed, the magnitude of the rail industry distress witnessed in the 1970s and 1980s was, in part, a measure of the price to be paid for a lack of ongoing policy vigilance.

Regarding the post-Staggers environment, the economic freedoms extended to the railroad industry, combined with the diminished role of the ICC and its successor, the STB, have encouraged increased rail industry scrutiny by federal entities that, in the past, were either uninterested or unable to exert influence.[73] This has, no doubt affected the nature of rail policies.

To begin, while Congress has not significantly modified the overall regulatory framework established in 1980, it has consistently attended to rail industry performance either through hearings, direct congressional studies, or by mandating STB studies and proceedings.[74] Indeed, as noted, Congress mandated the most recent NAS-sponsored analysis.[75] Similarly, the Executive's Department of Justice has routinely tested the boundaries that define its jurisdiction in rail matters and the Government Accountability Office (GAO) has provided research on numerous aspects of rail industry performance and policy.[76] Finally, the US Department of Transportation's Federal Railroad Administration (FRA), while traditionally focused on infrastructure and operational regulation, has taken a more active role in oversight of economic issues.[77] In a pre-Staggers era dominated by the ICC, involvement by other federal entities was far less

71. *See* MacDonald, *supra* note 24, at 85, 93-96.

72. *Id.* at 96.

73. *See supra* text accompanying note 3.

74. While the Staggers Act did not specifically mandate congressional oversight, implementation was consistently monitored by the Senate Commerce Committee's Subcommittee on Surface Transportation, which held annual oversight hearings each year between 1981 and 1985 and somewhat less frequently in following years. *See, e.g., Hearings Before the Subcommittee on Surface Transp. of the Committee on Commerce, Sci., and Transp.*, 100th Cong. (1987), http://njlaw.rutgers.edu/collections/gdoc/hearings/8/87602711/87602711_1.pdf.

75. *See* Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, Pub. L. No. 109-59, § 9907, 119 Stat. 1145, 1925-26 (2005).

76. *See supra* notes 3 and 74. The DOJ has attempted to exercise authority in the merger approval process. It has also launched inquiries in other oversight matters. See, *e.g.*, Russell Pittman, *The Economics of Railroad "Captive Shipper" Legislation*, 62 ADMIN. L. REV. 919, 920-21, 933-34 (2010).

77. As an example, the FRA undertook the environmental investigation required in conjunction with California's high-speed passenger rail initiative. *See* OFFICE OF R.R. DEV., U.S. DEP'T OF TRANSP., HMMH REPORT NO. 293630-4, HIGH SPEED GROUND TRANSPORTATION NOISE AND VIBRATION IMPACT ASSESSMENT 1-1, 9-2, 9-23 (Oct. 2005), https://www.fra.dot.gov/

regular or as extensive.[78]

PRINCIPLE 3: Wherever possible, regulators should engage in empirical counterfactual scrutiny of alternative market governance mechanisms.[79]

Depending on one's definitions, railroad industry oversight may be unrivaled for the number of empirical counterfactual applications used to evaluate current outcomes or the potential effects of alternative policies. In his text on the topic, Professor Mayo confines his examples to largely cross-sectional comparisons between actual regulatory regimes in different jurisdictions or different industries.[80] In contrast, counterfactual exercises in the course of railroad policy analysis tend to involve the empirical simulation of alternative policy or practice based on historical data and deterministic models.[81] Nonetheless, these railroad analyses are counterfactual in nature and share the RBR's intent.

The STB has summarized 49 rate proceedings considered under its tenure; of this total, 34 cases have relied on fully developed stand-alone cost analyses to determine rate reasonableness.[82] Rather than focus on actual incumbent carrier costs, these analyses consider the counterfactual costs that would be incurred by an efficient hypothetical carrier providing a set of services that include the issue traffic. The STB has applied similar processes in other proceedings.[83] For example, a counterfactual process is currently being used to anticipate the probable effects of federally imposed switching-based competitive access.[84]

Counterfactual constructs have also been used by other federal bodies to analyze the likely impacts of policy change. In response to congressional mandates, the US Department of Transportation's Federal Highway Administration (FHWA) has twice organized counterfactual studies to consider the rail industry impacts of federal changes to truck size and weight standards.[85] Both the initial study (FHWA, 2000) and the

eLib/details/L02562. In the past, such activities were conducted exclusively by the ICC and later, the STB.

78. *See* Dempsey, *supra* note 1, at 1152, 1160-66, 1169.

79. *See* Mayo, *supra* note 1, at 140.

80. *Id.*

81. This is particularly true of the SAC analysis mandated by the STB under Constrained Market Pricing. *See* Coal Rate Guidelines, Nationwide, 1 I.C.C. 2d 520, 524-25 (1985).

82. Surface Transp. Bd., *Summary of Results of Freight Rail Rate Challenges at the Surface Transportation Board,* SURFACE TRANSP. BD. (June 16, 2015), http://www.stb.dot.gov/stb/industry/Rate_Cases.htm.

83. Petition for Rulemaking to Adopt Revised Competitive Switching Rule, S.T.B. No. EP 711, *1 (Nov. 3, 2011), 2011 WL 5257467.

84. *Id.*

85. *See* FED. HIGHWAY ADMIN., U.S. DEP'T OF TRANSP., COMPREHENSIVE TRUCK SIZE AND WEIGHT STUDY, AT ES 1-4 (2000), http://www.fhwa.dot.gov/reports/tswstudy/EXEC-

study currently underway use deterministic counterfactual methods to estimate the redistribution of freight traffic between highway and rail that might result from changed federal truck standards.[86]

Finally, the academic community has also embraced counterfactual analyses to estimate the impacts of railroad policies. One of the earliest examples is the work of Clifford Winston, et al., wherein counterfactual estimates of rail pricing, performance, and traffic volumes in the absence of Staggers are used to estimate the early Staggers-related economy wide welfare gains.[87]

PRINCIPLE 4: In assessing the merits of alternative market governance mechanisms, policymakers should heavily weight granular empirical evidence collected from actual markets.[88]

This element of the RBR construct argues for disaggregation in the evaluation of regulatory effects.[89] Rate proceedings under the current regulatory regime certainly adhere to this principle, with consideration given to each specific rail-served market for which rate relief is sought. However, having noted this, much of the dialogue and the research that informs it (including both the NAS report and the current paper) often retreats to high levels of aggregation. Of such practices, RBR warns,

> . . .absent an empirical analysis of actual behaviors, the use of such high-level tools creates the profound risk of infinitely-lived regulatory superstructures for fear that behaviors may not comport with the benchmarks of perfect competition.[90]

PRINCIPLE 5: When considering alternative governance structures for a market, policymakers should focus on tangible, end-state economic metrics.[91]

The fifth principle in the RBR construct is, in fact, the complement to the framework's first tenet. If theoretical adherence is to be supplanted by real-world outcomes as the appropriate standard for judging regulatory performance then these real-world outcomes must be accessible through a set of appropriate market metrics. Further, while these metrics may capture elements of theoretical interest – for example welfare gains

SUM4.htm; *see* FED. HIGHWAY ADMIN., U.S. DEP'T OF TRANSP., COMPREHENSIVE TRUCK SIZE AND WEIGHT LIMITS STUDY, "MODAL SHIFT COMPARATIVE ANALYSIS TECHNICAL REPORT," at ES 1-2 (2015), http://www.fhwa.dot.gov/reports/tswstudy/TSWfinal.htm.

86. *Id.*

87. CLIFFORD WINSTON, ET AL., THE ECONOMIC EFFECTS OF SURFACE FREIGHT DEREGULATION 42 (1990).

88. Mayo, *supra* note 1, at 141.

89. *Id.*

90. *Id.*

91. *Id.*

or losses, indications of market structure, or clues to strategic interactions – their primary function is to focus attention on the outcomes observed by and important to market participants and other interested stakeholders. It is this principle the guides our development of the RBR "scorecard" in Section 4.

IV. NAS Findings and a Results-based Scorecard for Rail Governance

Deregulation's early results pointed to unanticipated levels of economic success—enough so that in 1995, as it prepared to replace the century-old Interstate Commerce Commission with the smaller Surface Transportation Board, the Senate Finance Committee concluded, "The Staggers Act is considered the most successful rail transportation legislation ever produced, resulting in the restoration of financial health to the rail industry."[92]

This conclusion notwithstanding, the two decades since the "sunsetting" of the ICC provide more than 15 years of additional data describing railroad industry outcomes. During these intervening years, both the broader economy and the railroad industry have continued to undergo structural change.[93] Thus, the continued evaluation of railroad industry oversight is both appropriate and manageable.

The goal, here, is to use the full 30-year time series of retail metrics prescribed by results-based analytics to form a results-based "scorecard". The purpose of this exercise is to assess how well the *implementation* of Staggers has resulted in achievement of its aims. These statutory goals are broader in scope than the initial charge given to the NAS select committee referenced above.[94] Further, the NAS analytics were tightly focused on more recent outcomes.[95] Thus, the NAS findings are available for some topic areas and for some time periods, but not for others.[96] Accordingly, where NAS-developed information is available, that informa-

92. Senate Comm. on Commerce, Sci, & Transp., Interstate Commerce Commission Sunset Act of 1995, S. Rep. No. 104-176, at 3 (1995).

93. As examples, consider that digital technologies and global trade have, to varying degree, displaced heavy industry as the country's primary economic focus and the energy sector today enjoys opportunities that are unprecedented as they were unforeseen. With regard to trade and digital technologies, *see* generally James Manyika et al., Global Flows in a Digital Age: How Trade, Finance, People, and Data Connect the World Economy (2014), http://www.mckinsey.com/insights/globalization/global_flows_in_a_digital_age. In reference to the changing energy sector and its impact on the U.S. Economy, *see* Dale W. Jorgenson et al., *Energy, the Environment, and US Economic Growth*, *in* 1A Handbook of CGE Modeling 477, 477-550 (2013).

