

BEFORE THE SURFACE TRANSPORTATION BOARD

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STB Ex Parte No. 761

HEARING ON REVENUE ADEQUACY

STB Ex Parte No. 722

RAILROAD REVENUE ADEQUACY

**SUPPLEMENTAL COMMENTS OF
THE ASSOCIATION OF AMERICAN RAILROADS**

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Verified Statement of Prof. Joseph P. Kalt & David Reishus, PhD

Reply Verified Statement of Prof. Robert Willig (Nov. 4, 2014)

INTRODUCTION

The Association of American Railroads (AAR) welcomes the opportunity to supplement its initial comments and testimony from the December hearing. The discourse at that hearing was wide-ranging and informative. We believe the hearing made clear that using system-wide financial health as a trigger for forced competitive access or Nixon-era limits on rate increases has no support in sound economics or the law.

Our goal in these supplemental comments is not to reiterate points made in our written testimony or hearing testimony. Rather, AAR focuses on three topics raised by the members at the hearing. In **Section I**, we provide further analysis of the statutory framework for revenue adequacy, including a closer look at the language in the statute referencing “economic profit or return (or both)” and the relevant rail transportation policy (RTP) factors. In particular, we address the question of whether the Board’s governing statute authorizes utility-style rate regulation with the goal of driving system-wide earnings towards the cost of capital. As demonstrated below, the statute plainly does not support that kind of earnings regulation.

In **Section II**, we address the flawed econometric model that the American Chemistry Council (“ACC”) presented at the hearing, which would use *average* competitive rates and system-wide financial health to set the *maximum* lawful rate. ACC’s proposal is rife with practical, economic, and legal flaws. As Professor Kalt and Dr. Reishus explain in their attached Verified Statement, the ACC proposal “represents a return to the pre-Staggers principles of ratemaking” where, “[i]n place of groups of rates determined by rate bureaus, the proposal would use a mathematical equation as its ‘rate bureau[.]’ . . . The[] commodity-based maximum rates would consider no information about specific customer demands, service levels, or costs. This proposal represents a large backwards step away from modern, flexible and innovative,

customer-based rail service and pricing.”¹ ACC’s proposal is an apt illustration of a point that AAR explained in detail in its Opening Comments, and that Professor Kalt and Dr. Reishus explain in their Verified Statement: any kind of revenue adequacy constraint should be abandoned, because “[a] finding of ‘revenue adequacy’ – even if properly measured using replacement cost – cannot identify which, if any, rates are above competitive levels.”² Moreover, when revenue adequacy is used to trigger rate regulation, in whatever form, the well-known distortions of earnings regulation come into play. This is precisely the case with regard to ACC’s proposal, which is a type of discredited earnings regulation.³

In **Section III**, we offer a lawful and sound path forward. The hearing revealed the members’ concerns that existing methods may not provide an adequate forum for small customers to challenge individual rates. AAR offers two interrelated options.

¹ Verified Statement of Prof. Joseph P. Kalt & David Reishus, PhD (“Kalt & Reishus V.S.”) ¶ 40. AAR is also attaching the verified statement of Professor Robert Willig, submitted in the prior hearing on revenue adequacy. See EP 722, Reply Comments of the Association of American Railroads, Reply Verified Statement of Prof. Robert Willig (“Willig Reply V.S.”) (Nov. 4, 2014). Professor Willig rebuts the flawed testimony of Professor Faulhaber, which ACC attached to its initial written comments in this proceeding, recycling the testimony from the joint shipper submission in EP 722. See Ex Parte Nos. 761 & 722, Written Testimony of the American Chemistry Council (Nov. 26, 2019) (attaching as Exhibit 1, Verified Statement of Gerald R. Faulhaber, Reply of Concerned Shipper Ass’ns, *Railroad Revenue Adequacy*, EP 722 (Nov. 4, 2014)). We offer the Willig Reply V.S. simply to remind the STB of the robust economic support for its Stand-Alone Cost test.

² Kalt & Reishus V.S. ¶ 56; see *Blue Cross & Blue Shield United of Wis. v. Marshfield Clinic*, 65 F.3d 1406, 1412 (7th Cir. 1995) (“[I]t is always treacherous to try to infer monopoly power from a high rate of return. ... [N]ot only do measured rates of return reflect accounting conventions more than they do real profits (or losses), as an economist would understand these terms, ... but there is not even a good economic theory that associates monopoly power with a high rate of return.” (internal citations omitted); *In re Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993*, 28 FCC Rcd. 3700, 3888, ¶ 284 (Mar. 21, 2013) (“[A]ccounting-based indicators of profitability are not estimates of economic profit, and neither accounting nor economic profits are considered reliable estimators of market power.” (internal footnotes omitted)).

³ Kalt & Reishus V.S. ¶¶ 23-40.

First, the STB should improve its existing tools by exploring ways to streamline and improve the SAC, Simplified-SAC, and Three-Benchmark tests. Professor Kalt has offered some smart simplifications for the SAC test, and the industry has offered ways to improve the Three-Benchmark approach. Second, the STB should investigate how to encourage parties to make greater use of the *voluntary* arbitration program Congress created. AAR believes that features of that program—particularly the lack of confidentiality and the selection of arbitrators—has deterred its use. AAR urges the STB to explore whether changes to the program could encourage use of the arbitration program.

I. THE STATUTE DOES NOT AUTHORIZE RATE REGULATION BASED ON A RAILROAD’S OVERALL EARNINGS.

At the December 2019 hearing, several questions were raised about the proper interpretation of the statutory provisions relating to revenue adequacy and rate regulation. As AAR explained at the hearing and as further discussed below, it is clear both on the face of the statute and from the context of Congress’s objectives that Congress did not intend to establish or permit a regime of rate regulation that constrains rates based on the level of a railroad’s overall earnings. AAR reiterates its request that the Board formally abandon the use of a revenue adequacy constraint, which is not supported by the statute and has never been applied in a rail rate case.

A. The Statutory Scheme Does Not Authorize the Use of a Revenue Adequacy Constraint to Regulate Rates.

The Board’s interpretation of the statutory provisions pertinent to revenue adequacy must begin with two well-known canons of statutory construction:

(1) statutory language must be given its plain meaning,⁴ and (2) statutory provisions must be read consistent with the whole text of the statute, including its stated objectives and context.⁵ Under both canons, the governing statute does not authorize the Board to employ a revenue adequacy constraint to regulate rail rates.

1. The plain meaning of the statute does not support a revenue adequacy constraint.

The plain meaning canon precludes a statutory interpretation that seeks to find hidden meaning in plain language or that seeks to draw implausible inferences from straightforward statutory language.⁶ Here, the plain language of the Interstate Commerce Act precludes the use of revenue adequacy as the basis for constraining rail rates or revenues.

Two statutory provisions speak directly to the proper use of revenue adequacy in the current regulatory scheme. Section 10701(d)(2) states that in considering the reasonableness of a rate, the Board must “recogniz[e] the policy of this part that rail

⁴ See *Estate of Cowart v. Nicklos Drilling Co.*, 505 U.S. 469, 475 (1992) (“In a statutory construction case, the beginning point must be the language of the statute, and when a statute speaks with clarity to an issue[,] judicial inquiry into the statute’s meaning, in all but the most extraordinary circumstance, is finished.”); see also *Pub. Empl. Retirement Sys. of Ohio v. Betts*, 492 U.S. 158, 171 (1989) (“[N]o deference is due to agency interpretations at odds with the plain language of the statute itself. Even contemporaneous and longstanding agency interpretations must fall to the extent they conflict with statutory language.”).

⁵ See *Gundy v. United States*, 139 S. Ct. 2116, 2126 (2019) (“This Court has long refused to construe words ‘in a vacuum,’ [as] ‘[i]t is a fundamental canon of statutory construction that the words of a statute must be read in their context and with a view to their place in the overall statutory scheme.’” (internal citations omitted)); *Robinson v. Shell Oil Co.*, 519 U.S. 337, 341 (1997) (“[S]tatutory language is determined by reference to the language itself, the specific context in which that language is used, and the broader context of the statute as a whole.”).

⁶ See *City of Farmington, N.M. v. FERC*, 820 F.2d 1308, 1315 (D.C. Cir. 1987) (“Where the language is plain and admits of no more than one meaning[,] the duty of interpretation does not arise” (quoting *Caminetti v. United States*, 242 U.S. 470, 485 (1917)) (rejecting the government’s interpretation of a statutory provision, explaining that the government “abandon[ed] the literal statutory language”).

carriers shall earn adequate revenues.” Section 10704 similarly states that the “Board shall make an adequate and continuing effort to assist those carriers in attaining revenue levels prescribed under this paragraph.” The plain language of these provisions instructs the Board to “assist” railroads in achieving revenue adequacy, not to cap revenues, or more aggressively regulate rates, once railroads achieve a prescribed level of financial health. Indeed, there is not a single statutory provision that identifies revenue adequacy as a basis for constraining firm-wide earnings or regulating the level of individual rail rates.

2. The statute, read as a whole, does not support a revenue adequacy constraint.

Under the whole-text canon of statutory construction, courts “do not . . . construe statutory phrases in isolation; [they] read statutes as a whole,” including the context and purposes of the statute.⁷ The 4R Act,⁸ in which the concept of revenue adequacy was introduced, was designed and structured to reduce the ICC’s over-regulation of railroads and to restore railroads’ financial health by giving them more flexibility in rate setting.⁹ Four years later, the Staggers Act¹⁰ reinforced the deregulatory efforts initiated in the 4R Act, and, specifically with regard to revenue adequacy, the Staggers Act

⁷ *United States v. Morton*, 467 U.S. 822, 828-34 (1984); see *Gundy v. United States*, 139 S. Ct. 2116 (2019) (“[R]easonable statutory interpretation must account for both the specific context in which ... language is used and the broader context of the statute as a whole’ And beyond context and structure, the Court often looks to ‘history [and] purpose’ to divine the meaning of language.” (internal citations omitted)); *United States v. Morton*, 467 U.S. 822, 828 (1984); see also *Freeman v. Quicken Loans, Inc.*, 566 U.S. 624, 632 (2012) (rejecting an interpretation of a statutory provision that would undercut the purpose of the statute by imposing liability on “the very class for whose benefit [the statute] was enacted”).

⁸ Railroad Revitalization and Regulatory Reform Act of 1976 (“4R Act”), Pub. L. No. 94-210, 90 Stat. 31.

⁹ See *infra* note 11.

¹⁰ Staggers Rail Act of 1980 (“Staggers” or “Staggers Act”), Pub. L. No. 96-448, 94 Stat. 1895.

changes were intended to clarify the ICC's duty to assist railroads in earning adequate revenues.¹¹ Neither statute provided the ICC with new regulatory tools for regulating the overall earnings of railroads. To the contrary, both statutes were designed to allow railroads to improve their financial health via deregulation.¹² Within this broader statutory context, the affirmative goal of revenue adequacy cannot plausibly be read as a limit on railroad earnings; rather, it is a directive from Congress to the agency to assist railroads in achieving financial health.

Even if the plain language of the statute and its wider context were ambiguous (and they are not), the legislative history demonstrates Congress's acute concern over the dismal financial condition of the rail industry and the over-regulation by the ICC that had contributed to that financial condition.¹³ The legislative history of the 4R Act and the Staggers Act shows that revenue adequacy was intended as an affirmative goal, not a rate constraint, and that the statutes' overarching objective was to make railroads financially viable by deregulating.¹⁴ For example, the legislative history contains numerous references to Congress's understanding of revenue adequacy as an affirmative objective:

¹¹ See *W. Coal Traffic League v. United States*, 719 F.2d 772, 774-75, 777 (5th Cir. 1983) (explaining that "through enactment of the [4R Act], Congress sought to reduce regulatory restraints on railroad pricing decisions" and that Congress in 1980 enacted "a second major deregulation statute, the Staggers Act[,] " [i]n an effort to hasten railroad rate deregulation").

¹² *Id.*

¹³ See *Milavetz, Gallop & Milavetz, P.A. v. United States*, 559 U.S. 229, 236 n.3 (2010) ("Although reliance on legislative history is unnecessary in light of the statute's unambiguous language, we note the support that record provides for the Government's reading.").

¹⁴ See *supra* note 11.

- “The Committee believes that it is important for the [ICC] to determine expeditiously adequate revenue levels for the carriers and to assist carriers in attaining such levels”¹⁵
- “It is the purpose of the Congress in [the 4R Act] to provide the means to rehabilitate and maintain the physical facilities, improve the operations and structure, and restore the financial stability of the railway system of the United States, and to promote the revitalization of such railway system, so that this mode of transportation will remain viable in the private sector of the economy and will be able to provide energy-efficient, ecologically compatible transportation services with greater efficiency, effectiveness, and economy”¹⁶
- “Almost all agree that something further must be done to improve the financial health of the nation’s railroads or the industry will continue to falter with the likely alternative being only an increasingly heavy burden on the consumer and taxpayer. To the extent it remains desirable to continue private sector ownership of this nation’s rail industry the need for this legislation is obvious and accepted. The goal is to allow for the restoration of the rail industry to vigorous and profitable growth.”¹⁷
- “Previous admonitions by the Congress that the Commission assist carriers in earning adequate revenue levels . . . have not achieved their goals.”¹⁸
- Revenue adequacy relates to “the opportunity for railroads to obtain adequate earnings to restore, maintain and improve their physical facilities while achieving the financial stability of the national rail system.”¹⁹
- The ICC “is given the mandate to place greater emphasis on the need for carriers to have adequate revenue levels.”²⁰

¹⁵ S. Rep. No. 94-499, at 52 (1975), *as reprinted in* 1976 U.S.C.C.A.N. 14, 52.

¹⁶ 45 U.S.C. § 801(a) (1976).

¹⁷ S. Rep. No. 96-470, at 6 (1979).

¹⁸ H.R. Rep. No. 96-1035, at 54 (1980), *as reprinted in* 1980 U.S.C.C.A.N. 3978, 3999 (internal citations omitted).

¹⁹ H.R. Rep. No. 96-1430, at 80 (1980), *as reprinted in* 1980 U.S.C.C.A.N. 4110, 4111.

²⁰ *Id.*, *as reprinted in* 1980 U.S.C.C.A.N. 4110, 4112.

Nothing in the legislative history suggests that Congress intended revenue adequacy to function as a cap on earnings or a rate constraint. In other words, the term “adequate” does not represent a ceiling but, rather, a goal.

3. Both federal court and agency precedent have recognized revenue adequacy as an affirmative objective.

The ICC recognized when it first implemented the revenue adequacy provisions that those provisions were intended to assist railroads to achieve revenue adequacy and were not a basis for a new rate constraint.²¹ As explained by the Third Circuit in upholding the ICC’s adoption of standards for defining and measuring revenue adequacy, the revenue adequacy provisions in the statute are “addressed to the opportunity to attain revenue levels which would reverse the long decline in the railroad industry. The specific objectives listed in section 205 [the revenue adequacy definition] *should not in [the ICC’s] view be read as limitations on revenue . . .*”²²

Courts and the ICC/STB have repeatedly recognized that the 4R Act and the Staggers Act were not designed to create new regulatory limits on railroad rates and revenues but just the opposite—to enable railroads to function more like other firms in the national economy. *See, e.g., Groome & Assocs., Inc. v. Greenville Cty. Econ. Dev. Corp.*, FD 42087, at 12 (STB served July 27, 2005) (“Congress directed [in the Staggers Act] that railroads be treated more like ordinary businesses than like public utilities.”); *Burlington N. R.R. Co. v. Pub. Util. Comm’n of Tex.*, 812 F.2d 231, 235 (5th Cir. 1987) (recognizing the intent of the Staggers Act was to take a step toward “treat[ing] the rail industry as any other unregulated industry”). Commercial firms are not subject to earnings regulation,

²¹ *See* AAR Opening Comments at 30-32. The ICC’s creation of the revenue adequacy constraint in 1985 was inconsistent with earlier and later agency and federal court precedent and should be abandoned. *See id.* at 30-35.

²² *Bessemer & Lake Erie R.R. Co. v. ICC*, 691 F.2d 1104, 1112 (3d Cir. 1982) (emphasis added).

and there is no basis in the statute or legislative history to conclude that Congress wanted to subject railroads to such onerous and distorting regulatory constraints — particularly when Congress’s goal was to support and ensure the financial health of the industry.²³

B. Textual Analysis of the Relevant Statutory Provisions Shows that Revenue Adequacy Was Not Intended as a Constraint on Rates.

There are two statutory provisions and two statements of Rail Transportation Policy that refer directly or indirectly to revenue adequacy. These provisions indicate that revenue adequacy is to be used as a measure of the financial health of the industry, monitoring the *agency’s* progress in meeting Congress’s goal of industry wellbeing. Likewise, none of these provisions treats revenue adequacy as a constraint on rates.

1. Section 10704(a)(2)

The statutory provision that explicitly sets out the revenue adequacy principle and standard is 49 U.S.C. § 10704(a)(2):

The Board shall maintain and revise as necessary standards and procedures for establishing revenue levels for rail carriers providing transportation subject to its jurisdiction under this part that are adequate, under honest,

²³ As discussed at the hearing, there is no legal basis for concluding that the revenue adequacy constraint has been ratified or otherwise approved by Congress. This is because there is no indication at all that Congress was aware of the obscure and never applied “revenue adequacy constraint” created in *Coal Rate Guidelines* when it reenacted the relevant legislation, much less “evidence of *express* approval[,]” as required. *Beverly Enters., Inc. v. Herman*, 119 F. Supp. 2d 1, 9 (D.D.C. 2000) (emphasis added); *see id.* (“[I]n order to construe congressional reenactment of a statute as an adoption of an agency interpretation thereunder, there must be a showing that Congress was aware of, and expressly approved of, the prior agency position. *See General Am. Transp. Corp. v. I.C.C.*, 872 F.2d 1048, 1053 (D.C.Cir.1989) ... [A]ssuming Congress was even aware of the [agency’s] construction, there is simply no evidence of express approval. ... [And] ‘[i]t is at best treacherous to find in congressional silence alone the adoption of a controlling rule of law....’” (quoting *Girouard v. United States*, 328 U.S. 61, 69 (1946)); *Isaacs v. Bowen*, 865 F.2d 468, 473 (2d Cir. 1989) (“[T]he doctrine applies when Congress indicates not only an awareness of the administrative view, but also takes an affirmative step to ratify it.”).

economical, and efficient management, for the infrastructure and investment needed to meet the present and future demand for rail services and to cover total operating expenses, including depreciation and obsolescence, plus a reasonable and economic profit or return (or both) on capital employed in the business. The Board shall make an adequate and continuing effort to assist those carriers in attaining revenue levels prescribed under this paragraph. Revenue levels established under this paragraph should –

- (A) provide a flow of net income plus depreciation adequate to support prudent capital outlays, assure the repayment of a reasonable level of debt, permit the raising of needed equity capital, and cover the effects of inflation; and
- (B) attract and retain capital in amounts adequate to provide a sound transportation system in the United States.

As noted previously, this provision calls for affirmative action to promote adequate revenues for every carrier. “Adequate” means “equal to, proportionate to, or fully sufficient for a specified or implied requirement.”²⁴ Section 10704(a)(2) defines that specific requirement as revenues that are sufficient to: i) allow for infrastructure and investment needed to meet present and future demand for rail services; ii) cover total operating expenses, including depreciation; and iii) provide for “a reasonable and economic profit or return (or both) on capital employed in the business.” The provision goes on to require that the Board make an “adequate and continuing effort to assist... carriers in attaining revenue levels” in accordance with this prescribed definition. 49 U.S.C. § 10704(a)(2). In other words, the statute calls for the Board to assist carriers in earning not up to their cost of capital, but rather revenue levels described by Section 10704(a)(2), which describes revenue *above and beyond* the cost of capital. As further explained in the next section, the specific words used in this provision have a plain

²⁴ 1 WEBSTER’S THIRD NEW INT’L DICTIONARY 25 (1976).

meaning that must be given effect. And that plain meaning unambiguously establishes that revenue adequacy is a floor, not a ceiling.

a. “reasonable and economic” profit or return

First, section 10704(a)(2) plainly states that in order for a carrier’s revenues to be considered adequate, those revenues must be sufficient to not only cover infrastructure costs and operating expenses, but also to earn a profit. The level of profit required is specifically defined as “a reasonable and economic profit or return.” 49 U.S.C. § 10704(a)(2). The word “economic” used as a modifier of “profit or return” has a plain meaning. First, it is widely understood that an “economic” profit or return is different from an “accounting” profit or return.²⁵ Unlike an “accounting” profit, which is based on the historical book value of assets, an “economic” profit must be based on a replacement cost assessment of asset values. As the Eleventh Circuit has explained:

Accounting profits differ from economic profits in several important ways [A]ccounting profits exceed economic profits. Thus, the perfectly competitive firm in equilibrium earns zero economic profits though its normal returns are reflected in positive accounting profits. Hence, substantial accounting profits—say, 20 percent—may be consistent with trivial or zero economic profit and thus do not necessarily indicate any market power.²⁶

Thus, because the STB’s revenue adequacy calculations are based on “accounting” profits, the STB’s calculations necessarily overstate a railroad’s “economic” profitability.

²⁵ See *In re Coca-Cola Co.*, 117 F.T.C. 795, 950 n.93 (1994) (“Economic profit accounts for the opportunity costs of all the assets that a firm uses in its business, while accounting profit reflects a firm’s explicit historical expenditures.”).

²⁶ *Bailey v. Allgas, Inc.*, 284 F.3d 1237, 1252 n.21 (11th Cir. 2002); see *In re Coca-Cola Co.*, 117 F.T.C. at 950 n.93 (1994) (“For purposes of antitrust analysis, ‘economic profit,’ rather than ‘accounting profit,’ is the appropriate measure of firm performance.”).

Likewise, section 10704(a)(2)'s revenue adequacy definition requires a greater level of profitability than that currently reflected by the STB's annual calculations.

This distinction between economic and accounting profit is widely acknowledged by economists as well:

- "The two concepts of profit differ because total cost, in the economist's definition, includes the opportunity cost of any capital, labor, or other inputs supplied by the owner of the firm. Thus, if a small business earns just enough to pay the owner the fees (say, \$35,000 per year) that her labor and capital could have earned if they had been sold to others, economists say she is earning zero *economic* profit. In contrast, most accountants will say her profit is \$35,000."²⁷
- "In the calculation of the implicit rental rate of capital used to determine long-run economic profits, capital assets should be valued at **replacement cost**, which is the long-run cost of buying a comparable-quality asset."²⁸

With regard to the term, "economic ... return," the Antitrust Division of the Justice Department has recognized that accounting returns do not reflect "true economic rates of return":

High accounting profits do not necessarily reflect the exercise of monopoly power. In particular, cost measures are normally available only from reports prepared in conformity with accounting conventions, but economics and accounting have significantly different notions of cost. Accounting figures seldom reflect the firm's true economic cost of producing its goods and services, and accounting rates of return will often differ from true economic rates of return. For example, determining if a firm is earning an economic profit requires accounting properly for depreciation and the economic replacement cost of the assets the firm is

²⁷ WILLIAM J. BAUMOL & ALAN S. BLINDER, *ECONOMICS—PRINCIPLES AND POLICY* 108 (6th ed. 1994) (emphasis in original).

²⁸ DENNIS W. CARLTON & JEFFREY M. PERLOFF, *MODERN INDUSTRIAL ORGANIZATION* 247 (4th ed. 2005) (emphasis in original).

using to generate its income. Yet the information reported by accountants frequently is not designed to measure and accurately reflect those costs.²⁹

Because the Board assesses revenue adequacy using “accounting” profits/returns based on the book value of a carrier’s assets, the Board’s revenue adequacy calculations say nothing about the level of “economic” profit or return the STB is supposed to assist railroads in earning.

Second, the term “reasonable and economic profit or return (or both)” means a profit or return (or both) *above* the cost of capital, not *equal* to the cost of capital (as the Board currently measures revenue adequacy).³⁰ For example, in *Bailey v. Allgas, Inc.*, the Eleventh Circuit explained that “[e]conomists regard capital’s opportunity cost as a cost and define *economic profit* as the return to investors *above and beyond* what is necessary to induce them to invest.” 284 F.3d 1237, 1252 n.21 (11th Cir. 2002). Likewise, the Transportation Research Board has stated that “zero economic profits” means “break even.”³¹ Zero profit—*i.e.*, a break-even earning of no more than the cost of capital—is

²⁹ U.S. Dep’t of Justice, *Competition and Monopoly: Single-Firm Conduct under Section 2 of the Sherman Act*, Chapter 2 (IV)(A) (2008) (internal citations omitted); *see id.* at 29 (contrasting accounting return with economic return: “[A]vailable estimates of a firm’s capital costs, an important input into calculating a firm’s profitability, are generally based on accounting rules that do not account for the riskiness of the investment. If the investment, at the time it was made, was quite risky, a very high accounting rate of return may reflect a modest economic return. More generally, when all relevant economic costs are properly accounted for, what may at first seem to be a supracompetitive return may be no more than a competitive one (or vice versa).”).

³⁰ As noted above, section 10704(a)(2) defines adequate revenues as those sufficient to: i) allow for infrastructure and investment needed to meet present and future demand for rail services; ii) cover total operating expenses, including depreciation; and iii) provide for “a reasonable and economic profit or return (or both) on capital employed in the business.” STB’s current revenue adequacy measurement fails to effectively reflect these three requirements.

³¹ National Academies of Sciences, Engineering, and Medicine 2015. *Modernizing Freight Rail Regulation*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/21759>, at 125.

not a profit; it is, by definition, the absence of profit.³² The reference to a “reasonable” economic profit or return naturally implies some positive amount of profit.

Economic literature is in accord: “Economic profit . . . is the amount a firm earns *over and above* the payments for all inputs, including the interest payments for the capital it uses and the opportunity cost of any capital provided by the owners of the firm.”³³ Accordingly, the Board’s determination that a railroad is “revenue adequate” when its accounting ROI equals the COC—and the unsupported statements in *Guidelines*, which suggested a revenue adequacy constraint would be triggered if accounting ROI equals the COC—are inconsistent with the requirements of 10704(a)(2). Such an interpretation reflects no economic profit to the railroad at all, much less a “reasonable” amount as required by statute, while simultaneously overstating a railroad’s actual “economic” profits or returns.

b. “attract and retain capital”

Subsections 10704(a)(2)(A) and (B) further explain that adequate revenue levels must “permit the raising of needed equity capital” and “attract and retain capital in amounts adequate to provide a sound transportation system.” A cap on rail earnings at the cost of capital would put railroads at a permanent disadvantage relative to other firms in the economy competing for capital, which is the exact opposite of Congress’s goal in the 4R Act and Staggers Act. As demonstrated at the hearing by the panel of economists sponsored by UP, NS, and CN, if the Board’s methods for calculating return on invested capital and railroad industry cost of capital were applied to other firms in the S&P 500, the median S&P 500 firm would have an ROI well above its cost of

³² *Id.*

³³ WILLIAM J. BAUMOL & ALAN S. BLINDER, *ECONOMICS—PRINCIPLES AND POLICY* 412 (11th ed. 2009) (emphasis in original, and some emphasis omitted).

capital.³⁴ If railroads were constrained to earn no more than their cost of capital, they would not be able to compete fairly or equally for capital investment, as envisioned by the statutory revenue adequacy definition.

2. Section 10701(d)(2)

A second statutory provision, section 10701, sets forth standards for, *inter alia*, rate reasonableness cases. As noted previously, section 10701(d)(2) instructs the Board to consider “the policy of this part that rail carriers shall earn adequate revenues” in determining maximum reasonable rates. Once again, the statute sets out an affirmative obligation to promote revenue adequacy, not a restraint on rates or an independent basis for regulating rates. It would turn section 10701(d)(2) on its head to read that provision as stating “that rail carriers shall earn [*no more than*] adequate revenues,” which is the assumption underlying the revenue adequacy constraint in *Guidelines*. Section 10701(d)(2) also sets out specific factors the Board must consider when determining maximum reasonable rates—the so-called Long-Cannon factors. While certain of the Long-Cannon factors suggest limitations on a railroad’s application of differential pricing, none of the factors contains any reference to revenue adequacy, let alone any implication that rates should be capped when a railroad achieves revenue adequacy. To the contrary, Congress *expressly limited* STB’s discretion to apply the Long-Cannon factors, instructing that the Board give them “due consideration” while “recognizing ... that rail carriers *shall earn adequate revenues*” in accordance with the definitional requirements of section 10704(a)(2). 49 U.S.C. § 10701(d)(2) (emphasis added).

³⁴ Ex Parte Nos. 761 & 722, Written Testimony of Professor Kevin Murphy, Ph.D., and Professor Mark Zmijewski, Ph.D., on behalf of Union Pacific Railroad Company, Norfolk Southern Railway Company, and CN (Nov. 26, 2019).

3. Rail Transportation Policy Factors

The RTP factors, contained in 49 U.S.C. § 10101, are not independent sources of regulatory authority but rather express the policies that are to guide the STB's exercise of authority granted elsewhere in the statute.³⁵ In other words, the general provisions in § 10101 cannot trump the specific provisions dealing with rate reasonableness.³⁶ Nevertheless, the RTP factors reinforce the point that revenue adequacy is a goal to strive for, not a constraint on rates.

The legislative history of the Staggers Act explains the overall thrust of the (then) new RTPs. In reference to the RTPs, the conference report on the Staggers Act explains:

Consistent with the new rail transportation policy of this Act, the Conferees intend that competition be recognized as the best control on the ability of railroads to raise rates. The purpose of this legislation is to reverse the decline of the railroad industry, which has been caused, in part, by excessive government regulation. The Conferees believe that by allowing the forces of the marketplace to regulate railroad rates wherever possible the financial health of the railroad industry will be improved and will benefit all parts of the economy, including shippers, consumers, and rail employees.³⁷

³⁵ See *CSX Transp., Inc. – Abandonment Exemption – in LaPorte, Porter, & Starke Ctys., Ind.*, AB 55 (Sub-No. 643X) et al., slip op. at 6 (STB served May 31, 2017) (“[T]he RTP does not create an independent basis for Board action in the absence of a violation of a substantive provision in the Interstate Commerce Act.”) (citations omitted).

