Ex Parte No. 431-3

224969

STATEMENT OF GERARD J. MCCULLOUGH

I. BACKGROUND AND EXPERIENCE

My name is Gerard McCullough. I am Associate Professor of Applied Economics at the University of Minnesota, a position I have held since 1996. At Minnesota, I am primarily responsible for teaching M.S. and Ph.D. courses in applied econometrics. My research focuses on the economics of transportation. I was Deputy Director of the MIT Center for Transportation Studies from 1985-1990 and Director of the University of Minnesota Center for Transportation Studies from 1996-2000. I have been a Visiting Professor of Economics at the University of the Social Sciences in Toulouse, France, and a Professor of Economics at the National Defense University in Washington, DC.

I have also been active in transportation research and policy analysis outside the university. I have been a consultant to the Minnesota Department of Transportation, the U.S. Department of Transportation, the World Bank and various private sector organizations. I served on the National Academy of Science Committee for Review of the Federal Railroad Administration's RD&D Programs from 2002 - 2007 and on the General Accountability Office's Expert Panel on Regulation of Freight Railroads in 2006. I was a Guest Editor of the *Review of Network Economics* March 2008 Special Issue on Rail Economics.

I have been involved in the study of rail costs since 1977 when I was a special assistant to Administrator John M. Sullivan of the Federal Railroad Administration (FRA). A major issue confronting the FRA at that time was the fragile economic condition of U.S. railroads in the Northeast and Midwest. The Carter Administration's response was to provide interim federal financial assistance to the industry and to propose legislation which changed the rail regulatory framework.

One of the studies that I relied on in helping Mr. Sullivan to build the case for the Staggers Rail Act was a draft study by Professors Ann F. Friedlaender of MIT and Richard H. Spady of Swarthmore entitled *Freight Transport Regulation*. In that study Friedlaender and Spady used an econometric model of the rail-truck market to evaluate whether the overall benefits conferred by close administrative regulation were sufficiently great to warrant the overall costs. Their results suggested otherwise.

I later had the opportunity to work with Professor Friedlaender as a research assistant at MIT. In my doctoral dissertation I extended the translog econometric model that she and others had developed to account for multiple rail outputs. Since then I have published a number of papers using econometric estimates of rail costs. My paper with Marc Ivaldi on "Density and Integration Effects on Class I U.S. Freight Railroads" in the 2001 *Journal of Regulatory Economics* was cited by the Board in its 2006 Ex Parte No. 657 (Sub-No.1) Decision on Major Issues in Rail Rate Cases.[1]

II. ANALYSIS OF THE UNIFORM RAIL COSTING SYSTEM (URCS)

The focus of this hearing is on how to revise the Uniform Rail Costing System (URCS). My focus is on item 13 of the list of topics which the Board announced in its Notice of Public Hearing on April 6, 2009. This asks whether and how the Board should update the various statistical relationships used in URCS. My response is conditional:

> *If* the Board concludes that URCS is an accurate and appropriate regulatory tool, and that URCS cannot be replaced by a better system or eliminated altogether, *then* the Board should consider updating the various

[1] STB ex Parte No. 657 (Sub-No. 1) MAJOR ISSUES IN RAIL RATE CASES, p. 18

statistical relationships used in URCS. *If* the Board decides to update the statistical relationships, *then* it should take into account the expert econometric testimony offered in connection with the Interstate Commerce Commission's adoption of URCS as its General Purpose Costing System.

In other words, I am suggesting that in addition to the topics identified on April 6 the Board also consider whether it is really feasible to use a regression-based costing system like URCS to project movement-specific costs. I am not proposing an answer to this question--I don't know the answer--but much of the prior expert econometric testimony on URCS suggests otherwise. Unless the Board addresses this fundamental issue, the data-related questions in items 1-12, and even the statistical question in item 13, are immaterial.

A. General Background on URCS

URCS is a set of three computer programs whose aim is to assign variable costs to a specific railroad freight movements.