94. *See* Transp. Research Bd., *supra* note 8, at 13, 41-42.

95. *Id.* at 56.

96. *See, e.g.*, *id.*

tion is incorporated here. Otherwise, separate information is brought to bear.

The complete *Findings*, *Goals*, and *Rail Transportation Policy* sections of the act are available in the legislation's opening Title.[97] Here, however, statutory goals and corresponding market metrics are divided into six groups that roughly correspond to legislative intent. Groupings include:

1. Efficiency and Use	**4.** Financial Stability, Investment, and Infrastructure
2. Competition and Railroad Rates	**5.** Employment, Worker Safety, and Compensation
3. Adequacy and Availability of Service	**6.** Safety and Environmental Outcomes

Selected metrics within each subset are presented in the remainder of this section.

A. Congressional Objective 1: Efficiency

"Efficiency" was near the top of the congressional list of desired outcomes.[98] However, nothing within the statutory language reveals what is meant by this term. Thus, I use the definitions most common to the economics discipline – allocative efficiency, technical efficiency, and dynamic efficiency.[99] Further, I *assume* that the prevailing opinion at the time of reform was that "inefficiency" meant that the degradation in infrastructure and equipment, combined with managerial and regulatory failures had led to a suboptimal use of unreliable services that were too costly to produce and, therefore, priced unnecessarily high. Based on this assumption, reduced costs, corresponding reductions in rates, increased use (output quantities), and improved service are the yardsticks by which we should measure Staggers' success in supporting an ". . . efficient rail transportation system."[100]

Producing railroad freight service requires inputs that include a route structure; locomotives, freight cars, and maintenance facilities; labor to maintain equipment and infrastructure to operate trains; fuel; and managerial and administrative services.[101] Attaining reform's goal of a more

97. Staggers Rail Act of 1980, Pub. L. No. 96-448, §§ 2, 3, 101, 94 Stat. 1895 (codified as amended at 49 U.S.C. § 10101).

98. *Id.* at § 2(4)

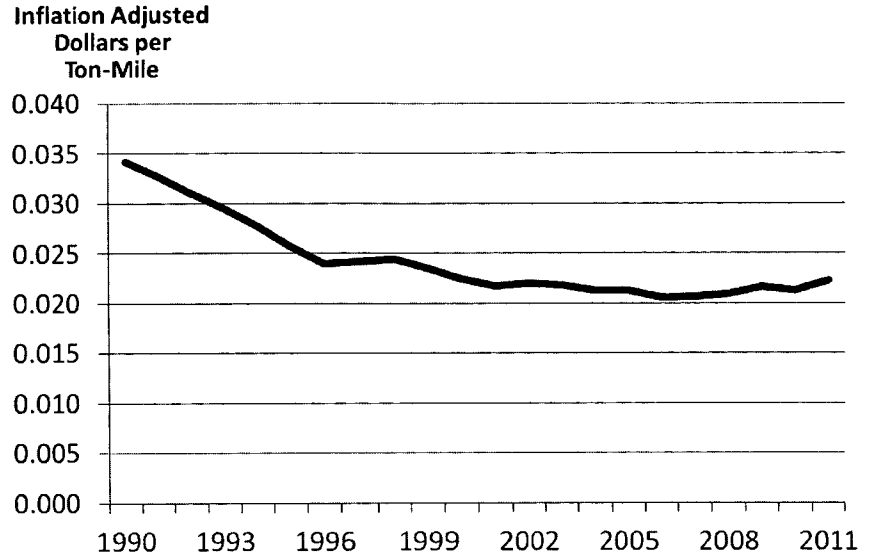
99. *E.g.*, Robert Cooter & Thomas Ulen, Law and Economics 17-18, 124, (Denise Clinton et al eds., 5th ed. 2008).

100. Staggers Rail Act § 101(a)(3).

101. *See generally* John Armstrong, The Railroad: What It Is, What It Does (5th ed. 2008) (for a general discussion of railroad network technologies and required inputs).

efficient rail system demanded that these inputs be acquired and combined in ways leading to lower costs.[102] The outcome of cost reducing activities, therefore, provides the first useful metric in the application of results-based regulation. This is depicted here in Figure 1. This figure indicates a decline in real, carrier-incurred, per-unit transportation costs of nearly 43 percent between 1990 and its minimum in 2004. Between 2004 and 2011, there is modest upward movement in this cost measure.

FIGURE 1—INFLATION ADJUSTED CARRIER COST PER TON-MILE OF SERVICE



Source: Surface Transportation Board, Annual R-1 Data[103]

The magnitude and sources of cost decreases has varied across carriers and commodity groups.[104] Moreover, while some reduced costs were directly attributable to reforms, others appear to have been coincidental. For example, Staggers explicitly expedited mergers, line sales, and line

102. *See* ARNE BECK ET AL., INTERNATIONAL TRANSPORT FORUM, DISCUSSION PAPER 2013-12: RAILWAY EFFICIENCY 33 (Mar. 2013), http://www.internationaltransportforum.org/jtrc/DiscussionPapers/DP201312.pdf.

103. SURFACE TRANSP. BD., ANNUAL R-1 DATA, http://www.stb.dot.gov/econdata. These values were derived from various databases on the STB website. "R-1 Data" refers to an extensive array of carrier-specific financial data reported to the STB on an annual basis. Prior to the STB, the R-1 data were collected by the ICC. Some elements within these data were collected as early as 1921. For related statutory authority, *see* 49 U.S.C. §§ 11145.

104. *See infra* pp. 12-14; *see also* ASS'N OF AM. R.R.S., NORTH AMERICAN FREIGHT RAIL INDUSTRY 19 (Mar. 2014), http://onlinepubs.trb.org/onlinepubs/railtransreg/Gray031414.pdf. The same STB data used to generate the aggregate industry depiction provided in Figure 1 are also available at the individual firm level for a variety of individual cost elements.

abandonments, thereby allowing carriers to measurably reduce the extent of physical infrastructure.[105] Between 1980 and 2011, Class I system route-miles fell from 164,822 to 95,514.[106] On the other hand, railroads were also among the earliest and most extensive users of labor-reducing digital technologies, an advent for which transportation policy-makers cannot claim credit.[107]

While cost cutting spanned all facets of railroad operation, the most common thread is the relationship between labor use, productivity, and associated costs.[108] In the wake of Staggers, Class I railroad employment fell by roughly two-thirds from well over 450,000 in 1980 to 163,000 in 2012.[109] At least during the first 10 years of the post-Staggers era, Davis and Wilson estimate that approximately 70 percent of this employment reduction was directly attributable to mergers or other activity directly traceable to regulatory change.[110]

A three-part chicken-and-egg story begins to unfold when the input and cost changes explained above are combined with data describing equilibrium rail output quantities and pricing. Figure 2 shows aggregate railroad ton-miles and rail's freight market share for 1990—2011. This output growth occurred over a Class I rail network that shrunk in extent by more than 40 percent.[111] The combination of traffic growth and network rationalization increased traffic density (as described in Section 2). This increase, depicted in Figure 3, has been an important source of additional economies that contributed to the unit cost reduction described above.

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105. Staggers Rail Act § 11345(a).

106. Route-Miles is the aggregate length of a roadway, excluding yard tracks and sidings, and does not reflect the fact that a mile of road may include two or more parallel tracks. There are currently seven Class I railroads, which are railroads with annual revenues of more than $277.8 million. CAMBRIDGE SYSTEMATICS, INC., FINAL REPORT: WASHINGTON STATE RAIL PLAN 2-6 (September 2013), http://www.wsdot.wa.gov/NR/rdonlyres/DC4101BC-6172-4B01-BAC5-6D0DCFAA22E2/0/TN6InstitutionalFrameworkandFundingSourcesforRail.pdf.

107. JAMES W. CORTADA, THE DIGITAL PRESS: HOW COMPUTERS CHANGED THE WORK OF AMERICAN MANUFACTURING, TRANSPORTATION, AND RETAIL INDUSTRIES 228-39 (2004).

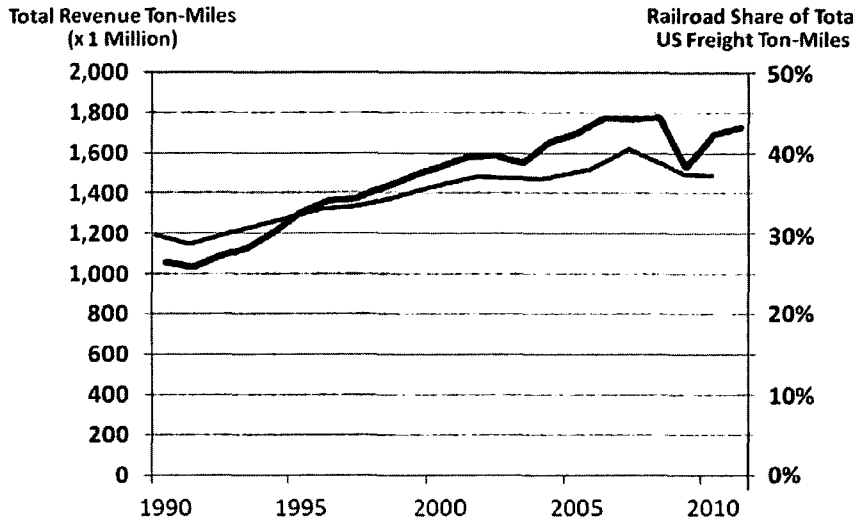
108. A number of studies have described the relationship between regulatory change and subsequent improvements in railroad industry productivity. *See, e.g.*, Carl Martland, *Improving Railroad Productivity: Implications of US Experience for Canadian Railroads*, 29 J. TRANSP. RES. F. 427 (1989); Henry McFarland, *The Effects of United States Railroad Deregulation on Shippers, Labor, and Capital*, 1 J. REG. ECON. 259 (1989); Wesley Wilson, *Cost Savings and Productivity in the Railroad Industry*, 11 J. REG. ECON. 21 (1997); John Bitzan & Theodore Keeler, *Productivity Growth and Some of Its Determinants in the Deregulated U.S. Railroad Industry*, 70 S. ECON. J. 232 (2003).