³⁶ See *Perez-Guzman v. Lynch*, 835 F.3d 1066, 1075 (9th Cir. 2016) (the “canon [of *generalia specialibus non derogant*—i.e., “the specific governs the general”] provides that a ‘narrow, precise, and specific’ statutory provision is not overridden by another provision ‘covering a more generalized spectrum’ of issues. *Radzanower v. Touche Ross & Co.*, 426 U.S. 148, 153–54, 96 S.Ct. 1989, 48 L.Ed.2d 540 (1976). When two statutes come into conflict, courts assume Congress intended specific provisions to prevail over more general ones, see *Fourco Glass Co. v. Transmirra Prods. Corp.*, 353 U.S. 222, 228–29, 77 S.Ct. 787, 1 L.Ed.2d 786 (1957), the assumption being that the more specific of two conflicting provisions ‘comes closer to addressing the very problem posed by the case at hand and is thus more deserving of credence,’ Antonin Scalia & Bryan A. Garner, *Reading Law: The Interpretation of Legal Texts* 183 (2012).”).

³⁷ H.R. Rep. No. 96-1430, at 89 (1980), as reprinted in 1980 U.S.C.C.A.N. 4110, 4120-21.

Another report states that “[t]his new section [section 10101] directs the Commission to encourage primary reliance on the marketplace rather than regulation, to limit regulation of railroads to those areas where there is an absence of effective competition and to permit rates which provide revenues necessary to maintain the rail system and to attract capital.”³⁸

In addition to the overall policy favoring deregulation, a return of railroads to financial health, and reliance on market forces rather than regulation to set rates, the specific RTP factors relating to revenue adequacy are consistent with the statutory provisions discussed above that treat revenue adequacy as an affirmative objective and not a constraint on rates.

a. RTP (3)

RTP(3) contains the one express instruction on revenue adequacy in the RTPs. RTP(3) directs the Board to “promote a safe and efficient rail transportation system by allowing rail carriers to earn adequate revenues.”³⁹ RTP(3) does not provide the slightest suggestion that rail rates should be capped once financial viability is achieved.

b. RTP (6)

RTP(6) contains an indirect reference to revenue adequacy, stating that it is Congress’s policy “to maintain reasonable rates where there is an absence of effective competition and where rail rates provide revenues which exceed the amount necessary to maintain the rail system and to attract capital.”⁴⁰ There were several questions at the hearing about the meaning of RTP(6) and its relevance to rate regulation.

³⁸ H.R. Rep. No. 96-1035, at 54 (1980), *as reprinted in* 1980 U.S.C.C.A.N. 3978, 3999.

³⁹ 49 U.S.C. § 10101(3).

⁴⁰ 49 U.S.C. § 10101(6).

On its face, RTP(6) expresses nothing more than Congress's desire that the agency enforce the provisions of the statute that govern rate reasonableness challenges, already discussed above. In other words, RTP(6) does not grant the Board authority above and beyond what the statute authorizes elsewhere. And the text of RTP(6) accords with this. The plain reading of RTP(6) is that rates must be "reasonable" when, in the context of market power, rates "provide revenues which exceed the amount necessary to maintain the rail system and to attract capital."⁴¹ RTP(6) does not say that rates must be "capped" when they exceed the amount necessary to maintain the rail system and to attract capital (to say nothing about a reasonable and economic profit or return), only that the rates must be "reasonable."

Importantly, a "reasonable rate[]" is not defined in RTP(6). Rate reasonableness principles are set out elsewhere in the statute, particularly in section 10701. But nowhere in section 10701 or elsewhere in the statute is a "reasonable" rate defined by reference to the level of firm-wide earnings or revenue adequacy. In fact, as discussed above, section 10701(d)(2), which identifies general rate reasonableness principles, does so with an express instruction that STB recognize the mandatory, affirmative goal of revenue adequacy, not utilize that concept to somehow constrain railroad revenues.

In assessing the reasonableness of a particular rate, the STB does consider the revenues generated by the challenged rate to determine whether the rate reflects an abuse of market power. But there is no connection between overall revenue levels earned by a rail carrier and the particular economic circumstances of the movement at issue in a rate reasonableness case. This analysis is consistent with RTP(6) and the rest of the statute, which must be read as a whole.⁴² While railroads must charge reasonable

⁴¹ 49 U.S.C. § 10101(6).

⁴² As a further example, RTP(6) cannot be read to negate section 10704(a)(2)'s definitional requirement that revenue adequate railroads earn a "reasonable and economic profit or return." See *supra* note 36.

rates, as envisioned by RTP(6), RTP(6) does not state or suggest that the reasonableness of a particular rate can be determined *based on* the level of a railroad's overall earnings.

c. RTP (12)

RTP(12) was also discussed at the hearing, but it has nothing to do with revenue adequacy or the level of a rail carrier's firm-wide earnings.⁴³ Rather, it relates to "undue concentrations of market power." The existence and exercise of market power can only be assessed by analyzing particular markets. Firm-wide revenues do not say anything about the existence or exercise of market power in particular markets.⁴⁴

C. The Statute Supports AAR's Request that the Board Abandon the Revenue Adequacy Constraint in *Guidelines*.

In its November 26, 2019 comments and again at the December 2019 hearing, AAR urged the Board to abandon the revenue adequacy constraint that is set out in *Guidelines*. The constraint has never been applied to railroads, and as written, its possible application is obscure. Even if it were supported by the statute, the revenue adequacy constraint created in *Guidelines* in the 1980s is simply out of date—modern-day economics have established that revenue adequacy is completely irrelevant to whether a rate is "unreasonable" (or anticompetitive).⁴⁵ An agency created for its expertise should reject a discredited basis for rate regulation.

Consistent with AAR's request that the Board abandon the revenue adequacy constraint, the statutory analysis above demonstrates that the revenue adequacy constraint in *Guidelines* is unsupported by the statute and rests on a mistaken

⁴³ See 49 U.S.C. § 10101(12).

⁴⁴ Kalt & Reishus V.S. ¶ 56.

⁴⁵ *Id.* ¶¶ 53, 56.

understanding of the statutory provisions related to revenue adequacy. For several reasons, the implementation of the revenue adequacy constraint would not be lawful.

First, the statutory scheme and the individual statutory provisions relating to revenue adequacy make it clear that revenue adequacy is an affirmative goal, not a constraint on the level of railroad earnings. The Board is directed to assist railroads in achieving financial viability, not to use financial health as the basis for establishing a new regime of more aggressive rate regulation.

Second, revenue adequacy is a floor, not a ceiling. Revenue adequacy is defined to include a “reasonable and economic profit or return,”⁴⁶ which cannot reasonably be interpreted to mean a break-even financial state where railroads, unlike other firms in the economy, are limited to earning no more than their cost of capital. Unlike public utilities, which are often held to earnings equal to their cost of capital, railroads are not guaranteed any level of earnings. And because railroads operate in continuously changing markets that sometimes result in profits and other times in losses, capping railroads’ earnings at their cost of capital would prevent railroads from recouping profits needed to offset instances of losses, thus dooming the rail industry to long-term revenue inadequacy – precisely the opposite of the statutory objective.

Third, the revenue adequacy provisions of the statute are part of a larger, deliberate statutory scheme for minimizing regulatory intervention into railroad rate-setting. When Congress instructed the ICC/STB to assist railroads to achieve revenue adequacy, Congress was not creating a new regulatory tool that would allow the ICC/STB to engage in earnings regulation that was already coming into broad

⁴⁶ 49 U.S.C. § 10704(a)(2).

disrepute among economists and regulators. On the contrary, it was urging the agency to ease off on rate regulation.⁴⁷

Finally, nothing in the statute supports a rate regulation standard that allows the Board to constrain rates on individual movements based on the overall level of revenues earned by the railroad. As AAR explained in its November 26, 2019 comments, system-wide financial health, even if properly measured, has no bearing on the reasonableness of an individual rate.⁴⁸

II. THE BOARD SHOULD REJECT ACC'S PROPOSAL.

ACC's proposal is not smart simplification because it is neither smart nor simple.⁴⁹ It is not smart because the proposed Benchmark Model is internally flawed. It is not capable of predicting actual competitive rates that any shipper would be likely to pay today.⁵⁰ Nor can the model reflect current marketplace conditions — “the model cannot account for the specific individualized marketplace influences on prices that demonstrably result in a wide distribution of rail rates”⁵¹ And because ACC's proposal uses revenue adequacy as a trigger as well as a measure for restricting rate levels, the Benchmark Model is a form of earnings regulation, with all the associated distortions and inefficiencies, including discouraging investment, innovation, and

⁴⁷ “Previous admonitions by the Congress that the Commission assist carriers in earning adequate revenue levels have not achieved their goals. As a result, the Committee is establishing a more straight forward mandate. This is a clear directive to ensure financially sound railroads, and the Commission is not to misuse the term “reasonable” to circumvent this directive.” H. Rep. No. 1035, 96th Cong., 2d Sess. at 54 (May 16, 1980).

⁴⁸ Ex Parte Nos. 761 & 722, Comments of the Association of American Railroads, at 9–10 (Nov. 26, 2019) (“AAR Opening Comments”).

⁴⁹ Kalt & Reishus V.S. ¶¶ 73-96.

⁵⁰ *Id.* ¶ 9; *see id.* ¶¶ 42-51.

⁵¹ *Id.* ¶ 76.

efficiency.⁵² ACC's proposal is also not simple—it is a complicated statistical and econometric model that is likely to be highly contentious and require expert econometricians to debate questions of regression specification, both substantive and technical.⁵³

Moreover, ACC's proposal is unlawful. It fails to satisfy the statutory requirements because it does not conduct an individualized analysis of the challenged rate. It is also an abrupt departure from agency precedent in that it is an unrestricted comparison approach based on an average of competitive rates, which has been rejected by the STB and federal courts. Finally, the Benchmark Method produces absurd results that would lead shippers to prefer the hand of the regulator to the hand of competition, which is contrary to the de-regulatory thrust of the statutory scheme.

A. ACC's proposal is flawed.

Professor Kalt and Dr. Reishus explain in detail why the Benchmark Model proposed by ACC is deeply flawed as a matter of sound economic policy. The flaws are described in greater detail in the attached verified statement, but some of the highlights are as follows.

ACC is mimicking the wrong type of competition. The Benchmark Model “applies the wrong set of principles to mimic competition”:⁵⁴ “In an industry like railroading with massive economies of scale and scope and huge sunk costs, differential pricing is consistent with competitive principles. On the other hand, while rail rates equal to short-run marginal cost can result when and where there are direct head-to-head alternatives for *specific* traffic, applying such rates for *all* traffic will not generate

⁵² *Id.* ¶¶ 5, 23-40.

⁵³ *Id.* ¶ 10; see ¶¶ 73-96.

⁵⁴ *Id.* ¶ 6.

revenue sufficient to sustain the railroad enterprise.”⁵⁵ Accordingly, the “appropriate competitive principles” are not head-to-head competition that prices at marginal cost but, rather, “*contestability*,” which is competition to be the single serving railroad.⁵⁶ In other words, the Benchmark Model cannot actually do what it claims to do—predict either “‘competitive’ rates that any shipper would be likely to pay today under proper principles,” or predict “‘supra-competitive’ [rates] ... above the level implied by contestability.”⁵⁷

The proposal is earnings regulation. The Benchmark Model proposed by the ACC has key characteristics of “old-style” regulation. At the simplest level, “old-style” rate-of-return (*i.e.*, earnings) regulation means any constraint based on system-wide earnings.⁵⁸ This is precisely what ACC proposes. The Benchmark Model does not even apply unless the carrier earns a certain level of system-wide earnings. As Professor Kalt and Dr. Reishus explain, “the rate caps [of the Benchmark Model] are triggered by a putative finding of revenue adequacy,”⁵⁹ which of course “cannot identify if a railroad is realizing supra-competitive levels of earnings in either the short- or long-run.”⁶⁰ In any event, because the “*trigger* for the imposition of rate regulation under the ACC approach would still be a finding of revenue over-adequacy, . . . carriers would face incentives to avoid tripping the trigger by, for example, undertaking efficiency and quality improvements that portend increases in revenue and earnings. . . . [T]hese are

⁵⁵ *Id.* ¶ 7.

⁵⁶ *Id.* ¶ 6.

⁵⁷ *Id.* ¶¶ 7, 9.

⁵⁸ See AAR Opening Comments, Kalt V.S. at 14.

⁵⁹ Kalt & Reishus V.S. ¶ 5.

⁶⁰ *Id.* ¶ 56.

the same distortionary incentives that full earnings-based rate regulation has so rampantly produced in other sectors.”⁶¹

Moreover, the Benchmark Model is designed to “eliminate railroad earnings deemed to be above”⁶² a certain level (depending on the CT level), and it tightens like a ratchet as a revenue-adequate carrier earns higher returns (from lawful rates charged to competitive traffic).⁶³ Professor Kalt and Dr. Reishus explain that “the more the calculated ROI exceeds the COC (without the CT cap), the more restrictive would be the CT rate caps.”⁶⁴ Worse, “[d]espite the claim to the contrary, there is nothing in the CT proposal ‘to maintain the long-term revenue adequacy’ of the rail carriers,” meaning that “there is nothing in the proposal that provides a mechanism by which railroads pushed to just-revenue-adequate levels by the ACC approach, but that subsequently fall below revenue adequate level, are guaranteed revenue to make up these revenue shortfalls, . . . [which] could well happen as a result of, for example, changes in economic and market conditions arising during the period of rate capping.”⁶⁵

Professor Kalt and Dr. Reishus explain, “[t]he limitations on overall revenues imposed by the proposed Benchmark and CT Methodology would be triggered by a finding of overall revenue adequacy and calculated in a manner to restrict aggregate revenues based on rates of return by applying restrictive caps to individual rates. . . . As such, this *is* rate-of-return regulation. . . . [T]he proposal has the characteristics of, and suffers the same failings as, other earnings-based rate regulation.”⁶⁶ It is

⁶¹ *Id.* ¶ 95.

⁶² *Id.* ¶ 24.

⁶³ *Id.* ¶¶ 23-33.

⁶⁴ *Id.* ¶ 32.

⁶⁵ *Id.* ¶ 33 (internal footnote omitted).

⁶⁶ *Id.* ¶ 35 (internal footnote omitted).

characteristics like these that would incentivize carriers to avoid the “stick” of the Benchmark Model by some artificial behavior, such as underpricing, wasteful investment, or underinvestment that would keep their ROI from equaling or exceeding the COC, which is directly contrary to the goals of Congress in enacting the 4R Act and the Staggers Act.

The ACC proposal suffers from an asymmetry problem. As briefly mentioned above, nothing in the ACC proposal would prevent railroads subject to the proposal’s rate restrictions from falling into revenue inadequacy *while subject to the proposal’s restrictions* in response to changing economic and market conditions.⁶⁷ “[R]ailroads are obviously subject to swings in economic conditions common to competitive industries,” and “[u]nlike true public utilities, with protected franchise monopolies over inelastically demanded services . . . , there is no mechanism by which a railroad’s revenues could be guaranteed to remain at ‘revenue adequate’ levels.”⁶⁸ Yet, the ACC proposal lacks any mechanism for going back and replenishing revenues held to inadequate levels by the combination of CT rate restrictions and weak economic conditions.⁶⁹ “This kind of asymmetric earnings regulation—rate caps when times are good but no floor when times are bad—poses additional risks and disincentives for ongoing investments” and “discourages innovations with uncertain outcomes: potential upside profits achieved through reduced costs or increased service quality would be limited by the rate caps, yet losses would be borne fully by the railroad.”⁷⁰

⁶⁷ *Id.* ¶ 33.

⁶⁸ *Id.* ¶ 34.

⁶⁹ *Id.* ¶¶ 33-34.

⁷⁰ *Id.* ¶ 34.

*The model would suffer from debilitating regulatory lag. “[T]he Benchmark model leads to inflexible pricing based on past rail rates.”*⁷¹ In particular, “[g]iven the backward-looking nature of any statistically-determined estimate, these benchmark rates would, at best, reflect market conditions that were in effect years earlier.”⁷² The Benchmark Model “lacks meaningful marketplace information on costs, service, customer characteristics, and marketplace alternatives available to customers that determine individual rates[, and] [t]he limited information it does have relies on rates in effect as long as ten years ago.”⁷³ Despite the fact that the “purpose of the model is to establish the ‘competitive’ rate that would be applicable to individual shippers, the model cannot actually identify the ‘competitive’ rates that any shipper would be likely to pay today under proper principles of competition.”⁷⁴

*The proposal is not smart simplification. ACC’s approach is outrageously complicated, forcing the Board to delve into complex statistical and econometric modeling that will resist standardization or simplicity.*⁷⁵ Parties would be forced to retain econometricians to debate “questions of regression specification—which variables are to be included and in what form, should they be interacted differently for different commodities, how does one account for changes in costs over time that may affect different traffic differentially, etc.”⁷⁶ “Related to these are problems of omitted variable bias, collinearity, use of specification tests for inclusion or not of variables,

⁷¹ *Id.* ¶ 38.

⁷² *Id.*

⁷³ *Id.* ¶ 9.

⁷⁴ *Id.*

⁷⁵ *See id.* ¶¶ 10, 73-96.

⁷⁶ *Id.* ¶ 91.

goodness of fit, and the ability to evaluate the predictive ability of the model.”⁷⁷

“Numerous other technical issues arise in the choice of estimation and statistical testing (e.g., adjustments for heteroskedasticity, clustering, geographic correlation, etc.).”⁷⁸

This is not simplification, smart or otherwise.

These and other flaws identified by Professor Kalt and Dr. Reishus should be sufficient to disqualify this benchmarking approach as a viable methodology for determining rate reasonableness for the freight rail industry.

B. ACC’s proposal is unlawful.

To the extent the STB needs more reasons, ACC’s proposal fails to satisfy the statutory requirements, would be an abrupt departure from agency and federal court precedent, and produces absurd results. Each is an independent reason to discard this concept.

1. ACC’s model does not perform an individualized analysis of the challenged rate.

The statutory scheme requires a detailed analysis of not only market dominance, but of whether a challenged rate is in fact unreasonable *in light of the market particularities* of the movement in question.⁷⁹ In particular, 49 U.S.C. § 10704(a)(1) requires a “full hearing” to examine an individual challenged rate, and that hearing must include, *inter alia*, the “due consideration [of] – (A) the amount of traffic which is transported at revenues which do not contribute to going concern value and the efforts made to minimize such traffic; (B) the amount of traffic which contributes only

⁷⁷ *Id.*

⁷⁸ *Id.*

⁷⁹ AAR Opening Comments, at 24-25 (citing 49 U.S.C. §§ 10701 and 10704); 49 U.S.C. § 10707(c) (“[A] finding of market dominance does not establish a presumption that the proposed rate exceeds a reasonable maximum.”).

marginally to fixed costs and the extent to which, if any, rates on such traffic can be changed to maximize the revenues from such traffic; and (C) the carrier's mix of rail traffic to determine whether one commodity is paying an unreasonable share of the carrier's overall revenues....” 49 U.S.C. § 10701(d)(2).

Section 10707 ties up the bow: “When the Board finds ... that a rail carrier ... has market dominance over the transportation to which the rate applies, it may then determine that rate to be unreasonable *if it exceeds a reasonable maximum for that transportation*[, and] a finding of market dominance does not establish a presumption that the proposed rate exceeds a reasonable maximum.” 49 U.S.C. § 10707(c) (emphasis added). In other words, the Board can find a rate is unreasonable only if it analyzes whether the challenged rate exceeds a reasonable *maximum* (not an average) for the *specific traffic to which the rate applies*. This analysis necessarily requires taking into account the market particularities of the movement at issue—otherwise, there is no way to determine a “reasonable maximum” rate “for the specific traffic to which the rate applies.”⁸⁰ *Id.*

A “benchmark” approach like the one proposed by the ACC cannot meet these statutory requirements. This is because the Benchmark Model *cannot* determine whether the challenged rate is appropriate in light of the market particularities of the movement to which it applies.⁸¹ Rather, under the Benchmark Model, a challenged rate is presumably unlawful merely because it happens to be above an *average* of competitive rates with some arbitrary similarities. As Professor Kalt and Dr. Reishus explain, the Benchmark Model “is an elaborate form of averaging, portending the imposition of homogenizing rate restrictions which would *push rates to average levels*

⁸⁰ Note, the RTP factors in 49 U.S.C. § 10101 must conform to this statutory scheme—not the other way around. *See supra* note 36.

⁸¹ Kalt & Reishus V.S. ¶¶ 7, 9, 51-56.

without proper, or even coherent, consideration of the actual economic circumstances — including competitive circumstances — that actually drive dynamic competitive pricing in the rail industry.”⁸² This fails to satisfy the statutory requirement that the Board determine a reasonable *maximum* rate according to the market realities for the movement at issue, not the *average* of competitive rates plus some arbitrary multiplier.

The “Competitive Threshold” (CT) does not solve this problem. The CT multiplier is simply an arbitrary point at which a rate above the average is deemed too high — *not* because of the market particularities of the movement at issue, but because the carrier is to whatever extent revenue adequate. This is not authorized by the statute. As Section II explains in detail, nowhere in the statute is the Board given authority to use mere revenue adequacy, rather than the particularities of the movement, to determine if a rate is unreasonable. Said in a different way, the CT (regardless of the number) fails to do what the statute requires: analyze whether the challenged rate is justified in light of the market particularities for the movement to which the rate applies. Combining an arbitrary average threshold with an arbitrary CT factor fails to meet this requirement.

2. ACC’s model is a comparison approach based on an average of competitive rates that has been rejected by the STB and Federal Courts.

ACC’s proposal is nothing more than a complicated way to judge the reasonableness of a challenged rate based on the average of rates from movements that have more competitive transportation options. It is a wolf wrapped in econometric clothing.

But the Board has repeatedly rejected using a comparison group approach that improperly pulls from competitive traffic. *See, e.g., EP 646-1, Simplified Standards for Rail*

⁸² *Id.* ¶ 92 (emphasis added).

Rate Cases, slip op. at 17 (“As such, the comparison group should consist of only captive traffic over which the carrier has market power. The rates available to traffic with competitive alternatives would provide little evidence on the degree of permissible demand-based differential pricing needed to provide a reasonable return on the investment.”); *US Magnesium, LLC v. Union Pac. R.R. Co.*, Docket No. 42114, at *5 (STB served Jan. 28, 2010) (“The comparison group should consist of only captive traffic over which the carrier has market power, as the rates available to traffic with competitive alternatives would provide little evidence of the degree of permissible demand-based differential pricing needed to provide a reasonable return on the investment.”); *E.I. Dupont de Nemours & Co. v. CSX Transp., Inc.*, Docket No. 42099 (STB served June 30, 2008) (“The comparison group should consist of only captive traffic over which the carrier has market power, as the rates available to traffic with competitive alternatives would provide little evidence on the degree of permissible demand-based differential pricing needed to provide a reasonable return on the investment.”); *see also* EP 646-1, *Simplified Standards for Rail Rate Cases*, slip op. at 80-82 (explaining that the proposal to include “traffic priced below 180% R/VC level” in the comparison group was erroneous and would not be adopted); *US Magnesium, LLC v. Union Pac. R.R. Co.*, Docket No. 42114, at *5 (STB served Jan. 28, 2010) (“[N]o movements priced below the 180% R/VC level may be included in the comparison group”); *S-W R.R. Car Parts Co. v. Mo. Pac. R.R. Co.*, Docket No. 40073, at *5-*7 (STB decided Dec. 1, 1988) (rejecting an argument that traffic with R/VC ratios below 180 should be included in the comparison group and noting, “[i]t would be entirely inappropriate to judge SWRC’s rates by comparison to a group of rates that includes traffic statutorily defined as not captive (R/VC less than 180 percent) during the complaint period”); *E.I. Dupont de Nemours & Co. v. CSX Transp., Inc.*, Docket No. 42099 (STB served June 30, 2008) (“[N]o movements priced below the 180% R/VC level may be included in the comparison group.”). Despite this mountain of clear precedent undermining its proposal, the ACC has not even acknowledged these

cases, let alone offered a reasoned basis for the STB to depart from agency precedent – precedent that is recent, repeated, and well-reasoned.

Moreover, the D.C. Circuit sharply criticized an approach to rate regulation similar to that proposed by the ACC. In *Burlington N. R.R. Co. v. ICC*, 985 F.2d 589 (D.C. Cir. 1993) (“*McCarty Farms*”), the D.C. Circuit scrutinized a very similar comparison approach and honed in immediately on the “fundamental conceptual problem” with using an R/VC comparison approach: “If the formula is employed regularly and repeatedly, it will reduce rates to the lowest R/VC used in the comparison group.”⁸³ The court reasoned that “it is hard to discern any principle behind the choice of benchmark traffic.”⁸⁴ In particular, the court noticed that because there was a discrepancy between the rates actually charged and the rates of the benchmark traffic, “it seems most probable that the transportation and demand characteristics of the two groups are in fact different.”⁸⁵ The D.C. Circuit further reasoned with regard to this type of “benchmarking” method, that “if a profit-maximizing railroad charges more for the issue traffic than for the benchmark traffic, that would seem to represent a judgment – by the party with the greatest interest in making it correctly – that the issue traffic either costs more to transport or has a less elastic demand.”⁸⁶

The same can be said for the ACC proposal, which suffers from the same conceptual problems that troubled the D.C. Circuit. All railroads, revenue adequate or not, are in the best position to determine the appropriate price for a service in light of the market particularities of the movement. As Professor Kalt and Dr. Reishus explain: the core premise of the Benchmark Model – that competitive conditions actually found

⁸³ *McCarty Farms*, 985 F.2d at 597.

⁸⁴ *Id.*

⁸⁵ *Id.* (emphasis added).

⁸⁶ *Id.* (emphasis added).

on some traffic can tell us the rates that competition would set on other traffic—is in direct contradiction to the underlying economics of competition pertinent to an industry with massive economies of scale and scope such as the rail freight transportation industry.⁸⁷ An approach like the Benchmark Model improperly interferes with a railroad’s right to determine the appropriate price for its services.⁸⁸ This is because the Benchmark Model does not pinpoint whether a rate is in fact unreasonable given the *actual* market forces in play for the movement.⁸⁹ As the D.C. Circuit explained, comparison approaches (like the R/VC method or the Benchmark Model) “do not intelligibly define” exploitation of captive shippers, unlike CMP methods, which are “well designed” to determine that.⁹⁰

3. ACC’s proposal will produce absurd results.

Finally, the ACC approach of setting the maximum lawful rate based on the average of competitive movements (even if adjusted for revenue adequacy with a CT threshold) would produce absurd results in two key respects.

First, the model itself will label roughly half of all the “competitive” rates as unreasonably high—plainly an absurd outcome. As discussed above, the Benchmark Model is just a complicated way of calculating an average.⁹¹ In particular, the Benchmark Model determines the average rate charged to customers who have

⁸⁷ Kalt & Reishus V.S. ¶¶ 7, 41-51.

⁸⁸ See 49 U.S.C. § 10701(c) (“a rail carrier providing transportation subject to the jurisdiction of the Board under this part may establish any rate for transportation or other service provided by the rail carrier”).

⁸⁹ Kalt & Reishus V.S. ¶¶ 7, 41-51.

⁹⁰ *McCarty Farms*, 985 F.2d at 598.

⁹¹ Kalt & Reishus V.S. ¶ 92.

competitive options, as defined by the model, over a certain period of time (in the past).⁹² This average figure is deemed the “competitive” or “benchmark” rate.

But herein lies the problem with the use of averages. By necessity under the model, *roughly half* of the rates taken into account (*i.e.*, rates where customers have competitive choices) will fall *above* the average (middle) line.⁹³ This means that those rates suddenly become “potentially non-competitive” rates simply by virtue of being above the average line. In other words, as Professor Kalt and Dr. Reishus explain: “rates on *roughly half* of competitive traffic will [necessarily] be above whatever line the Benchmark Model identifies as the ‘competitive rate’; [yet,] this benchmark rate line derived from purportedly ‘competitive’ traffic becomes the prevailing rate for purportedly ‘non-competitive’ traffic.”⁹⁴ This means that if, as ACC suggested, the CT is set at 1, then “*roughly half* of the ‘competitive traffic’ would be found to be paying rates above the rate cap imposed on ‘non-competitive’ traffic, and the average rate actually paid by ‘non-competitive’ traffic subject to the cap could well turn out to be *below* the average rate paid by ‘competitive’ traffic,” which is “wholly inconsistent with reasonable rate regulation or competitive principles applicable to the railroad industry.”⁹⁵ This is ridiculous. The Board should disqualify any model that uses hundreds of thousands of competitive rates as an input, but then labels half those rates as unreasonably high – such a model is neither reliable nor realistic.

This leads to a separate and additional absurdity: Under the Benchmark Model, regulated traffic would get a better deal than the majority of “competitive traffic,” which necessarily will have rates above the maximum lawful rate. As Professor Kalt

⁹² *Id.* ¶¶ 38, 58-72.

⁹³ *Id.* ¶¶ 8, 64.

⁹⁴ *Id.* ¶ 8 (emphasis added).

⁹⁵ *Id.* ¶ 8 (emphasis added).

and Dr. Reishus explain: “Based on the example in Table 4 of Dr. Caves’ statement, which applies a CT factor of 1.0 to BNSF and UP, rate caps generated by the Benchmark Methodology . . . would be *less than* what roughly half of comparable *competitive* traffic would be paying. This is a not an artifact of the illustration but a central feature of the Benchmark Methodology.”⁹⁶ Congress clearly did not intend that the STB should embrace a rate setting methodology where customers would prefer the visible hand of regulators to the invisible hand of competition.⁹⁷

III. THE BOARD SHOULD WIDEN ACCESS FOR SMALL SHIPPERS TO RATE RELIEF BY EXPLORING VOLUNTARY ARBITRATION.

At the hearing, there was some discussion of the Board’s alternative dispute resolution procedures. AAR urges the Board to explore why no stakeholder – railroad or shipper – has opted into the voluntary arbitration program for rate disputes. While disputes over maximum lawful rates were not historically eligible for voluntary arbitration under any agency program, Congress expanded the STB’s voluntary arbitration program to include rate disputes, and the Board has established revised rules to reflect this change.⁹⁸ The lack of popularity of the voluntary arbitration program may be attributed, in part, to several deterring features of the program that likely keep railroads, shippers, or both away.

⁹⁶ *Id.* ¶ 64.

⁹⁷ See H.R. Rep. No. 96-1430, at 89 (1980), as reprinted in 1980 U.S.C.C.A.N. 4110, 4120-21 (“The purpose of this legislation is to reverse the decline of the railroad industry, which has been caused, in part, by excessive government regulation. The Conferees believe that by allowing the forces of the marketplace to regulate railroad rates wherever possible the financial health of the railroad industry will be improved and will benefit all parts of the economy”); see also, *supra* Section I.B.3.

