



**U.S. Department of
Transportation**
Office of the Secretary
of Transportation

General Counsel

1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

January 16, 2009

Hon. Anne K. Quinlan
Acting Secretary
Surface Transportation Board
395 E Street, S.W.
Washington, D.C. 20423

Re: Ex Parte No. 680

Dear Secretary Quinlan:

The United States Department of Transportation submitted a summary of its comments in the above-referenced proceeding on December 19, 2008. At that time I indicated the Department would send a more detailed response to the Christensen Study in the near future. Enclosed is that response, as an Addendum to the original comments.

Pursuant to 49 C.F.R. 1117.1, the Department hereby requests that this Addendum be accepted out of time. Consideration of the additional information and recommendations contained therein will aid the Surface Transportation Board's assessment of policy options and so advance the public interest. Moreover, acceptance of this material will not prejudice any party.

Please contact me if you have any questions.

Respectfully,

A handwritten signature in cursive script that reads "Paul Samuel Smith".

PAUL SAMUEL SMITH
Senior Trial Attorney

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Enclosure

**Addendum to Comments of the
United States Department of Transportation**

**Study of Competition in the U.S. Freight Railroad Industry and Analysis of
Proposals that Might Enhance Competition**

STB Ex Parte No. 680

I. Introduction

In its filing of December 19, 2008, the U.S. Department of Transportation (the Department or DOT) submitted a summary of its comments to the Surface Transportation Board (STB or Board) on the *Study of Competition in the U.S. Freight Railroad Industry and Analysis of Proposals that Might Enhance Competition* (the Christensen Report or Study). At that time the Department indicated that it would provide a more extensive review of the Study. We now submit to the Board that review.

Furthermore, the Department strongly urges the Board to continue to invite comment on the Christensen Report. The Report and the comments in this docket should generate interest in additional economic analysis, but academics and others who may wish to pursue this course will require more time than has been or is usually allocated in such proceedings. An ongoing dialogue would be to everyone's benefit.

The Christensen Report is a very comprehensive review of many critical economic issues that influence railroad regulatory policies and it contains results that should inform future proposals to alter railroad regulation. The Department in general commends the authors of the Christensen Study. It is a balanced and thorough product, with all sides of the various debates fairly reviewed in light of the evidence. The findings of the Study appear to be supported by the analysis, and the analysis makes good use of the data available. The Report notes the need for more and better data in a number of areas in order to refine certain findings and to better evaluate the results of some of the more recent revisions in STB policy. The Department supports those recommendations.

The Christensen Report generally also acknowledges that railroad deregulation has been a success. It confirms the need for differential pricing and its findings concerning the overall pricing performance of the industry indicate that there is no evidence of abuse of market power. In addition, the Report shows that railroads have invested in additional capacity and improved efficiency over the time period studied (1986 – 2006).

That said, the Report documents that in recent years railroad costs and rates have increased while railroad productivity growth has declined. Due to capacity constraints, railroads have faced challenges serving their customers. In response to higher rates and deteriorating service, shippers have called for changes in regulation to better protect themselves from the railroads' market power, particularly as the industry appeared to approach revenue adequacy.

The Report should be the basis for analyzing various policy proposals that would alter the regulation of the railroad industry. Changes may be warranted, but should be considered only with careful attention to railroad industry economics, in order to ensure that such changes do not result in more harm than good and thereby thwart the goals Congress established for deregulation. The Department agrees with these conclusions of the Christensen Report.

The Department offers more specific comments below to highlight some of the information provided by the Report that supports the current regulatory framework. That framework is appropriate for an industry, like this one, with economies of density. The current framework allows the industry to earn sufficient profits to enable it to attract future infrastructure investment while also protecting shippers that lack competitive alternatives. Additionally, regulation should provide both incentives to reverse the railroad industry's productivity slowdown and the flexibility to adapt to changes in input prices, such as those associated with the recent substantial rate increases.

II. Data Quality and its Implications for Policy

One of the main findings in the Report relates to possible problems in calculating the variable cost component in a railroad's revenue-to-variable cost (R/VC) ratio.¹ The Study's authors find the use of variable cost data problematic because technological, operational, and infrastructure changes in the industry are not being effectively measured and the actual costs of shipments are not reflected in the R/VC measure. Vol. 2 at 11-25. DOT emphatically agrees and, as in previous proceedings, we urge the Board to review the Uniform Costing Rail System (URCS), the model that is currently used to estimate railroad regulatory costs. Furthermore, the recently adopted simplified standard for rail rate cases involving smaller rail rate disputes relies almost exclusively on R/VC ratio comparisons.² Quality data, therefore, is essential for effective and fair rate regulation.