109. ASS'N OF AM. R.R.S., *supra* note 104, at 25.

110. *See* David Davis & Wesley Wilson, *Deregulation, Mergers, and Employment in the Railroad Industry*, 15 J. REG. ECON. 5, 18, 19 (1999).

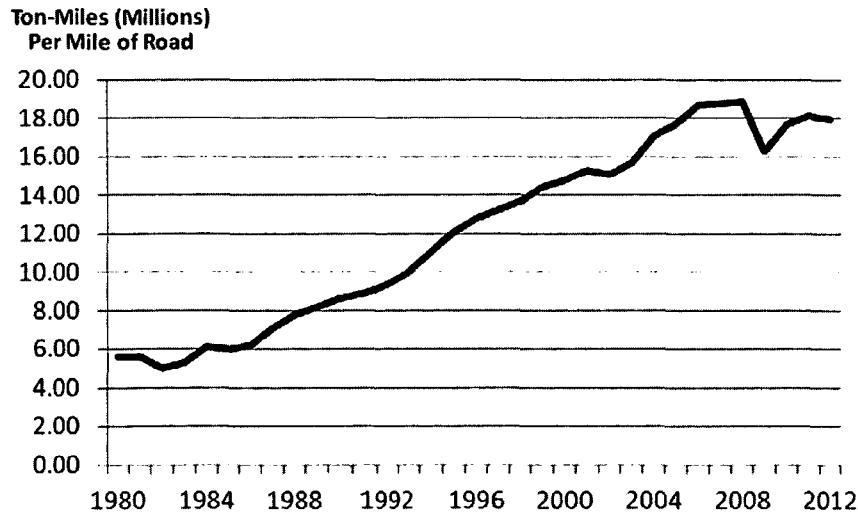
111. *See* CAMBRIDGE SYSTEMATICS, INC., *supra* note 106.

FIGURE 2—RAILROAD OUTPUT AND DOMESTIC FREIGHT MARKET SHARE



Sources: Surface Transportation Board/USDOT, Bureau of Transportation Statistics[112]

FIGURE 3—RAILROAD TRAFFIC DENSITY



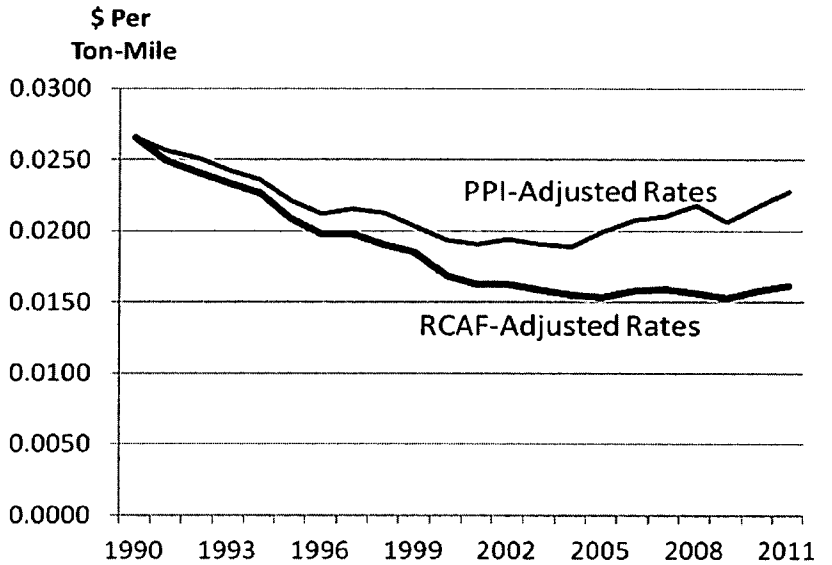
Source: Surface Transportation Board[113]

112. *See* U.S. DEP'T OF TRANSP., BUREAU OF TRANSP. STATISTICS, NAT'L TRANSP. STATISTICS (2014) Table 1-50 (special tabulation) (table labeled as "Ton-Miles of Freight"), http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_01_50.html.

113. ASS'N OF AM. R.R.S., *supra* note 104, at 27.

The final element in this scenario is pricing. Absent exogenous demand growth, reduced costs can only have led to the quantity increases and traffic densities that further reinforced cost reductions if prices fell or services improved sufficiently to produce larger equilibrium quantities.[114] In aggregate, this is what happened to real rail rates over the 18-year period between 1986 and 2004. Aggregated price changes are illustrated in Figure 4.

FIGURE 4—INFLATION-ADJUSTED AGGREGATE RAILROAD RATES (1990 BASE YEAR)



Sources: Surface Transportation Board[115]

The arithmetic inherent in these average rates indicates that, in the years following Staggers, real railroad rates fell measurably for many shippers and that, in real terms, aggregate rates remain well below pre-Staggers levels. However, as RBR suggests, the high level of aggregation may obscure details that are important to understanding the complex intertemporal course of rail pricing and its implications for forward-looking federal policy.[116] Indeed, identifying and analyzing these disaggregated, commodity-specific rate patterns, particularly as observed in recent years,

114. This is not to suggest that there was no demand growth during this period. In particular, the 1980s and 1990s saw a marked increase in the movement of both Powder River Basin coal and international containers from the West coast. However, parsing this traffic growth into the shares reflecting shipper responses to lowered rates versus pure demand growth is not possible within the current investigation.

115. *See supra* text accompanying note 103.

116. *See* Mayo, *supra* note 1, at 140.

is a fundamental contribution attributable to the NAS study process.[117] These results are summarized here in the following section that further describes post-Staggers competition and rates.

B. Congressional Objective 2: Competition and Railroad Rates

In an RBR setting, "results-based" implies results that are both understood and valued by market participants, most notably price.[118] If a policy results in output prices that are noncontroversial, then the competitive interactions that generated those prices generally satisfy common interests.[119] With this in mind the current discussion of competition focuses almost entirely on congressional intent and on post-Staggers *rates*.

The third congressional finding contained in Section 2 of the 1980 Staggers Act states, "today, most transportation within the United States is competitive. . . ."[120] Absent further explanation, we are left to infer, at least that, in 1980, the existing level of competition within and between freight modes was not an urgent congressional concern. Still, subsequent language in the goals and policy sections of the Act makes two points clear. First, there is congressional recognition that any solution of the railroad problem would likely require deviations from the pricing observed in perfectly competitive markets.[121] As importantly, however, the same language seems to warn that congress would not sanction gratuitous abuse of the rate-setting latitude about to be extended to rail carriers.[122]

Deregulated railroads immediately worked to reduce costs, but were slower to consider pricing.[123] Still, with cost reductions underway, the Class I railroads undertook the improvement of revenues derivable from growing traffic volumes.[124] Borrowing heavily from the techniques (and often the personnel) of the airline industry, the railroads began to seek price-cost margins that reflected actual shipper demand elasticities, and incurred costs rather than some supposed demand behavior or a set of broader policy goals that were not tied to firm profits.[125]

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117. *See* Transp. Research Bd., *supra* note 8, at 220-21.

118. Mayo, *supra* note 1, at 145.

119. *Id.* at 145-146.

120. Staggers Rail Act of 1980, Pub. L. No. 96-448, §§ 2(3), 94 Stat. 1895 (codified as amended at 49 U.S.C. § 10101).

121. For example, the policy prescription that prohibits unlawful discrimination seems to recognize that some of amount of price discrimination is necessary to assure the recovery of common costs. *See id.* § 101(a)(6), (13).

122. Staggers Rail Act § 101(a)(10-13).

123. *See* Burton, *supra* note 32, at 429.

124. *See* MacDonald, *supra* note 24, at 97.

125. *Id.* at 87. The pattern of real rate declines was also affected by the speed with which the ICC implemented Staggers' rate provisions. While there is a general consensus that the ICC

James MacDonald documents the post-Staggers movement toward profit enhancing discriminatory railroad prices.[126] The result is a highly evolved set of fluid pricing practices designed to capture shipper surplus by varying prices based on demand elasticities.[127] These practices are easily observed in the pricing of bulk commodities such as coal and grain, but are also evident in the pricing of transportation for other commodities such as chemicals and petroleum products.[128]

The recently released NAS analysis is also focused on commodity-specific rail rate outcomes.[129] Figures 5 and 6 provided here are similar to Figures 2.3 and 2.4 in the NAS report, except that the current figures depict the whole of the post-Staggers period whereas the NAS figures focus on the period from 2002 forward.[130] Otherwise, both sets of figures show real, commodity-specific rail rates expressed in current dollars and an index of these disaggregated rates where the initial period index value equals one.

worked vigorously to carry out the statute's intent, it appears that full implementation took several years.

126. *Id.* at 86.