Phase I of URCS is a set of regression programs which establish parametric relationships between 15 groupings of annual railroad expenses and a set of 10 main explanatory variables. Phase I involves 15 separate regressions in which the dependent variable is an expenditure account grouping and the independent variables include one output-related variable and one capacity-related variable. The most frequently used output measures are gross ton-miles or train-miles. The most frequently used capacity measure is miles of running track.

Phase II of URCS is a set of worksheets which combine the parameter results from Phase I with firm-level railroad operating and financial data to assign firm-level unit costs to the output-related variables. The unit costs assigned to each output measure include the variable portion of expenditures directly captured by the output-related parameter estimate and a set of allocations that are designed to capture a) variable expenses not reflected in the output-related parameters, and b) other expense items such as return on investment (ROI) and depreciation which are considered non-variable.

Phase III of URCS is an interactive costing program which uses the unit cost results from Phase II to assign a variable cost and a fully allocated cost to a particular freight movement on a particular railroad based on characteristics of the movement.

The Interstate Commerce Commission (ICC) began the development of URCS in 1977 following passage of the 1976 Railroad Revitalization and Regulatory Reform Act (4R Act). One aim of the 4R Act was to limit the scope of ICC rate review. The mechanism for doing this was to define a revenue-to-cost ratio below which rates were presumed to be reasonable and above which they were reviewable. The purpose of URCS was to estimate average variable costs more precisely than the Rail Form A system it replaced and to take advantage of a revised rail regulatory accounting system required by Section 307 of the 4R Act.

Commission staff developed URCS with a team of consultants that included Peat, Marwick, Mitchell & Co., Deloitte, Haskins and Sells, Reebie Associates, and M.L. Hall and Associates. A preliminary version was completed in December, 1977, but adoption was delayed by more than a decade by a long regulatory review of URCS.[2] In the course of this proceeding the Phase I regression analyses were heavily critiqued by academic experts and by the

[2] ICC Ex Parte No. 431 ADOPTION OF THE UNIFORM RAILROAD COSTING SYSTEM FOR THE PURPOSES OF DETERMINING VARIABLE COSTS IN SURCHARGE AND JURISDICTIONAL THRESHOLD DETERMINATIONS.

Railroad Accounting Principles Board (RAPB) that had been established by Congress to implement Section 307 of the 4R Act.[3] The questions posed by the RAPB prompted the Commission to ask Dr. M. Daniel Westbrook of Georgetown to reevaluate and revise URCS.[4] His revision, incorporating the 15 linear regressions mentioned above, was the basis of the system adopted by the Commission as its general Purpose Costing System (GPCS) on September 20, 1989.[5]

The Commission reopened its *ex parte* review of URCS three months later and in August, 1991, the Association of American Railroads (AAR) submitted a lengthy critique which identified a number of data-related and regression issues.[6] The Commission addressed the data-related issues in a 1993 ruling but postponed consideration of the regression issues.[7] In October, 1997, the Board announced it was discontinuing the inquiry due to a lack of resources.[8]

B. Formal Description of the URCS Phase I Regression Model

The main explanatory variables used in the Phase I regression program are listed in Table 1. The 15 regressions are summarized in Table 2. The expense categories in these 15 regressions comprise about 75 percent of total expenditures. The remaining expenditures—primarily ownership costs--are accounted for by allocations. Equipment-related ownership costs are assumed to be 100 percent variable and are fully allocated to the output-related variables. Property–related ownership expenses are assumed to be 50 percent variable and 50 percent of these are allocated to the output-related variables.