The second data problem uncovered in the Report is also directly related to the measurement of costs -- the unreliability of current R/VC ratios to assess shipper captivity (i.e., the absence of transportation alternatives). R/VC ratios rely on the alignment of actual and measured costs, and as already noted, costs as currently measured in URCS do not align with actual costs. The Christensen Report notes that measurement difficulties are causing a high variability in R/VC ratio estimates and mentions, as an example, the changes observed in intermodal and chemical traffic data. The instability in these ratios, in turn, is believed to be the reason behind the higher number of movements traveling at R/VC ratios of more than 300 percent or less than 100 percent. *Id.* The

¹ The R/VC ratio is used to determine whether the STB has jurisdiction over a particular move; by statute STB jurisdiction begins with R/VC ratios greater than 180 percent (provided the move is not under contract or exempt).

² The three benchmark approach determines rate unreasonableness if R/VC ratios of the rate at issue falls outside a confidence interval around the mean of the "comparison" group. STB Ex Parte No. 646 (Sub-No. 1), *Simplified Standards for Rail Rate Cases*, (served September 5, 2007).

Christensen Report confirms that URCS needs to be reformulated because several of its assumptions are obsolete, due to technological advances in railroad operations and equipment since the adoption of URCS.

III. Structure of the Railroad Industry and Current Regulatory Framework

The Department now turns to the information obtained from the Christensen Report regarding the structure of the railroad industry and its regulation. The Report addresses how industry structure and economics lead to certain regulatory imperatives, such as differential pricing. The industry's economies of density require differential pricing to permit railroads to recover the full costs of their infrastructure and service. The current rail economic regulatory framework is appropriate for that structure and provides railroads with the flexibility necessary to set rates and recover total costs, while at the same time protecting captive shippers.

A. Economies of Density ³

The Report confirms the presence of economies of density in the railroad industry through both an extensive literature review and by estimating a variable cost function and testing for the existence of economies of density.

The literature review discusses previous academic findings about the industry's cost structure and productivity. Economic studies included in the review used various theoretical designs and econometric estimation methods to analyze costs and productivity for railroads since 1990. Despite using different assumptions, all of the studies provided strong evidence of economies of density and positive effects from deregulation in terms of increasing productivity.⁴ Vol. 1 at 4-17.

The Study's authors used some of these findings to estimate a cost function in order to corroborate the information provided by the literature review and to determine if there had been any changes in trends in the railroads' cost structure and investment levels. They later analyzed the impact of various "policy options" using the variables in the cost function. Vol. 2 at 9-1. Using 1987 through 2006 data from the STB R-1 reports,⁵ the

³ Railroads are a decreasing cost industry because they face high fixed and common costs to maintain an extensive network, including the costs of right-of-way acquisition, roadbed preparation, installation of track and signals, etc. This network must be in place before any freight can move. Once an initial investment has been made to provide a given level of capacity, per-unit costs decline as production increases up to capacity. As output increases to that point, per-unit fixed costs and common costs decrease because they are spread over more and more units. Conversely, as railroad traffic shrinks, fixed and common costs are spread over a smaller traffic base, resulting in higher costs per unit. As traffic expands beyond capacity, per-unit costs rise.

⁴ Studies referenced in Chapter 4 are: *Ivaldi and McCullough (2007)*, *Ivaldi and McCollough (2008)*, *Bitzan and Keeler (2003, 2007)*, and *Bitzan and Wilson (2007a, 2007b)*.

⁵ The STB R-1 reports contain Class I railroad financial and operating data. Each Class I railroad operating in the United States is required to file this information with the STB.

short run variable cost function is used to measure the economies of density by holding constant the capital stock and network size. Table 1 shows the three possible outcomes in this test, depending on how variable cost changes with output.