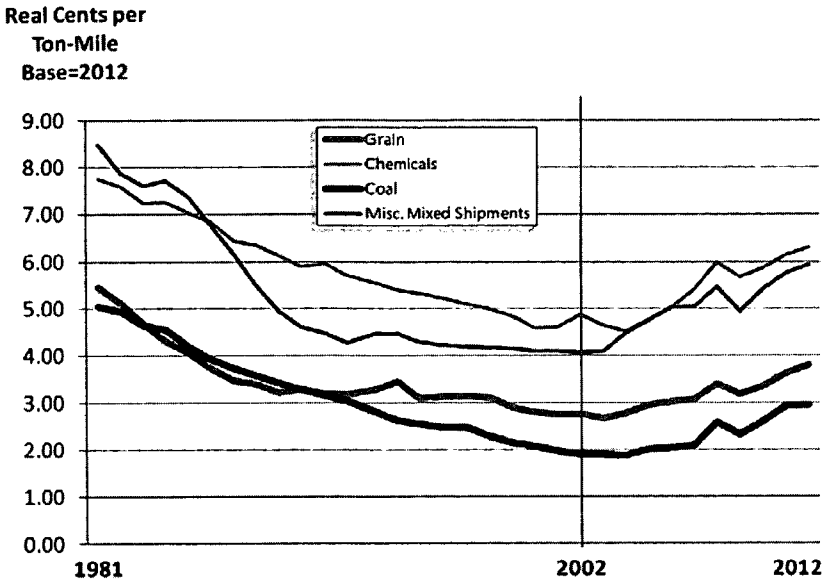
127. *Id.* at 99.

128. *Id.* at 85-86; 98. For early post-Staggers descriptions of the relationships between demand characteristics and emerging railroad rates, *see* Burton, *supra* note 32; Wesley Wilson, *Market Specific Effects of Railroad Deregulation*, 42 J. INDUS. ECON. 1 (1994). For a more recent assessment of these relationships, *see* John Bitzan & Theodore Keeler, *Productivity Growth and Some of Its Determinants in the Deregulated U.S. Railroad Industry*, S. ECON. J. 232 (2002). For a detailed examination of differential rate effects on grain movements, *see* KIMBERLY VACHAL, JOHN BITZEN, TAMARA VAN WECHEL, & DAN VINJE, DIFFERENTIAL EFFECTS OF RAIL DEREGULATION IN THE US GRAIN INDUSTRY (August 12-18, 2006) (contributed paper prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia). For a description of rail pricing of coal movements and its relationship with environmental regulation, *see* Meghan Busse & Nathanial Keohane, *Market Effects of Environmental Regulation: Coal, Railroads, and the 1990 Clean Air Act*, 38 RAND J. ECON. 1159 (2007). Finally, for a description of rail pricing strategies involving vertical foreclosure, *see* Mark Burton & Wesley Wilson, *Network Pricing: Service Differentials, Scale Economies, and Vertical Exclusion in Railroad Markets*, 40 J. TRANSPORT ECON. & POL'Y 255 (2006).

129. *See* TRANSP. RESEARCH BD. *supra* note 8, at 45.

130. *Id.* at 59-60.

FIGURE 5 — INFLATION-ADJUSTED RAILROAD RATES FOR SELECTED COMMODITY GROUPS

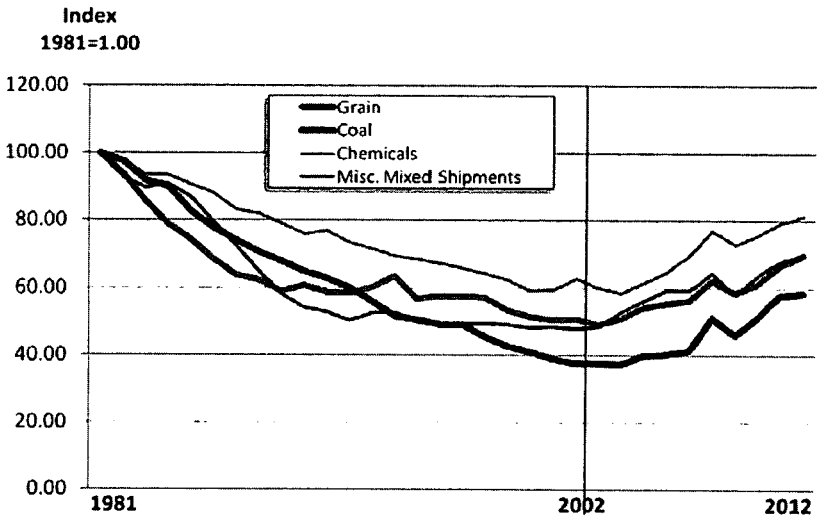


Source: Association of American Railroads[131]

Within these figures, the category of miscellaneous mixed shipments is largely comprised of intermodal movements. The figures demonstrate, at least three important outcomes. First, from the time of implementation through 2002, real rail rates fell consistently across *all* commodity groups, an outcome that is not guaranteed by the decline in aggregated average rates. Second, from 2002 forward these rates have increased, for the same four groups, though *all* remain lower than their 1981 levels. Finally, both upward and downward movements in real railroad rates vary across commodity groups, presumably based on changes to the demand characteristics revealed within shipper elasticities.

131. Per the author's request, the Association of American Railroads generated the data supporting this figure (data on file with author).

FIGURE 6 — INDEX OF INFLATION-ADJUSTED RAILROAD RATES FOR SELECTED COMMODITY GROUPS



Source: Association of American Railroads[132]

The NAS work furthers this disaggregated, commodity-specific rate analysis, by developing a taxonomy based on a variety of rate and shipment characteristics.[133] Specifically, both the 4R Act and Staggers permit regulators to "exempt" traffic from rate oversight if regulators judge that all such traffic is subject to effective competition.[134] In the data used to construct Figure 6, the miscellaneous shipments acting as a proxy for intermodal traffic move under such an exemption. The NAS analysis also distinguishes between contract rates and common carriage rates and rates based on shipment distance or size.[135]

For the most part, the results of the disaggregated analysis document expected outcomes. For example, over time, both shipment size and shipment distances have increased and most rate structures across commodity groups favor these changes.[136] However, the disaggregated analysis does underscore one result that is, perhaps, less obvious. As summarized in Table 1, grains (including soybeans) move under contract rates less often

132. Per the author's request, the Association of American Railroads generated the data supporting this figure (data on file with author).

133. TRANSP. RESEARCH BD., *supra* note 8, at 45.

134. Staggers Rail Act of 1980, Pub. L. No. 96-448, §§ 212-13, 94 Stat. 1895, 1912-13 (codified as amended in scattered sections of 49 U.S.C.).

135. Prior to the passage of Staggers, confidential contracts between railroads and shippers were deemed to be in conflict with railroads' common carrier obligations. Staggers reversed this position. *See* Staggers Rail Act § 208.

136. *See* TRANSP. RESEARCH BD., *supra* note 8.

than other commodities.[137] Moreover, non-exempt traffic moving under tariff rates tends to move at rates that are somewhat higher compared to URCS-based estimated variable costs as is indicated in Table 2.[138] This disparity could easily be attributable to higher costs associated with shorter and more varied grain shipments.[139] Still, it helps explain the rather vocal dissatisfaction over railroad rates expressed by many in the agricultural community.[140]

TABLE 1 — SUBSET OF 2012 SHIPMENT CHARACTERISTICS

Commodity	2012 Ton-Miles (X1B)	2012 Carloads (X1M)	2012 Average Tons per Carload	2012 Average Shipment Distance	Percent of Movements Under Contract
Coal	644	6.2	116	895	95
Grains and Soybeans	126	1.4	120	754	22
All Traffic	1254	28.4	62	712	76

Source: National Academies[141]

TABLE 2 — 2012 FREQUENCY OF RATE TO VARIABLE COST (RVC) RATIOS BY RATE CATEGORY

Rate Type	R/VC < 100%	100% ≤ R/VC < 180%	180% ≤ R/VC < 300%	R/VC ≥ 300%
Nonexempt	16%	56%	24%	4%
Tariff	4%	60%	31%	5%
Contract	19%	55%	21%	4%
Exempt	30%	57%	11%	1%
Total	20%	57%	20%	3%

Source: National Academies[142]

137. *Id.* at 68-69, 71-73.

138. *Id.* at 117.

139. *Id.*

140. *Id.*

141. Both longer shipment distances and consistent origin-destination pairs have been demonstrated to reduce unit shipping costs. *See* Burton, *supra* note 32, at 431; Wilson, *supra* note 128, at 7.

142. Based on shipper complaints, in 2013, the Surface Transportation Board initiated an *ex parte* proceeding to review its current policies regarding the regulation of rail rates for grain shipments. *See* Rail Transportation of Grain Rate Regulation Review, S.T.B. Ex Parte No. 665 (Sub-No. 1) (December 12, 2013). To date, this proceeding has not resulted in any substantive Board action.

C. Congressional Objective 3: Service Adequacy and Availability

For much of the 20th century, Class I railroads had little control over the extent of their networks or the services they provided.[143] Moreover, ICC- sanctioned rates seldom reflected the full cost of serving smaller, remotely located shippers. The result was broad rail network access that was reduced measurably in extent during the early post-Staggers era.[144]

More than *availability*, however, the performance measure discussed most often is *reliability* of transportation services.[145] Specifically, do shipments depart and arrive as scheduled, and are the contents undamaged? Given the importance shippers appear to place on these issues—particularly the variability of transport times—the paucity of publicly available metrics and credible research is surprising.

By surveying shippers, Grim, *et al.*, concluded that Staggers' early effect was to reduce both transportation times and their variability, but these results were derived before Class I railroads had engaged in extensive mergers, route rationalization, or other cost-reducing measures.[146] In contrast, nearly 525 shipper surveys secured by the Federal Government Accountability Office found that 63 percent of shippers believed railroad service quality had declined between 1990 and 1997.[147] Later still, a less formal exercise conducted by the Federal Railroad Administration led it to conclude that post-Staggers rail service quality suffers during periods of heavy demands (2004 in the FRA findings), but improves when demand is slack (2009 in the FRA findings).[148] Still, in summary, the FRA report states:

> [Public data on railroad performance] is very limited and includes only indirect measures of railroad service quality. Furthermore, no public records are kept on significant service disruptions that result in poor service quality. As

143. *See* Dempsey, *supra* note 1, at 1152.

144. As an illustration, in 1965 there were more than 65,000 North American locations (stations) to and from which shippers could originate or terminate traffic. By 2009, the number of shipment locations had fallen to less than 27,000 and of those, only 7,000 actively originated or terminated traffic. *See generally* The Official Railway Guide § E0-E151 (Erich Kaiser et al. eds., 2009).