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[3] Railroad Accounting Principles Board, *Final Report*, September 1, 1987.
[4] ICC Bureau of Accounts, *Uniform Railroad Costing System: Research Report*, July 1988.
[5] ICC Ex Parte No. 431 (Sub-No.1) September 20, 1989
[6] ICC Ex Parte No. 431 (Sub-No.2) Comments of the Association of American Railroads, August 14, 1991
[7] ICC Ex Parte No. 431 (Sub-No.2) July 21, 1993
[8] STB Ex Parte No. 431 (Sub-No.2) September 19, 1997

TABLE 1
URCS EXPLANATORY VARIABLES

Output Variables	
Variable Name	**Variable Abbreviation**
Carloads Originated and Received	CLOR
Car-miles (railroad-owned and leased)	CMPD
Gross Ton-Miles	GTMC
Locomotive Road-Miles	LRM
Train Miles Running	TM
Train Hours Switching	THS
Train Hours Yard Switching	THY
Capacity Variables	
Variable Name	**Variable Abbreviation**
Switching Track	ST
Miles of Running Track	TR
Yard Switching Track	YST

TABLE 2
URCS REGRESSIONS

Dependent Variable	Expense (1989)	Dependent Variable	Output	Capacity
General & Administrative	14.70	GENADM	GTMC	TR
Running Crew Wages	10.99	RUNWAGE	TM	TR
Transportation Overhead	8.42	TRANSOH	TM	TR
Transportation Fuel	6.98	RUNFUEL	LRM	TR
Road Loco Service & Ovhd	6.43	RLOCREP	LRM	TR
Track Maintenance Ovhd	6.31	MAINTOH	GTMC	TR
Yard Operations	5.36	YARDOP	THY	YST
Running Track Maintenance	4.44	RMAINT	GTMC	TR
Switching Crew Wages	3.67	SWWAGE	THY	YST
Freight Car Repair Expense	2.84	CARREP	CMPD	TR
Freight Car Repair Ovhd	2.11	CAROH	CMPD	TR
Road Train Inspection	0.91	TRNINSP	TM	TR
Switching Maint & Ovhd	0.84	SWMAINT	THS	ST
Yard Locomotive Repairs	0.35	YLOCREP	THY	YST
Carload-related Expenses	0.27	CAREXP	CLOR	TR
Wreck Clearing Expenses	0.20	CLWRCK	TM	TR

In the Commission's *1980 Railroad Cost Study* it listed multiple possible functional forms and sets of regressors for each expenditure category.[9] The final set of regressions used in URCS are the linear regressions specified by Westbrook in his 1988 *Research Report.*[10]

Each of these 15 regression equations can be written:

$$EXP^{n}_{i,t} = \beta^{n}_{1} * OUTPUT_{i,t} + \beta^{n}_{2} * CAPACITY_{i,t} + \beta^{n}_{3} * FIRM_{i} + \beta^{n}_{4} * TIME_{t} + \varepsilon_{i,t} \qquad (1)$$

where $EXP^{n}_{i,t}$ represents expenditures in expense category *n* by firm *i* in year *t*, $OUTPUT_{i,t}$ and $CAPACITY_{i,t}$ are firm-level output and capacity measures from Table 1, and $FIRM_i$ and $TIME_t$ are dummy variables which control for firm-specific effects and year-specific effects. The regression results which the STB currently uses are based on a balanced panel of 14 firms for the nine-year period 1979-1987 (126 observations). The panel is balanced (i.e. contains exactly 14 firms for each of the nine years) because in cases where there were mergers during the period, Westbrook combined the data from the pre-merger firms to build merged firms.[11] Data for the Florida East Coast and Conrail were eliminated as being non-representative.[12]

On Westbrook's guidance, the regressions were run with the data transformed to correct two statistical problems that are commonly encountered in panel data--autocorrelation and heteroscedasticity. Westbrook mistakenly advised the Commission not to transform the dummy variables.

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[9] ICC Bureau of Accounts, *Uniform Railroad Costing System: 1980 Railroad Cost Study*, December 1982, pp. 3-21 to 3-26.
[10] ICC, op. cit.,pp. 36-41
[11] This technique was criticized in the AAR's 1991 filing since it assumes that pre-merger operations have the same technological characteristics as post-merger operations.
[12] AAR analyzed the URCS regressions with and without Conrail/FEC and concluded that they should not have been excluded.