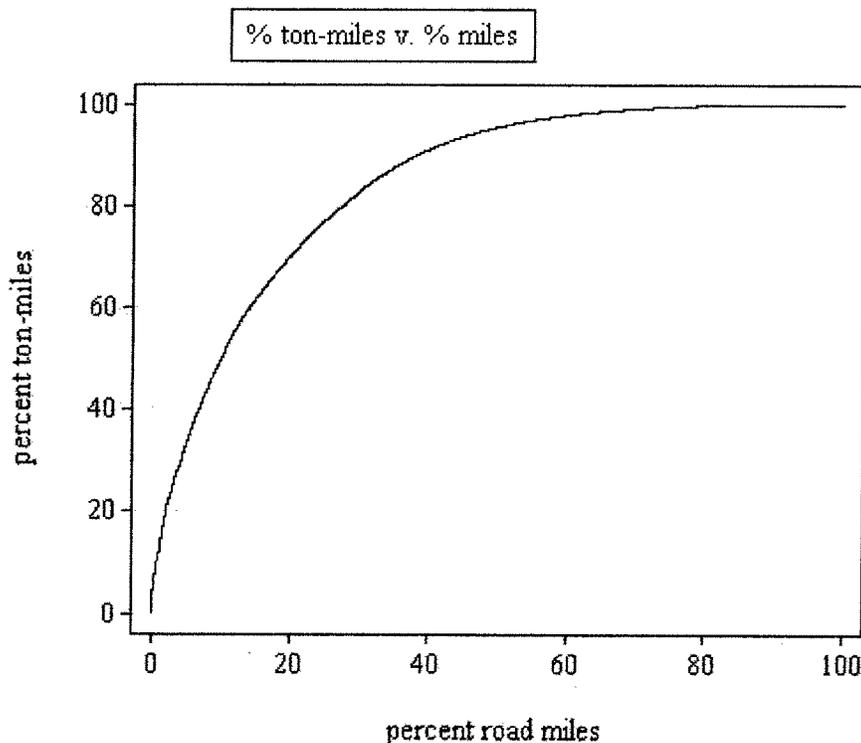
Table 1. - Economies of Density Matrix

If an increase in revenue ton-miles leads to:	Then, the railroad experiences:
variable cost decreases,	economies of density,
variable cost remaining constant,	constant return to density,
variable cost increases.	diseconomies of density.

Source: Christensen Report of Competition in the Railroad Industry, pp 9-10, 2008

The Christensen Report’s cost function analysis concludes that the Class I railroads are still subject to economies of density, meaning that their variable cost decreases as revenue ton-miles increase. The finding also indicates that for the industry overall, economies of density now result from increasing the number of shipments (i.e. greater ton-miles per mile of track) rather than from increasing the average length of haul of a shipment. Vol. 2 at 9-11. Such findings suggest that the network is being used more intensely. The Department’s own analysis of network usage also confirms freight movements are more concentrated over certain main lines. Figure 1 below shows the results of the DOT’s internal analysis on the concentration of freight movements over mainlines. For example, 80 percent of ton-miles travels on about 28 percent of the rail network.

Figure 1.-



Source: Federal Railroad Administration, Office of Policy, 2007

New legislative proposals affecting rail carriers' ability to price must take into account that the economies of density in the railroad industry require Class I carriers to adjust their pricing in order to be able to recover their variable (as well as fixed) costs. As the Christensen Report emphasizes;

The density measure has implications for revenue recovery. A railroad with economies of density cannot fully recover its variable cost by pricing ton-miles at short-run marginal cost, while a railroad experiencing diseconomies of density more than recovers its variable cost by pricing ton-miles at short-run marginal cost.

Vol. 2 at 9-11

Economies of density measures vary by railroad, with the major western railroads -- BNSF and UP -- appearing to have mild economies of density associated with the number of shipments and with very small economies of density arising from the average length of haul. *Id.* On the other hand, eastern railroads -- CSX and NS -- have larger economies of density from increasing the average length of haul than from increasing the number of shipments, although their density differentials with the western railroads have been shrinking over the past twenty years.

This finding is interesting in itself, but it is unclear whether it has any implications for a change in regulatory policy. The Department suggests the Board consider conducting further analysis of how the shift in economies of density from shipment to average length of haul may affect the ability of the railroad industry to recover its costs.

B. Economies of Scale

The variable cost function is also used to measure the economies of scale in the railroad industry. The total costs are measured in the long run by allowing all variables in the cost function to change. Table 2 shows how different scale economies vary with revenue ton-mile increases based on total cost behavior.

Table 2. - Economies of Scale Matrix

If an increase in revenue ton-miles leads to:	Then, the railroad experiences:
a less than proportional increase in total cost ,	economies of scale,
an increase in total cost of equal proportion,	constant returns to scale,
a more than proportional increase in total cost.	diseconomies of scale.