145. Michael A. McGinnis, *The Relative Importance of Cost and Service in Freight Transportation Choice: Before and After Deregulation*, 30 Transp. J. 12, 13 (1990).

146. Curtis Grimm & Clifford Winston, *Competition in the Deregulated Railroad Industry: Sources, Effects, and Policy Issues*, *in* Deregulation of Network Industries: What's Next? 41, 43 (Sam Peltzman & Clifford Winston ed., 2000).

147. *See* U.S. Gov't Accountability Office, GAO-99-93, Railroad Regulation: Changes in Railroad Rates and Service Quality Since 1990, 67 (1999).

148. *See* Mitchell Behm, Report on the Audit of the Quality of Service Provided Rail Shippers Report No. CR-2011-045 to Federal Railroad Administrator 2 (Feb. 15, 2011) (on file with U.S. Department of Transportation). The FRA assessment appears to have relied primarily on the results of shipper interviews in its assessment of service quality.

> a result of these factors, publically-available data is insufficient to monitor service quality.[149]

The select NAS committee was also charged with evaluating service quality.[150] In treating the topic, the committee suffered the same frustrations and reached essentially the same conclusion proffered by the FRA.[151] Specifically, the committee's report states:

> . . .there is substantial information on railroad traffic and revenues, much of it derived from STB's CWS. However, shipment-level data for evaluating or benchmarking railroad service quality do not exist. Apart from requiring railroads to report and publish aggregated statistics on train operations and car fleet status, STB does not sample or require the reporting of shipment-specific data pertaining to aspects of service performance such as delivery times or speeds. Hence, service trends and patterns cannot be examined with as much precision as rates, as Congress requested of this study.[152]

In response to shipper service quality issues during the winter of 2013-2014, the STB implemented a program of mandatory weekly railroad reporting aimed at providing more timely information to for both regulators and railroad customers.[153] However, both the NAS committee and many near the industry have questioned the value of this measure.[154] Specifically, the NAS committee reports:

> . . .the data to be collected are not specific with regard to shipment or even to origin and destination in the same manner as are the on-time arrival data collected for many years by the U.S. Department of Transportation (USDOT) for airlines. Furthermore, the proposed collection effort appears to be an ad hoc response to the disturbances of the previous winter; it does not appear to have been strategically devised in the sense of there being a plan for routine use of the information in monitoring performance.[155]

In summary, as imprecise and incomplete as available data are, they are consistent with the documented evidence of cost-reducing activities. Route rationalization, the elimination of duplicate facilities, and rate structures that encourage the concentration of larger shipment volumes in fewer corridors each contribute to lower unit costs by increasing route densities. However, creation of this traffic density, combined with elimination of excess capacity, can amplify both the extent of disruption-related delays and required network recovery times when rail systems are

149. *Id.*
150. TRANSP. RESEARCH BD., *supra* note 8, at 75.
151. *Id.*
152. *Id.*
153. *See* United States Rail Service Issues—Performance Data Reporting, S.T.B. EP 724 (Sub-No. 4) (December 30, 2014) (to be codified at 49 CFR pt. 1250.1-1250.3).
154. TRANSP. RESEARCH BD., *supra* note 8, at 86.
155. *Id.* at 87.

disrupted by track or equipment issues, derailments, weather problems, or unexpected peaks in network demands.

Service quality also includes the scope of available services.[156] In this regard, one of the most pronounced changes in American railroads—the emergence of robust and lucrative intermodal traffic—while not *caused* by regulatory—seems to have been affected by it. A full recounting of intermodal rail-truck traffic growth is beyond the scope of the current analysis and available elsewhere.[157] What is important here is to understand the extent of any linkages that tie intermodal traffic growth to current regulatory practice.

Figure 7 shows aggregate intermodal traffic volumes; two results stand out. First, over the nearly 25 years for which data are shown, the growth in total intermodal traffic was precipitous. Indeed, in 2014, intermodal shipping overtook coal as the leading revenue producer for the industry.[158] Second, over the same timeframe, intermodal traffic has come to be dominated by the movement of containers rather than truck trailers.

Prior to 2000, intermodal rail traffic growth was primarily a product of the increased global trade linked to escalating Asian manufacturing.[159] Intermodal railroad capacity probably facilitated increased trade, but it can hardly be credited with *creating* it.

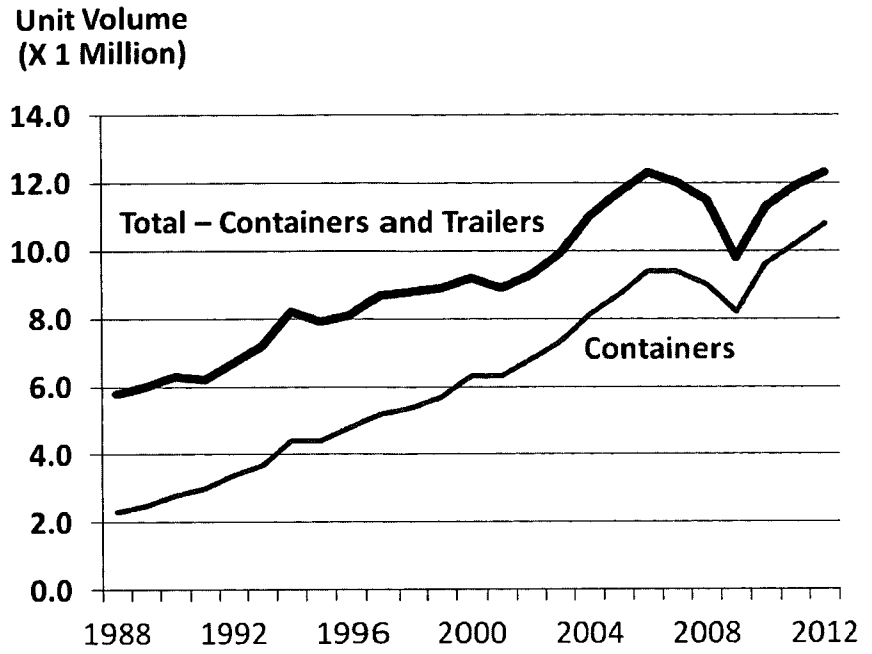
156. *See* Behm, *supra* note 148.

157. *See generally* E.N. Smith & F.M. Greenwood, *Tomorrow's Railroad*, TRAINS MAGAZINE, Nov. 1960, at 34-49 for a comprehensive popular discussion of intermodal's development. For a more current and academic treatment of the topic see a similarly dedicated issue of *The Intermodal Containment Era: History, Security, and Trends*, TR NEWS, Sept.-Oct. 2006, http://onlinepubs.trb.org/onlinepubs/trnews/trnews246.pdf. Finally, a more academic discussion of intermodal freight transport is available in JEAN-PAUL RODRIGUE ET AL., THE GEOGRAPHY OF TRANSPORT SYSTEMS (3d ed. 2013).

158. ASS'N OF AM. R.R.S, RAIL INTERMODAL KEEPS AMERICA MOVING 1 (May 2015) (on file with author), https://www.aar.org/BackgroundPapers/Rail%20Intermodal.pdf.

159. Between 1994 and 2013, the volume of total import and export traffic over US ports nearly tripled and this certainly accounts for much of the observed rail-truck intermodal growth. However, roughly a decade ago, domestic shippers began to adopt containerized shipping. At first, this pattern simply displaced existing trailer-on-flatcar (TOFC) traffic. However, domestic container use has continued to grow as a substitute for traditional all-truck routings. Indeed, some industry pundits were stunned when domestic container traffic recovered more quickly than international movements in the wake of the recent recession. *See* CHRISTIAN REYNAUD, INTERNATIONAL TRANSPORT FORUM, FORUM PAPER 2009-5: GLOBALIZATION AND ITS IMPACTS ON INLAND AND INTERMODAL TRANSPORT 4-7 (2009), http://www.internationaltransportforum.org/pub/pdf/09FP05.pdf.

FIGURE 7—RAILROAD INTERMODAL TRAFFIC GROWTH



Source: Surface Transportation Board[160]

Further, Class I Railroads had begun to provide intermodal service three decades before deregulation, and experiments with the double-stacking of international containers for railroad movement were already underway in 1980.[161] For these reasons, it is likely that the volume of intermodal rail-truck shipments would have grown under any regulatory scenario. However, with that noted, one might also suspect that intermodal traffic has grown more rapidly than it would have under a more restrictive regulatory regime.

The current generation of intermodal equipment and terminals has required extensive investment in both railroad cars and facilities.[162] Anecdotal conversation suggests that the amount of this total has been provided by third-party, non-railroad firms, and a modest amount of the required investment has been supported by public expenditures.[163] Still,

160. Ass'n of Am. R.R.s, *Weekly Traffic of Major U.S. Railroads,* WEEKLY RAILROAD TRAFFIC, Jan. 10, 1998 through Dec. 28, 2012.

161. James E. Vance, Jr. et al, *Railroad,* ENCYCLOPEDIA BRITANNICA 3, http://www.britannica.com/technology/railroad/Intermodal-freight-vehicles-and-systems (last visited Jan. 4, 2016).

162. A reasonably exhaustive search revealed no reliable totals for capital spending directly related to rail-truck intermodal capacity expansion.

163. *See* Darius W. Gaskins, *Regulation of Freight Railroads in the Modern Era: 1970-2010,* 7 REV. OF NETWORK ECON. 561, 570 (2008).

the Class I railroads have provided much of the additional capital necessary to intermodal's growth.[164] Moreover, Darius Gaskins makes it clear that in advance of deregulation (and for some years afterward), railroad borrowing for *any* purpose was extremely difficult.[165] Thus, the pace of intermodal traffic growth was almost certainly accelerated by the improved Class I financial performance described next.