⁹⁸ Surface Transportation Board Reauthorization Act of 2015 § 13, codified at 49 U.S.C. § 11708; EP 730, *Revisions to Arbitration Procedures*, Decision (STB served Sept. 30, 2016).

First, the program is not confidential. Although the decisions are non-precedential,⁹⁹ the STB nonetheless requires the publication of the decisions on its website, with confidential information redacted. This is a major departure from common expectations that arbitration is private and confidential. Ensuring confidentiality for the arbitration program would significantly lower the risk of agreeing to arbitrate because, whichever side wins, the other side does not have to worry about a damaging public result that they will have limited ability to appeal.

Second, the arbitrator pool for the arbitration program is much too limited. The STB requires participants in an arbitration to select arbitrators from a limited pool of arbitrators unless *all* parties opt out of the Board's list.¹⁰⁰ There is no reason why a railroad should not be permitted, when it opts into the arbitration program, to expand the list to include other experienced neutral arbitrators. The current rules do not permit that departure.

Third, the issue of market dominance, which can still be costly for litigants, must first be determined by the Board before parties can be referred to an arbitration panel. This guarantees a more lengthy and costly process than is necessary and that might even exceed the time and cost of bringing a rate challenge before the STB under one of the simplified approaches. If the parties could include the issue of market dominance in the arbitration process, money and time could be saved, and parties may be more likely to opt into the arbitration program.

Finally, under current rules, the Board will police against the improper disaggregation of large disputes into many small cases on only a case-by-case basis. For

⁹⁹ 49 U.S.C. § 11708(d)(5).

¹⁰⁰ In other words, once parties have agreed to the voluntary arbitration program, there is no option to opt out of the Board's list of arbitrators so long as at least one party sees the Board's pool as favorable. Thus, if a railroad opts into the arbitration program, it cannot unilaterally choose to use arbitrators outside of the Board's list.

example, the Board cautioned shippers that they cannot take a large case that is suitable for a Simplified-SAC presentation and try to break it apart into dozens of Three-Benchmark cases. EP No. 646-1, *Simplified Standards for Rail Rate Cases*, Decision, at 32-33 (STB served Sept. 5, 2007). However, over objections from the rail industry and at the shippers' request, the STB elected not to create any mechanical protections and instead rely on a case-by-case analysis. *Id.* This remains problematic, as a railroad that agrees to voluntarily arbitrate smaller disputes will have no protections against a customer's disaggregation of claims because the individual arbitrator would have no standards to enable him or her to police that kind of behavior.

The Board should explore how to improve its voluntary arbitration program, particularly in light of the deterring aspects, above. This is an additional type of "smart simplification" that AAR and Professor Kalt advocated for in AAR's initial EP 761 Comments.¹⁰¹

CONCLUSION

For the reasons herein, the Board should abandon the revenue adequacy constraint altogether, reject ACC's proposal, and instead explore improvements to its voluntary arbitration program.

¹⁰¹ AAR Opening Comments, at 6; *Id.*, Kalt V.S., at ¶¶ 14, 139-47.

Respectfully submitted,

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February 13, 2020

**Verified Statement of
Joseph Kalt and David
Reishus**

Before the Surface Transportation Board

Docket No. EP 761

Hearing on Railroad Revenue Adequacy

**RESPONSE TO THE “BENCHMARK METHODOLOGY” PROPOSAL
SUBMITTED BY THE AMERICAN CHEMISTRY COUNCIL**

**Verified Statement of
Prof. Joseph P. Kalt and David Reishus, PhD**

February 13, 2020

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I. INTRODUCTION

A. WITNESS INTRODUCTIONS

1. **Joseph P. Kalt, PhD:** I am the Ford Foundation Professor (Emeritus) of International Political Economy at the John F. Kennedy School of Government at Harvard University and a senior economist with Compass Lexecon, an economics consulting firm specializing in the analysis of competition, among other areas of economics. I hold B.A., M.A., and Ph.D. degrees in economics. I submitted a Verified Statement in this proceeding on behalf of The Association of American Railroads,¹ and provided companion oral testimony before the Surface Transportation Board (“the Board”) on December 12, 2019. My curriculum vita, which lists my prior testimony as an expert, my publications, and my other professional activities, was attached to my prior Verified Statement.

2. **David Reishus, PhD:** I am an Executive Vice President at Compass Lexecon, an economics consulting firm and division of FTI Consulting, Inc. I received a B.A. degree in economics from Northwestern University, and M.A. and Ph.D. degrees in economics from Harvard University. In my professional career, I have focused on microeconomic issues with emphasis on issues of taxation, regulation (including natural resource, energy, transportation and international trade), and antitrust policy. Most of my work has been in the context of natural resource, energy, electricity, and regulated transportation industries. Beginning in 1995, I have studied and provided economic consulting services relating to the economics of rail freight regulation and related contractual and organizational issues. As part of this work, I have previously provided expert testimony before the Board on an array of economic matters, including rail competition, mergers, trackage rights, and access. My curriculum vita is attached as Appendix A to this statement.

3. The opinions expressed herein are our own, and do not necessarily represent those of our employers or their other employees.

¹ Written Testimony of Joseph P. Kalt, Ph.D., November 26, 2019 (hereinafter “Kalt VS (2019)”) attached to Comments of the Association of American Railroads, STB Ex Parte No. 761 Hearing on Revenue Adequacy, STB Ex Parte No. 722 Railroad Revenue Adequacy, November 26, 2019.

B. ASSIGNMENT

4. We have been asked by the Association of American Railroads (“AAR”) to analyze the Benchmark Model and Methodology proposal of the American Chemistry Council (“ACC”) for rail ratemaking. This proposal is described in the Verified Statement of Kevin W. Caves, Ph.D., filed on behalf of the American Chemistry Council; Dr. Caves also presented this proposal at the December 12, 2019 hearing.²

II. SUMMARY OF CONCLUSIONS

5. The proposed “Benchmark Model” and the Competitive Threshold-determined rate caps are a form of earnings-based rate regulation, with all the flaws and failings such an approach brings to the railroad industry. As presented by Dr. Caves, the rate caps are triggered by a putative finding of revenue adequacy based on historical book values. The stringency of the resulting revenue caps depends on the level of company-wide revenue “over-adequacy”. While the cap applicable to any individual shipment is derived from the Benchmark Model, the level of revenue restriction is based on railroad-wide earnings. Thus, the serious and well-recognized distortions of earnings-based regulation – including deleterious incentives for, and impacts on, cost-minimizing behavior, service quality, innovation, investment, and responsiveness to changing market circumstances of such earnings-based regulation, especially when based on historical book valuation – would result under ACC’s proposal.

6. The proposal applies the wrong set of principles to mimic competition. The appropriate competitive principles are ones of *contestability*—competition to be the serving railroad—and these are the principles embedded in the Constrained Market Pricing approach of the Board. These principles result in prices that reflect the demands, service levels, and costs of serving *specific* traffic, rather than assuming (as Dr. Caves does) that shipments of the same commodity, length, and size would have the same rates regardless of location on the system, service quality, and customer needs. The Benchmark Model’s approach of setting rates on all traffic based on rates

² Verified Statement of Kevin W. Caves, PhD on Behalf of The American Chemistry Council, STB Docket No. EP 755 Final Offer Rate Review and STB Docket No. EP 761 Hearing on Revenue Adequacy, November 12, 2019 (hereinafter “Caves VS”) attached to the Written Testimony of the American Chemistry Council, STB Docket No. EP 761 Hearing on Revenue Adequacy, STB Docket No. EP 722 Railroad Revenue Adequacy November 26, 2019 (hereinafter “ACC Filing”).

for traffic which has direct rail or intermodal alternatives violates these principles and fails to mimic competition relevant to the railroad industry.

7. The Benchmark Model's approach to ratemaking is flawed at its core. In an industry like railroading with massive economies of scale and scope and huge sunk costs, differential pricing is consistent with competitive principles. On the other hand, while rail rates equal to short-run marginal cost can result when and where there are direct head-to-head alternatives for *specific* traffic, applying such rates for *all* traffic will not generate revenue sufficient to sustain the railroad enterprise. Moreover, the Benchmark Model cannot identify which, or even if any, rates are "supra-competitive"—i.e., above the level implied by contestability. To do so requires looking at railroad returns on a replacement cost basis, and at revenues and costs relating to specific groups of traffic. The proposed Benchmark Model methodology does none of this.

8. Although not explicit, the Benchmark Model methodology bases its rate caps on the *average* of competitive rates. Statistical regression performed on the purportedly "competitive" traffic is an exercise in line-fitting. As such, rates on roughly half of competitive traffic will be above whatever line the Benchmark Model identifies as the "competitive rate"; this benchmark rate line derived from purportedly "competitive" traffic becomes the prevailing rate for purportedly "non-competitive" traffic. Dr. Caves includes a Competitive Threshold multiplier to adjust the proposed rate caps based on the fitted benchmark rate regression line. In fact, in some of his demonstrations of the proposal, the rate caps on purportedly "non-competitive" shipments are set equal to the "benchmark" rate. In this case, rates for "non-competitive" traffic would be capped at the *average* of the rates on corresponding "competitive" traffic. As a result, roughly half of the "competitive traffic" would be found to be paying rates above the rate cap imposed on "non-competitive" traffic, and the average rate actually paid by "non-competitive" traffic subject to the cap could well turn out to be below the average rate paid by "competitive" traffic. The proposal and such absurd outcomes are wholly inconsistent with reasonable rate regulation or competitive principles applicable to the railroad industry.

9. The Benchmark Model methodology does not represent smart simplification of rail rate regulation. As it fails to apply the appropriate principles for mimicking competition, it represents a move away from smart rate regulation. The Benchmark Model lacks meaningful marketplace information on costs, service, customer characteristics, and marketplace alternatives available to

customers that determine individual rates. The limited information it does have relies on rates in effect as long as ten years ago. Given that the purpose of the model is to establish the “competitive” rate that would be applicable to individual shippers, the model cannot actually identify the “competitive” rates that any shipper would be likely to pay today under proper principles of competition. The model also introduces a rash of complexities that would be likely to vex railroads, shippers, and the Board for years. For example, the model identifies traffic eligible for rate relief based on a myriad of arbitrary decisions and mechanical criteria for separating “competitive” from purportedly “non-competitive” traffic. As Dr. Caves’ own results reveal, even very modest differences in these criteria can result in more than three-fold differences in the amount of “non-competitive” traffic potentially eligible for rate relief.

10. Establishing reliable universal criteria applicable to all traffic for separating “competitive” from “non-competitive” traffic is not simple and would inevitably be highly contentious. For example, purely as a result of the mathematics of statistical regression, roughly half of all shipments categorized into the purportedly “competitive” shipments used to estimate the benchmark regression line would have rates that lie *above* the that line – i.e., these “competitive” rates are above the benchmark of competitive rates. Under ACC’s logic, these shipments would have rates higher than what the Benchmark Model says competition would allow. They would nevertheless be ineligible for ACC’s system of rate relief as the CT is determined by, and the rate caps applied to, the separate putatively “non-competitive” traffic. For this reason, customers with shipments categorized as “competitive” but having rates above the benchmark of competitive rates could be expected to argue vigorously that the Benchmark Model, itself, finds their rates to be above competitive levels and that the criteria that results in their pertinent shipments being labeled “competitive” are invalid. Such scenarios threaten to introduce intolerable instability in the proposed process for dividing “competitive” from “non-competitive” shipments: Moving more “competitive” traffic to the “non-competitive” side of the traffic dividing line would necessitate recalculation of the Benchmark model, which would then ratchet the benchmark line downward. This would lower the benchmark “competitive” rate relative to the rates paid by the remaining “competitive” traffic, portending more challenges of putatively “competitive” shipments with rates above the competitive benchmark being challenged as too high to be competitive; and so on. Similar issues arise in establishing the applicable Competitive Threshold and in determining the appropriate data coverage, variables, specification and estimation methods to be used by the

statistical model in calculating with the benchmark “competitive rate” applicable to “non-competitive” traffic.

III. SUMMARY OF THE “BENCHMARK MODEL”

A. MODEL OVERVIEW

11. Testifying on behalf of the ACC, Dr. Caves proposes the Board develop a “Benchmark Model” in the form of a statistical regression equation that would be used to “determine maximum reasonable rates for revenue adequate railroads.” The proposed Benchmark Model would create a “Competitive Threshold,” defined by Dr. Caves as “the maximum ratio by which captive rates would be permitted to exceed competitive rates while still satisfying the regulatory requirements of railroad revenue adequacy.”³

12. The methodology proposed by Dr. Caves proceeds in four steps.

- Select a “benchmark group” of putatively “competitive” movements.⁴
- Develop an econometric (i.e., statistical) regression model (the “Benchmark Model”) using Waybill Sample data for the “competitive” movements that ‘fits’ a regression line for the revenue-per-ton-mile rates on the benchmark group’s shipments to an equation containing various shipment characteristics.⁵
- Use the Benchmark Model’s fitted regression line to predict the revenue-per-ton-mile rates for “potentially non-competitive” traffic – i.e., traffic that was not included in the benchmark group of competitive traffic. The actual rates for the “potentially non-competitive” traffic are compared to the predicted values from the econometric model to purportedly “identify movements with abnormally high rates.”⁶

³ Caves VS at p. 3.

⁴ Caves VS at p. 12.

⁵ Caves VS at p. 20.

⁶ Caves VS at p. 24.

- For Revenue Adequate carriers, use the “Benchmark Method” to determine a “Competitive Threshold” that establishes the level of rate relief that “captive shippers” should receive.⁷

B. DATA

13. Dr. Caves’ model relies primarily on data available from the Surface Transportation Board’s Carload Waybill Sample (“CWS”). Dr. Caves also uses the Centralized Station Master databases (“CSM”), Port Series data from the U.S. Army Corps of Engineers, and railroad network geographic information system (“GIS”) data in his analysis.⁸

14. Dr. Caves uses the CWS to identify certain shipment characteristics. The characteristics include: revenue; weight (tons); the deregulation flag; distance; shipment size (in carloads); number of railroads; car ownership (i.e., private car flag); commodity code (“STCC”); hazardous material dummy variable; Rule 11 dummy variables; and year.

15. Dr. Caves uses the CSM and GIS data in conjunction with information in the CWS data to determine what he calls “potentially competitive rail alternatives.”⁹ He uses the Port Series and GIS data in conjunction with the CWS data to identify what he calls “potentially competitive water-based alternatives.”¹⁰

C. “COMPETITIVE” TRAFFIC GROUP

16. The first step in Dr. Caves’ Benchmark Model is to define a sample of movements from the CWS that he deems to be “competitive.” A move is included in the putatively “competitive” sample if it meets any one of the following criteria:

- It is a “deregulated (exempt)” shipment.¹¹ While not explicitly stated, it appears that “exempt shipments” in the model are based only on commodity exemptions, and traffic

⁷ Caves VS at p. 29.

⁸ Caves VS at pp. 9-12.

⁹ Cave VS at p. 12.

¹⁰ Cave VS at p. 12.

¹¹ Caves VS at p. 12

moving under equipment (i.e., TOFC/COFC) exemptions are not “competitive” under this criterion.¹²

- It is subject to rail competition. Dr. Caves considers a move rail-competitive if at least one Class I railroad operated within five miles of the origin, provided the *same* railroad also operated within five miles of the destination.¹³ Dr. Caves also considers various alternative definitions of “benchmark groups” that allow the distance between Class I railroads to differ by as much as 50 miles.¹⁴
- It is subject to water-based competition. Water-based competitive rail traffic is defined as having at least one port on the same waterway within five miles of both the origin and the destination.¹⁵ Dr. Caves considers various alternative definitions of “benchmark groups” that allow the distance to ports to increase to as much as 50 miles.¹⁶
- It is subject to truck competition. Truck competitive movements are defined as movements that are shorter than 200 miles and consist of fewer than five carloads.¹⁷

17. Dr. Caves’ criteria for placing deregulated traffic in the “competitive sample” does not explicitly include traffic with revenue less than or equal to 180% of variable cost or traffic moving under contract – traffic not subject to rate regulation. Unless covered by the screens defined above, this traffic is excluded from the “competitive” sample and is part of the “potentially non-competitive” traffic subject to rate-setting under Dr. Caves’ “Competitive Threshold”.

¹² Caves VS at pp. 12-13. Note that none of the shipments in the Commodity Group, “Miscellaneous Mixed Shipments” (i.e., 2-digit STCC 46) are treated as exempt by Dr. Caves. Caves VS, Table 2B, at pp. 17-19. Intermodal traffic is commonly waybilled in this commodity group and this commodity group is among the largest category moved.

¹³ Caves VS at p. 13.

¹⁴ Caves VS at p. 21.

¹⁵ Caves VS at p. 13.

¹⁶ Caves VS at p. 21.

¹⁷ Caves VS at p. 13.

D. MODEL SPECIFICATION

18. Dr. Caves uses what he deems to be his “competitive sample” of moves identified from the CWS to estimate an econometric (i.e., statistical) regression model that is designed to predict the natural logarithm of revenue-per-ton-mile (the dependent variable) based on “shipment characteristics” (the independent variables).¹⁸ The independent variables consist of:¹⁹

- logarithm of distance (miles),
- logarithm of number of carloads,
- a “dummy variable” if a private railcar or not,
- a “dummy variable” if a hazardous material,
- “dummy variables” for Rule 11 movements,
- the number of railroads on a move; and
- “fixed effects”²⁰ for commodities (at the 5-digit STCC level), and
- “fixed effects” by commodity, year, and railroad to try to control for the effect of the masking of contract revenues in the CWS used.

19. Applying the estimated coefficients from the above regression, Dr. Caves uses his limited information on shipment characteristics—haul length, carloads, number of railroads, the “dummy variables”, and the “fixed effects”—for the designated “potentially non-competitive” moves (i.e., the moves not included in the “competitive sample”) to predict the logarithm of the “competitive” revenue-per-ton-mile rates for the “potentially non-competitive traffic.”²¹ Dr. Caves’ basic idea is that these predicted rates for what he calls “potentially non-competitive” movements are what he

¹⁸ Caves VS at pp. 20-22.

¹⁹ Caves VS at pp. 20-23.

²⁰ Fixed effects in this context are variables that are constant across moves; these variables, such as year of the move and commodity moved, do not change over time. They have fixed effects; in other words, any impact they have on a move’s rate is the same across all moves having the same year or commodity. A regression with “fixed effects” imposes single average effects of, e.g., year and commodity on the rates for all moves having the same year and commodity. “Dummy variables” are similar in that they estimate the average effect of some variable, e.g., hazardous material or not, over all movements.

²¹ Caves VS at pp. 24-25.

believes such movements would have received if they had been “competitive” (according to Dr. Caves’ definitions of “potentially non-competitive” and “competitive”). The resulting predicted “competitive” rates are roughly the “average” rates observed for “competitive traffic” having the same model-included characteristics (i.e., the characteristics of the variables he has selected for inclusion in the model).²² As we explain below, this ambitious attempt is conceptually misguided in its understanding of the nature of competition in an industry such as railroading, and it utterly fails as a statistical technique for identifying individual rates that competition would generate for any given movement of a customer.

E. THE LINK TO REVENUE ADEQUACY: THE SO-CALLED “COMPETITIVE THRESHOLD”

20. Dr. Caves advises the Board to “implement a Benchmark-based rate standard by allowing captive rates to exceed competitive rates by a predetermined Competitive Threshold.”²³ The so-called Competitive Threshold would be determined by the STB based on an analysis of revenue adequacy.

21. Dr. Caves’ application of his model first calculates the reduction in each putatively “revenue adequate” railroad’s revenue necessary to set the Return on Investment (“ROI”), based on the accounting measure of net historic (book) invested capital, equal to the Cost of Capital (“COC”) over some period.²⁴ For each railroad that has an ROI in excess of COC for the period, he examines the rates and revenues from the purportedly “non-competitive” traffic. He then calculates the “Minimum Viable Competitive Threshold”, which is defined as the lowest value of the threshold that, combined with the benchmark rates for the purportedly “non-competitive”

²² As we explain below when addressing the econometric issues, the process of fitting a regression “line” to the scatter of points estimates the conditional expectation of the variable of interest (i.e., the rail rate)—the average rate given the explanatory values.

²³ Caves VS, Table 5, at p. 29.

²⁴ Caves VS, Table 5, at pp. 33 and 35. As previously demonstrated, use of accounting measures of net historic (book) invested capital in determinations of revenue adequacy is professionally discredited in finance and economics, and would represent a return to experientially discredited and now widely abandoned regulatory standards. See Kalt VS (2019).

traffic, would reduce overall historical railroad revenue and earnings such that ROI would not fall below COC for the historical period.²⁵

22. This Competitive Threshold (CT) is a multiplier to be applied to the predicted “competitive” revenue-per-ton-mile rates from the statistical regression model for all “potentially non-competitive” movements. A CT of 1.0, for example, implies that rates on the “potentially non-competitive” movements are capped at a level equal to the predicted rate from the econometric model.²⁶ These calculations determine the maximum rate for each of the “potentially non-competitive” movements and is intended to reduce revenue and earnings to each railroad up to the amount calculated above.

IV. THE PROPOSED BENCHMARK AND CT METHODOLOGY FUNCTIONS AS AN EARNINGS-BASED REVENUE CAP WITH ALL THE ASSOCIATED DISTORTIONS AND INEFFICIENCIES

23. The proposed Benchmark Model and CT Methodology is, at its core, *earnings regulation*. It would utilize putative findings of over-adequate earnings to trigger caps on individual shipments’ rates and thereby pull down overall system-wide revenues and earnings relative to what they otherwise would be. Specifically, the application of the Benchmark Methodology is tied to a determination of revenue (over-) adequacy: “The level of CT would be selected based on an analysis of revenue adequacy.”²⁷ As explained by the ACC, Dr. Caves has intentionally designed the CT “to determine the degree of differential pricing above the predicted competitive benchmark rate that is necessary to maintain the long-term revenue adequacy of the defendant rail carrier.”²⁸ In short, the proposed CT Methodology is clearly designed to trigger caps on rates for certain shipments, and thereby to reduce the revenues and attendant earnings, of railroads found to

²⁵ Caves VS at p.32. Dr. Caves does not allow the CT to go below 1.0. This ensures that the rate caps are not less than his benchmark rates.

²⁶ Caves VS at p.33.

²⁷ Caves VS at p. 29.

²⁸ ACC Filing at p. 4.

otherwise have revenues and earnings that yield “excess” accounting rates of return on investment (ROI).²⁹

24. Dr. Caves’ presentation of the Benchmark and CT Methodology makes it clear that the proposal is a form of regulation under which putative findings of over-adequate aggregate earnings trigger restraints on certain rates so as to limit overall aggregate revenue and earnings to putatively adequate levels. In the illustrations in Tables 5 and 6 of his Verified Statement, Dr. Caves determines a CT value for each of the three railroads that, based on his calculations, were “revenue adequate.” For these railroads, the illustration sets the CT at a level to cap affected rates to the extent necessary to eliminate railroad earnings deemed to be above the revenue adequate level (with a minimum CT level of 1.0).

25. Consistent with Dr. Caves’ illustrations, Figure 1 below provides a simple illustration of the relationships between revenue adequacy, revenue limitations, and rate caps in the Benchmark Model. In Figure 1 and for purposes of exposition, the subject railroad is assumed to serve only four shipments, all with the same commodity, length of haul, and other limited shipment characteristics included in the Benchmark Model regression. Without any loss of basic concepts, this assumption eliminates the need to convert between rates and revenues and allows us to avoid the complexities that arise from the statistical modelling and estimation; we address those complications below.

26. In Figure 1, two shipments are purportedly “competitive” and have the same \$700 rate (with corresponding revenue to the railroad); and two shipments are purportedly “non-competitive” with rates (and revenue to the railroad) of \$1,050 each. In this example, the Benchmark Model would identify the benchmark price as the average of the “competitive” rate (\$700 in bold in the Figure). In the illustration, the purportedly “non-competitive” rates are on average higher than “competitive” rates, in this example by 50%. The resulting total revenue of the railroad is \$3,500.

²⁹ The ACC proposal fully embraces the wholly discredited historical book accounting approach to measuring and using “revenue adequacy.” For review and discussion of the reasons for the professional rejection of the approach, see, e.g., Kalt VS (2019) and Written Testimony of Professor Kevin Murphy, Ph.D., and Professor Mark Zmijewski, Ph.D., On Behalf of Union Pacific Railroad Company, Norfolk Southern Railway Company, and CN STB Ex Parte No. 761 Hearing on Revenue Adequacy, STB Ex Parte No. 722 Railroad Revenue Adequacy, November 26, 2019 (hereinafter “Murphy and Zmijewski (2019)”).

Figure 1
Illustrating the Benchmark Model:
An Example Railroad with Four Shipments

Shipment	Uncapped Rates		Benchmark Model	
	Rate	Average	Rate	Rate Cap
"Competitive"				
1	\$700	\$700	\$700	--
2	\$700		\$700	
"Non-Competitive"				
3	\$1,050	\$1,050	\$900	\$900
4	\$1,050		\$900	
Total Revenue	\$3,500		\$3,200	
			CT	1.29
Target "Revenue Adequate"			\$3,200	
Minimum Revenue				

27. Based on a separate revenue adequacy analysis of the railroad's historical ROI and COC, the proposal determines the railroad's revenue required to have ROI just equal to the COC. If in the example in Figure 1 the railroad were not found to be "revenue adequate" (i.e., $ROI \leq COC$) then the rate caps would not be in effect. If instead, the railroad were found to be "revenue adequate" ($ROI > COC$), then rate caps would be triggered for specific shipments upon a demonstration of railroad market dominance vis-à-vis those shipments. In this case, assume the minimum revenue necessary for the railroad to be "revenue adequate" is calculated to be \$3,200. Rate caps for purportedly "non-competitive" traffic would then target pushing aggregate revenues down to \$3,200.

28. The right-hand side of Figure 1 shows how this rate cap would apply to a "revenue adequate" railroad. Consistent with Dr. Caves' illustrations, in this case, the CT would be set to eliminate total railroad revenue and earnings in excess of the minimum "revenue adequate" revenue level (\$3,200). In our example, the railroad is earning \$300 above this level (revenue of \$3,500 minus \$3,200). Under the proposal, the CT is set at the level that eliminates \$300 of revenue from the "non-competitive" group of shippers. This would require applying a rate cap of

\$900 to the two “non-competitive” shipments currently paying \$1,050 each (2 shipments times $(\$1,050 - \$900 = \$150)$ equals \$300, the targeted revenue reduction.) The CT follows immediately from the targeted revenue and the corresponding required rate cap to meet that reduction; it is the ratio of the targeted rates (\$900) divided by the benchmark rate (\$700) for a value of 1.29. Thus, the CT is the element that converts the targeted revenue reduction to be extracted from the “non-competitive” traffic into the applicable rate cap.

29. Note that if the minimum revenue necessary for the railroad to just be “revenue adequate” were lower for any reason, then the targeted revenue restrictions and rate caps would be more stringent. If the railroad engaged in efficient, cost-reducing activities and operations that would cause its ROI to be higher at any given revenue level, this would reduce the “target” revenue for the railroad and cause the rate caps to be more stringent (i.e., lower). If the “revenue adequate” target revenue in Figure 1, for example, were \$3,000 rather than \$3,200 due to efficiency enhancements, then an additional \$200 of revenue would be targeted to be removed from the “non-competitive” traffic. The rate caps in Figure 1 would then need to be set at \$800 instead of \$900, and the CT would be 1.14 ($\$800/\700).

30. A similar increased stringency in the rate caps would follow if revenue from “competitive” traffic went higher, perhaps as a result of service improvements that benefitted affected customers and increased their relative willingness to pay. If all else were the same in Figure 1, except that “competitive” rates were \$750 (instead of \$700) and thus revenue to the railroad were \$100 higher than in the Figure, then revenue from “non-competitive” traffic would need to be reduced by that same \$100. The resulting applicable rate cap would need to be \$850 (instead of \$900). The corresponding CT would be 1.13 ($\$850/\750). Of course, in the process, any incentive to provide customers with improved service would be dampened or eliminated altogether.

31. As shown by this simple example, the structure of the Benchmark Model results in rate caps that are triggered by earnings levels. And the restrictiveness of the proposed rate caps varies based on the railroad’s overall revenue and earnings from its aggregate traffic. This restrictiveness of the rate caps does not depend on whether the railroad is “revenue adequate” as a result of cost-reducing efficiencies, improved service quality to “competitive” shippers, or, potentially, as a result of rates to some (unidentified) shippers which really are above the “mimic competition” contestable levels.

32. Consistent with the example of Figure 1, and as shown by Dr. Caves and explained by the ACC, the CT revenue cap is set so that the historic book accounting-based earnings ROI would be equal to the COC. All else equal (and as is apparent from our example in Figure 1 and Dr. Caves' illustrations), the more the calculated ROI exceeds the COC (without the CT cap), the more restrictive would be the resulting CT rate caps.³⁰

33. Despite the claim to the contrary, there is nothing in the CT proposal "to maintain the long-term revenue adequacy"³¹ of the rail carriers. For railroads found to have been revenue *over* adequate over some test period in the past based on the backward-looking measure of "adequacy", the CT proposal is designed to push revenues down to the just-revenue-adequate level (as currently measured).³² The proposal threatens ultimately to drive revenue below adequate levels (as currently measured) because there is nothing in the proposal that provides a mechanism by which railroads pushed to just-revenue-adequate levels by the ACC approach, but that subsequently fall below revenue adequate level, are guaranteed revenue to make up these revenue shortfalls. This could well happen as a result of, for example, changes in economic and market conditions arising during the period of rate capping. The CT approach provides for no mechanism for real-time rate *uncapping* by which a railroad pushed into revenue inadequacy could recoup the revenue foregone in such a "down" period once and if times improve. And, to be sure, for revenue *inadequate* carriers, *nothing in the proposal would help them to become revenue adequate*. As indicated by Dr. Caves: "The remaining railroads are not revenue adequate, so the CT is not applicable to them."³³ (As we discuss below, notwithstanding this proffer of assurance, the mere prospect of revenue-limiting rate caps would distort the incentives and behavior of even currently non-revenue adequate carriers.)

34. As Dr. Caves recognizes, most of rail traffic is competitive. Moreover, railroads are obviously subject to swings in economic conditions common to competitive industries. Unlike true public utilities, with protected franchise monopolies over inelastically demanded services

³⁰ Even if the CT were not chosen mechanically so that historical revenues were at the exact minimum "revenue adequate" level, any relationship between historical earnings and the existence of the CT caps (due to a finding of revenue adequacy) or the stringency of the threshold based on some evaluation of past earnings and revenues leads to the disincentives and inefficiencies of earnings-based rate regulation.