The Westbrook regressions were run using the GAUSS econometric programming language. In its 1991 filing the AAR duplicated Westbrook's results using the Statistical Analysis Software (SAS) system. The AAR recognized Westbrook's data transformation error but for verification purposes did not correct it. The detailed regression results are reported in the appendix to Westbrook's July 1988 *Research Report* and in Appendix B of the AAR's August 14, 1991 filing in Ex Parte No. 431 (Sub-No. 2). The output and capacity variables have the proper signs in all 15 regressions. The output variables are significant at the 95 percent level in all 15 of the regressions and the capacity variables are significant in 9.

The URCS Phase I regression program has as its basic aim the determination of a set of parameter values which link together the 15 expense accounts identified in Table 2 and the seven output-related activities identified in Table 1. The parameter estimates are the key statistical elements used in Phase II of URCS to project unit costs.

Westbrook illustrates the regressions using road maintenance expenditures (RMAINT) as an example. Rewrite the expression in equation (1) as

$$RMAINT_{i,t} = \beta_1^{RM} GTMC_{i,t} + \beta_2^{RM} TR_{i,t} + \beta_3^{RM} FIRM_i + \beta_4^{RM} TIME_t + \varepsilon_{i,t} \qquad (2)$$

where $RMAINT_{i,t}$ is annual firm-level railway operating expenditures on running (non-yard) track, $GTMC_{i,t}$ is gross ton-miles, and $TR_{i,t}$ is miles of running track. The parameters express the marginal effect that gross ton-miles have on maintenance expenditures (β_1^{RM}) while controlling for the influence of network capacity (β_2^{RM}), firm-related effects (β_3^{RM}) and time (β_4^{RM}). Regression on the 1979-87 panel gives a set of estimated $\hat{\beta}$-values that are passed on to Phase II of the URCS program.

Notice in Table 2 that gross ton-miles (GTMC) is the output-related variable for running track maintenance (RMAINT), General and Administrative Expenses (GENADM) and Track Maintenance Overhead (MAINTOH). The firm-specific unit cost of a gross ton-mile calculated in Phase II requires a summation over the set of average variable expenditures for all three categories each calculated using $\hat{\beta}''$ values from separate regressions.

Comparable calculations are made in the Phase II program for carloads (CLOR), car-miles (CMPD), locomotive road-miles (LRM), train-miles (TM), and train hours switching (THS and THYS). These values are passed on to the Phase III program where the outputs associated with a specific movement are identified and combined with the unit cost estimates to project movement-specific costs.

C. Statistical Issues in the URCS Phase I Regression Program

Even before the official Commission release of the *1980 Railroad Cost Study* URCS met considerable criticism from professional economists. A thorough critique of URCS was provided by Friedlander and Spady in a paper prepared for a June 1980 Commission Conference on Railroad Costing.[13] The paper argues on theoretical grounds that the Phase I regression model does not adequately represent rail technology and cannot therefore accurately project costs. In its 1991 filing the AAR conducted an empirical test of URCS's ability to predict expenditures within sample. It found significant problems with the URCS predictions in 12 of 15 expenditure categories.

[13] The paper is titled "Economic Costs and the Uniform Railroad Costing System."

(1.) 1980 Friedlaender Spady Analysis of URCS

Friedlaender and Spady identify three major problems with the way costs are modeled in the URCS Phase I Regression Program: a) URCS fails to distinguish between short-run and long-run costs, b) URCS omits important variables in its explanation of rail costs and oversimplifies rail technology, and c) URCS fails to account for the potential tradeoffs across its 15 expenditure categories. This critique is mirrored and expanded in later comments by Zvi Griliches of Harvard and W.G. Waters II and Michael W. Tretheway of the University of British Columbia.