D. Congressional Objective 4: Financial Stability, Investment, and Infrastructure

The discussion of investment's role in intermodal traffic growth underscores the potential importance of capital spending as an RBR metric. But the broader-based investment behavior of Class I railroads implies more. It is a closely observed indicator of financial vitality and the healthy ability to adapt to changing economic conditions.[166] To reiterate, regulatory reform was pursued to avert more drastic federal intervention in rail-served markets.[167] Hence, ongoing financial viability was (and is) a prominent policy goal.[168]

Data indicate that, in addition to investment in intermodal-related capacity, the post-Staggers rail industry continues to invest extensively in equipment (primarily locomotives) and track structures. Industry investment totals for each are depicted in Figure 8. Regarding track and structures, reductions to the extent of rail networks appear to have been matched with improvements to surviving rail routes.[169] On average, slightly more than two-thirds of rail industry capital spending has been to improve track and related structures.[170] The balance has been spent on equipment—primarily diesel locomotives and electronic data management systems.[171]

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164. *See id.* at 571.

165. *Id.* at 562.

166. *See* Jeffrey Macher et al., *Revenue Adequacy: The Good, the Bad, and the Ugly*, 41 Transp. L.J. 85, 97 (2014).

167. *See* MacAvoy & Snow, *supra* note 31.

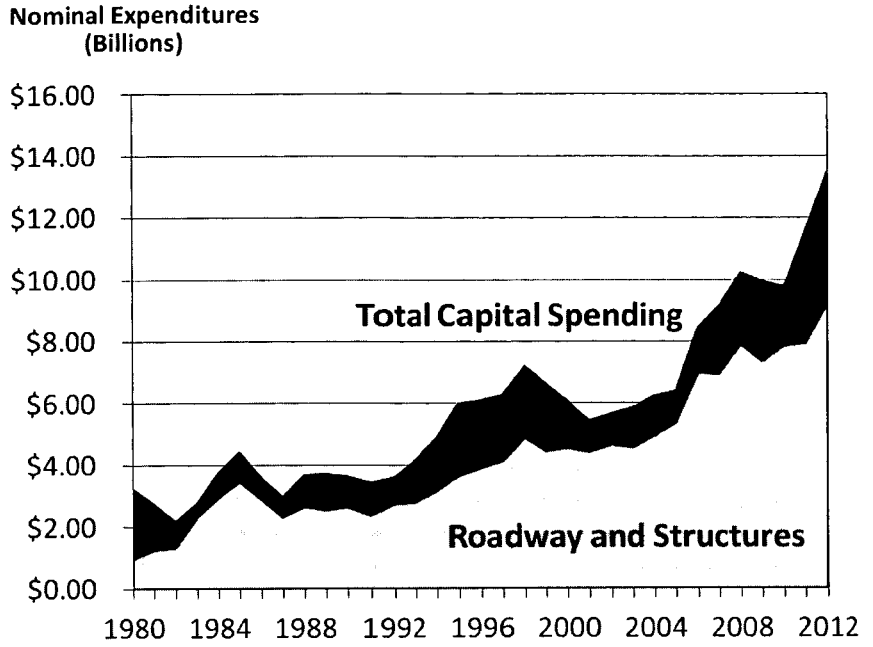
168. See Staggers Rail Act of 1980, Pub. L. No. 96-448, § 101, 94 Stat. 1895, 1895,96 (codified as amended at of 49 U.S.C. § 10101a) for a historical perspective on this concern.

169. This conclusion is supported by an array of indicators. For example, while the number of railroad route miles fell from 179,000 to just over 95,000, the number of track miles per route mile increased from 1.62 to 1.71 over the same period, largely because of an increase in the availability of multiple mainline tracks. At the same time, the load-bearing capacity of each track mile has been increased by increasing the actual weight of the rail in place. Between 1980 and 2011, the average weight of Class I rail (measured in pounds per yard) increased from 112 to 130. Calculation based on ICC / STB data as reported in the AAR's *Railroad Facts* for 1980 and 2012. *See* Ass'n of Am. R.R.s, Yearbook of Railroad Facts: 1982 43, 54 (1982); Ass'n of Am. R.R.s, Yearbook of Railroad Facts: 2012 3, 48 (2012).

170. *See* Ass'n of Am. R.R.s, *supra* note 104, at 39.

171. *See id.*

FIGURE 8—NOMINAL RAIL INDUSTRY CAPITAL SPENDING FOR TRACK AND EQUIPMENT



Source: Surface Transportation Board[172]

There are other important indicators of rail industry financial stability in addition to investment. Perhaps the clearest sign of renewed financial health was an end to the decades long sequence of railroad bankruptcy proceedings.[173] This paper's background briefly alludes to the Penn Central bankruptcy that led to the creation of Conrail in 1976. In the wake of Staggers, expedited merger evaluations quickly produced a similar but privately led reorganization of non-Conrail railroads throughout the US.[174] As a result, the number of Class I railroads fell from roughly 40 in 1980 to only 14 in 1990.[175] This process of firm consolidations, combined with 0ther deregulation-related outcomes, ended the era of Class I railroad bankruptcies. The disposition of the Milwaukee Road assets in the late 1980s is the most recent occurrence involving a bankrupt

172. *See id.*

173. *See* GALLAMORE & MEYER, *supra* note 2; LOVING, *supra* note 2 (by the 1970s many U.S. railroads had either failed financially or were near failure).

174. *See generally* DAUGHEN & BINZEN, *supra* note 25; *see also* GALLAMORE & MEYER, *supra* note 2, at 257-311.

175. In strict terms, based on separate corporate identities and revenue thresholds, there were 40 Class I railroads in 1980. THE BUSINESS OF TRANSPORTATION 43 (Darren Prokop ed., 2014); FED. R.R. ADMIN., FREIGHT RAILROADS BACKGROUND (2015).

Class I US rail carrier.[176]

To measure success in the area of financial stability, the 1980 federal legislation continued the reliance on *revenue adequacy*, a concept first introduced in railroad policy by the 4R Act.[177] Macher, *et al,* carefully trace the use of this concept in the post-Staggers era.[178] Suffice it to say that revenue adequacy compares a railroads return on investment to its cost of capital.[179] If a railroad's return on investment is found to be above the industry's weighted average cost of capital it is be labeled as "revenue adequate", while if the ROI falls below the industry-wide cost of capital, it is labeled revenue inadequate.[180]

While economists are generally reticent to use accounting measures of this kind, Figure 9 provides a graphical summary of the railroad industry's financial performance as measured by the yardstick of revenue adequacy.[181] A casual assessment of this figure suggests two decades of financial recovery, followed by a decade of more normal financial performance by Class I carriers.

Macher, *et al,* give a substantially more robust empirical comparison of railroad returns to earnings in both other network industries and among firms in industries that are widely acknowledged as highly competitive.[182] With regard to revenue adequacy and railroad earnings, they conclude:

> In sum, whether assessed relative to other comparable industries, the broad array of non-financial operating in the US, or leading firms operating in competitive global markets, revenue adequacy measures of US rail carriers are in virtually every sense "normal" rather than excessive.[183]

176. *See In re* Chicago, Milwaukee, St. Paul & Pac. R. Co., 827 F.2d 112, 113 (7th Cir. 1987). Formally, the Chicago Milwaukee St Paul and Pacific Railroad, on December 19, 1977, the Milwaukee Road petitioned for reorganization pursuant to Section 77 of the Bankruptcy Act of 1898, formerly 11 U.S.C. § 205 (1976) (repealed 1978). The United States District Court for the Northern District of Illinois served as the reorganization court.

177. Railroad Revitalization and Regulatory Reform Act of 1976, Pub. L No. 94-210, § 205, 90 Stat. 31 (codified as amended in 45 U.S.C. § 801); Staggers Rail Act of 1980, Pub. L. No. 96-448, § 205, 94 Stat. 1895 (codified as amended at 49 U.S.C. § 10701).

178. *See* Macher et al., *supra* note 30, at 86. For a discussion of a calculation alternative, *see* Mark Burton & Charles Sims, *Understanding Railroad Investment Behaviors, Regulatory Processes, and Related Implications for Industry Oversight*, (Rev. Indust. Org. Working Paper, 2015), http://www.gcbpp.org/files/Railroad/Burton.SimsPaper.pdf.

179. Macher et al., *supra* note 30, at 101.

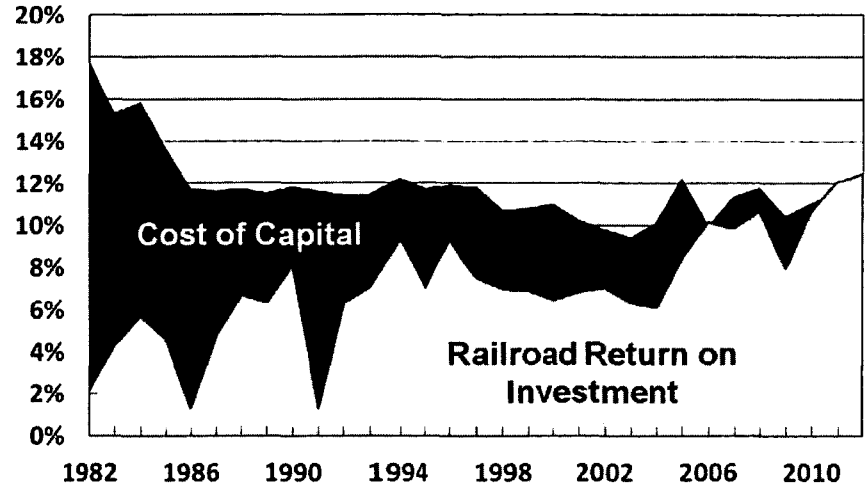
180. *Id.* at 97.

181. *Id.* at 104-05.