³¹ ACC Filing at p. 17.

³² Subject the statutory limitation on rate setting and not setting rate caps *below* the benchmark level.

³³ Caves VS at p. 34.

(e.g., municipal water service or, in an earlier era, electric power companies), there is no mechanism by which a railroad's revenues could be guaranteed to remain at "revenue adequate" levels. This kind of asymmetric earnings regulation—rate caps when times are good but no floor when times are bad—poses additional risks and disincentives for ongoing investments. Likewise, it discourages innovations with uncertain outcomes: potential upside profits achieved through reduced costs or increased service quality would be limited by the rate caps, yet losses would be borne fully by the railroad.

35. Dr. Caves also claims that "implementing the CT is not equivalent to implementing rate-of-return regulation."³⁴ He bases this on the proposition that some "non-competitive" shippers may not be statutorily eligible for rate relief due either to having rates less than 180% of variable cost or failing to sustain a claim of rail market dominance.³⁵ This overlooks the fact that the limitations on overall revenues imposed by the proposed Benchmark and CT Methodology would be triggered by a finding of overall revenue adequacy and calculated in a manner to restrict aggregate revenues based on rates of return by applying restrictive caps to individual rates. The triggering of CT rate caps and (as shown in his illustration) the stringency of those CT rate caps turn directly on the degree of historical revenue over-adequacy, which in turn is determined by the *aggregate* earnings and rates of return realized by the railroad. As such, this *is* rate-of-return regulation. It uses putatively excess ROI to trigger rate restrictions and adjust the stringency of rate caps so as to push aggregate revenue, earnings, and rates of return down to purportedly adequate levels.³⁶ As such, the proposal has the characteristics of, and suffers the same failings as, other earnings-based rate regulation.³⁷

36. The Benchmark Methodology earnings-based rate caps portend all of the distortions associated with that type of outdated regulation that Prof. Kalt discussed in his prior Verified Statement.³⁸ We will not repeat them all here, but as previously summarized, the deficiencies of

³⁴ Caves VS at p. 29.

³⁵ Caves VS at p. 30.

³⁶ The proposal puts a floor of 1.0 on the CT, which may become binding before revenues are at the "adequate" level.

³⁷ See Kalt VS (2019) for extensive discussion of these failings.

³⁸ See, esp., Kalt VS (2019) at pp. 38-48. See also the discussion of Prof. Sappington, Regulatory Policy Design in the U.S. Railroad Industry, attached to Written Testimony of Norfolk Southern Railway Company, STB Docket

earnings-based regulation include: “(1) limited incentives for innovation and cost reduction; (2) over-capitalization; (3) high costs of regulation; (4) excessive risks imposed on customers; (5) cost shifting; (6) inappropriate levels of diversification and innovation; (7) inefficient choice of operating technology; and (8) insufficient pricing flexibility in the presence of competitive pressures.”³⁹

37. From among the numerous distortions and inefficiencies that the proposed earnings-based rate cap creates, here we highlight two which are particularly relevant to the Benchmark Methodology. First, the level of the CT, if applied, depends on the overall earnings—i.e., revenues less costs—of the subject railroad. Tying future revenues to past costs, as the proposal does, would substantially weaken railroads’ incentives to engage in investments and management efforts to reduce costs and improve efficiency. This is true regardless of whether otherwise efficient and cost-saving investments and activities would impact traffic categorized as “competitive” or “potentially non-competitive”, as the earnings threshold does not distinguish whether costs and revenues arise from “competitive” or “non-competitive” traffic. As history has borne out in the railroad and many other industries, these types of disincentives and impediments to providing efficient, quality service matter immensely.

38. Second, the Benchmark model leads to inflexible pricing based on *past* rail rates. The Benchmark Model calculates a single benchmark “competitive” rate for all shipments for a commodity, with adjustments only for carloads, distance, and four other characteristics of the shipment.⁴⁰ As discussed in more detail below, this statistically-determined benchmark rate essentially reflects a form of an “average” of rates designated as “competitive”, with different “averages” for different commodities. This benchmark rate would apply to all railroads and movements regardless of location—a shipment of coal from Appalachia to Baltimore would have the same benchmark rate as one from the Powder River Basin to Kansas (with the same adjustment

No. EP 761, Hearing on Revenue Adequacy and Docket No. EP 722, Railroad Revenue Adequacy, November 26, 2019 (hereinafter “Sappington (2019)”).

³⁹ Mayo, John W. and David E. M. Sappington, “Regulation in a ‘Deregulated’ Industry: Railroads in the Post-Staggers Era,” *Review of Industrial Organization* vol. 49, 203-227 (2016) (hereinafter, “Mayo and Sappington (2016)”) at p. 215, citing Sappington, David E. M., “Price Regulation,” in M. E. Cave, S. K. Majumdar, & I. Vogelsang (eds.), *Handbook of Telecommunications Economics*, Elsevier, Amsterdam, vol. I, 225–293 (2002).

⁴⁰ These are number of railroads involved in the shipment, whether a private car is used, whether it is a hazardous material (or not), and if (and where) there is a Rule 11 movement. *Caves VS* at p. 23.

for any difference in the length of haul that is applicable to traffic for all commodities).⁴¹ Given the backward-looking nature of any statistically-determined estimate, these benchmark rates would, at best, reflect market conditions that were in effect years earlier.

39. Under the proposal, once a “potentially non-competitive” shipper demonstrates that it is subject to market dominance, that shipper would be eligible to have its rates capped at the specified benchmark rate times the CT applicable to its carrier.⁴² But these rate caps would apply to all shipments, regardless of service level, location, costs, economic and competitive conditions, and customer demands. A shipment of a commodity on some high-cost, low-density line would be charged the same rate as a shipment on a lower-cost, higher-density line. As the demonstration of market dominance excludes factors such as geographic and product competition that vary across customers and time as economic conditions vary, these rate caps necessarily fail to respond to differences across customers or changes in market conditions. This inflexibility provides incentives to re-allocate resources (inefficiently) in ways that would reduce service quality on capped rates in order to capture additional revenue on uncapped rates. This would be a form of cross-subsidization.

40. The Benchmark Model and its corresponding rate inflexibility is a move away from sound principles of rail regulation and the competitive principles appropriate to the railroad industry. In many respects, the proposal represents a return to the pre-Staggers principles of ratemaking. In place of groups of rates determined by rate bureaus, the proposal would use a mathematical equation as its “rate bureau”: The same CT per-ton-mile rate cap for all (purportedly non-competitive) movements of a given commodity on a railroad would be determined by a mathematical equation (with differences only for length of haul, shipment size, and specific limited factors related to the number of carriers if an interline move). These commodity-based maximum rates would consider no information about specific customer demands, service levels, or costs. This proposal represents a large backwards step away from modern, flexible and innovative, customer-based rail service and pricing.

⁴¹ As discussed below, the Benchmark Model includes approximately 10,000 variables, by railroad, year, and commodity, to account for the masking. Caves VS at p. 21 and 23. Presumably, no such railroad-specific variables would be included in a model based on actual revenue, as the revenue would not be masked.

⁴² The rates would also need to be subject to STB rate-making authority—i.e., non-exempt traffic, not moving under contract, found to be market dominant, and rates limited to no less than 180% of variable cost.

V. THE BENCHMARK METHODOLOGY IS INCONSISTENT WITH COMPETITIVE PRINCIPLES PROPERLY APPLICABLE TO THE RAILROAD INDUSTRY

41. As set out by Dr. Caves, the Benchmark Model is “used to predict the rates that would be expected to prevail under competitive conditions” for the purportedly non-competitive traffic.⁴³ The proposal caps rates on putatively “non-competitive” traffic on a revenue adequate railroad based on a common CT multiplier (equal to as low as 1.0) of the estimated prevailing “competitive” rate for that traffic. According to Dr. Caves: “Railroads that earn rates of return in excess of the cost of capital are subject to rate regulation [under the proposal] only to the extent that these excess returns are the result of charging supracompetitive prices to captive shippers.”⁴⁴ This attempt to identify “supracompetitive” rates and mimic competition for “non-competitive” traffic fails to capture the competitive principles and realities *relevant to the rail industry*. (Indeed, as we show in Section VI below, much of Dr. Caves’ *competitive* traffic would pay rates that the Benchmark Methodology would find to be considered “supra-competitive” (i.e., excessively high) when paid by “non-competitive” traffic.)

A. COMPETITIVE PRINCIPLES APPLICABLE TO THE RAILROAD INDUSTRY

42. The appropriate *mimic competition* principles for railroads would not generally result in “non-competitive traffic” with rates capped at the average of otherwise comparable “competitive” traffic,⁴⁵ nor would we expect the traffic to match the average for competitive traffic. Instead, we would expect differential pricing, based on customer characteristics (including access to realistic alternatives that affect the elasticities of customers’ demands) to contribute to differential recovery across movements of the costs of a carrier’s common and shared assets.

43. Railroads are characterized by substantial fixed and common costs with enormous economies of scale and scope. In any sector, sufficient economies of scale relative to the size of market demand can make it most efficient—and hence in the public interest—to have one large firm serve the entire volume of market demand rather than trying to satisfy that demand with any combination of smaller, higher cost firms. Similarly, sufficient economies of scope relative to the

⁴³ Caves VS at p. 7.

⁴⁴ Caves VS at p.

⁴⁵ For extended discussion of the competitive principles applicable to the railroad industry, see Kalt VS (2019).

demands for various levels of service can make it most efficient to have a wide range of differentiated products across a wide range of differentiated customers provided by a single large firm rather than any combination of smaller firms.

44. Much, but not all, of the traffic served by the railroads are subject to competition from other railroads and other modes of transportation (trucks, pipelines, and water transportation), as well as product and geographic competition. Rates on traffic that is subject to direct competitive forces (e.g., due to trucks, other railroads, or geographic competition) tend toward the service-quality-adjusted, short-run marginal cost of the next-best competitive alternative (e.g., trucks or an alternative railroad) for *that* traffic. With large economies of scale and scope, if all rates were set at these levels, the resulting revenue would be unable to justify keeping investments in the rail industry, and the rail network could not be sustained. As a result, differential pricing with prices above short-run marginal costs for some traffic, and in some cases perhaps substantially above, is necessary for the sustained operation of the railroads.

45. The kind of competition applicable to an industry characterized by substantial economies of scale and/or scope—known as “contestability” (i.e., where competition takes the form of a contest to see who will be the supplier) —generates differential pricing. Particularly in the presence of large economies of scope (where one railroad can most efficiently combine the shipments of myriad kinds of freight from myriad customers across a far-flung network with differential traffic density on the many segments of the network), differential pricing represents the outcome of competition through contestability whereby rates would vary based on differences in variable costs specific to the portion of the network used, shipper demands, line density, and the rental costs (as determined by replacement costs) for the shared assets used to serve different groups of customers. In industries—like railroading—where such contests are inhibited by barriers to entry and/or exit created by the prevalence of sunk costs and/or regulatory structures, the applicable “mimic competition” principle of sound regulation appropriately simulates this form of competitive pricing.⁴⁶

46. The rail industry’s very large economies of scale and scope dictate that it would be grossly wasteful to have multiple railroads serving large swaths of the nation’s geography. For much of

⁴⁶ See Kalt VS (2019).

the country, doing that would entail hugely expensive duplication of facilities where a single system can readily handle available traffic. Under these fundamental economic characteristics, effective mimicking of competition entails contestability—i.e., setting regulated rates at the levels that competition to be the winner among multiple potential suppliers would set if such competition was not blocked by barriers to entry and/or exit. Under contestability for an industry such as railroads, competitively mimicked and sustainable rates for *all* traffic are not equal to the rates for *some* traffic on which direct competition drives rates toward short-run marginal cost. Rather, rates consistent with competitive outcomes means that *some* portion of a carrier’s traffic pay rates above those paid by other traffic (i.e., other traffic which can avail itself of direct alternatives to the service provided by the railroad). These differences in rates are limited by the differences in costs of competing for the ability to serve different groups of customers under different circumstances and costs.

47. Under such conditions, what competition produces as competitive prices for a particular customer is certainly *not* some average statistical amalgam of rates paid by other customers who do have multiple suppliers from which to choose. Instead, *competition* produces prices for solely-served customers that vary with those customers’ individual circumstances and demands. That is, *competition* produces rates that would not be expected to be the same for all shippers of the same commodity even after adjusting for the shipment characteristics identified by Dr. Caves. The Board’s SAC framework accords with these basic economics of contestable markets. The ACC’s proposal does not.⁴⁷

48. The Board’s current—and appropriate—framework for rate regulation recognizes that competition limits the degree of differential pricing experienced by affected shippers based on principles of contestability. The rates and revenues those shippers pay are just those necessary to sustain that portion of the network used by those shippers. Rates for those shippers are

⁴⁷ An alternative to competitive market principles is “second-best” Ramsey pricing—in which the markup over marginal costs varies traffic based on individual customers’ willingness-to-pay and their responsiveness to price—and total revenue collected reflects that needed to sustain the rail network. The CT Methodology, with a single “markup” over competitive rates for all customers (not *costs*) is in no way an approximation to Ramsey pricing. It is widely recognized that Ramsey pricing is informationally impossible in the railroad industry, given the need to have customer-specific information on rail demand that varies over time for vast numbers of customers. See, Intervistas Consulting Inc., Project No. FY14-STB-157, *Surface Transportation Board: An Examination of the STB’s Approach to Freight Rail Rate Regulation and Options for Simplification, Final Report*, 2016 at pp. 21-28.

appropriately capped, based on the ‘mimic competition’ principle, at the cost at which a would-be alternative contesting railroad would provide those services. This is the competitive foundation of contestability that underlies the SAC framework. Under this principle, the *competitive* per-ton-mile rate (the concept endorsed and employed—albeit, improperly—by Dr. Caves) would vary for proper competitive reasons based on the costs of sustaining the portions of the network and costs of providing services used by different shippers with different direct alternative options. For a given commodity and even after controlling for length of haul and shipment size, *competitive* per-ton-mile rates properly vary, for example, between shippers utilizing costly but low-density portions of the network and shippers on lower-cost, high-density parts of the system.

49. Nothing about these competitive principles implies that the per-ton-mile rate for a commodity should be the same across shippers (even after controlling for length of haul and shipment size). Higher rates determined under these principles are not “supra-competitive” under the appropriate competitive standard for the rail industry. Rates for shippers subject to some form of marketplace competition and for shippers only subject to contestable competition will all have rates based on the specific characteristics of the shipment (and the economic environment) in which the shipment occurs. These include costs, service, congestion, demand, and competitive factors far beyond those identified by Dr. Caves. The imposition of rates (or rate caps) without accounting for these specific shipment-specific factors is not capable of mimicking competition.

50. The ACC’s version of ‘mimic competition’ is inconsistent with the foregoing basic principles of sound rail rate regulation. The Benchmark/CT Methodology appears to assume that competitive market principles would result in all “non-competitive” traffic for a commodity paying the same rate per-ton-mile, with adjustments common to all commodities only for length of haul, size of shipment, and measures related to the extent of interlining. There is no plausible view of competition that would fail to recognize that characteristics of customers’ demands, costs, service quality, geography, and density of traffic on utilized lines are attributes that vary across shipments and locations. Indeed, as discussed more below, purportedly “competitive” traffic under Dr. Caves’ criteria will have large variation in rates across customers and routes, based on shipment- and customer-specific marketplace factors. Rates customers pay under even the type of competition envisioned by Dr. Caves are not some standard, fixed rate. The proffered methodology ignores this reality of the rail industry and is not capable of incorporating such price variation.

51. The intent of the Benchmark Methodology is to identify the rates for all traffic as though each movement were subject to direct, head-to-head competitors. As we explain below, the model fails to achieve that intent. It cannot identify the appropriate factors that determine individual rail rates even where there is direct, head-to-head competition; and it embraces the wrong concept of competition for sound regulation for an industry with economies of scale and scope as large as those found in freight railroading.

B. THE USE OF MEASURES OF “REVENUE ADEQUACY” BASED ON HISTORICAL COSTS TO TRIGGER THE PROPOSED RATE CAPS IS INCONSISTENT WITH COMPETITIVE PRINCIPLES

52. In violation of the principles of *competitive* differential pricing, but used nevertheless for purposes of establishing rate caps for all purportedly non-competitive traffic, the Benchmark/CT Methodology applies a single mark-up percentage to the benchmark rates. As shown in Dr. Caves’ examples and our example in Figure 1, the CT mark-up is tied to a measure of revenue adequacy based on historical book accounting. We have explained above and previously how distortions and incentives for inefficient behavior arise from tying rate caps to historical earning levels.⁴⁸ Historical accounting-based rate-of-return regulation provides no sound basis to trigger an attempt to impose “competitive” outcomes by applying earnings regulation or rates caps.

53. A finding of revenue adequacy based on historical book measures of invested capital cannot identify if and on what traffic rates may be above those implied by proper competitive market principles. As Prof. Kalt (and Profs. Murphy and Zmijewski) have shown, ROI (measured using historical book accounting) in excess of the COC is an expected and widespread outcome of firms operating in competitive industries, even over long, multi-year periods.⁴⁹ A finding of ROI in excess of COC based on such measures is not a reliable indicator of whether *any* prices are above appropriate competitive levels.

54. As Prof. Kalt has previously explained, the proper measure for whether a railroad (or other business enterprise) is earning above long-run competitive levels turns on valuing the assets of the company at replacement cost, not historical book value.⁵⁰ It is the current value of replacing the

⁴⁸ See also Kalt VS (2019) at pp. 38-48.

⁴⁹ See Kalt VS (2019) at pp. 32-38; Murphy and Zmijewski (2019).

⁵⁰ Kalt VS (2019) at pp. 16-23.

assets used, and the return earned on that value, which determine whether the firm is earning economic and, perhaps, supra-competitive economic profits. Under the appropriate contestability standard, the return on the replacement value of employed assets determines whether revenues are at a level necessary to sustain the enterprise.

55. Indeed, it is the expectation of earning returns on *replacement* cost at or above the cost of capital that would signal to a potential competitor the potential for economic profits and that this is a business in which it might be worth risking an investment.⁵¹ Due to large sunk costs and high costs of entry and exit, this type of entry does not occur in railroads.⁵² But it is the expected return on replacement costs that provides the appropriate benchmark for identifying the long-run competitive return. Of course, in practice, returns in any year may fluctuate around those levels; for example, due to booms and busts in the economy. Thus, even under a replacement cost standard, it is necessary to look at returns over a longer period to establish whether returns are consistent with competitive outcomes.

56. These principles are embedded in the existing CMP approach of the Board. Under CMP, rates for a given portion of a carrier's traffic are compared to the rates necessary to sustain a competitive level of return on a replacement cost basis (as represented by the SAC of a would-be competitive entrant). Consistent with competitive principles, such SAC rates are considered on a going-forward basis. Indeed, the contrast with the SAC framework highlights the deep flaws in the ACC proposal's attempt to mimic competition:

- The trigger for applying the Benchmark Methodology turns on the use of historical book accounting for invested capital rather than replacement cost for identifying when and if ROI is above the COC. Such an approach cannot identify if a railroad is realizing supra-competitive levels of earnings in either the short- or the long-run.
- A finding of "revenue adequacy"—*even if* properly measured using replacement cost—cannot identify which, if any, rates are above competitive levels. Absent such a demonstration, the use of a CT mark-up over the benchmark rates to establish rate caps

⁵¹ See Carlton, Dennis W., and Jeffrey M. Perloff, *Modern Industrial Organization*, 4th ed., New York: HarperCollins College Publishers, 2004 at pp. 247-248.

⁵² With large sunk investment by an incumbent, a new entrant risks being stuck in a market with two competitors when that market can only support one firm as a result of the economies of scale and scope relative to market size. Sunk costs – a barrier to *exit* – thus act as a barrier to *entry* and hence contestable entry in practice.

regardless of customer characteristics, demand, and costs of service of any specific “non-competitive” traffic is unjustified and not consistent with principles of competition.

- Moreover, as application of the SAC framework has shown, there can be pockets of above-competitive rates even on a railroad that is not earning, in the aggregate, its COC on either a replacement cost or historical book value basis. There is no underlying connection between rates capped by contestable competition and the proposed Benchmark Methodology.

VI. THE BENCHMARK MODEL RESULTS IN INCONSISTENT TREATMENT OF COMPETITIVE AND NON-COMPETITIVE TRAFFIC AND RATES

57. The Benchmark Model is an econometric regression of rail rates on a handful of variables related to the physical characteristics of the move (i.e., length of haul, volume, private car, etc.), along with hundreds of commodity fixed effects codes and roughly 10,000 fixed effects based on a combination of year, railroad, and commodity (used by Dr. Caves with the intent of adjusting for the effects of masking of revenue in the CWS). We discuss the limitations and pitfalls of the regression approach below. First, however, it is important to understand the conceptual failings inherent in using a statistically-determined “prevailing” competitive price as the basis for capping rates on individual movements.

58. As explained by Dr. Caves, statistical regression is an exercise in fitting lines through points.⁵³ Regression is a commonly used technique for analyzing data and identifying patterns and statistical relationships among data.⁵⁴ It uses variation in explanatory (“independent”) variables to “explain” the variation in some “dependent” variable. In the case of the Benchmark Model, the dependent variable is rail rates (measured as the logarithm of revenue per-ton-mile), and the data to be “fit” by the regression consist of the constructed “competitive” sample of rail rates. Regression as used here is a method of estimating coefficients that permits the determination of the mean (i.e., the “average”) of the dependent variable (i.e., the logarithm of rail rates), conditional on the values of the independent variables (length of haul, the “dummy” variables, etc.).

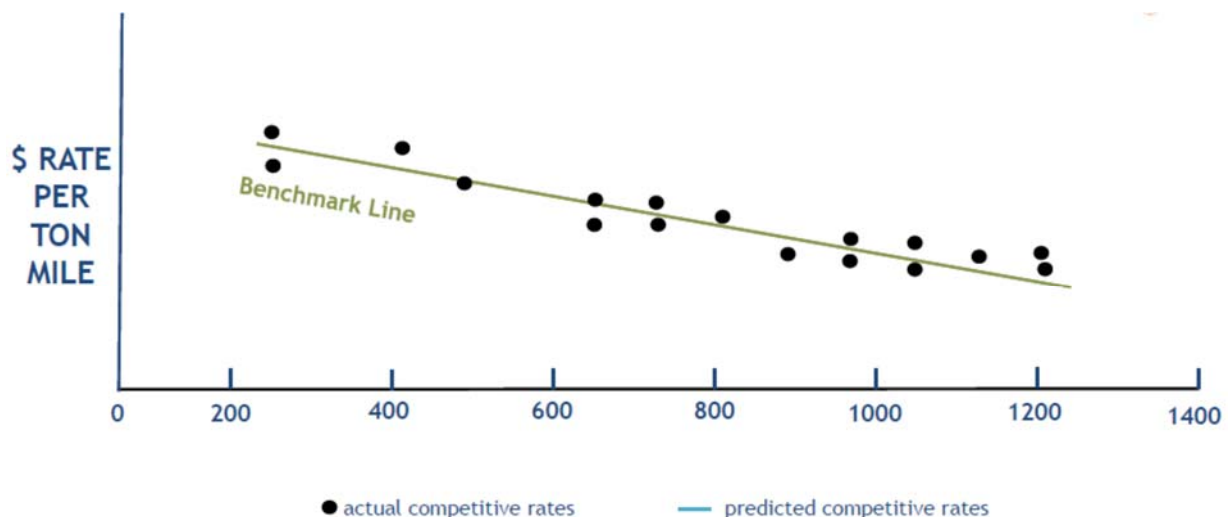
⁵³ Caves VS at pp. 7-8.

⁵⁴ See, for example, William Greene, *Econometric Analysis*, 7th ed. (2012) (hereinafter “Greene”) at p. 12.

59. Figure 2 below is an illustration of this “line-fitting” exercise presented by Dr. Caves at the December 12 hearing. Figure 2 displays illustrative data for putatively “competitive” traffic, consisting of rates (as the dependent variable needing to be explained) and lengths of haul (as the explanatory independent variable), along with the regression line that best “fits” the data in the sense of showing how length of haul can most closely predict rates. In the illustration, rates go down by a certain amount as length of haul increases in equal increments. While the illustration shows the relationship between rates and one independent variable, length of haul, the Benchmark Model as presented by Dr. Caves has thousands of variables that are being considered simultaneously. While this increases the complexity of calculation and eliminates the ability to draw a simple graph, the basic concept of line fitting still holds.

Figure 2

Dr. Caves’ Illustration of Fitting the Benchmark Model



Source: Dr. Caves Presentation, EP 761 Hearing, December 12, 2019.

60. In the above illustration, the “data” on shipment rates lie above and below the line, indicating that the “predicted” benchmark line of “competitive” rates per ton mile based on length of haul is sometimes below and sometimes above the data on rates per ton mile designated as “competitive” and utilized to fit the benchmark line. This is a required property of regression, as the regression mathematically minimizes the vertical distance (squared) between the observed data and the fitted line. As a result, the line of predicted rates will always run between actual rates that

have been designated as “competitive”, with some predicted rates being below and some being above the levels of those actual rates. Typically, roughly half of the data will be above the predicted line and half will be below. And if the model is well specified (meaning it does a good job of capturing the underlying economic relationships that account for the actual rates in the data), this property is likely to be true even as one looks at sub-groups of data (say, for example, only single-line chemical traffic with lengths of haul between 500 and 1000 miles, etc.).⁵⁵ Indeed, as the Benchmark Model includes fixed effects for each 5-digit commodity, the model attempts to adjust for average differences in rates across commodities.

61. We have recreated Dr. Caves’ “illustration” of the line fitting exercise consistent with the limited information and model results reported by Dr. Caves. (See Figure 3 below.) We conservatively calibrated the illustration so that it matches Dr. Caves’ estimated relationship between rates per-ton-mile and length of haul (both in logarithms) and his reported measure of how well the regression fits.⁵⁶ Figure 3 shows the results of this exercise. Dr. Caves’ underlying regression is linear in the logarithms of rates and length of haul. In order to discuss this in terms of the relevant variable—the level, rather than the logarithm, of rail rates—we transform the regression results in logarithms back into terms of rates in dollars. This results in a fitted “line” that bends.

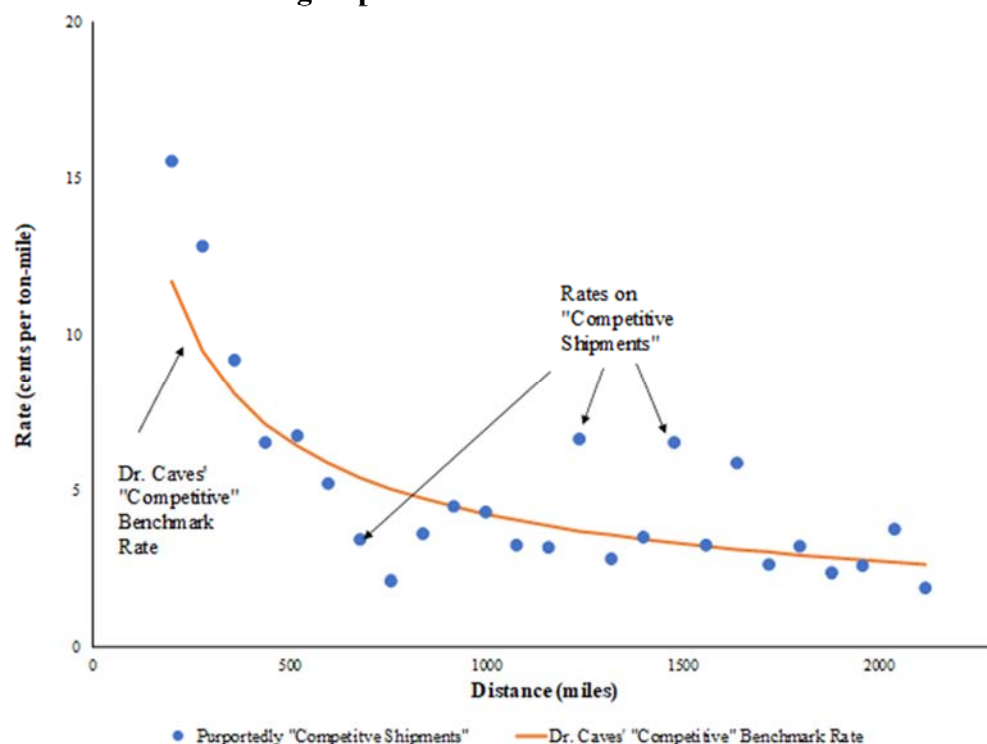
62. Figure 3 illustrates how the Benchmark regression model works, consistent with the information reported by Dr. Caves. The illustrative, purportedly “competitive” shipment rates

⁵⁵ See, for example, David F. Hendry and Bent Nielsen, *Econometric Modeling* (2007), at p. 168.

⁵⁶ We created 25 data points where there was an underlying linear relationship between the logarithm of rates and length of haul, and then added a random normal variable for the unexplained “error” to create illustrative data consistent with the basics of the Benchmark Model. The fitted regression line in Figure 2 has a slope of -.63, consistent with Dr. Caves estimate, and it has a slightly better “fit” than for the Benchmark Model, an R-Square of .587 v. .572, meaning that the illustrated data is slightly “closer” to the line than if there were a higher R square. As the average length of haul for a Class 1 Railroad in 2018 was over 1000 miles in 2018, we allowed the length of haul to range evenly between 200 and 2120 miles. (See <https://www.bts.gov/content/average-length-haul-domestic-freight-and-passenger-modes-metric>.) We drew a random set of normal “error” terms for each illustrative observation and adjusted the underlying linear relationship and variance of the errors to approximately match the estimates for the coefficient on length of haul and R-square reported by Dr. Caves. Obviously different draws of the random unexplained “error” variable would result in a different scatter of “competitive shipment” points.

scatter above and below the fitted line.⁵⁷ As such, the fitted line mathematically “averages” the information from the data.⁵⁸ In the specific illustration of Figure 3, rates for 13 of the 25 “competitive movements” exceed “the rates that would be expected to prevail under competitive conditions” as determined by the Benchmark Model. This is a built-in feature of the Benchmark Model—*roughly half* of the actual competitive rates exceed the rates that are *expected* under the Benchmark Model and which are the basis for setting rates on purportedly non-competitive traffic.

