UNITED STATES OF AMERICA

SURFACE TRANSPORTATION BOARD

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PUBLIC HEARING

IN THE MATTER OF:	:	**Docket No. EP 722**
	:	
RAILROAD REVENUE ADEQUACY &	:	**&**
PETITION OF THE WESTERN COAL	:	**EP 664**
LEAGUE TO INSTITUTE A RULEMAKING	:	**(Sub-No.2)**
PROCEEDING TO ABOLISH THE USE OF	:	
MULTI-STAGE DISCOUNTED CASH FLOW	:	
MODEL IN DETERMINING THE RAILROAD	:	
INDUSTRY'S COST OF EQUITY CAPITAL	:	
	:	

Thursday,
July 23, 2015

Surface Transportation Board
Suite 120
395 E Street, S.W.
Washington, D.C.

The above-entitled matter came on for hearing, pursuant to notice, at 9:30 a.m.

BEFORE:

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ANN D. BEGEMAN	**Vice Chairman**
DEB MILLER	**Commissioner**

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P-R-O-C-E-E-D-I-N-G-S

(9:32 a.m.)

MR. ELLIOTT: Good morning everyone. Why don't we reconvene the hearing? Just a few reminders, the lights are up here. When you see the yellow light it means that you have one minute left. When you see the red light that means your time is up. Obviously, we're fairly liberal on the red light, but we would like you to keep that mind, and if someone does start running over maybe the lawyer next to them can give them a little elbow just so he knows that that's happening.

Let's see what else do we have? If you haven't checked in already please check in up front, and what else? I just want to make sure I have all the emergency stuff, always very important, especially in a rail proceeding. Safety first, so if there is an evacuation necessary, please proceed through the back doors. There is a description of the evacuation procedures in the back. You'll head out of the

building through the front entrance that you came in. There is a place to convene on those instructions in the back.

Also a note regarding slide presentations, if you haven't put those in the record please do so within the next two days or provide two copies up front. Also, we are going to take another break for lunch today. Thank goodness we did that yesterday, because it was quite a long day. So we will probably do something similar to what we did yesterday, which would be after, well, we'll see how it plays out. But it might be after the AAR or Panel III. And lastly, I would like to thank staff very much. We don't realize how much work this takes to come up with our preparation, the set-up for the hearing. It's a lot of work. Staff has done an excellent job, and I really appreciate what they have done. We are very lucky here at the Board to have such excellent staff that fills in, because their normal job is not to set-up hearings. So we greatly appreciate that. So why

don't we bring up the first panel today, Western Coal and Arkansas Electric? Please begin any time you're ready.

MR. ROSENBERG: Good morning. I'm Robert Rosenburg of Sloven Loftus appearing on behalf of the Western Coal Traffic League, unfortunately accompanied by the League's two expert witnesses, Dr. Levine, the former Vice President of Economics and Finance for the AAR and Professor Triantis, who's the Dean of the Roger H. Smith School of Business at the University of Maryland. We greatly appreciate the Board's accommodating our expert witnesses' scheduling constraints. I expect you're more interested in hearing from our experts, but allow me to speak first.

The Board's stated objective is to measure the opportunity cost of capital. Done properly, the cost of capital should reflect no more than what is required to attract needed capital, or more significantly these days, retain that capital since the larger railroads have not

needed to raise equity from outside investors for nearly twenty-five years. Instead they've been sending cash out to equity holders through dividends and large stock buy-backs.

Investors invest based on expected returns. To measure those investor expectations one would logically use the same approach as the financial and investment community, since that is how investors formulate and express their expectations. That means the same model, the same inputs, the assumptions and to the extent possible, the same results. The Board has adopted this approach in Maine but with respect, less so in practice. The Board's hybrid methodology deviates substantially from prevailing financial practices and results. In other words our issues are less with the theory and more with the implementation. They are substantial.

CAPM long ago displaced MSDCF as the dominant cost of capital model, especially for firms such as railroads that are not subject to

pervasive economic regulation. The Ibbotson 1926 base risk premium overstates the returns that investors expect to achieve in a current environment and the basis on which they invest. A Blume data adjustment is also common. Failing to follow these norms has led to cost of capital values that substantially exceed industry benchmarks. The consequences include overstated ERCs costs and jurisdictional thresholds, unreasonable rates that are made to appear reasonable and immune from challenge and reductions in rate relief.

The overstatement incenses and enables railroads to increase their rates and reduce their volumes and limit their capacity investment. It also makes a very revenue-adequate industry appear less sustainable, as the industry has been earning its cost of capital over at least the past decade. Correcting these flaws is not difficult. What's needed is to describe the MSDCF and return to relying solely on the CAPM, as the Board did in 2005 and 2006,

but update that CAPM by using a more reasonable risk premium and a Blume or some other data adjustment that is tied less to the railroad's recent exploitation of their market power, and is more reflective of the economy as a whole.

The current MSDCF is particularly defective. As deployed it lacks transitions that should be fundamental. It depends heavily on growth rates that are unlikely to be accurate to begin with. The growth rates are being further tainted by the industry's substantial buy-backs. The fixes that the AAR discusses for the MSDCF only exacerbate the problems. For example, the AAR's buy-back solution to treat them as an additional distribution to stockholders involves a double count since the model already recognizes all available cash flow and then some.

CAPM is the most widely used approach even according to Professor Myers. The 2013 best practices survey among 19 leading firms, including UP, found that ninety percent use CAPM exclusively, and only one used the dividend

discount DCF approach. And that was just a back-up to the CAPM. The 2013 survey of the Association for Financial Professionals also showed DCF under five percent. Morningstar's own 2010 survey of subscribers showed less than twenty-five percent used DCF models. Morningstar itself doesn't use the MSDCF and no longer even publishes it. The MSDCF simply lacks the wide commercial acceptance that Board posited in 2009. CAPM is overwhelmingly preferred in the market.