182. *Id.* at 110.

183. *Id.*

FIGURE 9—RAIL INDUSTRY RETURN ON INVESTMENT AND THE COST OF CAPITAL



Source: Surface Transportation Board[184]

The NAS committee's treatment of railroad revenues and the ability they may or may not afford for future investment can only be characterized as dismissive.[185] The NAS report catalogues the statutory requirement for the calculation of revenue adequacy, the regulatory implementation of this requirement, and the progress that railroads have made in attaining revenues that are adequate by this measure, but otherwise, give little weight to the topic.[186] Regarding requisite or efficient levels of forward-looking investment, the NAS study sites several federal and NGO evaluations, but provides no direct evidence or comment on the magnitude of current railroad industry investment, requirements for future capital spending, or the ability of the private sector to afford future investment.[187]

E. CONGRESSIONAL OBJECTIVE 5: SAFETY AND ENVIRONMENTAL OUTCOMES

Staggers called for a freight rail system that is "safe and efficient."[188] Ultimately, efficiency is largely measurable by market transactions or their underlying economic condition.[189] This is less in the case for safety

184. ASS'N OF AM. R.R.S., *supra* note 104, at 44.

185. TRANSP. RESEARCH BD., *supra* note 8, at 98-99.

186. *See generally id.* at 151-56.

187. *Id.* at 92-98.

188. Staggers Rail Act of 1980, 49 U.S.C. § 10101 (2015).

189. *See* ROBERT COOTER & THOMAS ULEN, LAW AND ECONOMICS 13-49 (4th ed. Addison Wesley 2003).

and environmental outcomes.[190]

Safety performance (or lack of it) affects a wide range of individuals who are exposed to railroad-related hazards in varying ways. The most obvious groups are railroad employees and railroad passengers.[191] However, safety outcomes extend to motorists, pedestrians, and anyone who resides or works near active railroad properties. While there have been freight railroad accidents over the past two generations that some might judge as horrific, aggregate safety performance has improved measurably over the past three and a half decades. Safety performance data are summarized Table 3.

In addition to safety performance, railroad operations are subject to the same basic environmental standards that govern most industry and commerce.[192] Generally, both the form and extent of the environmental requirements railroads face are indistinguishable from the requirements imposed on other industries.[193] The most notable exception to this commonality is in the area of locomotive emissions and their influence on air quality.

The 1990 Clean Air Act mandated the development and implementation of emission standards for railroad locomotives and other off-road, diesel-powered vehicles.[194] As a result, in 1998 the Environmental Protection Agency (EPA) introduced a tiered set of locomotive emission standards based on the year of manufacture (or remanufacture).[195] These standards govern emissions within four different pollutant categories.[196]

The original standards were subsequently modified in 2008, with more stringent emission standards for existing tiers and the introduction of Tier 4 standards applicable to locomotives manufactured during or after 2015.[197] These rules are designed to reduce particulate matter (PM)

190. *Id.*

191. Class I railroads no longer directly provide passenger services. However, passenger operations are routinely provided on Class I owned rights-of-way or on rights-of-way that require regular interaction with freight trains. *See* The Rail Passenger Service Act of 1970, 45 U.S.C. §§ 501-658 (repealed 1994). For this reason, it is difficult to isolate freight-only impacts on railroad passenger safety. However, the figures reported here do exclude light-rail (transit) casualties sustained when no conventional train service was involved.

192. For a description of the overall array of environmental regulations and guidelines applicable to the railroad industry, *see Transp. and Warehousing Sector: (NAICS 48-49)*, U.S. ENVTL PROT. AGENCY, http://www2.epa.gov/regulatory-information-sector/transportation-and-warehousing-sector-naics-48-49 (last visited Dec. 21, 2015).

193. *Id.*

194. *See* 40 C.F.R. §§ 85, 89, 92 (1998) for emission standards for locomotives and locomotive engines.

195. *Id.* at § 92.8.

196. *Id.*

197. *See* Control of Emissions of Air Pollution From Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder, 40 C.F.R. §§ 9, 85, 86, 89, 92, 94, 1033, 1039, 1042, 1065, 1068 (2008).

emissions from locomotives by as much as 90 percent and Nitrogen Oxide (NOx) emissions by as much as 80 percent when fully implemented.[198] There is little recorded rail industry opposition to the development, implementation, or tightening of locomotive emission standards and it appears compliance with these standards has not been an issue.

TABLE 3—RAILROAD SAFETY PERFORMANCE METRICS

Safety Metric / Year / Change	1980	1990	2012	Change (1980-2012)
Total Incidents per One Million Train-Miles	11.433	4.729	2.389	-49.5%
Derailments per One Million Train-Miles	8.976	3.525	1.759	-50.1%
Grade Crossing Collisions per 1M Train-Miles	14.786	9.387	2.695	-71.3%
Employee Injuries per 100 Employees	11.163	7.590	1.708	-77.5%
Employee Fatalities per 100 Thousand Employees	19.190	14.450	6.910	-52.2%
Train Accidents with Release per One Thousand Hazardous Materials Carloads	0.143	0.027	0.013	-51.1%

Sources: Federal Railroad Administration[199]

The reduction of railroad locomotive emissions is likely in the public's interest, but its link to regulatory format is, at best, indirect. While the development and implementation of emission standards was statutorily mandated, the industry's acquiescence to these regulations coincided with its own program to reduce locomotive fuel consumption and, thereby, operating costs.[200] The industry's cost reduction program seems to have independently promoted the accelerated replacement of existing locomotives with technologically superior equipment, with or without federal encouragement.

It would be difficult to credit this sequence of events to a change in regulatory policies except for the already-noted connection between regulatory reform and firm-level investment ability. While an unassailable

198. Control of Emissions of Air Pollution From Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder, 73 Fed. Reg. 25098, 25098 (May 6, 2008) (codified at 40 C.F.R. §§ 9, 85, 86, 89, 92, 94, 1033, 1039, 1042, 1065, 1068).

199. U.S. DEP'T OF TRANSP., BUREAU OF TRANSP. STATISTICS, NAT'L TRANSP. STATISTICS, Tables 2-39 to 2-44 (2015) (tables labeled as "Railroad and Grade-Crossing Fatalities by Victim Class," "Railroad and Grade-Crossing Injured Persons by Victim Class," "Train Fatalities, Injuries, and Accidents by Type of Accident," "Railroad Passenger Safety Data," "Railroad System Safety and Property Damage Data," and "Fatalities and Injuries of On-Duty Railroad Employees"), http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/ (last visited Dec. 21, 2015).

200. ASS'N OF AM. R.R.S., *supra* note 104, at 31, 32, 37-39, 41.

defense is impossible, it is not unreasonable to conclude that improved emissions performance on the part of Class I railroads was ultimately predicated on the improved financial performance attributable Staggers that has underwritten locomotive replacements.

With regard to the NAS committee activities, the committee was not charged with evaluating safety or environmental outcomes and, therefore, provided little attention to these areas.[201] Its position is best summarized by its statement that, "It believes that maintaining an efficient and financially sound rail system would be consistent with these strategic [safety and environmental] goals."[202]

F. Congressional Objective 6: Employment, Worker Safety, and Compensation

A simple examination of historical data highlights the relationship between rail industry regulatory change and railroad employment.[203] While railroad employment had fallen during the 1960s and 1970s, between 1980 and 1990 the number of full-time rail employees fell more than 47 percent, from 518 to 272 thousand workers.[204] Over the same period, railroad output increased by 14.2 percent to just over one billion ton-miles per year.[205] Interestingly, Staggers, makes no mention of sustained industry employment within either its goals or underlying policies. Instead, it simply encourages, "fair wages and safe and suitable working conditions in the railroad industry."[206]

201. Transp. Research Bd., *supra* note 8, at 223.

202. *Id.*

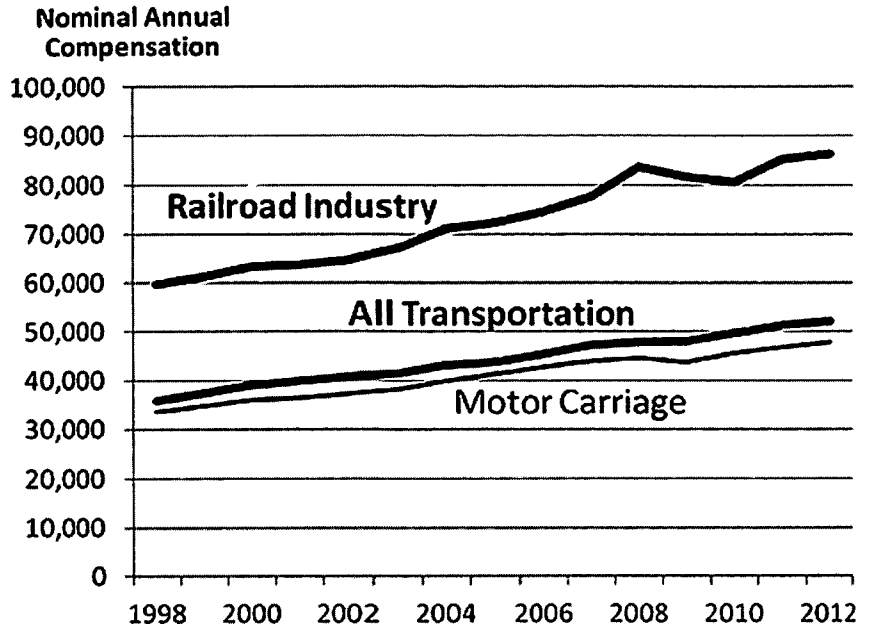
203. Ass'n of Am. R.R.s., *supra* note 104, at 25, 26, 43.