Figure 3
Illustration of Fitting Benchmark Model
Matching Reported Coefficient and Goodness of Fit



Note: Because the model is estimated in logarithms, but the results are graphed in terms of the *level* of rates, the fitted “line” curves.

⁵⁷ The level of the rate in Figure 3 is not calibrated to any particular value, as we did not have the average rate in the masked CWS. The *relative* differences between the “actual” data points and the line, however, are consistent with the reported data.

⁵⁸ Under least squares linear regression, the line minimizes the square of the deviation of the actual and predicted variable – in this case, the logarithm of the rate per ton-mile. We abstract from the additional statistical complexities required to determine predicted rate *levels*—the variable we care about—as a result of converting from logarithms to levels. See, e.g., James Stock and Mark Watson, *Introduction to Econometrics*, 2nd ed. (2007) (hereinafter “Stock and Watson”) at pp. 274-275.

63. The illustrative data in Figure 3 roughly correspond to the reported goodness of fit of the regression. The goodness of fit measure, called “R-Squared”, tells us how much of the variation in the rates per ton-mile for the “competitive” group the Benchmark Model explains—the answer is less than 60%.⁵⁹ On one hand, some of the variation in observed rates arises from the Board’s masking process. This lowers the R-Squared measure of explanatory power. On the other hand, Dr. Caves includes roughly 10,000 separate fixed effects variables that would not normally be included in a Benchmark Model. Inclusion of these variables may offset some (or all) of the effects of masking, as well as explain some of the variation in rail rates across time, commodity, and railroad that the model may not otherwise explain—thus tending to raise the explanatory power.⁶⁰

64. As seen in Figure 3, roughly half of the “competitive” traffic has rates higher than the benchmark rate that would apply to comparable (as determined by the limited variables included in the regression) “non-competitive” traffic. Based on the example in Table 4 of Dr. Caves’ statement, which applies a CT factor of 1.0 to BNSF and UP, rate caps generated by the Benchmark Methodology on purportedly “non-competitive” traffic would be *less than* what roughly half of comparable *competitive* traffic would be paying. This is not an artifact of the illustration but a central feature of the Benchmark Methodology.

65. The limited ability of the Benchmark Model to explain competitive rates can lead to large differences between the benchmark rate and the rates actually paid by competitive traffic. Based on the Figure 3 illustration calibrated to the reported Benchmark Model results in Dr. Caves’ Verified Statement, the average mark-up over the prevailing competitive benchmark rate for competitive traffic with rates above that benchmark is 30%. In the same example, over 10% of the competitive moves have rates more than 75% above the benchmark level.⁶¹ Thus, even with

⁵⁹ Caves VS at pp. 21-22.

⁶⁰ As a mathematical property, the inclusion of additional variables into a regression cannot decrease and almost always increase the amount of variation that the regression “explains,” regardless of whether these variables have any underlying economic or statistical significance or improve the quality of prediction when applied to another sample of data (e.g., the purportedly “non-competitive” traffic.)

⁶¹ The specific results stated here depend on the illustration that was drawn randomly but are intended to roughly match the results reported by Dr. Caves. More robust values would require analysis of the underlying data and model, but the similar principle would be expected to be found.

the CT set at levels greater than the benchmark rate, rates for some traffic designated as “competitive” would be above the rate caps imposed on “non-competitive” traffic.⁶²

66. In addition, like competitive traffic, purportedly “non-competitive” traffic almost certainly has a range of rates both above and below the benchmark rate implied by the model. According to Dr. Caves, 73.9% of the non-competitive traffic in his data has rates at 150% or below of the benchmark rate.⁶³ Although not reported, it is also almost certain that there are substantial volumes of “non-competitive” traffic in his data with rates below the supposed prevailing competitive rate. Thus, it follows that the imposition of a binding rate cap on all “non-competitive” traffic at the rates from the Benchmark Model would drive *average* rates on non-competitive traffic below the *average* for purportedly comparable competitive traffic.⁶⁴ Nothing in the ACC approach model would provide railroads the ability to raise “non-competitive” rates already below the cap in response to the imposition of the cap, and so the average must be lower. Even with a CT greater than 1.0 (so that the rate caps are some arbitrary multiple of the benchmark rates), it is inevitable that the average for non-competitive traffic potentially subject to the cap would be less than the rate cap. At the same time, some of the purportedly competitive traffic, perhaps substantial volumes, would in any case have rates in excess of that paid on average by non-competitive traffic.

67. Building on the example used earlier in Figure 1, we can illustrate how the application of the Benchmark/CT Methodology can result in these types of untenable results. Figure 4 below replicates the illustration in Figure 1 of the Benchmark Model applied to a railroad with four shipments. The information is the same as before, with the purportedly “competitive” and “non-competitive” shipments having the same average rates and revenue. In Figure 4, however, we allow a \$200 variation above and below the average for both groups. In this example, some “competitive” traffic has rates higher than some matching “non-competitive” traffic. This would inevitably happen under the Benchmark Model.

⁶² Although these results are one example based on the limited information on masked revenue provided by Dr. Caves, actual rail rates among shippers for even narrowly drawn traffic lanes and commodities subject to direct competition vary significantly due to customer preferences, customer-specific marketplace options, service differences and other economic factors.

⁶³ Caves VS at p.27.

⁶⁴ Other limitations on rate-setting authority—the 180% R/VC threshold, no authority over contract rates, and need for a market dominance showing—may prevent the imposition of binding rate caps at the Benchmark level for some traffic.

Figure 4
The Benchmark Model:
An Example Railroad with Individual Rates

Shipment	Uncapped Rates		Benchmark Model	
	Rate	Average	Rate	Rate Cap
"Competitive"				
1	\$500	\$700	\$500	--
2	\$900		\$900	
"Non-Competitive"				
3	\$850	\$1,050	\$850	\$950
4	\$1,250		\$950	
Total Revenue	\$3,500		\$3,200	
			CT	1.36
	Target "Revenue Adequate" Minimum Revenue		\$3,200	

68. As before, in order to eliminate the \$300 of purportedly excess revenue (the difference between the railroad's uncapped revenue and the target), the CT would be set so as to reduce revenues generated by putatively "non-competitive" rates by \$300. A rate cap of \$950 would apply (implying a CT of 1.35, \$950/\$700), and the rate cap would be binding on only one of the "non-competitive" shippers. The other "non-competitive" shipment has rates below the cap (albeit, rates could still readily be above the 180% of variable cost threshold and subject to market dominance). However, if the target revenue reduction were greater, perhaps as a result of more efficient railroad operations, the results become more extreme. Some of the illustrations of Dr. Caves result in a CT of 1.0.⁶⁵ A CT of 1.0, in the example in Figure 4, would imply a rate cap of \$700 applicable to the "non-competitive" traffic, leaving one of the two competitive shippers with a rate \$200 above the rate cap. As explained above, this result is a necessary outcome of the Benchmark Model.

⁶⁵ Caves VS at p. 33.

69. With more shipments, the observed range of rates would be larger, and it would be inevitable that some “non-competitive” rates would turn out to be less than the benchmark rate for comparable (according to the regression’s included variables) “competitive” traffic. In Figure 4, this would occur if Shipment 3 had a rate of \$650. The resulting rate cap could then drive the average of “non-competitive” rates *below* the competitive level specified by the model. This is economically incoherent.

70. The application of Dr. Caves’ type of mechanical statistical benchmarking for ratemaking necessarily results in the sort of perverse results described above. The underlying economic problem is that the Benchmark Model applicable to all rail traffic is incapable of capturing the forces of supply and demand affecting individual shippers’ and shipments’ rail rates. The model contains “fixed effects” by commodity that have the effect of adjusting the predicted benchmark rate toward the average rate for that commodity, such that the benchmark rate for “non-competitive” traffic for a commodity simply reflects the average rate paid by so-called “competitive” traffic for that commodity. The model also contains other factors that obviously influence rates—length of haul, interline costs, private versus carrier-owned cars, etc. The interactions of these factors vary across time, location, and customer, and the model cannot capture the effects of such customer- and traffic-specific factors on rates.

71. As is well known, a variety of direct competitive factors—such as geographic and product competition—influence rates. Yet, these factors are wholly absent from the Benchmark Model. Similarly, service quality and other cost factors influence rates in a manner not captured by the model. Rates paid by sophisticated customers moving similar or same commodities over the same highly competitive routes can vary substantially and reflects differences in customer-specific choices, service quality, and outcomes. Looking across time and across location, even within the same commodity, further expands the range of marketplace attributes that determine prices. Virtually none of this is or can be captured by the Benchmark Model.

72. The variation in rates unexplained by the Model is not some insignificant noise in the data. Instead, it represents the real outcomes of marketplace forces that are not captured by the Model. A reasonable application of an attempt to mimic competition would need to address and incorporate these differences, not “average” over them—as the Benchmark Model does—in a manner that ignores the economic factors relevant to efficient rail service and pricing.

VII. THE BENCHMARK/CT METHODOLOGY IS NOT A MOVE TOWARD SMART SIMPLIFICATION

73. Dr. Caves' Benchmark/CT Methodology appears simple on its face: run a regression, choose a CT, and impose rate caps. The proposal, however, does not represent smart simplification for addressing rail rate regulation. It is not smart in that it creates arbitrary distinctions and burdens railroads and shippers with an array of harmful inflexibilities, disincentives, and inefficiencies, some of which have been highlighted above. And it is not simple, as it creates a range of complexities and disputes that are unlikely to find any simple, consistent, and stable solution.

A. METHODOLOGICAL FLAWS AND ISSUES

74. The proposal suffers from the fundamental problem of not addressing the relevant concept of rail regulation—i.e., contestability; and from the irresolvable problem of imposing system-wide revenue constraints on railroads, particularly when based on accounting ROI-COC comparisons. But the proposal is rife with other methodological difficulties and flaws, as well. We discuss these briefly below.

1. Data Issues and Timing

75. Dr. Caves' methodology requires a large sample of waybills in order to apply his Benchmark Model. In his proposal, he has utilized CWS data spanning eight years from 2006-2013. Even with more up-to-date data, the model would require several years of waybills to generate enough data for any potential application. The 2018 Public Use Waybill Sample became available in December 2019. Assuming the confidential waybill sample became available at a similar time, the data would need to be incorporated into the modelling exercise, the results verified and approved. The implication is that updated benchmark rates applicable to 2020 or 2021 would be based on rail rates in effect ten years ago, from 2011 through 2018, assuming eight years of data would continue to be used.

76. While Dr. Caves' Model is proffered as a demonstration of the proposed methodology, even with non-masked data the methodology would inevitably and inherently require the use of *historical* rail rates for predicting *current* "competitive" rates. There is nothing in the structure of the proposed Benchmark Model that can address changing cost factors, economic forces, and marketplace conditions over time and across commodities to yield benchmarks coherently applicable to future rates. Indeed, Dr. Caves hints that the non-masked model may include

“dummy variables” that account for average differences in rates across years and railroad.⁶⁶ But this method cannot determine the appropriate average value for the *current* year from historical data. As we’ve explained, the model cannot account for the specific individualized marketplace influences on prices that demonstrably result in a wide distribution of rail rates for what the model would treat as comparable traffic.

77. Consider, for example, the case of coal, one of the largest rail commodities and one that Dr. Caves has identified as being 70% non-competitive.⁶⁷ As natural gas and renewables displace coal for electric generation, rail shipments of coal have declined substantially, by roughly a third from 2011. Economic and environmental pressures are only likely to continue this trend.⁶⁸ A leading competitive factor in the current economy constraining rail rates for coal is product competition. With this form of competition, some coal customers can turn to different fuels or products—natural gas, renewables, or purchased power—to satisfy their needs for electric generation as an alternative to purchasing and transporting coal. This competitive factor continues to change over time and varies across customers and locations; rates from 2011 are not a reliable basis by which to set system-wide rate caps for coal traffic in 2021 and beyond. Nothing in the model can identify the marketplace effects of the changing and differential competition from natural gas and renewables, or identify the effects of future environmental policies that vary across states and regions.

78. One can readily identify similar large swings in economic conditions for other commodities in response to industry, competitive (e.g., pipeline completions), and commodity sector changes such as the phenomena of crude-by-rail and “frac sand”. More broadly, procyclical changes in economic conditions can lead to substantial swings in overall rail traffic, revenue, and rates such that rates based on history and as captured in the Benchmark Model make poor guides, or “benchmarks”, for current conditions.

⁶⁶ Caves VS at p. 21, fn. 30.

⁶⁷ Caves VS at p. 15.

⁶⁸ See AAR, *Railroads and Coal*, May 2019. <https://www.aar.org/wp-content/uploads/2018/05/AAR-Railroads-Coal.pdf>

2. The “Competitive” and “Potentially Non-Competitive” Groups

79. The choice of how to divide traffic into a “competitive” group and a “non-competitive” group is fundamental to the Benchmark Model. The “competitive” traffic becomes the source of data for estimating the model, but this traffic is then not part of the “non-competitive” traffic that is presumably eligible to have rates capped. The size and composition of the non-competitive traffic group also affects the magnitude of the potential CT that would be used to eliminate past earnings above the historical, book accounting-based revenue adequacy measure. The larger the volume of non-competitive traffic, the greater the aggregate reduction in revenue that results from the application of a rate cap at any CT level.

80. Dr. Caves has presented no evidence or analysis to support the metrics he uses to identify his “competitive sample.” Each represents fertile ground for endless dispute. For example:

- Dr. Caves’ definition of rail “competition” does not appear to include interline competition. Dr. Caves considers a move subject to potential rail competition only if the *same* Class I railroad is within a certain number of miles of the origin and destination.⁶⁹
- Dr. Caves definition of rail “competition” does not account in any way for product and geographic competition. Such competition cannot be dismissed on grounds of expediency without introducing what statisticians refer to as “specification” or “left-out variable” bias (i.e., bias introduced by trying to explain the level of competitive rail rates with a model that does not account for the *economically* relevant forces of competition in the industry).
- Dr. Caves presents no analysis supporting his assertion that 200 miles and fewer than five carloads are the limits of truck competition, nor has he demonstrated that the limits of truck competition are uniform across commodities.
- It appears that Dr. Caves does not consider TOFC/COFC traffic within the context of exempt or truck competitive, and such traffic would be competitive or non-competitive based on other criteria.

81. In addition to being too narrow, the criteria defining the “Competitive Set” excludes analysis of product and geographic competition entirely (apart from commodities already found to be exempt), as well as build-in/build-out threats. Product and geographic competition have been recognized by the ICC and the Board as essential sources of competition for many rail movements.

⁶⁹ Caves VS at p. 13.

More importantly, both common sense and technical economics recognize the roles of product and geographic competition.

- A shipper may have the ability to shift production to a different area and access alternative transportation options, or access different destinations for the sale of a more-or-less fungible product (geographic competition). That competition will discipline rates but is not reflected in any of Dr. Caves' criteria.
- A shipper may be able to use multiple products in its business. If a shipper can use a substitute product (product competition) that offers different transportation alternatives, that competition will discipline rates but is not reflected in Dr. Caves' criteria. Indeed, the declining demand for coal transportation in the face of on-going product competition demonstrates the force of this factor.

82. Arbitrary alternatives for the rules for dividing traffic into the “competitive” and “potentially non-competitive” categories result in large differences in the traffic that are deemed “potentially non-competitive” and in the potential economic effect of the proposal on shippers and carriers. As indicated by Dr. Caves, 76% of the traffic is “competitive” under his preferred screen, with 24% “potentially non-competitive.”⁷⁰ If the number of observations in the “competitive” traffic (the measure reported by Dr. Caves) correspond to traffic percentages, then moving from the narrowest to the broadest definition in Dr. Caves' Table 3 results in a “competitive” traffic going from 76.2% of all movements to 93.4% of movements being “competitive”.⁷¹ “Potentially non-competitive” traffic correspondingly drops from 23.8% to 6.6% of all traffic. This represents a more than three-fold change in the traffic that would be potentially subject to the imposition of price thresholds. Were a railroad found to be revenue adequate under the proposal, these differences in the size and composition of the “non-competitive” group would lead to large differences in the amount of revenue that could be potentially capped. This would necessarily lead to large differences in the corresponding CTs required to claw back a given targeted level of revenue, as well as in the resulting magnitude and distribution of the effect of any rate cap obtained by different shippers.

⁷⁰ Caves VS at Table 2A. This refers to the unweighted traffic; the traffic weighted by the expansion factor is 80%.

⁷¹ Caves VS at Table 3. If the number of waybill observations corresponds to the unweighted traffic, then, per Dr. Caves, the number of waybills included in column BG1 represents 76.2% of the sample, and thus the number of waybills in column BG9 would represent over 93% of the sample.

83. The metrics used to identify “competitive” and “non-competitive” traffic would likely be the subject of intense debate among the interested parties in any given case. Dr. Caves identified certain “screens” subject to alternative specifications. We highlighted certain competitive factors ignored by these screens. The questions of what screens should be used, whether the same screen should apply to all commodities, and which commodities should be included under which definition of which screen are likely to be the subject of intense disagreement and enormous complexity. Is the same distance to an alternative railroad the appropriate measure of “competitive” when applied to shippers of grain, miscellaneous mixed freight, or toxic inhalant chemicals? The proposed screens currently adopt the existing commodity (but not equipment) exemptions. The need to identify and justify reliable screens for distinguishing “competitive” and “non-competitive” traffic risks turning this proposal into a vast exemption-style proceeding. Moreover, in order to then implement the Benchmark Model, such a proceeding would have to arrive at non-arbitrary, broad-brush, mechanically-applicable criteria for distinguishing competitive from non-competitive conditions across different commodities shipped by rail.

84. Given that shippers obtain no benefit from this proposal by being included in the “competitive” sample, there would also likely be great pressure to substantially restrict the criteria for being included in the “competitive” sample and to, instead, expand the “non-competitive” group. Regardless of how the traffic is split between competitive and non-competitive, it would almost certainly be the case, as explained above and if the model is working as intended, that approximately half of the competitive shipments would have rates above the benchmark rate. Some or all of those “competitive” shippers could find themselves in the position of paying rates in excess of rates capped under this proposal. The need to maintain the separate treatment of the “competitive” and “non-competitive” groups, however, is core to the logic of the Benchmark Methodology, and failure to establish and maintain that divide would render the concept of a “benchmark” meaningless.

85. The conflict between “competitive” and “non-competitive” shippers would also likely play out in ways that lead to instability and ongoing ratcheting of benchmarks and rates. If the assignment into the “competitive” sample does not prevent a shipper from exercising statutory rights to seek rate relief, then any “competitive” shipper that can satisfy the tests for market dominance could be eligible for rate relief under the Benchmark/CT Methodology. Shippers designated as being in the “competitive” group, but with rates above the benchmark, and especially

with rates well above the benchmark, would have the incentive to make such a showing and take advantage of the relief permitted. But in such cases, it is wholly inconsistent to include such shipments in the purportedly “competitive” data sample that determines the competitive benchmark rates. Eliminating those shipments from the “competitive” group would require re-running the model and result in lower benchmark rates. This loop of “competitive” traffic seeking relief, leaving the “competitive” data sample, re-running the model, and ratcheting benchmark rates lower could readily continue until either multiple rounds of proceedings exhaust the traffic that could plausibly argue for market dominance, or all rates are at the 180% R/VC threshold.

3. Model Specification

86. Despite the large number (850) of “fixed effects” (individual variables intended to capture differences in the average value across different classifications) for commodity type (and 10,000 additional fixed effects included solely for the purpose of controlling for the masking of the Waybill sample), the statistical model includes very little of the economic and competitive factors that actually affect rail rates. The variables, apart from the commodity shipped, that Dr. Caves uses to attempt to “explain” differences in rates consist of: haul distance, number of carloads, number of railroads, and a few dummy variables used to identify *average* effects of the use of private cars, presence of hazardous material, and whether a rate relates to a Rule 11 move.

87. The statistical regression assumes that all traffic responds to the few identified factors (i.e., distance, carloads, etc.) in the same manner across all traffic and time. There is nothing in the regression to account for variation in rates across different traffic due to differences in cost factors (apart from commodity and the handful of items mentioned above), service quality, congestion, reliability, or timeliness that affect railroads’ costs and shippers’ willingness to pay. Moreover, variation in the force of competition (effectiveness and cost of competing modes or intra-modal costs) across traffic in different circumstances within the designated “competitive” data sample is completely ignored.

88. Even within the limited range of factors considered in Dr. Caves’ regression, the statistical model embodies a variety of assumptions that are unlikely to hold universally. For example, the number of carloads and distance of a move are assumed to have the same effect on intermodal as on coal traffic.

89. Likewise, there is nothing in Dr. Caves' framework that identifies how any of these factors differ over time—the regression assumes all real (i.e., inflation-adjusted) rates⁷² respond to these factors identically from 2006 to the present, and there is nothing in the model to account for how competitive rail rates actually respond to changes in costs or the prices of competitive alternatives across time.

90. The fact that more than 40% of the variation in the real rate per ton-mile is left unexplained by Dr. Caves' statistical regression demonstrates that the regression model does not reliably capture the determinants of competitive prices. Dr. Caves correctly makes the point that a model can generate reliable results even if a substantial amount of the variation is unexplained—but this conclusion depends on an understanding of reliable *for what purpose*. If knowing the *average* effect of length of haul on rates is the purpose of the statistical analysis, we may be able to get a reliable measure of that average effect from a well-specified model with large unexplained variation in the regression. If, however, we are interested in predicting competitive, benchmark rates applicable to *individual* shipments, rather than average rates over a large group of shipments, then the model's inability to explain individual rates with any precision makes that model unusable for that intended purpose.⁷³ As the results of the Benchmark Model are intended to be used to cap rates on individual shipments, the Benchmark/CT Methodology requires accurate and reliable estimates of rates to the individual shipper, which it does not and cannot provide.

91. This discussion identifies just some elements of the technical economic and statistical thicket of issues that would need to be thrashed out and decided.⁷⁴ We've discussed the threshold problem of characterizing traffic as competitive or non-competitive for purposes of determining the data on which the statistical model could be run. Additional economic statistical issues include questions of regression specification—which variables are to be included and in what form, should they be interacted differently for different commodities, how does one account for changes in costs

⁷² Where nominal rail rates are adjusted to real rates by the *consumer* price index. This implicitly assumes that all rail rates will trend at the rate of consumer prices.

⁷³ Assuming an otherwise well-specified model, this difference is the difference in the confidence in the estimate of the effect of length of haul and the prediction error applicable to any individual rate. Greene at pp. 80-87. In the case of rail rates derived from the Benchmark Model, the unexplained prediction error includes the effects of precisely those factors that actually determine individual rates, but that are excluded from the model.

⁷⁴ See, for example, Greene at Chap. 5 and 352-354; Stock and Watson at Ch. 9; and Jeffrey Wooldridge, *Econometric Analysis of Cross Section and Panel Data* (2002) at pp.328-331.

over time that may affect different traffic differentially, etc. Related to these are problems of omitted variable bias, collinearity, use of specification tests for inclusion or not of variables, goodness of fit, and the ability to evaluate the predictive ability of the model. Numerous other technical issues arise in the choice of estimation and statistical testing (e.g., adjustments for heteroskedasticity, clustering, geographic correlation, etc.). As decisions on these issues would affect the resulting model and its output, the resolution of these issues is likely to affect different shippers differently. These types of concerns would likely be of significance to various interested parties; the issues and their resolution are far from simple.

92. All the foregoing issues drive home the point that the use of a “black box” statistical regression as *the* basis for setting myriad rail rates would generate open-ended, contentious, and intense dispute. At its core, the statistical Benchmark Model is an elaborate form of averaging, portending the imposition of homogenizing rate restrictions which would push rates to average levels without proper, or even coherent, consideration of the actual economic circumstances—including competitive circumstances—that actually drive dynamic competitive pricing in the rail industry.

B. THE BENCHMARK/CT METHODOLOGY’S RATE CAPS

93. The use of the Benchmark Methodology and CT-based rate caps suffers from arbitrariness and failings of the same type as the Rail Rate Reform Task Force’s RIC proposal, but with much greater force and potential for distortion. (See Kalt VS (2019) and Section IV above on the extensively documented distortive effects of earnings-based rate regulation.) Like similar proposals, the ACC proposal deviates from the mimic competition principle relevant for railroads that calls for some degree of differential pricing along the lines discussed above and previously identified by Prof. Kalt.⁷⁵ It does not qualify as *smart* simplification.

94. In addition to the distortions introduced by earnings-based rate regulations, the application of the CT rate caps would eliminate the incentive for railroads to maintain or improve service quality for traffic on which the CT reduces rates. A reduction in service quality would be borne by the shipper and the corresponding cost savings would be gained by the railroad. As long as service quality is above the minimum level necessary to retain the customers’ traffic at the *capped*

⁷⁵ Kalt VS (2019) at pp. 8-12.

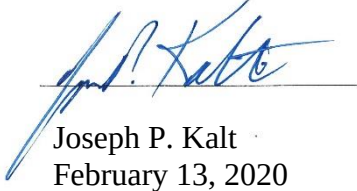
rates, the railroad has no incentive to maintain or improve service quality. Instead, it has the incentive to try to effectively transfer as much of the costs of the service on to shippers.

95. Dr. Caves suggests that the Board need not necessarily set the CT at the level that would eliminate revenue in excess of the calculated revenue adequacy level. This does not eliminate the distortions and harms of rate cap regulation that triggers rate tightening based on a seller's levels of earnings and revenue. The *trigger* for the imposition of rate regulation under the ACC approach would still be a finding of revenue over-adequacy. As a result, carriers would face incentives to avoid tripping the trigger by, for example, undertaking efficiency and quality improvements that portend increases in revenues and earnings. As previously documented, these are the same distortionary incentives that full earnings-based rate regulation has so rampantly produced in other sectors.⁷⁶

96. Similarly, were the Board to select some arbitrary level for the CT, potentially affected shippers (and railroads) would have the strong incentive to litigate and pressure the Board to tighten (or loosen) any arbitrarily selected CT. The balance of these pressures would likely turn on the financial performance and earnings of the railroads. Moreover, while the use of a historical-cost revenue adequacy measure to impose widespread rate regulation is inconsistent with appropriate mimic competition principles, the use of an arbitrarily chosen CT in the Benchmark/CT Methodology is equally inconsistent. The proposed approach, with any chosen CT level and with its inability to capture the economic factors that actually determine rail rates in the real world, would leave rate regulation untethered from any valid competitive principle. Such an approach would be the opposite of a principled and smart simplification of the rail regulatory process.

⁷⁶ See, for example, Kalt VS (2019) at, esp., pp. 38-48; Mayo and Sappington (2016); and Sappington (2019).

I declare under penalty of perjury that the foregoing is true and correct.

A handwritten signature in blue ink, appearing to read "J. P. Kalt", is written over a horizontal line. Below the line, the name "Joseph P. Kalt" and the date "February 13, 2020" are printed in black text.

Joseph P. Kalt
February 13, 2020

I declare under penalty of perjury that the foregoing is true and correct.

A handwritten signature in blue ink, appearing to read "David Reishus", written over a horizontal line.

David Reishus
February 13, 2020

APPENDIX A



CURRICULUM VITAE

David Reishus

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PROFESSIONAL EXPERIENCE

Compass Lexecon
Boston, MA
Executive Vice President, April 2013 – present
Senior Vice President/Senior Managing Director, July 1999 – March 2013

The Economics Resource Group, Inc., Cambridge, MA
President, 1993 – June 1999
Senior Economist, 1990 – 1993

Provides economic analysis and advice on issues of regulation, antitrust, taxation and applied microeconomics to a variety of clients. Develops, manages, and oversees economic analyses for clients and other principals. Responsible for the management and operations of the company.

U.S. Congress, Joint Committee on Taxation, Washington, DC
Economist, 1987 – 1990

Provided economic analysis and development of legislative tax proposals. Responsibilities included corporate and foreign taxation and proposals related to low-income taxpayers, child care, and health issues.

Harvard University, Cambridge, MA
Instructor, 1986 – 1987

Leader of senior thesis tutorial for industrial organization and finance topics. Previously taught Introductory Economics.

Information Resources, Inc., Chicago, IL
Consultant, 1979 – 1980

EDUCATION

Harvard University, Cambridge, MA
Ph.D. in Economics, 1988
Dissertation: “Empirical Essays on the Economics of Taxation and the Firm”
M.A. in Economics, 1983

Northwestern University, Chicago, IL
B.A. in Economics, 1979

TESTIMONY AND OTHER REPORTS

Government of British Columbia and Government of Canada
Before the International Trade Administration, Department of Commerce, Countervailing Duty Investigation of Certain Softwood Lumber Products From Canada (C-122-858), First Administrative Review. Response to Petitioner’s Submission of August 12, 2019. Expert Witness Statement, August 26, 2019.

Government of British Columbia and Government of Canada
Before the International Trade Administration, Department of Commerce, Countervailing Duty Investigation of Certain Softwood Lumber Products From Canada (C-122-858), First Administrative Review. Economic Analysis of British Columbia Log Export Permitting Process, Stumpage and Log Markets. Expert Witness Statement, July 15, 2019.

Government of Canada
Before the International Trade Administration, Department of Commerce, In the Matter of Certain Softwood Lumber Products from Canada (A-122-857). Economic Analysis Regarding Claims of Particular Market Situation for Canadian Softwood Lumber By-Products. Expert Witness Statement, July 20, 2017.

Association of Oil Pipe Lines
Before the Federal Energy Regulatory Commission. Docket No. RM17-1-000 Revisions to Indexing Policies and Page 700 of FERC Form No. 6. Declaration, January 19, 2017.

BNSF Railway Company
Before the Surface Transportation Board. Finance Docket No. 32760 (Sub-No. 46) BNSF Railway Company -- Terminal Trackage Rights --Kansas City Southern Railway Company and Union Pacific Railroad Company. Verified Statement, October 23, 2015.

Association of American Railroads

Petition of the Association of American Railroads to Institute a Rulemaking Proceeding to Reintroduce Indirect Competition as a Factor Considered in Market Dominance Determinations for Coal Transported to Utility Generation Facilities; Surface Transportation Board Ex Parte No. 717. Verified Statement, November 14, 2012.

Modis

In the United States District Court for the District of Columbia, Case 1:09-cv-01051-RWR, Modis, Inc. v. Infotran Systems, Inc. and Tien H. Tran v. Modis Inc. and Timothy W. Martin. Expert Report, October 18, 2010. Deposition testimony December 7, 2011.

Government of Canada

In the Matter of Arbitration No. 91312, Canada v. The United States of America. Expert Witness Statement of Joseph P. Kalt and David Reishus, May 12, 2009.