(a.) URCS fails to distinguish between short-run and long-run costs.

The basic idea here is that any representation of a firm's costs must take into account the level of the firm's output and the level of its capital investment. In equation (2), for example, road maintenance expenditures ($RMAINT_{i,t}$) are expected to vary directly with gross ton-miles ($GTMC_{i,t}$) but in the short-run the relationship between the two is conditional on the size (and perhaps the quality) of the firm's network. To properly account for variable costs, which is a short-run concept, a well-specified model must distinguish between short-run and long-run costs by introducing an independent variable like track miles ($TR_{i,t}$).

In its *1980 Rail Cost Study* the Commission proposed a set of regression functions which expenses and output levels were both divided by the square root of track-miles to control for differences in capacity. Friedlander and Spady noted that this functional form does not introduce capacity as an independent factor and therefore did not distinguish between short-run and long-run costs.

This specification issue is corrected in the Westbrook regressions in equation (1) and equation (2) but the long-run versus short-run issue has not been completely resolved. The regression results which the Board currently uses are based on a

panel of firms that operated between 1979 and 1987. The size of rail networks relative to output levels has changed considerably since then as railroads have consolidated and rationalized their systems. Even if the long run versus short run distinction is properly specified the coefficients have probably changed.

(b.) URCS omits important variables in its explanation of rail costs and oversimplifies rail technology.

The second requirement for a regression model that represents costs is that it include all of the relevant explanatory variables. This derives from a fundamental rule in regression analysis. Inclusion of irrelevant variables will not result in biased parameter estimates; exclusion of relevant variables will. Friedlaender and Spady note that in addition to output levels and capacity (capital) the most important variables in explaining a firm's costs are input prices. These might be omitted from a model if the prices the firm pays for labor, fuel, materials, and so on, increase uniformly, but this does not appear to be the case with railroads. Because the URCS regressions omit input prices the $\hat{\beta}$-values that URCS uses to project movement costs are biased. This would be true even if the 1978-1987 estimates values were updated.

Friedlaender and Spady also question whether the output variables which URCS uses adequately represent the scope of rail activities. The output measures gross ton-miles, carloads, car-miles, locomotive road-miles, train-miles, and train hours switching are not differentiated in the URCS regressions between bulk and intermodal services, for example. Unless these services are technologically the same, this adds another element of bias to the $\hat{\beta}$-values.

Friedlaender and Spady's also object to the fact that URCS imposes a linear form on the regressions. The linear cost models in equations (1) and (2) assume an overly simplistic production relationship. Westbrook argues that the linear form is

necessary to estimate *variability*. Griliches notes in his Expert Report on Westbrook's study that *cost variability* has no recognized meaning in the economics literature.[14] If what Westbrook means by variability is the ratio of variable cost to total cost [equation (1.5) on p. 7 of his *Research Report*] then there is no reason why a Cobb Douglas or more flexible functional form could not be used to project this ratio.

(c.) URCS fails to account for the interrelationships among its expenditure categories.

URCS uses 15 separate regressions to capture the relationship between railroad expenditures and railroad activities. This is a nonstandard representation of costs. In the standard representation of a *joint* production technology the short-run cost relationship is written

$$C^V = C^V(y_A, y_B, \ldots, w; t) \qquad (3)$$

where w represents input prices, t represents technological variables, and the subscripted y variables represent outputs or output-related production activities. In this mathematical representation of costs, activity levels, input prices and technology all work together to influence expenditures. The marginal effect of activity y_A on costs is conditioned by the level of activity y_B. To use railroads as examples, the overall effect on expenditures of line haul activities (crews, fuel, locomotives) would not be independent of yard-related activities (yard operations, yard locomotives).