204. A significant share of this reduction – as much as 20 percent – reflects Conrail employment cuts made as it reorganized railroad operations in the northeast. *See* U.S. Dep't of Transp., Bureau of Transp. Statistics, Nat'l Transp. Statistics, Table 3-23 (2014) (table labeled as "Employment in For-Hire Transportation and Selected Transportation-Related Industries (NAICS)"), http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/index.html (last visited Dec. 21, 2015).

205. *See* U.S. Dep't of Transp., *supra* note 204, at Table 1-50 (table labeled as "Ton-Miles of Freight").

206. *See* Staggers Rail Act of 1980, 49 U.S.C. § 10101(11) (2015).

FIGURE 10 – NOMINAL ANNUAL EMPLOYEE COMPENSATION



Source: Bureau of Transportation Statistics[207]

Regarding wage rates, there is evidence that the abrupt rail industry workforce reductions in the immediate wake of reform temporarily eroded organized labor's ability to secure wage premiums that had historically existed between rail workers and similarly skilled craft workers in other industries.[208] However, by the late 1990s, any softening of rail industry compensation had passed. Figure 10 depicts nominal annual compensation for railroad workers, trucking industry employees, and the broader transportation and warehousing sector. Over the period for which the U.S. Department of Labor provides comparable data, rail industry earnings have more than kept pace with industry averages.[209] As Table 3 shows, employee safety outcomes are also consistent with the policies enumerated in Stagger. Over the 33 years summarized in this table, the rate of reportable injuries per 100 employees has fallen by 77.5 percent while the annual rate of employee fatalities has declined by 52.2 per-

207. U.S. DEP'T OF TRANSP., BUREAU OF TRANSP. STATISTICS, NAT'L TRANSP. STATISTICS, Table 3-25 (2015) (table labeled as "Average Wage (a) and Salary Accruals per Full-Time Equivalent Employee by Transportation Industry (North American Industry Classification System [NAICS] basis) (Current dollars)"), http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_03_25.html (last visited Dec. 21, 2015).

208. *See* James MacDonald & Linda Cavalluzzo, *Railroad Deregulation, Pricing Reforms, Shipper Responses and the Effects on Labor*, 50 INDUS. & LAB. REL. REV. 80, 81, 88-89 (1996).

209. U.S. DEP'T OF TRANSP., *supra* note 207, at table 3-25.

cent to less than seven per 100 thousand employees.[210]

V. RBR AND RECOMMENDED REGULATORY CHANGE

As the end product of its work, the National Academies committee offers a set of six recommendations aimed at the "modernization" of railroad industry oversight.[211] Here, the NAS recommendations are evaluated based on the evidence developed in the preceding section and the tenets that form the results-based regulation framework. The NAS committee's recommendations, as they appear in the study summary, are reproduced in Table 4.

TABLE 4— NAS COMMITTEE RECOMMENDATIONS[212]

Topic Area	Recommendations
MAXIMUM RATE PROTECTIONS	*Recommendation:* Prepare to repeal the 180 percent revenue-to-variable-cost formula by directing USDOT to develop, test, and refine competitive rate benchmarking methods that can replace URCS in screening rates for eligibility to be challenged.
	Recommendation: Replace STB rate reasonableness hearings with arbitration procedures that compel faster resolutions of disputes involving rates deemed eligible for challenge because they substantially exceed their competitive rate benchmarks.
	Recommendation: Allow reciprocal switching as a remedy for unreasonable rates.
ANNUAL REVENUE ADEQUACY DETERMINATIONS	*Recommendation:* End annual revenue adequacy determinations and require periodic assessments of industry-wide economic and competitive conditions.
MERGER REVIEW AND PUBLIC INTEREST STANDARD	*Recommendation:* Transfer merger review authority to the antitrust agencies and apply customary antitrust principles rather than a public interest standard.
STRATEGIC REVIEW	*Recommendation:* Congress should give STB the direction and resources to undertake a strategic review of all of its data programs to simplify or discontinue the reporting of littleused data as a general matter and to support the recommended changes in its regulatory practices and approaches.

At the core of results-based regulation there is a fundamental re-

210. U.S. DEP'T OF TRANSP., *supra* note 199, at table 2-39 to 2-44.

211. These recommendations are discussed throughout the NAS document, but are first provided in its summary. *See* TRANSP. RESEARCH BD., *supra* note 8, at 5-9.

212. *Id.*

quirement that alternative regulatory policies be embraced when (and only when) these alternatives can be expected to achieve outcomes that are better than the economic results attainable under the status quo.[213] Further, any such conclusions should be based on empirical evidence and not simply predicted by economic theory or made desirable by philosophical sentiment.[214]

The data preparation and analyses prepared in support of the NAS study clearly meet the highest standard of rigor and the descriptions of the analytical results are remarkable for their clarity and precision. Indeed, the NAS study effort exemplifies the sort of vigilance encouraged by results-based regulation.[215] Nonetheless, at least three of the six committee recommendations do not currently meet the core RBR standard and, therefore, based on this standard, would be rejected in the absence of additional empirical support.

In its favor, the NAS analysis demonstrates that the 180 percent R/VC threshold used to screen shipper rate protests is both ill-suited and miscalculated for that purpose.[216] Moreover, the technical appendix demonstrating an alternative method of rate benchmarking offers empirical evidence that this alternative can potentially improve regulatory outcomes.[217] Thus, the report's first recommendation merits consideration when judged by RBR's core standard. Likewise, the committee's various analyses aptly demonstrate the handicaps imposed by data that are unnecessarily limited in scope, content, and accuracy. Accordingly, the committee's last recommendation regarding data improvements would clearly promote the vigilance advocated under RBR. Finally, the recommendation that responsibility for further merger evaluations be shifted from the STB to the appropriate antitrust authority (presumably, the U.S. Department of Justice in most cases) would seem to fall outside the RBR framework.

The three remaining recommendations – the substitution of arbitration in the determination of rate reasonableness, the imposition of reciprocal switching as a competitive tonic, and the abandonment of revenue adequacy as a rate basis –share a common failure. Each seeks to remedy a problem that has not been shown to exist through a policy alternative with no demonstrated capacity for improvement.

In a theoretically-centered discussion, the debate regarding the NAS (or any such) proposals would focus on potential changes in consumer

213. *Mayo, supra* note 1, at 151.

214. *Id.* at 155-56.

215. *Id.* at 138.

216. *See* TRANSP. RESEARCH BD., *supra* note 8, at 5.

217. *See id.* at 225-58 (Appendix B, "Demonstration of Competitive Rate Benchmarking to Identify Unusually High Rates").

and producer surplus. However, when evaluating consumer well-being, RBR favors less reliance on relatively nebulous measures of surplus in favor of more tangible, telltale metrics like equilibrium market quantities or corresponding prices. Through that lens, there is nothing in Section 4 above, nor anything in the NAS analyses, that suggests a sustained pattern of unnecessarily high prices or inefficiently constrained output quantities. Without this motivation, it is impossible to embrace change. Moreover, even forgiving this shortfall, there is no empirical evidence as to the extent (if at all) that arbitration and reciprocal switching or the abandonment of revenue adequacy would lead to lower, sustainable railroad rates and increased volumes of shipped commodities. In summary, while these ideas may each have attractive qualities, each would require considerably more investigation before finding acceptance in a RBR-compliant setting.

VI. Concluding Thoughts

Considering the market metrics described above, most will concur that the implementation of Staggers has largely satisfied the congressional intent expressed in the 1980 legislation. Still, in 2008, Darius Gaskins wrote:

> . . . "deregulation" of the U.S. railroads has not created a textbook competitive industry. Competition between railroads and with other transportation modes has been created, but there are still many monopolistic or duopolistic features in the rail industry. The residual regulatory issue is what the appropriate remedies for "captive" or sole-served rail customers are. Sadly to say, this regulatory dilemma still has not been solved to everyone's satisfaction after 150 years of effort.[218]

In this conclusion, Dr. Gaskins cites Grimm and Winston.[219] One must suspect this view did not originate with them, but has been echoed many times previously. The "railroad problem" is one that simply lacks a lasting and universally agreeable solution. In this light, the use of results-based-regulation as a basis for ongoing US railroad policy is not only an account of the current regulatory framework, it is a concession to recurring frustration with past approaches, and an admission that this problem will not fade. The results-based approach by no means abandons economic theory, but by emphasizing simply derived empirics and counterfactual examples, it does redirect policy-making attention away from theoretical ideals and toward observed outcomes and the potential outcomes *achievable* under alternative policies. Consequently, by its de-

218. Gaskins, *supra* note 163, at 561.

219. *See* Grimm, *supra* note 146.

sign, RBR is perfectly suited to the theoretically intractable matter of railroad policy.

When compared to conditions in 1980, the current railroad industry is vastly more efficient. As the current analysis has shown, these efficiencies have resulted in reduced costs, generally lower prices, greater rail output and market shares, remarkable private sector investment, and financial stability, all without any evidence of serious market abuse. Nonetheless, these conclusions alone do not necessarily point to the current program of federal oversight as the best course forward. Reaching that conclusion requires that the benchmark results observed under the status quo be evaluated alongside both what might have been under a different regulatory program and, more importantly, estimates of what might be attainable under forward-looking alternatives. In short, there is no lasting equilibrium.

Still, the notion that preferable economic outcomes are not really achievable appears to have made policy-makers hesitant to modify the existing federal framework governing US railroads. Results-based regulation suggests that this instinctive caution is healthy. By isolating most (if not all) of the requisite retail metrics prescribed by RBR, efforts like the NAS study, as well as the work presented here, continue the inquiry that is and has been integral to Staggers' success. As previously noted, however, offering final conclusions while additional counterfactual comparisons are unavailable would be premature. What can be said is that the metrics describing post-Staggers rail industry performance set a high bar to be reached by any alternative rail industry oversight program. Finally, while it is doubtful any policy alternative could be poorly enough conceived or badly enough implemented to return US railroads to their condition of 40 years past, that specter will not be easily retired.