Government of Canada

In the Matter of Arbitration No. 7941, The United States of America v. Canada. Expert Witness Statement, June 29, 2008. Rebuttal Expert Witness Statement, August 11, 2008. (With Joseph Kalt).

Government of Canada

In the Matter of an Arbitration Under Chapter Eleven of the North American Free Trade Agreement Between Merrill & Ring Forestry, L.P. and The Government Of Canada. Expert Report, May 9, 2008. Supplemental Expert Affidavit, March 19, 2009. Oral testimony, May 21, 2009.

Dynergy

In the Circuit Court of Colbert County, State of Alabama, NO. CV-2003-142JMH, Nelson Brothers, LLC v. Cherokee Nitrogen v. Dynergy Marketing & Trade; Dynergy Inc. Expert Report, August 22, 2007.

Independent Energy Producers Association of California

Before the Federal Energy Regulatory Commission, Docket No. R.06-02-013, Long-Term Procurement Plans, Prepared Testimony of the Independent Energy Producers Association; Prepared Testimony of David Reishus and Joseph Cavicchi on behalf of the IEPA, March 2, 2007.

First Energy

Before the Pennsylvania Public Utility Commission, Petition of Metropolitan Edison Company for Approval of a Rate Transition Plan (Metropolitan Edison Company Docket No. R-00061366) and Petition of Pennsylvania Electric Company for

Approval of a Rate Transition Plan (Pennsylvania Electric Company Docket No. R-00061367), Direct Testimony of David A. Reishus, April 10, 2006.

ExpressTrak LLC

In the United States District Court For the District of Columbia, Case No. 02- CV-1773, National Railroad Passenger Corporation v. ExpressTrak, L.L.C., Expert Report, Dated January 3, 2006; revised April 7, 2006. Deposition testimony, March 24 and April 26, 2006.

British Columbia Lumber Trade Council and the Province of British Columbia

Before the International Trade Administration, Department of Commerce, In the Matter of Certain Softwood Lumber Products from Canada (C-122-839). Statement for the First Administrative Review, March 15, 2004 (with Joseph Kalt); Response to Price Impact of Canadian Log Restraints, March 16, 2004 (with Joseph Kalt); Response to Coalition Submission on Pass-Through Issues, April 15, 2004 (with Joseph Kalt); Economics of Arm's-Length Transactions and Subsidy Pass-Through, September 15, 2004 (with Joseph Kalt); Economic Analysis of the Vancouver Log Market, February 28, 2005 (with Joseph Kalt); Comment on the Economic Implications of the Annual Allowable Cut, December 5, 2005 (with Joseph Kalt); Update to Economic Analysis of the Vancouver Log Market, December 5, 2005 (with Joseph Kalt). Reports filed from March 15, 2004 to December 5, 2005.

Multiple Associations of Energy Producers

Before the Public Utilities Commission of the State of California, Rulemakings R.04-04-025 – R.04-04-003, “Prepared Rebuttal Testimony,” October 28, 2005 (with A. Joseph Cavicchi). Oral testimony, January 23 and 24, 2006.

PPL Corporation

United States of America, Before the Federal Energy Regulatory Commission, Docket No. ER05-1416-000, “Affidavit of A. Joseph Cavicchi, Joseph P. Kalt, Ph.D., and David A. Reishus, Ph.D. on Behalf of the PPL Parties,” October 19, 2005.

The Burlington Northern and Santa Fe Railway Company

Before the Surface Transportation Board, Finance Docket No. 34342, Kansas City Southern -- Control -- The Kansas City Southern Railway Company, Gateway Eastern Railway Company, and The Texas Mexican Railway Company. Verified Statement, June 3, 2003; Verified Statement, August 4, 2003; Reply Verified Statement, August 29, 2003.

Dynegy Inc.

United States of America, Before the Federal Energy Regulatory Commission, San Diego Gas & Electric Company v. Sellers of Energy and Ancillary Services, Investigation of Practices of the California ISO and PX; Pub. Utils. Comm'n of the State of California v. Sellers of Long-Term Contracts. Prepared Rebuttal Testimony (with Patrick Wang), March 20, 2003.

Duke Energy Trading and Marketing LLC

United States of America, Before the Federal Energy Regulatory Commission, San Diego Gas & Electric Company v. Sellers of Energy and Ancillary Services into Markets Operated by the California Independent System Operator and the California Power Exchange; Investigation of Practices of the California Independent System Operator and the California Power Exchange. Prepared Rebuttal Testimony (with Patrick Wang), March 20, 2003.

Dynegy Inc.; Duke Energy Services LLC; Mirant Americas, Inc.; Reliant Energy; Williams Energy Marketing and Trading Co.

United States of America, Before the Federal Energy Regulatory Commission, San Diego Gas & Electric Company v. Sellers of Energy and Ancillary Services into Markets Operated by the California Independent System Operator and the California Power Exchange; Investigation of Practices of the California Independent System Operator and the California Power Exchange. Affidavit (with Patrick Wang), October 15, 2002 (revised November 12, 2002).

Association of American Railroads

Review of Rail Access and Competition Issues, Before the Surface Transportation Board, Ex Parte No. 575. Joint Verified Statement (with Joseph Kalt), March 26, 1998.

Crow Tribe of Indians

Report Concerning the Crow Tribe Resort Tax (with Joseph P. Kalt), November 27, 1996; *Surrebuttal Report Concerning the Crow Tribe Resort Tax* (with Joseph P. Kalt), February 25, 1997; and *Report Concerning the Crow Tribe Resort Tax* (with Joseph P. Kalt), March 31, 2000.

Sithe Energies

Economic Impact on New York State of the Sithe Plan, Chapter IV of *Energizing New York: The Sithe Plan*, December 8, 1995.

Massachusetts Department of Environmental Protection

Use of an Economic Test for Distinguishing Legitimate Recycling Activities, July 1993.

SELECTED OTHER CONSULTING EXPERIENCE**Government of Canada**

Assisted in developing presentations, responses and submissions before WTO dispute settlement panel regarding countervailing duties.

Major Coal Producers

Analyzed end-market competitive alternatives and pricing behaviors.

Management Company

Analyzed lost profits and other damages arising from contractual dispute in Asian gaming.

Large Integrated Electric Utility

Analyzed cost and rate impacts related to shut down of nuclear plant.

International Oil Company

Analyzed cost structure for major deepwater crude oil exploration and production investment.

Independent Transmission Company

Analyzed risk and financial investment incentives for stand-alone transmission project.

Large Solar Power Provider

Assisted in data analysis of market operations and outcomes.

Merchant Power Generator

Analyzed economic, regulatory and financial issues related to proposed new pipeline investment and novel regulatory regime.

Supermajor Oil Company

Assist in analysis of competition and proposed conditions related to divestiture of regional midstream petroleum product assets.

Electric and Gas Utility Holding Companies

Analyzed potential competitive issues arising from multiple mergers between large electric, gas utility, and interstate gas pipeline companies for use before Federal competition authorities and state regulatory agencies.

Major Regional Hospital

Performed statistical analysis of patient waiting-times and follow-up.

Petroleum Products Pipeline

Analyzed business and regulatory options for large interstate petroleum products pipeline subject to market-based and regulated tariffs.

Dean Foods

Analyzed claims of price fixing and statistical model of antitrust damages for use in class certification.

Group of Class 1 Railroads

Analyzed claims of competitive harm and the development and use of econometric models for pricing, damages and class certification in the context of alleged price-fixing.

Government of Canada

In context of international arbitration under the U.S. Canada Softwood Lumber Agreement, analyzed pricing patterns, effects of risk and government development and timber pricing policies in multiple provinces on the North American lumber markets, Developed dynamic economic models of production and trade capable of determining appropriate export measure adjustments.

Major Energy Traders

Assisted in analyses of claims of market manipulation in physical and financial energy markets.

U.S. Generation Companies

Advise on methods for performing merger analysis and analysis of competitive effects of proposed divestitures.

Western Refining

Analyzed effect of a contested proposed merger involving southwestern refining, wholesale, and marketing operations

AT&T

Analyzed competitive issues in the long-distance telephone market in the context of a class-action price-fixing suit.

Pacific Lumber/Scotia Pacific

Assisted in analysis and projections involving redwood product markets for business valuation in bankruptcy.

TAPS Carriers

Assisted in development of ratemaking analyses for oil pipeline rates.

General Electric & Bechtel

Analyzed derivation of cost of equity, discount factor, and method for contract damages and expropriation of Dabhol power plant in the context of I.C.C. arbitration.

Class 1 Railroad

Analyzed potential competitive harm of vertical rail merger and possible remedies before the Canadian Competition Bureau.

Multinational Oil Companies

Analyzed alternative approaches for identifying, measuring and managing price and fiscal risks in long-term contracts in connection with multiple billion-dollar-plus projects in in Africa and Middle East.

Frontier Oil Corporation

Analyzed application of discount factors and method in damages arising from a failed merger.

Amoco

Analyzed marketability and market value of natural gas for purposes of class-action royalty valuation.

Class 1 Railroad

Analyzed claims of vertical market foreclosure and anticompetitive conduct in rail transportation.

Supermajor Oil Company

Performed functional analysis of sources of global value creation for international tax treatment.

Government of Canada

Assisted in analysis of changes in forestry practices and stumpage charges in the context of international trade agreements.

Exxon Corporation and Affiliated Companies

Performed analysis of design and effect of U.K. oil and gas tax system.

CSX Corporation and CSX Transportation, Inc.

Analyzed historical evidence of rail consolidations and the impact of the proposed Conrail transaction on Eastern coal shippers. Evaluated competitive requirements of proposed conditions on the transaction.

Group of Major Oil Companies

Developed and analyzed a database of crude oil purchases for analyzing issues of crude oil valuation at the wellhead in the context of multiple class action litigations.

Koch Pipeline

Assisted in developing product and market definitions relating oil pipeline antitrust allegations.

British Petroleum

Performed economic analysis of alternative organizational forms for operating petroleum assets. Developed advanced financial tools for valuing decision alternatives and contingent assets.

Exxon

Performed economic analysis of certain fuel used and cost allocations among the Prudhoe Bay Unit owners for a royalty dispute with the State of Alaska.

Burlington Northern Railroad/Santa Fe Railroad

Analyzed competitive impacts of proposed railroad merger for use before the Interstate Commerce Commission.

PSI/CINergy

Adapted economic model of regional economy and performed analysis of the economic impact of alternative merger scenarios for a public utility.

El Paso Natural Gas Company

Performed economic analysis of markets and competition for an open-access natural gas pipeline for use in an antitrust case.

Better Home Heat Council, Inc.

Performed economic analysis of a local gas utility's conservation programs effect on consumer fuel-switching decisions and public policy impact for use before the Massachusetts Department of Public Utilities.

Association of American Railroads

Analyzed the impact of market conditions for the exemption of rail transportation of export corn and soybeans from Interstate Commerce Commission regulation.

ARCO Pipe Line Company

Evaluation of market power of petroleum products pipeline in consideration of light-handed regulation for use before the Federal Energy Regulatory Commission.

BP/America

Assisted in the design and implementation of crude oil valuation analyses for royalty litigation.

Williams Natural Gas Pipeline Co.

Prepared pricing analysis of natural gas purchase contracts, performed calculation of damages, and analyzed economic submissions for use in antitrust case.

El Paso Corporation

Various projects including strategic analysis of market opportunities to enhance value of the pipeline and analysis of market competition in gathering and long-distance gas transportation.

Government of British Columbia

Assisted in evaluation of impact of Canadian log export regulations on U.S. and Pacific Rim log and wood products trade and industry.

Atlantic Richfield Company

Provided economic analysis of market structure and conduct for the distribution of motor fuels for use in an antitrust case.

Burlington-Northern Railroad

Assisted in evaluating market impacts of innovative railroad grain car service rate and reservation policy for use before the Interstate Commerce Commission.

National Cattleman's Association

Researched and wrote report analyzing the welfare and environmental effects of domestic U.S. beef production with particular concern about appropriate policy responses.

PUBLICATIONS AND RESEARCH

"Corporate Reorganizations: Tax Treatment of Corporate Mergers, Acquisitions, and Reorganizations," *The Encyclopedia of Taxation and Tax Policy*, 2nd ed., The Urban Institute Press, 2006. (Revised and updated.)

"Corporate Reorganizations: Tax Treatment of Corporate Mergers, Acquisitions, and Reorganizations," *The Encyclopedia of Taxation and Tax Policy*, The Urban Institute Press, 1999.

"Outside Directorships, the Reputation of Managers, and Corporate Performance" (with S. Kaplan), *Journal of Financial Economics*, Vol. 27, No. 2, September 1990.

"Financing Child Care: Who Will Pay for the Kids?," *National Tax Journal*, Vol. XLII, No. 3, September, 1989.

"The Effects of Taxation on the Merger Decision" (with A. Auerbach), in A. Auerbach, ed., *Corporate Takeovers: Causes and Consequences*, University of Chicago Press, 1988.

"Taxes and the Merger Decision" (with A. Auerbach), in J. Coffee, L. Lowenstein, and S. Rose-Ackerman, eds., *Knights, Raiders and Targets*, Oxford University Press, 1988.

"The Impact of Taxation on Mergers and Acquisitions" (with A. Auerbach), in A. Auerbach, ed., *Mergers and Acquisitions*, University of Chicago Press, 1988.

OTHER PROFESSIONAL ACTIVITIES

Presentations to National Bureau of Economic Research, Federal Reserve Bank of Cleveland, Federal Reserve Bank of New York, Harvard University, Tax Economists Forum, National Tax Association, Western Economic Association, The Institute for Energy Law of The Center for American and International Law.

Memberships in National Tax Association, American Economic Association.

Referee for *Quarterly Journal of Economics*, *Journal of Law and Economics*.

HONORS AND AWARDS

National Science Foundation Fellowship, 1981-1985.

International Foundation of Employee Benefit Plans, Graduate Research Fellowship, 1984.

Phi Beta Kappa, 1979.

Reply Verified Statement of Robert Willig

Before the
Surface Transportation Board

RAILROAD REVENUE ADEQUACY
Docket No. EP 722

Reply Verified Statement of

Robert Willig

Professor of Economics and Public Affairs
Princeton University

On behalf of the Association of American Railroads

November 4, 2014

I. Introduction and Statement Overview

Witness Introduction

My name is Robert Willig. I am Professor of Economics and Public Affairs in the Economics Department and the Woodrow Wilson School of Public and International Affairs of Princeton University. I also serve as a senior consultant to the economics consulting firm Compass Lexecon.

I have done extensive research and economic analysis of the railroad industry over the course of my career.¹ I have also testified before the Surface Transportation Board, and its predecessor, the Interstate Commerce Commission about issues affecting the rail industry on many occasions.

In general, my academic area of focus for teaching and research is microeconomics, with particular specialization in the field of industrial organization, including competition and regulatory policy. I have extensive experience analyzing such economic issues arising under the law. While on leave from Princeton, I served as Deputy Assistant Attorney General in the Antitrust Division of the United States Department of Justice, and in that capacity served as the Division's Chief Economist. I have consulted to international public agencies, national governments, private companies and law firms, and appeared many times as an expert witness before Congress, federal and state courts, federal administrative agencies, and state public utility commissions on subjects involving microeconomics, competition and regulation, in a wide variety of sectors including transportation and railroading specifically.

My curriculum vitae is attached as Appendix A and lists my publications and my other professional activities.

¹ See, for example, "Competitive Rail Regulation Rules: Should Price Ceilings Constrain Final Products or Inputs?" (with W. J. Baumol); *Journal of Transport Economics and Policy*, Vol. 33, Part 1, pp. 43-53 ; "Restructuring Regulation of the Rail Industry," (with Ioannis Kessides), in *Private Sector*, Quarterly No. 4, September 1995, pp. 5-8; "Competition and Regulation in the Railroad Industry," (with Ioannis Kessides), in *Regulatory Policies and Reform: A Comparative Perspective*, C. Frischtak (ed.), World Bank, 1996; "Railroad Deregulation: Using Competition as a Guide," (with W. Baumol), *Regulation*, January/February 1987, vol. 11, no. 1, pp. 28-35; "Pricing Issues in the Deregulation of Railroad Rates," (with W. Baumol), in *Economic Analysis of Regulated Markets: European and U. S. Perspectives*, J. Finsinger (ed.), 1983.

Purpose and Summary of Findings

I have been asked by the Association of American Railroads (“AAR”) to provide my analysis of and reactions to the verified statement of Professor Gerald R. Faulhaber that he filed on September 5, 2014 before the Surface Transport Board in Docket No. EP 722 on behalf of “Concerned Shippers,” and which he titled “RAILROAD RATES FOR CAPTIVE SHIPPERS: TIME FOR A RESET” (Faulhaber V.S.). This verified statement has several averred conclusions that create the danger of misleading the unwary reader because they are at once dramatically worded and unambiguously incorrect. I was asked to focus particularly on the material that concerns the use of the stand-alone cost test.

The principal overarching assertion of Professor Faulhaber is: “The economic models upon which the stand-alone cost test were developed and used bear no relation to the STB-regulated freight industry; the use of the stand-alone cost test for STB rate-making in the freight industry has no economic validity and is unsupported by the economic literature.”² Unambiguously to the contrary, below I shall describe the economic validity and show economists’ support for the use of the stand-alone cost test in the regulation of the freight industry with citations to the literature and many distinguished economists. Indeed, an article coauthored by Professor Faulhaber in the *Journal of Economic Literature* characterized the stand-alone cost test as an innovative practical product of theoretical economic research that is “good for society” in its application by the ICC to the regulation of railroad freight services:

Now, stand-alone cost is itself an example of a recent contribution of economic theory to regulatory practice Though the stand-alone criterion predates the literature on contestable markets, it is the latter that completes the rationale for the criterion as a regulatory instrument consumers are appropriately protected in terms of pricing [by the stand-alone cost test] The contestability literature (Baumol, Panzar, and Willig 1988) adopted the idea from Faulhaber, and showed explicitly that it constituted a key element of a program of rate regulation that, perhaps for the first time, was fully embedded in the logic of economic analysis.³

² Faulhaber V.S. p. 11.

³ Gerald R. Faulhaber and William J. Baumol, “Economists as Innovators: Practical Products of Theoretical Research,” *Journal of Economic Literature*, Vol. 26, No. 2 (Jun. 1988), pp. 595-596.

Thus, this contribution of Professor Faulhaber to the economics literature rebuts his condemnation that the stand-alone cost test has no economic validity and is unsupported by the economic literature.

In addition to his false assertions regarding the economic validity of the stand-alone cost test, the Faulhaber V.S. articulates some dramatic propositions that warrant attention in this summary because they too create a danger of misleading the reader. For example, in several passages, the Faulhaber V.S. avers that rail freight firms are permitted “to charge near-monopoly prices to captive shippers” (Faulhaber V.S. pp. 3, 11). This is patently false. Where there is market dominance, prices charged are subject to maximum rate reasonableness regulation implemented via the stand-alone cost test, and this test mimics the protections against monopoly pricing that shippers would experience in contestable markets.⁴

And despite Professor Faulhaber’s professed concerns with the SAC methodology, (Faulhaber V.S. pp. 11-12), and his faulting of the Board for failing to create some sort of standardized SAC model, he acknowledges that the STB has developed and adopted a Simplified Stand-Alone Cost (“SSAC”) methodology. But despite the importance that Professor Faulhaber accords to the issue, his Verified Statement includes no indication of what it is about the STB’s simplified SAC test that makes it fall so short of what he calls for in a “standard stand-alone cost model.” And his Verified Statement includes no consideration of the possibility that the simplified SAC test solves the problem he perceives of the costliness of the use of SAC, but is not attractive for shippers because it does not show that their rates are excessive under the SAC standard.

Professor Faulhaber argues that shippers’ rates should be lowered by regulation “instantly” because he maintains that they are at “near monopoly” levels and that the railroads are some of the most profitable firms in the US economy (pp. 11-12). Although

⁴ Professor Faulhaber’s paper in the *Journal of Economic Literature*, *op.cit.*, provides adequate evidence here in its description of how the ICC and STB regulatory system of Constrained Market Pricing includes the stand-alone cost test to limit pricing under market dominance (p. 595), and that this ceiling has the competitive characteristics of contestable markets that preclude monopoly pricing (p. 596).

he acknowledges that he does not have a solution to the policy problem of how to deal with his unsupported presumption that railroads are pricing near monopoly levels, he asserts that there is no economic model in the literature that points to a theoretically sound solution. Nevertheless, he contends that the STB should develop practical solutions even if they are not grounded in sound economic principles (p. 12).

This reasoning should be rejected at every step of the way. First, Professor Faulhaber presents no support for his claim that rail rates are at near monopoly levels, and the evidence in the Opening Comments of AAR and individual railroads is to the contrary. Second, basing rate regulation on standards that are without theoretical support is a prescription for induced inefficiency, capital insufficiency, deterioration of service quality and repeat of the underlying causes of the troubled history of the industry before the successful response of the ICC and the STB to the Staggers Act.⁵ Finally, there is every reason to go forward with continued reliance on the economic model that was chosen by the ICC and the STB to underlie Constrained Market Pricing, that was found in and supported by the economic literature, and that still provides competitive standards to guide appropriate regulatory solutions where they are needed. These solutions should be recognized to include appropriate practical measures like the STB's adoption of simplified SAC, while avoiding measures that may appear to be practical but that are dangerously distorting because they are not based on theoretical economic guideposts of competition.

In the sections to follow, I focus on what Professor Faulhaber had to say about the stand-alone cost test. In addition to showing that his asserted negative conclusions are wrong, I present clear examples to show that the test has been well-supported by leading economists. I discuss the conclusions in Professor Faulhaber's Verified Statement and emphasize that they are inconsistent with economic logic and threaten to undermine the dramatic progress in railroad regulation that has been accomplished since the passage and implementation of the Staggers Act.

⁵ For support and development of this point, see for example Willig, R. and W. J. Baumol, "Using Competition as a Guide," *AEI Journal on Government and Society: Regulation*, 1987 No. 1, pp. 28-35.

II. SAC Is Economically Valid, Based on Appropriate Economic Models and Well Supported by the Economics Profession.

The fundamental rationale for the use of SAC in the assessment of maximum rate reasonableness for traffic over which the serving railroad has market dominance has not changed and remains compelling since its first articulation by the ICC as part of its proposal for the regulatory policy labeled Constrained Market Pricing:

The “stand-alone cost” to any given shipper (or shipper group) is the cost of service [to] that shipper alone, as if it were isolated from the railroads’ other customers. It represents that level at which the shipper could provide the service itself. No shipper would reasonably agree to pay more to a railroad for transportation than it would cost to produce in isolation itself, or more than it would cost a competitor of the railroad to provide the service to it. Thus, the stand-alone cost serves as a surrogate for competition: it enforces a competitive standard on rail rates in the absence of any real competitive alternative.

* * *

Because the stand-alone cost represents the cost of obtaining service from another source (i.e. reproducing the service capability), the cost of facilities must be based on replacement cost, or the current cost of producing equipment or plant with equivalent capabilities.⁶

Soon after the ICC published its proposal for Constrained Market Pricing (“CMP”), a group of some of the leading academic economists who had conducted research on the economic underpinnings of regulation submitted a joint verified statement to the ICC on the subject.⁷ They included the above quotation about stand-alone costs from the ICC and characterized CMP as “a breakthrough in bringing federal regulatory policy in line with modern economic theory” (p. 1). Thus, from the start, the testimony of

⁶ *Coal Rate Guidelines, Nationwide*, Ex Parte No. 347 (Sub-No. 1), at 11-12 (Feb. 8, 1983).

⁷ *Verified Statement of Economists Supporting the Principles of Constrained Market Pricing*, (attached) signed by Marcus Alexis (Northwestern University), Kenneth Arrow (Stanford University), Elizabeth Bailey (Carnegie Mellon University), Professor William J. Baumol (Princeton and New York Universities), Professor Charles H. Berry (Princeton University), Ronald R. Braeutigam (Northwestern University), Professor Ann F. Friedlaender (M.I.T.), Professor Richard Gilbert (Stanford University), Stephen M. Goldfeld (Princeton University), Professor Janusz Ordover (New York University), Professor John Panzar (Northwestern University), Professor Almarin Phillips (University of Pennsylvania), Professor James Rosse (Stanford University), Professor David Sappington (University of Pennsylvania), and Professor Robert D. Willig (Princeton University).

leading academic economists demonstrated the falsity of the claim in the *Faulhaber V.S.* (p. 11) that “the use of the stand-alone cost test for STB rate-making in the freight industry has no economic validity and is unsupported by the economic literature.”

The economists’ verified statement proceeded with timeless accuracy to offer an articulation, that deserves repetition here, of the economic theory behind their stated agreement with the SAC analysis of the ICC:

To prevent abuse of any monopoly power, there is no need to regulate prices that are no higher than those which could prevail under effective competition. Where competition is effective, no railroad will be able to charge any shipper rates in excess of the minimum cost (including the capital costs) that would be incurred currently to provide the service in isolation. The reason for this constraint is simple: in a market subject to effective active or potential competition, any railroad charging in excess of that amount would invite entry into the market by a firm willing to charge no more than is necessary just to cover that level of costs. Since the stand-alone cost is the minimum current cost of providing a service in isolation, the stand-alone cost test is the proper means to ensure that rates do not involve any abuse of monopoly power.

The Commission is also correct in recognizing that the stand-alone cost test applies to rates for groups of services or shippers as well as individual services. Just as rates that return revenues in excess of the minimum current cost of providing a single service will invite entry by a competitor willing to charge rates which earn no more than that level of costs, rates consistently in excess of the minimum current cost of providing any group of services will also invite competition.

We agree further, that stand-alone costs must include or reflect the total current replacement costs of providing a service or group of services in isolation. This is so whether current costs are higher or lower than costs that were incurred in the past, for the costs that pricing in competitive markets, i.e. the costs of entry, are always current replacement costs.⁸

The basic economic theory explained here is still the foundation for the appropriate use of stand-alone costs in assessing maximum rate reasonableness for railroads with market dominance over particular shippers. Some twenty years later, an

⁸ *Verified Statement of Economists Supporting the Principles of Constrained Market Pricing* pp. 6-7.

analogous, accurate and more up-to-date articulation appeared in a book intended to convey guidance on regulatory policy under the auspices of the World Bank:

A critical issue for efficiency is the criterion used to set rate ceilings for captive shippers—that is, where the railroad has market dominance. Although rate ceilings derived from fully distributed costs are inimical to the public interest, economically rational ceilings can be obtained from stand-alone costs. These are the costs of serving any captive shipper or group of shippers that benefit from sharing joint and common costs as if the shipper or group were isolated from the railroad’s other customers (see endnote 4 of executive summary). The stand-alone cost method finds the theoretically maximum rate that a railroad could levy on shippers without losing its traffic to a hypothetical competing service offered by a hypothetical entrant facing no entry barriers or by a shipper providing the service itself.⁹

This report for the World Bank then describes why the constrained market pricing approach adopted by the ICC offered a “promising solution” to the regulatory dilemma of how to regulate rates where there is an absence of competition, yet promote efficient rail operations.

[T]he firm cannot adopt a price higher than what an efficient entrant (rival) could afford to charge for the product in a competitive market where inputs are available on competitive terms. This price ceiling is the stand-alone cost of the product or service. A price constrained not to exceed the stand-alone cost ensures that customers pay no more than they would have if the item had been sold in an effectively competitive (contestable) market.¹⁰

The 2004 World Bank Policy Report confirmed that “[t]he main purpose of the stand-alone cost ceiling, aside from its role in eliciting economic efficiency, is to protect consumers from monopolistic exploitation by the regulated firm.”¹¹

In sum, the economic literature plainly supports the Board’s use of the stand-alone cost test. Support is found in the clarity of the fundamental connections between

⁹ Kessides, Ioannis, *Reforming Infrastructure: Privatization, Regulation and Competition*, a World Bank Policy Research Report, published by the World Bank and Oxford University Press, 2004, pp. 193-94.

¹⁰ *Id.* at 273-274 (internal citations omitted).

¹¹ *Id.*

the stand-alone cost test and the valid economics of the competitive standard articulated in Faulhaber's own 1988 contribution to the economic literature. It is found in the 1983 verified statement of the many leading academic economists in support of stand-alone cost principles. And support is found in the 2004 World Bank Policy Report by Ioannis Kessides and several other sources from the economic literature discussed below. The claim that "the use of the stand-alone cost test for STB rate-making in the freight industry has no economic validity and is unsupported by the economic literature" (Faulhaber V.S. p. 11) cannot withstand scrutiny.

Professor Faulhaber offers several reasons for this assertion. He asserts that there is no economic justification for using the stand-alone cost test as a measure of cross-subsidy. He claims that the test does not protect shippers from abuses of market power. And he states that the test deprives shippers of the benefits from railroad economies of scope and scale. Each reason is incorrect, as discussed below.

III. The Cross-Subsidization Interpretation of the Stand-alone Cost Test Is Valid

The first reason offered by Professor Faulhaber for his negative conclusion about the use of SAC is that: "The model of the industry assumed in Faulhaber (1975) bears no relation to the STB regulated freight shipping industry, and never has. Conclusion: there can be no economic justification for the use of the stand-alone cost test as a measure of cross-subsidy for railroads. None" (Faulhaber V.S. p. 7).¹²

The primary distinction between the model analyzed in Faulhaber (1975) and the rail freight shipping industry that Professor Faulhaber points to is that the model assumes that total revenues are equal to total costs, while he avers that "railroads are not subject to a profit constraint and by any measure are highly profitable today" (Faulhaber V.S. p. 7). This distinction appears to be important to Professor Faulhaber due to his logical demonstration in Faulhaber (1975) that if the revenues from some services exceed their stand-alone costs, then given that total revenues equal total costs, it must follow that some other services pay revenues below their incremental costs. Thus, failure of the

¹² Faulhaber (1975) refers to Faulhaber, G.R., "Cross-Subsidization: Pricing in Public Enterprises," *American Economic Review*, 65, 1975, pp. 966-77.

stand-alone cost test by some services, in such a setting, implies that they are providing a cross-subsidy to the other services that are priced below the costs that they cause – their incremental costs. And, it is true that without the assumption that total revenues equal (or are less than) total costs, failure of the stand-alone cost test does not logically imply that some other services are necessarily receiving a cross-subsidy.