The URCS system represents all 15 categories independently. Abstracting from equation (1) above, the URCS formulation could be rewritten $C^i = C^i(y_A, t_A)$, where C^i is an expenditure category and y_A and t_A are the assigned output-

[14] ICC, op. cit., Appendix, Letter to Ronald Young, dated January 6, 1988.

related and capacity-related variables. This is a *non-joint* production system whose overall expenditures would be written $C^V = \sum C^i$ .The assumption here is that the marginal effect of an output--train-miles ($TM_{i,t}$) for example--depends only on the level of that output and not on the level of other outputs such as yard operations ($THY_{i,t}$).

2. 1991 AAR Analysis of URCS Phase I

The Commission staff does not appear to have taken the academic critique of URCS too seriously but some specification issues were raised officially a few years later by the RAPB. In it 1987 *Final Report*, the RAPB (whose members included economist Merton Peck of Yale) made the following observations: (a.) The Commission should test alternative (especially nonlinear) functional forms and alternative explanatory variables.(b.) The URCS specifications should take into account the effect on costs of traffic density. (c.) The URCS specifications should also take into account the effect on costs of changes in railroad productivity.[15] The RAPB report prompted the Commission to re-open its URCS proceeding in 1990 and the AAR responded in depth in August, 1991.

The AAR report is based on a collaboration among AAR staff experts (including econometrician Dr. Scott Dennis), costing experts from individual railroads and academic experts Waters and Tretheway. The AAR takes as given the non-joint structure of URCS and focuses on the reliability and accuracy of the regressions. The basic conclusions are (a.) the fit of the URCS regressions is "extremely poor", and (b.) the regression coefficients are unstable over time. These conclusions lead the AAR to propose an alternative regression model with 28 account groupings, nonlinear functional forms and multiple explanatory variables in each regression.

[15] RAPB, op. cit., Volume 2, *Detailed Report*, pp. 99-114

(a.) The fit of the URCS regressions is "extremely poor".

The standard measure of fit in a regression is $R^2 = 1 - (SSE / SST)$ where SSE is sum of squared residual distances between actual observations and projected observations, and SST is the total sum of squared distances of the observations from their mean value. A related measure, relevant especially to forecasting, is the Mean Square Error of prediction. This is defined as $MSE = SSE/(t-k)$ where t is number of observations and k is number of explanatory variables. The Root Mean Square Error is

$$RMSE = \sqrt{(SSE/(t-k)}\,, \qquad (4)$$

and the measure the AAR uses to evaluate the fit of the URCS regressions is "Root Mean Square Error Forecast" , i.e.

$$RMSEF = \left(\frac{RMSE}{\bar{y}}\right) * 100\,, \qquad (5)$$

where $\bar{y}$ is the mean of the dependent variable. This expresses the representative prediction error relative to the size of the variable.

The AAR results on RMSEF for the 15 URCS regressions are presented in Table 4 (p.19) of the AAR's Verified Statement. Twelve of the 15 regressions in URCS have RMSEFs of more than 30 percent.

To illustrate the degree of imprecision involved, AAR extrapolates the predicted Car Expenses (CAREXP) expenditures for the Norfolk Southern and Kansas City Southern railroads for the 1979-1987 period and finds percentage differences between actual and predicted values ranging from 300 to 1200 percent.

(b.) The URCS regression coefficients are unstable over time.

To check the stability of the URCS coefficients, AAR first corrected Westbrook's regressions by transforming the firm and time dummies and by including FEC and Conrail in the data base. It then ran a series of regressions for 1979-1985, 1979-1986, 1979-1987, 1979-1988, and 1979-1989, and tested whether the estimated values of the output-related and capacity-related coefficients for the 15 accounts changed significantly. The coefficients in only four of 15 categories remained within error bands of two standard deviations across all five regressions. The coefficients were unstable in 11 of 15 categories.

III. CONCLUSIONS AND RECOMMENDATIONS

There is little reason to be confident that the $\hat{\beta}$-parameters in URCS accurately project variable costs. Nor is it clear that an update of the URCS regressions using the same set of truncated specifications will solve the problem. The issues which Friedlaender and Spady identified would still be present in a new set of regressions using a full dataset (or subset) from the 1979 to 2008 time period.