Source: *Christensen Study of Competition in the Railroad Industry, pp. 9-13, 2008*

The Report's authors find constant returns to scale in the railroad industry, while economies of scale have been exhausted for both average length of haul and number of shipments. DOT finds this result interesting and believes that the shift of the industry to constant returns to scale calls for additional research, to assess if this development suggests any regulatory changes.

C. Differential Pricing

The Christensen Report confirms that the railroad industry must be able to use differential pricing to fully recover costs. Under this framework, different customers face different rate levels based on their elasticity of demand (Ramsey pricing). As a consequence, for those customers with few shipping options, railroads are able to increase their markup over marginal costs and raise sufficient revenue to cover both variable and fixed costs. The Department fully supports this conclusion based on the information provided by the Study.

D. Revenue Adequacy

The STB is directed by Congress to oversee the industry in such a way that railroads become “revenue adequate,” and the Board evaluates each railroad for this purpose every year. Revenues are “adequate” when the return on invested capital (ROIC) equals the cost of capital (CC). In order to be revenue adequate, revenues in the railroad industry should provide:

1. support for 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;
2. attract and retain capital in amount adequate to provide a sound transportation system.⁶

As the Report indicates, historically the industry has only been able to reach that point sporadically. Vol. 2 at 10-6. The most recent data analyzed in the Christensen Study appear to confirm that railroads will likely achieve revenue adequacy more often in the near future (unless the current recession or other events prevent this). It is unclear at this time what this status, once consistently attained over some period, implies under current regulations and the outcome of rate cases. As explained below (Section V.C., Existing Railroad Economic Regulation), under present regulations the STB theoretically can limit rates and provide protection to captive shippers from unreasonable ratemaking practices based on the adequacy of a defendant carrier’s revenues. However, this constraint has never actually been used in a rail rate case, and DOT continues to urge the STB to clarify just how it will apply.

IV. Pricing Behavior, Productivity, and Cost Curves

The Report analyzes four rail rate indices to assess rail rate trends over the last 20 years. The analysis shows that there were stable rate levels until around the year 2000, at which time more rapid rate increases began. In later years (2004 through 2006) rate increases coincide with input price increases, a slowdown in productivity growth, and greater demand for rail transportation. While one would expect that railroads would respond to increasing demand through higher rates where possible, the effects of slower productivity

⁶ I.C.C. Ex Parte No. 347 (Sub-No. 1), *Coal Rate Guidelines*, page 17-18.

growth cannot be ignored here. The railroad industry is a “price taker” for its production inputs (e.g. fuel, labor) and like all businesses must cover these costs. Thus, rate increases due to higher input prices are ordinarily to be expected. However, until the recent slowdown in productivity growth, railroads were able to reduce or limit rate increases and pass along productivity gains to shippers (i.e., through lower rates and/or better service) despite increases in the cost of inputs. The Department believes that slower productivity growth limits railroads’ ability to pass along productivity gains through, for example, service adjusted rates. As a consequence, shippers are now experiencing higher rates for rail transportation. The Department believes that further research should be undertaken to reveal the reasons for the productivity slowdown. Such research could help guide the adoption of policies that will support increased productivity, which will ultimately enhance rail service and lower rates for shippers.

A. Industry Productivity Levels

The Report uses two indices to study the productivity growth of the industry. The first index references the productivity adjustment factor (PAF). This index measure is based on a revenue-weighted index of railroad ton-miles that takes into account different shipment measures such as weight, length of haul, car type, and service type. Information provided about the PAF illustrates that railroad productivity gains were significant through the 1990s until 2002 when productivity levels started to fall below the rate of input price growth.

The second index used is the Bureau of Labor Statistics Multifactor Productivity index (MFP), which measures productivity levels for line-haul rail service (not only Class 1s). This index can also be used to: 1) compare the railroad productivity against other sectors of the economy, 2) distinguish shipment characteristics, and 3) measure output in ton-miles. MFP growth for this decade has been significantly lower than previous years and, if compared with the rest of the economy, shows railroads are still experiencing a slightly higher but diminishing rate of productivity growth.

Thus, the railroad industry saw faster productivity gains than the general economy for most of the post-Staggers period (1980-2006). However, since 2002, the trend appears to be slowing and becoming more in line with the rest of the economy. The Department finds it noteworthy that the productivity growth rate differential between the industry and the general economy has now dropped to pre-Staggers Act levels. Vol.2 at 8-28. If, as Chapter 9 of the Study states, the productivity decline is a result of (temporarily disruptive) line and yard construction projects, such capital investment eventually will lead to increased capacity, then it is good news. If these declines, however, are mainly the result of other structural factors, further investigation is important in order to inform future regulatory or legislative proposals.