There are several significant points to note in response. As a preliminary observation, note that the assumption in Faulhaber (1975) is that total revenues equal total costs, where costs are assessed in the same manner as are stand-alone costs – i.e. on a replacement cost basis. While the Faulhaber V.S. asserts that the railroads “by any measure are highly profitable today,” (Faulhaber V.S. p. 7) he does not claim support for a conclusion that their revenues exceed replacement costs. His problem with deviation of the industry from the assumptions of the model in Faulhaber (1975) would only begin to arise if revenues were to exceed replacement costs.

More significantly, consistent with Faulhaber (1975), it can be logically asserted that rates that produce revenues at or below stand-alone costs cannot be the source of cross-subsidies, regardless of the relationship between total revenues and total costs. Thus, the connection between the stand-alone cost test and cross-subsidization can be maintained, regardless of viewpoints on the railroad’s total finances. The use of SAC for purposes of assessing maximum rate reasonableness for traffic over which the railroad is market dominant is that it ensures that rates that pass the stand-alone cost test are guaranteed to be free of provision of cross-subsidies. The stand-alone cost test thus protects shippers that lack effective competition from the burden that their supplying a cross-subsidy would impose on them, regardless of whether services that would receive the benefits of such a cross-subsidy can be identified or even ascertained, and regardless of the total finances of the railroad.

Contrary to the Faulhaber V.S., economic literature reaches this same conclusion. Meitzen and Larson observe that “SAC can serve as the theoretically correct basis for revenue ceilings, and can serve as an independent cost-based test for cross-subsidies. When a multiproduct firm is constrained to zero economic profits, one can test for the existence of cross-subsidies by performing either a SAC test or an incremental cost test, but both are not needed. Passing a SAC test implies that the appropriate incremental cost

test will also be passed. **Finally, if the revenues for a service (or a group of services) are less than SAC, then this service (or group of services) cannot be said to be the source of a subsidy even if economic profits exist.**¹³

On a more technical point, the Faulhaber V.S. highlights as another distinction between Professor Faulhaber's model and the industry that "the focus of the cross-subsidy work was on well-defined (by tariff) *services* (not individual customers, such as captive shippers)."¹⁴ However, the Faulhaber V.S. does not explain why or how that distinction makes a difference to the analysis or to the underpinnings of the use of SAC in CMP. Indeed, in another of his contributions to the economics literature, on the subject of cross-subsidy tests, Professor Faulhaber seems to address this issue under the heading of "How Are the Firm's Services Defined?"¹⁵ He replies to his own question with: "In brief, the answer is that anything the enterprise assigns a separate price to can and should be treated as a separate service."¹⁶ Although it is not clear that Professor Faulhaber intended this answer to apply generally, despite its wording, on its face it seems to imply that the supply of rail freight transport to a shipper that bears a separate price (as is often the case for substantial shippers) can and should be viewed as a separate service for the purpose of analyzing cross-subsidization with SAC. As such, there would be only limited or no basis for the concerns expressed in the Faulhaber V.S. about the distinction between the focus on services in the model in Faulhaber (1975) and the industry focus on applying SAC to shippers that lack effective competition. In any event, there is no concern based on economic theory about applying the SAC test to the revenues and stand-alone costs of the services supplied to individual or groups of shippers – especially if their rates are not rigidly linked to the rates of other shippers left out of the stand-alone cost traffic group.

¹³ Meitzen, Mark E. and Alexander C. Larson, "Uses and Abuses of Stand-Alone Costs," *Utilities Policy*, April 1992, p. 137 (emphasis added). The *Verified Statement of Economists Supporting the Principles of Constrained Market Pricing* is in explicit agreement. For example: "Rather, as the Commission recognizes, a cross-subsidy can only occur in an economic sense where a shipper (or group of shippers) pays more than the total cost of serving it alone" (pp. 7-8).

¹⁴ Faulhaber V.S. p. 7.

¹⁵ Faulhaber, G.R., "Cross-Subsidy Analysis with More Than Two Services," *Journal of Competition Law & Economics*, 1(3), 2005, p. 446.

¹⁶ *Id.*

Finally, on the role of cross-subsidization as a basis for the validity of the role of SAC in CMP, even though the SAC test can be properly interpreted as a test for the possibility that the issue traffic is providing cross-subsidies, as explained above, there is no need to rely on that interpretation of the SAC test. Instead, the SAC test provides shippers that lack effective competition with protections against exploitation of monopoly power over them, just as they would receive from effective competition in contestable markets. This is so regardless of the perceived state of the overall finances of the railroad, and regardless of whether recipients of any cross-subsidies can be identified.

IV. The Stand-alone Cost Test Provides Shippers the Protection From Monopoly Power That They Would Receive From Competition in Contestable Markets

Professor Faulhaber then asserts that the BPW book on contestability also fails to support the STB's adoption of SAC, asserting: "Unfortunately, the failure of STB-regulated rail firms to fit the model of Faulhaber (1975) also applies here. [In] BPW [1982], the firm is also assumed to be a profit-constrained enterprise for which regulators control all the prices of the enterprise, which also apply to services (not individuals)" (Faulhaber V.S. pp. 7-8).¹⁷

This assertion is unambiguously wrong in each of its three prongs. First, the Faulhaber V.S. states, as quoted above, that in BPW (1982) the firm is assumed to be a profit-constrained enterprise. That is not the case. Rather it is proven in BPW (1982) (p. 314, referring back to p. 201) that in the absence of entry barriers, in a sustainable industry configuration (which is a requirement of equilibrium), each firm must earn zero economic profit. Hence, contrary to the claim in the Faulhaber V.S., this characteristic is not an assumption, as it is in Faulhaber (1975), but a conclusion that follows from the properties of the absence of entry barriers in contestable markets.

Second, the Faulhaber V.S. asserts that in BPW (1982) the firm is assumed to be an enterprise for which regulators control all the prices. That is not the case. Instead, to the contrary, the firms and their prices are assumed to be entirely free of regulation. Rather, the firms are under strong competitive pressures, particularly pressures from

¹⁷ BPW (1982) here refers to Baumol, W.J., Panzar, J.C., and Willig, R.D., *Contestable Markets and the Theory of Industry Structure*, New York, 1982, Harcourt Brace Jovanovich.

potential entrants who face no entry barriers by the assumptions of what constitutes contestable markets, and the firms are free to choose their own prices accordingly. BPW (1982) demonstrates that the chosen prices affect demands for the firms' products and must be sustainable in equilibrium in that they do not provide profit incentives for new firms to enter the markets.

Third, and finally, the Faulhaber V.S. asserts that in BPW (1982), as in Faulhaber (1975), the prices of the enterprise apply to services (not individuals). This assertion is wrong. In BPW there is a set of products with no restrictions on them, so that the analysis could represent situations where some products are particular to some one or more consumers, without demand from other consumers, while other products are demanded by consumers generally. It is most germane to recognize that in BPW (1982), on page 313 and 354 for example, in a sustainable industry configuration (a requirement for equilibrium in contestable markets), the stand-alone cost test must be satisfied, in order to remove incentives for entry, for any collection of quantities of the products that are less than or equal to total market demands. In other words, equilibrium in contestable markets forces revenues to be less than or equal to stand-alone costs for any quantities that do not exceed the levels of total market demand for any or all of the markets' products.

So, for example, revenues must not be greater than stand-alone costs for each service and each group of services, if that is the way that the firm organizes its sales.¹⁸ And it is the case that revenues must not be greater than stand-alone costs for the quantities purchased by any given consumer, and also for the aggregate quantities of any group of consumers, and also for any portions of the aggregate quantities of any group of consumers. This is a clear consequence of the nature of contestable markets, since potential entrants have the capability of entering the markets with no entry barriers in order to sell any quantities of the markets' goods to whatever consumers want them, so long as there is demand for them, and so long as the entrant can cover its (stand-alone) costs with revenues from the prices it charges that do not exceed those of the incumbent firms. Consequently, if the incumbents' revenues exceed stand-alone costs for any

¹⁸ It may be worth noting that in BPW pp. 352-356 the work of Faulhaber (1975) is discussed, and it is shown that the results about cross-subsidization derived to hold in contestable markets are substantial generalizations of his earlier results.

feasible quantities of the markets' goods, then there will be positive incentives for entry that disturbs equilibrium. It follows that consumers in contestable markets are protected by competition from having to pay prices that generate revenues that fail any flexibly defined proper stand-alone cost test.

So contrary to Professor Faulhaber's assertions, the BPW (1982) model is amply flexible to fit STB-regulated rail firms, and it shows that the stand-alone cost test provides to shippers the protections against excessive prices that they would have as a result of competition in contestable markets.

This conclusion was fully articulated in the economic literature by Baumol and Willig,¹⁹ as well as by others.²⁰ We began our discussion of the connections between CMP and contestable market theory with this very pertinent quote from the ICC:

A rate level calculated by the SAC methodology represents the theoretical maximum rate that a railroad could levy on shippers without substantial diversion of traffic to a hypothetical competing service. It is, in other words, a simulated competitive price. (The competing service could be a shipper providing service for itself or a third party competing with the incumbent railroad for traffic. In either case, the SAC represents the minimum cost of an alternative to the service provided by the incumbent railroad.) The theory behind SAC is best explained by the concept of 'contestable markets.' This recently developed economic theory augments the classical economic model of 'pure competition' with a model which focuses on the entry and exit from an industry as a measure of economic efficiency. The theory of contestable markets is more general than that of 'pure competition' because it does not require a large number of firms. In fact, even a monopoly can be contestable. The underlying premise is that a monopolist or oligopolist will behave efficiently and competitively where there is a threat of losing some or all of its markets to a new entrant. In

¹⁹ Baumol, William J. and Robert D. Willig, "Contestability: Developments since the Book," *Oxford Economic Papers*, New Series, Vol. 38, Supplement: Strategic Behaviour and Industrial Competition (Nov. 1986), pp. 9-36.

²⁰ See, e.g., Braeutigam, R.R., "Optimal Policies for Natural Monopolies", in R. Schmalensee and R. Willig. eds. *Handbook of Industrial Organization*, Vol 2, North-Holland, Amsterdam, 1989, p. 1340; Faulhaber, G.R. and William J. Baumol, "Economists as Innovators: Practical Products of Theoretical Research," *Journal of Economic Literature*, Vol. 26, No. 2 (Jun. 1988), pp. 595-596; Kessides, Ioannis, *Reforming Infrastructure: Privatization, Regulation and Competition*, a World Bank Policy Research Report, published by the World Bank and Oxford University Press, 2004, pp.193-194.

other words, contestable markets have competitive characteristics which preclude monopoly pricing.²¹

We then proceeded to give this summary of our own research on the subject:

In perfectly contestable markets, the price of a product will lie somewhere between its incremental and its stand-alone cost, just where it falls in that range depending on the state of demand. One cannot legitimately infer that monopoly power is exercised from data showing that prices do not exceed stand-alone costs, and stand-alone costs constitute the proper cost-based ceilings upon prices, preventing both cross-subsidization and the exercise of monopoly power (see Faulhaber (1975) for tests of cross-subsidy and their equivalence).

* * *

Thus, the forces of idealized potential competition in perfectly contestable markets enforce cost constraints on prices, but prices remain sensitive to demands as well. Actual and potential competition are effective if they constrain rates in this way, and in such circumstances regulatory intervention is completely unwarranted. But if, in fact, market forces are not sufficiently strong, then there is likely to be a proper role for regulation, and the theoretical guidelines derived from the workings of contestable markets are the appropriate ones to apply. That is, prices must be constrained to lie between incremental and stand-alone costs.²²

The formal relationship between SAC and the theory of contestable markets is noted in the chapter of the *Handbook of Industrial Organization* on the optimal regulation of natural monopoly, by Ronald Braeutigam. After discussing two observations about the stand-alone cost test as a subsidy test setting an upper bound on the revenues generated by services, Braeutigam wrote:

Third, in a contestable market, one would expect entry to occur if any of the subsidy tests (on any subset of services) were not satisfied.²³

²¹ *Coal Rate Guidelines, Nationwide*, 1 I.C.C.2d 520, 528 (1985), *aff'd sub nom. Consolidated Rail Corp. v. United States*, 812 F.2d 1444 (3d Cir. 1987).

²² Baumol, William J. and Robert D. Willig, "Contestability: Developments since the Book," *Oxford Economic Papers*, New Series, Vol. 38, Supplement: Strategic Behaviour and Industrial Competition (Nov., 1986), pp. 31-32.

²³ Braeutigam, R.R., "Optimal Policies for Natural Monopolies", in R. Schmalensee and R. Willig, eds. *Handbook of Industrial Organization*, Vol 2, North-Holland, Amsterdam, 1989, p. 1340.

And, as my last, but not least, example of support from the economic literature for the stand-alone cost test, here is the string of quotes from the article by Gerald Faulhaber and William Baumol that I presaged in the introduction:

Now, stand-alone cost is itself an example of a recent contribution of economic theory to regulatory practice Though the stand-alone criterion predates the literature on contestable markets, it is the latter that completes the rationale for the criterion as a regulatory instrument consumers are appropriately protected in terms of pricing [by the stand-alone cost test] The contestability literature (Baumol, Panzar, and Willig 1988) adopted the idea from Faulhaber, and showed explicitly that it constituted a key element of a program of rate regulation that, perhaps for the first time, was fully embedded in the logic of economic analysis.²⁴

V. The Stand-alone Cost Test Allows Shippers to Benefit from Railroad Economies of Scale and Scope.

The final substantive reason offered in the Faulhaber V.S. to discredit the stand-alone cost test is that it allegedly does not permit shippers to benefit fully from economies of scale and scope, and it therefore is an inappropriate tool to determine rate levels. The Faulhaber V.S. asserts:

In the context of cross-subsidy and contestable markets, then, stand-alone costs are an absolute upper limit on pricing, which in themselves do not permit the sharing of the benefits of the scale and scope of the firm, and by no means [are] a prescription for rate-setting (Faulhaber V.S. p. 8).

This assertion is wrong in completely ignoring the fact that the stand-alone cost test empowers a complaining shipper over whom the railroad has market dominance to include in its test any and all the additional traffic that the shipper believes contributes economies of scale or scope to the railroad's provision of its services.²⁵ Through this process, the shipper can assure that it shares in the benefits of the railroad's economies of scale and scope, since the amount of the stand-alone costs that the complaining shipper's

²⁴ Faulhaber, G.R. and William J. Baumol, "Economists as Innovators: Practical Products of Theoretical Research," *Journal of Economic Literature*, Vol. 26, No. 2 (Jun., 1988), pp. 595-596.

²⁵ The topic of how important it is to effectively choose the traffic group included in the SAC test is a primary theme of Faulhaber, G. R., "Cross-Subsidy Analysis with More Than Two Services," *Journal of Competition Law & Economics*, 1(3), 2005, pp. 441-448.

revenues may be called upon to cover decreases whenever more traffic can be added to the stand-alone railroad such that the traffic's incremental revenue exceeds the additional costs incurred by the stand-alone railroad to access and handle that additional traffic. The addition to the cost of the stand-alone railroad due to adding additional traffic is lower, and thus the added traffic is more beneficial to the complaining shipper, the stronger are the economies of scale and scope.

Therefore, the ICC was correct when it concluded that "the presence and extent of production economies can be tested in each case through a stand-alone cost calculation."²⁶ The ICC properly reasoned that "If these economies are significant, the captive shipper can increase the traffic base for the stand-alone system in order to lower the cost to itself. At the point that additional traffic would not lower the cost to the stand-alone group of shippers, production economies are exhausted and the most efficient plant size has been demonstrated. Thus, by adjusting both the plant and the traffic base, the captive shipper can identify and take full advantage of any economies of scope, scale and density."²⁷

A simple numerical example will help to illustrate these principles. In the example depicted in **Figure 1** and **Table 1**, below, the complaining shipper's issue traffic flows from Origin 1 to Destination 1 along facilities that include interchange 1 (I-1) and interchange 2 (I-2). The revenue paid to the railroad for this issue traffic by the complaining shipper, less the variable cost incurred by the railroad to move this traffic, is the net revenue of 13. Underlying these figures is a time frame that for this example applies to the flow of the issue and the other traffic. Over this same time frame, the fixed costs of the railroad's facilities that go from Origin 1 to Destination 1 are $5+5+5 = 15$. Assume for this example that the railroad is market-dominant with respect to the issue traffic. Then, application of the stand-alone cost test to the issue traffic alone shows that the gross revenues, that equal 13 plus the variable costs, are less than the stand-alone costs that equal 15 plus the same variable costs.

²⁶ *Coal Rate Guidelines*, 1 I.C.C.2d at 532.

²⁷ *Id.*

Figure 1

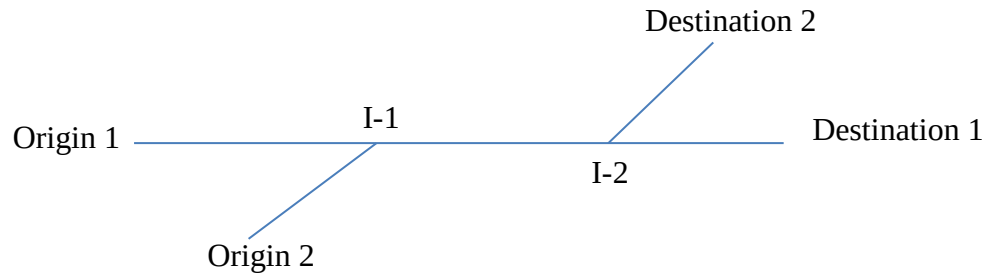


Table 1

Net revenue from issue traffic	13
Net revenue from additional traffic	10
Facilities cost from Origin 1 to I-1	5
Facilities cost from I-1 to I-2	5
Facilities cost from I-2 to Destination 1	5
Facilities cost from Origin 2 to I-1	3
Facilities cost from I-2 to Destination 2	3

In this example, a complaining shipper who ships from Origin 1 to Destination 1 could not prevail under the stand-alone cost test if it only built a SARR to handle its own traffic. However, the complaining shipper may feel that it is not getting the benefit in its rates of the railroad's economies of scale and scope, since it knows that the facilities that serve its traffic are also utilized to serve other traffic as well. The stand-alone cost test enables shippers to make sure they are getting any benefits of economies of scale and scope that are experienced by the railroad, because the shipper is entitled to consider expanding the domain of the stand-alone cost test to include the revenues and costs that arise from any additional traffic that shares common costs with the issue traffic.

In the example illustrated by **Figure 1** and **Table 1**, the net revenues from the issue traffic together with the additional traffic that flows from Origin 2 to Destination 2 totals 23. The stand-alone cost of the facilities needed to transport both the issue and the additional traffic include the $5+5+5 = 15$ as before, plus the costs of 3 of the facilities needed to bring the additional traffic from Origin 2 to I-1, plus the costs of 3 of the facilities needed to bring the additional traffic from I-2 to Destination 2, for a total facilities stand-alone cost of 21. Here, with the net revenues of all the included traffic of 23 exceeding the needed facilities' stand-alone cost of 21, the complaining shipper would be shown to be correct that its rates do not reflect the full benefits of the railroad's

economies of scale and scope, that it is paying more than it would have to with the protections of a fully competitive contestable market, and that regulation under Constrained Market Pricing would not permit those rates to be charged. In this way, complaining shippers can make sure their rates do reflect benefits of the railroad's economies of scale and scope by exercising their ability to expand the ambit of the stand-alone cost test to include traffic that is additional to their issue traffic, and that shares common facilities in a fashion that engenders economies of scale or scope.

Thus, this example well illustrates why it is that the *Faulhaber V.S.* is wrong in its assertion that the SAC test denies to shippers the benefits of railroads' economies of scale and scope, so long as the use of SAC allows the shipper to expand the stand-alone railroad, as does CMP, to include additional traffic that shares common facilities.

VIII. Conclusion

The *Faulhaber V.S.* constitutes a dramatically worded attack on the use of the stand-alone cost test in railroad regulation, but I have shown that each element of Professor Faulhaber's claims is wrong.

The writings of distinguished economists, including the past writings of Professor Faulhaber, affirm that the stand-alone cost test is economically valid, and that it is based on economic modeling that applies to the STB-regulated freight industry. The stand-alone cost test protects shippers without effective competition from exploitation of monopoly power by assuring that they need pay no more than they would have if they were making their purchases in effectively competitive (contestable) markets. In its original articulation, the ICC understood the fundamental economics that still holds: "Thus, the stand-alone cost serves as a surrogate for competition: it enforces a competitive standard on rail rates in the absence of any real competitive alternative."²⁸

The kind of frustrations expressed in Professor Faulhaber's statement about the use of stand-alone costs should be channeled into appropriately constructive practical measures like the STB's adoption of simplified SAC, rather than destructively impelling

²⁸ *Coal Rate Guidelines, Nationwide*, Ex Parte No. 347 (Sub-No. 1), at 11 (Feb. 8, 1983).

false attacks on the economic foundations of SAC. It is most important for the future of the industry to avoid regulatory measures that may appear to be practical but that are dangerously distorting because they are not based on the theoretical economic guideposts of competition. Instead, it should be recognized that it is the sound economics of CMP that still provide an appropriate guide for regulatory solutions, where they are needed, that are based on competitive standards. Accordingly, the Board should reject efforts to have it discard the SAC test as the centerpiece of its CMP Guidelines, and it should be vigilant to guard against suggested “reform” measures that would undermine the sound and well-supported theoretical underpinnings of that test.

VERIFICATION

I, Robert Willig, verify under penalty of perjury under the laws of the United States that the foregoing is true and correct and that I am qualified and authorized to file this statement.

Executed: November 1, 2014


Robert Willig

Appendix A

Curriculum Vitae

Name: **Robert D. Willig**

Address: 220 Ridgeview Road, Princeton, New Jersey 08540

Birth: 1/16/47; Brooklyn, New York

Marital Status: Married, four children

Education: Ph.D. Economics, Stanford University, 1973
Dissertation: Welfare Analysis of Policies
Affecting Prices and Products.
Advisor: James Rosse

M.S. Operations Research, Stanford University, 1968.

A.B. Mathematics, Harvard University, 1967.

Professional Positions:

Professor of Economics and Public Affairs, Princeton University, 1978-.

Principal External Advisor, Infrastructure Program, Inter-American Development Bank, 6/97-8/98.

Deputy Assistant Attorney General, U.S. Department of Justice, 1989-1991.

Supervisor, Economics Research Department, Bell Laboratories, 1977-1978.

Visiting Lecturer (with rank of Associate Professor), Department of Economics and Woodrow Wilson School, Princeton University, 1977-78 (part time).

Economics Research Department, Bell Laboratories, 1973-77.

Lecturer, Economics Department, Stanford University, 1971-73.

Other Professional Activities

ABA Section of Antitrust Law Economics Task Force, 2010-2012

Advisory Committee, Compass Lexecon 2010 -

OECD Advisory Council for Mexican Economic Reform, 2008 - 2009

Senior Consultant, Compass Lexecon, 2008 -

Director, Competition Policy Associates, Inc., 2003-2005

Advisory Bd., Electronic Journal of I.O. and Regulation Abstracts, 1996-2008.

Advisory Board, Journal of Network Industries, 2004-2010.

Visiting Faculty Member (occasional), International Program on Privatization and Regulatory Reform, Harvard Institute for International Development, 1996-2000.

Member, National Research Council Highway Cost Allocation Study Review Committee, 1995-98.

Member, Defense Science Board Task Force on the Antitrust Aspects of Defense Industry Consolidation, 1993-94.

Editorial Board, Utilities Policy, 1990-2001.

Leif Johanson Lecturer, University of Oslo, November 1988.

Member, New Jersey Governor's Task Force on Market-Based Pricing of Electricity, 1987-89.

Co-editor, Handbook of Industrial Organization, 1984-89.

Associate Editor, Journal of Industrial Economics, 1984-89.

Director, Consultants in Industry Economics, Inc., 1983-89, 1991-94.

Fellow, Econometric Society, 1981-.

Organizing Committee, Carnegie-Mellon-N.S.F. Conference on Regulation, 1985.

Board of Editors, American Economic Review, 1980-83.

Nominating Committee, American Economic Association, 1980-1981.

Research Advisory Committee, American Enterprise Institute, 1980-1986.

Editorial Board, M.I.T. Press Series on Government Regulation of Economic Activity, 1979-93.

Program Committee, 1980 World Congress of the Econometric Society.

Program Committee, Econometric Society, 1979, 1981, 1985.

Organizer, American Economic Association Meetings: 1980, 1982.

American Bar Association Section 7 Clayton Act Committee, 1981.

Principal Investigator, NSF grant SOC79-0327, 1979-80; NSF grant 285-6041, 1980-82; NSF grant SES-8038866, 1983-84, 1985-86.

Aspen Task Force on the Future of the Postal Service, 1978-80.

Organizing Committee of Sixth Annual Telecommunications Policy Research Conference, 1977-78.

Visiting Fellow, University of Warwick, July 1977.

Institute for Mathematical Studies in the Social Sciences, Stanford University, 1975.

Published Articles and Book Chapters:

"Unilateral Competitive Effects" (with Bryan Keating), in The Oxford Handbook on International Antitrust Economics, (Roger D. Blair and D. Daniel Sokol, eds.), Oxford University Press, forthcoming 2014.

"Activating Actavis: A More Complete Story" (with Barry C. Harris, Kevin M. Murphy, and Matthew B. Wright), Antitrust, vol. 28, No. 2 (Spring), 2014.

"Reverse Payments' in Settlements of Patent Litigation: Split Opinions on Schering-Plough's K-Dur (2005 and 2012)" (with John P. Bigelow), in The Antitrust Revolution (Sixth Edition), (J. Kwoka and Laurence White, eds.), Oxford University Press, 2013.

"The Delta-Northwest Merger: Consumer Benefits from Airline Network Effects (2008)" (with Mark Israel, Bryan Keating and Daniel Rubinfeld), in The Antitrust Revolution (Sixth Edition), (J. Kwoka and Laurence White, eds.), Oxford University Press, 2013.

"Airline Network Effects and Consumer Welfare" (with Bryan Keating, Mark Israel and Daniel Rubinfeld), Review of Network Economics, published online November 2013.

"The Liftoff of Consumer Benefits from the Broadband Revolution" (with Mark Dutz and Jon Orszag), Review of Network Economics (2012) vol. 11, issue 4, article 2.

"Competition and innovation-driven inclusive growth" (with Mark Dutz, Ioannis Kessides and Stephen O'Connell), in Promoting Inclusive Growth: Challenges and Policies, Luiz de Mello and Mark Dutz (eds.), OECD, 2011.

"Unilateral Competitive Effects of Mergers: Upward Pricing Pressure, Product Quality, and Other Extensions," Review of Industrial Organization (2011) 39:19–38.

"Antitrust and Patent Settlements: The Pharmaceutical Cases," (with John Bigelow) in The Antitrust Revolution (Fifth Edition), John Kwoka and Lawrence White (eds.), 2009.

"The 1982 Department of Justice Merger Guidelines: An Economic Assessment," (with J. Ordovery) reprinted in Economics of Antitrust Law, Benjamin Klein (ed.), Edward Elgar, 2008.

"On the Antitrust Treatment of Production Joint Ventures," (with Carl Shapiro) reprinted in Economics of Antitrust Law, Benjamin Klein (ed.), Edward Elgar, 2008.

"Consumer's Surplus Without Apology," reprinted in Applied Welfare Economics, Richard Just, Darrel Hueth and Andrew Schmitz (eds.), Edward Elgar, 2008; reprinted in Readings in Social Welfare: Theory and Policy, Robert E. Kuenne (ed.), Blackwell, 2000, pp. 86-97; reprinted in Readings in Microeconomic Theory, M. M. La Manna (ed.), Dryden Press, 1997, pp. 201-212.

"The Risk of Contagion from Multi-Market Contact," (with Charles Thomas), The International Journal of Industrial Organization, Vol. 24, Issue 6 (Nov. 2006), pp 1157 – 1184.

"Pareto-Superior Nonlinear Outlay Schedules," reprinted in The Economics of Public Utilities, Ray Rees (ed.), Edward Elgar, 2006; reprinted in The Economics of Price Discrimination, G. Norman, (ed.), Edward Elgar, 1999.

"Economic Effects of Antidumping Policy," reprinted in The WTO and Anti-Dumping, Douglas Nelson (ed.), Edward Elgar, 2005.