My first recommendation is that Board should evaluate whether URCS is capable of accurately projecting movement specific rail costs. This may require some initial updating of URCS, but the burden of proof is on the Board to establish that there is a relation between URCS and real costs of rail operations. In his 1988 *Research Report* Westbrook notes that the regression equations in URCS are activity equations not cost functions and that the "URCS activity equations do not possess the characteristics of economic cost functions (p. 15)." This does not mean, however, that URCS cannot be evaluated using economic categories. If URCS is not an economic model, what is it?

What follows are three very preliminary suggestions as to how URCS could be evaluated.

--A first test might be to estimate the variances that are involved when URCS projects a specific movement cost. In equation (2), for example, there are estimated variances associated with each of the $\hat{\beta}^{RM}$ parameters. There are also estimated variances associated with each of the $\hat{\beta}^{N}$ parameters in the other 14 regressions. The aggregate effect of these variances, which can be estimated using standard statistical techniques, will carry over into the estimation of output-specific unit costs and movement-specific variable costs. If it has not already done so, the Board should estimate and evaluate the scale of the total variances associated with each movement-specific cost estimate.

--A second test might be to use URCS to project the costs of all the movements of an entire railroad (or railroads) for an entire year and then to compare these projected expenditures to the actual expenditures which the railroad (or railroads) made. This type of projection is common technique used to test formal econometric cost models. It is an extension of the AAR's extrapolation of in-sample results for Norfolk Southern and Kansas City Southern Car Expense (CAREXP) expenditures.

--A third test might be to compare the estimates that URCS generates with other types of cost estimates produced by railroads themselves or by other experts. These might include straightforward accounting estimates, engineering cost estimates, operations research estimates (network models), and formal econometric estimates of the type recently done for the Board by Laurits R. Christensen Associates, Inc.[16] In a 2003 study for the Federal Railroad Administration, Professors Wesley.W. Wilson and John D. Bitzan compared URCS estimates to estimates generated by a translog (TL) cost function of the

[16] Laurits R. Christensen Associates, Inc., A Study of Competition in the U.S. Freight Railroad Industry and Analysis of Proposals that Might Enhance Competition, November 2008

type used by Christensen Associates. URCS estimates for chemical moves ranged from 1.078 cents per ton-mile to 3.59 cents while the TL estimates ranged from 0.42 cents to 1.6 cents. There were similar differences between the URCS estimates and the TL estimates for coal and farm movements.[17]

My second recommendation is that the Board also consider whether it is prudent to use URCS to regulate the rail industry. This recommendation is based less on my econometric work and more on my experience as a participant in the process that led to the Staggers Rail Act. In fact, the political impetus for Staggers did not come from railroads or from government officials but from a group of shipper representatives who formed a supportive the committee of rail shippers. These executives convinced Congress that they could manage their own industries (including automobiles and chemicals) better if they were able to deal directly with the railroads and not work through the Commission.

The key insight embodied in the Staggers Rail Act is that demand-side signals are as important as cost-side signals in allowing a complex network industry to evolve and to play a dynamic role in a modern economy. The Board has distinguished itself over the past 29 years by keeping this basic insight in mind and by emphasizing the importance of carrier-shipper negotiations. This is sometimes difficult. Shippers are no more eager to reveal their valuations than railroads are to reveal their costs. But the Board should evaluate whether a GPCS like URCS--albeit a re-tooled URCS—will increase or decrease the liklihood of productive negotiations. .

[17] Wesley W. Wilson and John D. Bitzan, "Costing Individual Railroad Movements,"Federal Railroad Administration, September 2003, pp. 31-32. It is not necessarily true that the TL can accurately project today's movement-specific costs. The TL which Wilson and Bitzan estimate has 94 right hand side variables and is estimated using 1983-1997 data. The 2007 Class I data base has seven observations.