B. Importance of Productivity in Pricing

Rate trends are strongly affected by productivity. The Report’s analysis of the trends in the Unadjusted Rail Cost Adjustment Factor (RCAF-U) and the Adjusted Rail Cost

Adjustment Factor (RCAF-A), and PAF supports the conclusion that rates are increasing due to lower productivity growth, which can no longer offset input price increases. Lower productivity growth has not allowed the railroads to absorb the significant input price increases seen since 2004 in fuel, materials and supplies, and labor.

C. Railroad Industry Cost Curves

The Christensen Report developed estimates of the variable cost function both for individual railroads and the industry as a whole. The estimated function was then used to obtain the marginal cost of a revenue ton-mile over the period 1987-2006. The Report finds three distinct marginal cost trends in the industry: the first period is from 1987 to 1994, in which the industry enjoyed decreasing marginal cost; the second period is from 1994 to 2004, in which the railroads had nearly constant marginal cost; and the (admittedly short) third period is from 2004 to 2006, in which the railroad industry has begun to see increasing marginal costs. The authors list fuel prices, strong demand for rail services, and a “negative technical” change as the reasons for recent changes in marginal costs.

The Department is aware of fuel price increases and the strong demand for railroad services for these changes during that period, but the DOT finds the “negative technical change” component in the estimated function is an indicator of the slowdown in the industry’s productivity growth. As noted above, healthy productivity levels in the industry are key for a sustainable system with lower rates and improved service. It is important for the Board to understand what underlying changes have led to this “negative technical” result, so as to promote a robust railroad industry and avoid unintended detrimental consequences.

Similarly, the Report addresses average total cost (ATC), average variable cost (AVC), and average fixed cost (AFC). The three measures show a parallel trend to marginal cost with the exception of a onetime “bump” in the mid-nineties when AVC and ATC increased as a result of the consolidation in the railroad industry. Thereafter, both AVC and AFC trended downward until 2004 when that trend changed and cost started to increase. Cost curves are closely tied to the regulatory process and the STB must be able to determine if identified changes in AVC and AFC amount to just another “bump” in the timeline (e.g. increased capital investment), or if there is another factor arising in the industry structure that increases costs. More research is therefore needed to explain what factors are causing recent increases in the cost curves and what the implications might be for the regulation of the railroad industry.

D. Pricing Behavior

As noted earlier, railroad rate increases were moderate throughout the 80s and 90s until 2004, when shippers started to see substantial rate increases. In fact, the Report finds rate increases on the order of 7 to 8 percent per year since 2004. Christensen states that rail rates change based on three factors: input prices, productivity, and market structure (including supply and demand). We have addressed the first two, and now turn to the

Christensen Report's discussion of changes in market structure that affect railroad pricing behavior.

To assess the changes in market structure, the Report employs three "markup ratios" to determine pricing behavior. The first ratio reflects revenues as a ratio of marginal costs and shows that the railroads have actually exercised more market power during times of decreasing marginal cost. The second measure is an industry ratio of revenue per ton-mile over average variable costs for the period. This series has increased steadily over time but it always remains under the 180 percent jurisdictional threshold. The third and last markup ratio is the revenue-per-ton-mile to average cost ratio, which conveys information about railroad revenue adequacy. This ratio shows that railroads have rarely been revenue adequate with some exceptions -- the mid-nineties and in 2006.

The three pricing markup ratios in the Christensen Study provide evidence that the railroads are not exercising market power. The Department fully supports this finding based upon the information provided. The Christensen Study's analysis of the data indicates that railroads exercised more market power during periods of declining marginal costs and that there is no excess revenue being generated. Vol. 2 at 10-11. The Study also notes that the market power being exercised in the industry is consistent with (and required by) the presence of economies of density.