"Merger Analysis, Industrial Organization Theory and the Merger Guidelines," reprinted in Antitrust and Competition Policy, Andrew Kleit (ed.) Edward Elgar, 2005

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Brookings Institution Conference on The Economics of the Airline Industry

"Airline Network Effects and Consumer Welfare"	2012
AGEP Public Policy Conference on Pharmaceutical Industry Economics, Regulation and Legal Issues; Law and Economics Center, George Mason University School of Law	
"Pharmaceutical Brand-Generic Disputes"	2012
U.S.-EU Alliance Study Peer Review Conferences	
"Review of Cooperative Agreements in Transatlantic Airline Markets"	2012
"The Research Agenda Ahead"	2012
Antitrust in the High Tech Sector Conference	
"Developments in Merger Enforcement"	2012
Georgetown Center for Business and Public Policy, Conference on the Evolution of Regulation	
"Reflections on Regulation"	2011
Antitrust Forum, New York State Bar Association	
"Upward Price Pressure, Market Definition and Supply Mobility"	2011
American Bar Association, Antitrust Section, Annual Convention	
"The New Merger Guidelines' Analytic Highlights"	2011
OECD and World Bank Conference on Challenges and Policies for Promoting Inclusive Growth	
"Inclusive Growth From Competition and Innovation"	2011
Villanova School of Business Executive MBA Conference	
"Airline Network Effects, Competition and Consumer Welfare"	2011
NYU School of Law Conference on Critical Directions in Antitrust	
"Unilateral Competitive Effects"	2010
Conf. on the State of European Competition Law and Enforcement in a Transatlantic Context	
"Recent Developments in Merger Control"	2010
Center on Regulation and Competition, Universidad de Chile Law School	
"Economic Regulation and the Limits of Antitrust Law"	2010
Center on Regulation and Competition, Universidad de Chile Law School	
"Merger Policy and Guidelines Revision"	2010
Faculty of Economics, Universidad de Chile	
"Network Effects in Airlines Markets"	2010
Georgetown Law Global Antitrust Enforcement Symposium	
"New US Merger Guidelines"	2010

FTI London Financial Services Conference "Competition and Regulatory Reform"	2010
NY State Bar Association Annual Antitrust Conference "New Media Competition Policy"	2009
Antitrust Law Spring Meeting of the ABA "Antitrust and the Failing Economy Defense"	2009
Georgetown Law Global Antitrust Enforcement Symposium "Mergers: New Enforcement Attitudes in a Time of Economic Challenge"	2009
Phoenix Center US Telecoms Symposium "Assessment of Competition in the Wireless Industry"	2009
FTC and DOJ Horizontal Merger Guidelines Workshop "Direct Evidence is No Magic Bullet"	2009
Northwestern Law Research Symposium: Antitrust Economics and Competition Policy "Discussion of Antitrust Evaluation of Horizontal Mergers"	2008
Inside Counsel Super-Conference "Navigating Mixed Signals under Section 2 of the Sherman Act"	2008
Federal Trade Commission Workshop on Unilateral Effects in Mergers "Best Evidence and Market Definition"	2008
European Policy Forum, Rules for Growth: Telecommunications Regulatory Reform "What Kind of Regulation For Business Services?"	2007
Japanese Competition Policy Research Center, Symposium on M&A and Competition Policy "Merger Policy Going Forward With Economics and the Economy"	2007
Federal Trade Commission and Department of Justice Section 2 Hearings "Section 2 Policy and Economic Analytic Methodologies"	2007
Pennsylvania Bar Institute, Antitrust Law Committee CLE "The Economics of Resale Price Maintenance and Class Certification"	2007
Pennsylvania Bar Institute, Antitrust Law Committee CLE "Antitrust Class Certification – An Economist’s Perspective"	2007
Fordham Competition Law Institute, International Competition Economics Training Seminar "Monopolization and Abuse of Dominance"	2007
Canadian Bar Association Annual Fall Conference on Competition Law	

“Economic Tools for the Competition Lawyer”	2007
Conference on Managing Litigation and Business Risk in Multi-jurisdiction Antitrust Matters	
“Economic Analysis in Multi-jurisdictional Merger Control”	2007
World Bank Conference on Structuring Regulatory Frameworks for Dynamic and Competitive South Eastern European Markets	
“The Roles of Government Regulation in a Dynamic Economy”	2006
Department of Justice/Federal Trade Commission Section 2 Hearings	
“(Allegedly) Monopolizing Tying Via Product Innovation”	2006
Fordham Competition Law Institute, Competition Law Seminar	
“Monopolization and Abuse of Dominance”	2006
Practicing Law Institute on Intellectual Property Antitrust	
“Relevant Markets for Intellectual Property Antitrust”	2006
PLI Annual Antitrust Law Institute	
“Cutting Edge Issues in Economics”	2006
World Bank’s Knowledge Economy Forum V	
“Innovation, Growth and Competition”	2006
Charles University Seminar Series	
“The Dangers of Over-Ambitious Antitrust Regulation”	2006
NY State Bar Association Antitrust Law Section Annual Meeting	
“Efficient Integration or Illegal Monopolization?”	2006
World Bank Seminar	
“The Dangers of Over-Ambitious Regulation”	2005
ABA Section of Antitrust Law 2005 Fall Forum	
“Is There a Gap Between the Guidelines and Agency Practice?”	2005
Hearing of Antitrust Modernization Commission	
“Assessment of U.S. Merger Enforcement Policy”	2005
LEAR Conference on Advances in the Economics of Competition Law	
“Exclusionary Pricing Practices”	2005
Annual Antitrust Law Institute	
“Cutting Edge Issues in Economics”	2005
PRIOR Symposium on States and Stem Cells	

“Assessing the Economics of State Stem Cell Programs”	2005
ABA Section of Antitrust Law – AALS Scholars Showcase “Distinguishing Anticompetitive Conduct”	2005
Allied Social Science Associations National Convention “Antitrust in the New Economy”	2005
ABA Section of Antitrust Law 2004 Fall Forum “Advances in Economic Analysis of Antitrust”	2004
Phoenix Center State Regulator Retreat “Regulatory Policy for the Telecommunications Revolution”	2004
OECD Competition Committee “Use of Economic Evidence in Merger Control”	2004
Justice Department/Federal Trade Commission Joint Workshop “Merger Enforcement”	2004
Phoenix Center Annual U.S. Telecoms Symposium “Incumbent Market Power”	2003
Center for Economic Policy Studies Symposium on Troubled Industries “What Role for Government in Telecommunications?”	2003
Princeton Workshop on Price Risk and the Future of the Electric Markets “The Structure of the Electricity Markets”	2003
2003 Antitrust Conference “International Competition Policy and Trade Policy”	2003
International Industrial Organization Conference “Intellectual Property System Reform”	2003
ABA Section of Antitrust Law 2002 Fall Forum “Competition, Regulation and Pharmaceuticals”	2002

Fordham Conference on International Antitrust Law and Policy	
“Substantive Standards for Mergers and the Role of Efficiencies”	2002
Department of Justice Telecom Workshop	
“Stimulating Investment and the Telecommunications Act of 1996”	2002
Department of Commerce Conference on the State of the Telecom Sector	
“Stimulating Investment and the Telecommunications Act of 1996”	2002
Law and Public Affairs Conference on the Future of Internet Regulation	
“Open Access and Competition Policy Principles”	2002
Center for Economic Policy Studies Symposium on Energy Policy	
“The Future of Power Supply”	2002
The Conference Board: Antitrust Issues in Today’s Economy	
“The 1982 Merger Guidelines at 20”	2002
Federal Energy Regulatory Commission Workshop	
“Effective Deregulation of Residential Electric Service”	2001
IPEA International Seminar on Regulation and Competition	
“Electricity Markets: Deregulation of Residential Service”	2001
“Lessons for Brazil from Abroad”	2001
ABA Antitrust Law Section Task Force Conference	
“Time, Change, and Materiality for Monopolization Analyses”	2001
Harvard University Conference on American Economic Policy in the 1990s	
“Comments on Antitrust Policy in the Clinton Administration”	2001
Tel-Aviv Workshop on Industrial Organization and Anti-Trust	
“The Risk of Contagion from Multimarket Contact”	2001
2001 Antitrust Conference	
“Collusion Cases: Cutting Edge or Over the Edge?”	2001
“Dys-regulation of California Electricity”	2001
FTC Public Workshop on Competition Policy for E-Commerce	
“Necessary Conditions for Cooperation to be Problematic”	2001
HIID International Workshop on Infrastructure Policy	
“Infrastructure Privatization and Regulation”	2000
Villa Mondragone International Economic Seminar	
“Competition Policy for Network and Internet Markets”	2000

New Developments in Railroad Economics: Infrastructure Investment and Access Policies “Railroad Access, Regulation, and Market Structure”	2000
The Multilateral Trading System at the Millennium “Efficiency Gains From Further Liberalization”	2000
Singapore – World Bank Symposium on Competition Law and Policy “Policy Towards Cartels and Collusion”	2000
CEPS: Is It a New World?: Economic Surprises of the Last Decade “The Internet and E-Commerce”	2000
Cutting Edge Antitrust: Issues and Enforcement Policies “The Direction of Antitrust Entering the New Millennium”	2000
The Conference Board: Antitrust Issues in Today’s Economy “Antitrust Analysis of Industries With Network Effects”	1999
CEPS: New Directions in Antitrust “Antitrust in a High-Tech World”	1999
World Bank Meeting on Competition and Regulatory Policies for Development “Economic Principles to Guide Post-Privatization Governance”	1999
1999 Antitrust Conference “Antitrust and the Pace of Technological Development” “Restructuring the Electric Utility Industry”	1999 1999
HIID International Workshop on Privatization, Regulatory Reform and Corporate Governance “Privatization and Post-Privatization Regulation of Natural Monopolies”	1999
The Federalist Society: Telecommunications Deregulation: Promises Made, Potential Lost? “Grading the Regulators”	1999
Inter-American Development Bank: Second Generation Issues In the Reform Of Public Services “Post-Privatization Governance” “Issues Surrounding Access Arrangements”	1999 1999
Economic Development Institute of the World Bank -- Program on Competition Policy “Policy Towards Horizontal Mergers”	1998
Twenty-fifth Anniversary Seminar for the Economic Analysis Group of the Department of	

Justice	
“Market Definition in Antitrust Analysis”	1998
HIID International Workshop on Privatization, Regulatory Reform and Corporate Governance	
“Infrastructure Architecture and Regulation: Railroads”	1998
EU Committee Competition Conference – Market Power	
“US/EC Perspective on Market Definition”	1998
Federal Trade Commission Roundtable	
“Antitrust Policy for Joint Ventures”	1998
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“Communications Mergers”	1998
The Progress and Freedom Foundation Conference on Competition, Convergence, and the Microsoft Monopoly	
Access and Bundling in High-Technology Markets	1998
FTC Program on The Effective Integration of Economic Analysis into Antitrust Litigation	
The Role of Economic Evidence and Testimony	1997
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Microeconomic Analysis and Guideline	1997
World Bank Economists --Week IV Keynote	
Making Markets More Effective With Competition Policy	1997
Brookings Trade Policy Forum	
Competition Policy and Antidumping: The Economic Effects	1997
University of Malaya and Harvard University Conference on The Impact of Globalisation and Privatisation on Malaysia and Asia in the Year 2020	
Microeconomics, Privatization, and Vertical Integration	1997
ABA Section of Antitrust Law Conference on The Telecommunications Industry	
Current Economic Issues in Telecommunications	1997
Antitrust 1998: The Annual Briefing	
The Re-Emergence of Distribution Issues	1997
Inter-American Development Bank Conference on Private Investment, Infrastructure Reform and Governance in Latin America & the Caribbean	
Economic Principles to Guide Post-Privatization Governance	1997

Harvard Forum on Regulatory Reform and Privatization of Telecommunications in the Middle East	
Privatization: Methods and Pricing Issues	1997
American Enterprise Institute for Public Policy Research Conference	
Discussion of Local Competition and Legal Culture	1997
Harvard Program on Global Reform and Privatization of Public Enterprises	
“Infrastructure Privatization and Regulation: Freight”	1997
World Bank Competition Policy Workshop	
“Competition Policy for Entrepreneurship and Growth”	1997
Eastern Economics Association Paul Samuelson Lecture	
“Bottleneck Access in Regulation and Competition Policy”	1997
ABA Annual Meeting, Section of Antitrust Law	
“Antitrust in the 21st Century: The Efficiencies Guidelines”	1997
Peruvian Ministry of Energy and Mines Conference on Regulation of Public Utilities	
“Regulation: Theoretical Context and Advantages vs. Disadvantages”	1997
The FCC: New Priorities and Future Directions	
“Competition in the Telecommunications Industry”	1997
American Enterprise Institute Studies in Telecommunications Deregulation	
“The Scope of Competition in Telecommunications”	1996
George Mason Law Review Symposium on Antitrust in the Information Revolution	
“Introduction to the Economic Theory of Antitrust and Information”	1996
Korean Telecommunications Public Lecture	
“Market Opening and Fair Competition”	1996
Korea Telecommunications Forum	
“Desirable Interconnection Policy in a Competitive Market”	1996
European Association for Research in Industrial Economics Annual Conference	
“Bottleneck Access: Regulation and Competition Policy”	1996
Harvard Program on Global Reform and Privatization of Public Enterprises	
“Railroad and Other Infrastructure Privatization”	1996

FCC Forum on Antitrust and Economic Issues Involved with InterLATA Entry “The Scope of Telecommunications Competition”	1996
Citizens for a Sound Economy Policy Watch on Telecommunications Interconnection “The Economics of Interconnection”	1996
World Bank Seminar on Experiences with Corporatization “Strategic Directions of Privatization”	1996
FCC Economic Forum on the Economics of Interconnection Lessons from Other Industries	1996
ABA Annual Meeting, Section of Antitrust Law The Integration, Disintegration, and Reintegration of the Entertainment Industry	1996
Conference Board: 1996 Antitrust Conference How Economics Influences Antitrust and Vice Versa	1996
Antitrust 1996: A Special Briefing Joint Ventures and Strategic Alliances	1996
New York State Bar Association Section of Antitrust Law Winter Meeting Commentary on Horizontal Effects Issues	1996
FTC Hearings on the Changing Nature of Competition in a Global and Innovation-Driven Age Vertical Issues for Networks and Standards	1995
Wharton Seminar on Applied Microeconomics Access Policies with Imperfect Regulation	1995
Antitrust 1996, Washington D.C. Assessing Joint Ventures for Diminution of Competition	1995
ABA Annual Meeting, Section of Antitrust Law Refusals to Deal -- Economic Tests for Competitive Harm	1995
FTC Seminar on Antitrust Enforcement Analysis Diagnosing Collusion Possibilities	1995
Philadelphia Bar Education Center: Antitrust Fundamentals Antitrust--The Underlying Economics	1995
Vanderbilt University Conference on Financial Markets	

Why Do Christie and Schultz Infer Collusion From Their Data?	1995
ABA Section of Antitrust Law Chair=s Showcase Program Discussion of Telecommunications Competition Policy	1995
Conference Board: 1995 Antitrust Conference Analysis of Mergers and Joint Ventures	1995
ABA Conference on The New Antitrust: Policy of the '90s Antitrust on the Super Highways/Super Airways	1994
ITC Hearings on The Economic Effects of Outstanding Title VII Orders "The Economic Impacts of Antidumping Policies"	1994
OECD Working Conference on Trade and Competition Policy "Empirical Evidence on The Nature of Anti-dumping Actions"	1994
Antitrust 1995, Washington D.C. "Rigorous Antitrust Standards for Distribution Arrangements"	1994
ABA -- Georgetown Law Center: Post Chicago-Economics: New Theories - New Cases? "Economic Foundations for Vertical Merger Guidelines"	1994
Conference Board: Antitrust Issues in Today's Economy "New Democrats, Old Agencies: Competition Law and Policy"	1994
Federal Reserve Board Distinguished Economist Series "Regulated Private Enterprise Versus Public Enterprise"	1994
Institut d'Etudes Politiques de Paris "Lectures on Competition Policy and Privatization"	1993
Canadian Bureau of Competition Policy Academic Seminar Series, Toronto. "Public Versus Regulated Private Enterprise"	1993
CEPS Symposium on The Clinton Administration: A Preliminary Report Card "Policy Towards Business"	1993
Columbia Institute for Tele-Information Conference on Competition in Network Industries, New York, NY "Discussion of Deregulation of Networks: What Has Worked and What Hasn't"	1993
World Bank Annual Conference on Development Economics "Public Versus Regulated Private Enterprise"	1993

Center for Public Utilities Conference on Current Issues Challenging the Regulatory Process	
"The Economics of Current Issues in Telecommunications Regulation"	1992
"The Role of Markets in Presently Regulated Industries"	1992
The Conference Board's Conference on Antitrust Issues in Today's Economy, New York, NY	
"Antitrust in the Global Economy"	1992
"Monopoly Issues for the '90s"	1993
Columbia University Seminar on Applied Economic Theory, New York, NY	
"Economic Rationales for the Scope of Privatization"	1992
Howrey & Simon Conference on Antitrust Developments, Washington, DC	
"Competitive Effects of Concern in the Merger Guidelines"	1992
Arnold & Porter Colloquium on Merger Enforcement, Washington, DC	
"The Economic Foundations of the Merger Guidelines"	1992
American Bar Association, Section on Antitrust Law Leadership Council Conference, Monterey, CA	
"Applying the 1992 Merger Guidelines"	1992
OECD Competition Policy Meeting, Paris, France	
"The Economic Impacts of Antidumping Policy"	1992
Center for Public Choice Lecture Series, George Mason University Arlington, VA	
"The Economic Impacts of Antidumping Policy"	1992
Brookings Institution Microeconomics Panel, Washington, DC,	
"Discussion of the Evolution of Industry Structure"	1992
AT&T Conference on Antitrust Essentials	
"Antitrust Standards for Mergers and Joint Ventures"	1991
ABA Institute on The Cutting Edge of Antitrust: Market Power	
"Assessing and Proving Market Power: Barriers to Entry"	1991
Second Annual Workshop of the Competition Law and Policy Institute of New Zealand	
"Merger Analysis, Industrial Organization Theory, and Merger Guidelines"	1991
"Exclusive Dealing and the <u>Fisher & Paykel</u> Case"	1991
Special Seminar of the New Zealand Treasury	
"Strategic Behavior, Antitrust, and The Regulation of Natural Monopoly"	1991

Public Seminar of the Australian Trade Practices Commission "Antitrust Issues of the 1990's"	1991
National Association of Attorneys General Antitrust Seminar "Antitrust Economics"	1991
District of Columbia Bar's 1991 Annual Convention "Administrative and Judicial Trends in Federal Antitrust Enforcement"	1991
ABA Spring Meeting "Antitrust Lessons From the Airline Industry"	1991
Conference on The Transition to a Market Economy - Institutional Aspects "Anti-Monopoly Policies and Institutions"	1991
Conference Board's Thirtieth Antitrust Conference "Antitrust Issues in Today's Economy"	1991
American Association for the Advancement of Science Annual Meeting "Methodologies for Economic Analysis of Mergers"	1991
General Seminar, Johns Hopkins University "Economic Rationales for the Scope of Privatization"	1991
Capitol Economics Speakers Series "Economics of Merger Guidelines"	1991
CRA Conference on Antitrust Issues in Regulated Industries "Enforcement Priorities and Economic Principles"	1990
Pepper Hamilton & Scheetz Anniversary Colloquium "New Developments in Antitrust Economics"	1990
PLI Program on Federal Antitrust Enforcement in the 90's "The Antitrust Agenda of the 90's"	1990
FTC Distinguished Speakers Seminar "The Evolving Merger Guidelines"	1990
The World Bank Speakers Series "The Role of Antitrust Policy in an Open Economy"	1990
Seminar of the Secretary of Commerce and Industrial Development of Mexico "Transitions to a Market Economy"	1990

Southern Economics Association	
"Entry in Antitrust Analysis of Mergers"	1990
"Discussion of Strategic Investment and Timing of Entry"	1990
American Enterprise Institute Conference on Policy Approaches to the Deregulation of Network Industries	
"Discussion of Network Problems and Solutions"	1990
American Enterprise Institute Conference on Innovation, Intellectual Property, and World Competition	
"Law and Economics Framework for Analysis"	1990
Banco Nacional de Desenvolvimento Economico Social Lecture	
"Competition Policy: Harnessing Private Interests for the Public Interest"	1990
Western Economics Association Annual Meetings	
"New Directions in Antitrust from a New Administration"	1990
"New Directions in Merger Enforcement: The View from Washington"	1990
Woodrow Wilson School Alumni Colloquium	
"Microeconomic Policy Analysis and Antitrust--Washington 1990"	1990
Arnold & Porter Lecture Series	
"Advocating Competition"	1991
"Antitrust Enforcement"	1990
ABA Antitrust Section Convention	
"Recent Developments in Market Definition and Merger Analysis"	1990
Federal Bar Association	
"Joint Production Legislation: Competitive Necessity or Cartel Shield?"	1990
Pew Charitable Trusts Conference	
"Economics and National Security"	1990
ABA Antitrust Section Midwinter Council Meeting	
"Fine-tuning the Merger Guidelines"	1990
"The State of the Antitrust Division"	1991
International Telecommunications Society Conference	
"Discussion of the Impact of Telecommunications in the UK"	1989
The Economists of New Jersey Conference	
"Recent Perspectives on Regulation"	1989

Conference on Current Issues Challenging the Regulatory Process	
"Innovative Pricing and Regulatory Reform"	1989
"Competitive Wheeling"	1989
Conference Board: Antitrust Issues in Today's Economy	
"Foreign Trade Issues and Antitrust"	1989
McKinsey & Co. Mini-MBA Conference	
"Economic Analysis of Pricing, Costing, and Strategic Business Behavior"	1989
	1994
Olin Conference on Regulatory Mechanism Design	
"Revolutions in Regulatory Theory and Practice: Exploring The Gap"	1989
University of Dundee Conference on Industrial Organization and Strategic Behavior	
"Mergers in Differentiated Product Industries"	1988
Leif Johanson Lectures at the University of Oslo	
"Normative Issues in Industrial Organization"	1988
Mergers and Competitiveness: Spain Facing the EEC	
"Merger Policy"	1988
"R&D Joint Ventures"	1988
New Dimensions in Pricing Electricity	
"Competitive Pricing and Regulatory Reform"	1988
Program for Integrating Economics and National Security: Second Annual Colloquium	
"Arming Decisions Under Asymmetric Information"	1988
European Association for Research in Industrial Economics	
"U.S. Railroad Deregulation and the Public Interest"	1987
"Economic Rationales for the Scope of Privatization"	1989
"Discussion of Licensing of Innovations"	1990
Annenberg Conference on Rate of Return Regulation in the Presence of Rapid Technical Change	
"Discussion of Regulatory Mechanism Design in the Presence of Research, Innovation, and Spillover Effects"	1987
Special Brookings Papers Meeting	
"Discussion of Empirical Approaches to Strategic Behavior"	1987
"New Merger Guidelines"	1990
Deregulation or Regulation for Telecommunications in the 1990's	
"How Effective are State and Federal Regulations?"	1987

Conference Board Roundtable on Antitrust	
"Research and Production Joint Ventures"	1990
"Intellectual Property and Antitrust"	1987
Current Issues in Telephone Regulation	
"Economic Approaches to Market Dominance: Applicability of Contestable Markets"	1987
Harvard Business School Forum on Telecommunications	
"Regulation of Information Services"	1987
The Fowler Challenge: Deregulation and Competition in The Local Telecommunications Market	
"Why Reinvent the Wheel?"	1986
World Bank Seminar on Frontiers of Economics	
"What Every Economist Should Know About Contestable Markets"	1986
Bell Communications Research Conference on Regulation and Information	
"Fuzzy Regulatory Rules"	1986
Karl Eller Center Forum on Telecommunications	
"The Changing Economic Environment in Telecommunications: Technological Change and Deregulation"	1986
Railroad Accounting Principles Board Colloquium	
"Contestable Market Theory and ICC Regulation"	1986
Canadian Embassy Conference on Current Issues in Canadian -- U.S. Trade and Investment	
"Regulatory Revolution in the Infrastructure Industries"	1985
Eagleton Institute Conference on Telecommunications in Transition	
"Industry in Transition: Economic and Public Policy Overview"	1985
Brown University Citicorp Lecture	
"Logic of Regulation and Deregulation"	1985
Columbia University Communications Research Forum	
"Long Distance Competition Policy"	1985
American Enterprise Institute Public Policy Week	
"The Political Economy of Regulatory Reform"	1984
MIT Communications Forum	
"Deregulation of AT&T Communications"	1984

Bureau of Census Longitudinal Establishment Data File and Diversification Study Conference "Potential Uses of The File"	1984
Federal Bar Association Symposium on Joint Ventures "The Economics of Joint Venture Assessment"	1984
Hoover Institute Conference on Antitrust "Antitrust for High-Technology Industries"	1984
NSF Workshop on Predation and Industrial Targeting "Current Economic Analysis of Predatory Practices"	1983
The Institute for Study of Regulation Symposium: Pricing Electric, Gas, and Telecommunications Services Today and for the Future "Contestability As A Guide for Regulation and Deregulation"	1984
University of Pennsylvania Economics Day Symposium "Contestability and Competition: Guides for Regulation and Deregulation"	1984
Pinhas Sapir Conference on Economic Policy in Theory and Practice "Corporate Governance and Market Structure"	1984
Centre of Planning and Economic Research of Greece "Issues About Industrial Deregulation"	1984
	"Contestability: New Research Agenda" 1984
Hebrew and Tel Aviv Universities Conference on Public Economics "Social Welfare Dominance Extended and Applied to Excise Taxation"	1983
NBER Conference on Industrial Organization and International Trade "Perspectives on Horizontal Mergers in World Markets"	1983
Workshop on Local Access: Strategies for Public Policy "Market Structure and Government Intervention in Access Markets"	1982
NBER Conference on Strategic Behavior and International Trade "Industrial Strategy with Committed Firms: Discussion"	1982
Columbia University Graduate School of Business, Conference on Regulation and New Telecommunication Networks "Local Pricing in a Competitive Environment"	1982
International Economic Association Roundtable Conference on New Developments in the Theory of Market Structure	

"Theory of Contestability"	1982
"Product Dev., Investment, and the Evolution of Market Structures"	1982
N.Y.U. Conference on Competition and World Markets: Law and Economics	
"Competition and Trade Policy--International Predation"	1982
CNRS-ISPE-NBER Conference on the Taxation of Capital	
"Welfare Effects of Investment Under Imperfect Competition"	1982
Internationales Institut für Management und Verwaltung Regulation Conference	
"Welfare, Regulatory Boundaries, and the Sustainability of Oligopolies"	1981
NBER-Kellogg Graduate School of Management Conference on the	
Econometrics of Market Models with Imperfect Competition	
"Discussion of Measurement of Monopoly Behavior: An	
Application to the Cigarette Industry"	1981
The Peterkin Lecture at Rice University	
"Deregulation: Ideology or Logic?"	1981
FTC Seminar on Antitrust Analysis	
"Viewpoints on Horizontal Mergers	1982
"Predation as a Tactical Inducement for Exit"	1980
NBER Conference on Industrial Organization and Public Policy	
"An Economic Definition of Predation"	1980
The Center for Advanced Studies in Managerial Economics Conference on The Economics of	
Telecommunication	
"Pricing Local Service as an Input"	1980
Aspen Institute Conference on the Future of the Postal Service	
"Welfare Economics of Postal Pricing"	1979
Department of Justice Antitrust Seminar	
"The Industry Performance Gradient Index"	1979
Eastern Economic Association Convention	
"The Social Performance of Deregulated Markets for Telecom Services"	
1979	
Industry Workshop Association Convention	
"Customer Equity and Local Measured Service"	1979
Symposium on Ratemaking Problems of Regulated Industries	
"Pricing Decisions and the Regulatory Process"	1979

Woodrow Wilson School Alumni Conference "The Push for Deregulation"	1979
NBER Conference on Industrial Organization "Intertemporal Sustainability"	1979
World Congress of the Econometric Society "Theoretical Industrial Organization"	1980
Institute of Public Utilities Conference on Current Issues in Public Utilities Regulation "Network Access Pricing"	1978
ALI-ABA Conference on the Economics of Antitrust "Predatoriness and Discriminatory Pricing"	1978
AEI Conference on Postal Service Issues "What Can Markets Control?"	1978
University of Virginia Conference on the Economics of Regulation "Public Interest Pricing"	1978
DRI Utility Conference "Marginal Cost Pricing in the Utility Industry: Impact and Analysis"	1978
International Meeting of the Institute of Management Sciences "The Envelope Theorem"	1977
University of Warwick Workshop on Oligopoly "Industry Performance Gradient Indexes"	1977
North American Econometric Society Convention "Intertemporal Sustainability"	1979
"Social Welfare Dominance"	1978
"Economies of Scope, DAIC, and Markets with Joint Production"	1977
Telecommunications Policy Research Conference "Transition to Competitive Markets"	1986
"InterLATA Capacity Growth, Capped NTS Charges and Long Distance Competition"	1985
"Market Power in The Telecommunications Industry"	1984
"FCC Policy on Local Access Pricing"	1983
"Do We Need a Regulatory Safety Net in Telecommunications?"	1982
"Anticompetitive Vertical Conduct"	1981
"Electronic Mail and Postal Pricing"	1980
"Monopoly, Competition and Efficiency": Chairman	1979

"A Common Carrier Research Agenda"	1978
"Empirical Views of Ramsey Optimal Telephone Pricing"	1977
"Recent Research on Regulated Market Structure"	1976
"Some General Equilibrium Views of Optimal Pricing"	1975
National Bureau of Economic Research Conference on Theoretical Industrial Organization	
"Compensating Variation as a Measure of Welfare Change"	1976
Conference on Pricing in Regulated Industries: Theory & Application	
"Ramsey Optimal Pricing of Long Distance Telephone Services"	1977
NBER Conference on Public Regulation	
"Income Distributional Concerns in Regulatory Policy-Making"	1977
Allied Social Science Associations National Convention	
"Merger Guidelines and Economic Theory"	1990
Discussion of "Competitive Rules for Joint Ventures"	1989
"New Schools in Industrial Organization"	1988
"Industry Economic Analysis in the Legal Arena"	1987
"Transportation Deregulation"	1984
Discussion of "Pricing and Costing of Telecommunications Services"	1983
Discussion of "An Exact Welfare Measure"	1982
"Optimal Deregulation of Telephone Services"	1982
"Sector Differentiated Capital Taxes"	1981
"Economies of Scope"	1980
"Social Welfare Dominance"	1980
"The Economic Definition of Predation"	1979
Discussion of "Lifeline Rates, Succor or Snare?"	1979
"Multiproduct Technology and Market Structure"	1978
"The Economic Gradient Method"	1978
"Methods for Public Interest Pricing"	1977
Discussion of "The Welfare Implications of New Financial Instruments"	1976
"Welfare Theory of Concentration Indices"	1976
Discussion of "Developments in Monopolistic Competition Theory"	1976
"Hedonic Price Adjustments"	1975
"Public Good Attributes of Information and its Optimal Pricing"	1975
"Risk Invariance and Ordinally Additive Utility Functions"	1974
"Consumer's Surplus: A Rigorous Cookbook"	1974
University of Chicago Symposium on the Economics of Regulated Public Utilities	
"Optimal Prices for Public Purposes"	1976
American Society for Information Science	
"The Social Value of Information: An Economist's View"	1975
Institute for Mathematical Studies in the Social Sciences Summer Seminar	

"The Sustainability of Natural Monopoly"	1975
U.S.-U.S.S.R. Symposium on Estimating Costs and Benefits of Information Services "The Evaluation of the Economic Benefits of Productive Information"	1975
NYU-Columbia Symposium on Regulated Industries "Ramsey Optimal Public Utility Pricing"	1975

Research Seminars:

Bell Communications Research (2)	University of California, San Diego
Bell Laboratories (numerous)	University of Chicago
Department of Justice (3)	University of Delaware
Electric Power Research Institute	University of Florida
Federal Reserve Board	University of Illinois
Federal Trade Commission (4)	University of Iowa (2)
Mathematica	Universite Laval
Rand	University of Maryland
World Bank (3)	University of Michigan
Carleton University	University of Minnesota
Carnegie-Mellon University	University of Oslo
Columbia University (4)	University of Pennsylvania (3)
Cornell University (2)	University of Toronto
Georgetown University	University of Virginia
Harvard University (2)	University of Wisconsin
Hebrew University	University of Wyoming
Johns Hopkins University (2)	Vanderbilt University
M. I. T. (4)	Yale University (2)
New York University (4)	Princeton University (many)
Northwestern University (2)	Rice University
Norwegian School of Economics and Business Administration	Stanford University (5) S.U.N.Y. Albany