V. Policy Recommendations

A. Efficient Access Pricing For Rail Bottlenecks

The Christensen Report considers the likely economic impact of "open-access" reforms and concludes that shippers would be unlikely to gain significant benefit except, potentially, in cases of reciprocal switching. The Report notes that the total cost of any move over a given distance will increase if the traffic is diverted under an open-access regime. This is due to the need for an interchange between two railroads and the resulting shorter haul for each of them. Interchange between carriers is inherently costly and time-consuming. Since railroad costs per ton mile generally decline with length-of-haul, the sum of the costs for the two railroads is likely higher than the cost for a single line move. Report at 22-6.⁷ Because of length-of-haul economies, total cost increases as the share of the haul each of the railroads handles approaches 50%. Report at 22-7, Figure 22-2. Any benefit a shipper receives from open-access would necessarily be reduced by the extra cost incurred by the two carriers, assuming no change in distance. Since total cost of the shared move would be closest to the total cost of the incumbent railroad when the length-of-haul on the bottleneck is shortest, it follows that reciprocal switching has the greatest potential to provide shippers with meaningful benefits.

⁷ Thus, if the railroad now carrying the non-bottleneck segment has a significantly shorter route, total cost may decline.

As the Report notes:

For the proposed open-access policies to produce an overall gain in economic welfare, the effects of lower prices to shippers, increased output, and/or increased service quality due to competitive pressures must outweigh any increase in railroad costs. Furthermore, in a dynamic context, the economic assessment of the likely effects of these proposals must include the impacts on railroads' profitability and investment incentives.
Report at 22-12.

The Report contains a very informative presentation of the likely economic effects of various open-access proposals in Table 22-1. Report at 22-13. The Department agrees with this assessment of the potential consequences of open-access reforms.

B. Data Improvements

The Christensen Study points out problems in the data and warns the Board about the need for improvements if data is used as a measure of shipper captivity or in STB policy. The Report correctly observes that URCS as the "VC" input for the R/VC ratio is not economically appropriate, but DOT notes that that the more theoretically correct MC is not easily determined. However, the Department fully agrees that an R/VC ratio over 180 is not *per se* indicative of shipper captivity and market power abuse, as the Report points out, but may be a good "initial screening" for rate reasonableness, as it is used now. The continued use of URCS, however, should be based on a thorough assessment of the regulatory costing system, as DOT has recommended before.

The Christensen Report takes up the interesting issue raised in the Government Accountability Office report⁸ on the freight railroad industry, which noted the apparent reduction in shipments moving at rates over the 180 R/VC level, and the simultaneous growth in shipments moving at rates above 300 R/VC. While one hypothesis might be that the railroads are using market power to abuse those shippers with particularly inelastic demand, the Report notes that shipments at the other end of the spectrum -- very low R/VC ratios -- are also growing. It attributes at least some of these "outliers" to data reporting problems or to very specific service issues that either lower or raise costs, but are not captured by URCS. The implication is that the reasons for the very high or very low rates reflected in these outliers should be examined more carefully before conclusions are reached about railroad use or abuse of market power.

C. Existing Economic Regulation

Current railroad economic regulation properly recognizes the existence of captive shippers, and protects them from the lack of competition by limiting the railroads' ability to impose unreasonable rates through the Constrained Market Pricing (CMP) framework. The CMP framework uses many economic theories and concepts (differential pricing,

⁸ Government Accountability Office, *Freight Railroads: Industry Health Has Improved, but Concerns about Competition and Capacity Should Be Addressed*, GAO-07-94, October 6, 2006

contestable markets, Ramsey pricing, cost of capital, and return on invested capital), to establish a regulatory structure of four constraints. This framework provides shippers with alternatives (i.e. constraints) to examine the reasonableness of rates for regulated railroad traffic: 1) the revenue adequacy constraint, 2) management efficiency constraint, 3) phasing constraint, or 4) the stand-alone cost constraint (SAC). To date the SAC has been more widely used, and recently numerous revisions have been adopted to make it more “user-friendly” and accessible for all shippers. The Report does not reach any conclusions regarding the effectiveness or efficiency of the current methods used to resolve contested rate cases.

The Department supports the continued use of this framework since it provides protection to shippers that lack competitive options and accommodates the economic realities of the industry. DOT also sees a need for additional research to ensure continued access to regulatory relief for captive shippers.

Conclusions

The Department welcomes the Christensen Report and its findings as a fair and unbiased estimate of many critical factors in the debate over railroad regulation. DOT notes that the Report’s findings generally support the existing rail regulatory regime and indicate that, if changes are to be made, they should be made carefully and at the margins. DOT agrees with these conclusions. The Report also indicates areas where additional research is needed, and we believe encourage that research as well.

Finally, the Department urges the Board to invite additional comment on and analysis of the Christensen Report. A more thorough “peer review” should provide more confidence in its findings or reveal any latent errors.