It would be one thing if the MSDCF and CAPM produced similar results but they have not. To the extent the results may appear close in 2013 or '14, it's only because the Board's risk premium bated inputs lead to CAPM overstatement. The Board needs to establish which method is more credible, reliable and accepted. CAPM should be an easy choice. The AAR criticizes CAPM for being backwards-looking, but that relates to how it is applied. In particular, the AAR insists that the Board continue to use a backwards-looking, very dated and consequently overstated

historical risk premium that does not conform to current practice. The proper and common approach is to use a risk premium that reflects current expectations rather than long-term past performance.

One can get to a more reasonable, current and commonly accepted risk premium by several different paths. One can, like Canada, use a shorter historical period, such as fifty years, that better represents current conditions but still retains stability and accuracy. There are the various surveys that we present in our evidence, such as those by Graham Harvey, the Association for Financial Professionals and Professor Fernandez, that reflect what chief financial officers, academics and financial professionals currently utilize for the risk premium.

All of those surveys point to a risk premium of five percent or lower. Duff & Phelps also recommends five percent. And as of March this year, Morningstar released an article

showing that it's using a four point five percent risk premium. An alternative is to derive the premium that's implied by using market valuation and cash flow projections. The AAR replied, included this approach and derived a high premium, but only by using a single-stage DCF model, essentially equivalent to what the Board used prior to 2006 for capturing the railroad cost of equity and which Professor Myers included in his text book is an example of how not to calculate cost of capital.

A better approach that's employed by Professor Damodaran of the New York University's Stern School of Business, and shown posted on his website, is to use an MSDCF, and his approach includes buy-backs and cash flows, uses five years of earnings per share and projections and then a terminal growth rate. After adjusting for a twenty-year, risk-free rate he uses a ten year risk-free rate. His approach currently results in a risk premium of around five percent or less.

All these paths confirm that the 1926-

based risk premium is not the industry norm. The historical risk premium may actually measure the past but investors look to the future. Using a 1926-based risk premium at seven percent when investors expect a premium of five percent or less overstates the incentive needed to attract investment. It gives investors or the railroads a windfall return at the expense of captive shippers. If the Board wants to follow the industry norm, which is what it previously said it wants to do, it should modify its approach. Likewise, a Blume adjustment to the data is generally as being more reflective of the long-term prospective trends, although something more direct or substantial may make more sense, especially given BNFS's status and the evidence that the high datas in recent years have resulted from the exercise of railroad market power rather than any increase in inherent risk.

Finally, we have evidence from a variety of respected sources, showing that the results of these changes, and not just the

underlying methods and inputs, track what the financial investment community perceives. The railroads didn't submit any evidence of that sort, although they logically have full access to all of it. Their silence is conspicuous. Let me turn to some additional questions in the Board's notice.

The League opposes the use of replacement costs for the reasons presented yesterday. But if replacement costs are utilized, then it becomes necessary to use a rail cost of capital in order to avoid a double count of inflation. So you would have gone from using two things that are reasonably knowable, meaning the net book value of assets and the nominal cost of capital, to two things that are difficult to determine, are not regularly calculated and so utilized, meaning the replacement costs of the rail networks and the rail cost of capital, when the ultimate result, if done correctly, probably shouldn't change. You would just be making life difficult for yourselves for no good reason that

we can discern.

Let me also note a few years ago that the League proposed that the Board revise its determination of the railroad debt equity capital structure to treat operating leases as debt in order to conform with standard practice within the financial community. The AAR proposed, and the Board rejected the proposal on the grounds that it was too difficult and was also inconsistent with GAP, generally accepted accounting principles, even though the cost of capital isn't even part of GAP. Essentially our proposal didn't get the time of day. Now replacement costs are extremely difficult, they are not consistent with GAP and they are not consistent with standard financial practice. Yet the Board is asking about the replacement cost and not capital structure. Symmetry and balance seem to be missing. Also, if the Board is still insistent on considering an MSDCF approach, we would suggest you look again at the model that the League proposed seven years ago, which turns

out to be very similar to what appears to be the Browder (phonetic) Group standard model, defining cash flows as dividends plus buy-backs and begin to phase them to the terminal growth rate by year six.

In addition you should adjust the BPS growth rates to reflect the EPS growth rates to reflect buy-backs, but again we continue to see no reason to include the MSDCF as part of some sort of average. Finally, the AAR and its required comments address at some length what various League members, the various investor-owned utility or IOU members had said in their own rate cases and to the State Public Utility Commissions and at FIRC. Since the AAR's oral presentation may also dwell on such things and we may not otherwise have a chance to respond, let me note three points.

First, it's not surprising that regulated entities seek higher return on equities or ROEs, or that their customers seek lower ROEs. That's the sort of thing that makes the world go

around. The League is composed of not only investor-owned utilities but also public power and electric cooperative utilities. You shouldn't be surprised if they don't see everything the same way. In particular, the Public Power and Coop Utilities have been the leaders at FIRC in seeking lower ROEs for the IOUs. In that regard we would note that the Browder said a number of things in recent years that support the League's position, and a number of those matters are noted in the League's required comments.

Second, rather than focus on what parties have or haven't said elsewhere, it's more instructive to focus on what regulators have actually done. The ROEs for electric utilities at FIRC and at State Public Utility Commissions are now generally around ten percent or lower, but those are leashed to be considered in conjunction with the utilities' capital structures, which are generally around 50/50 equity and debt. If you will put up briefly with

some relatively quick math, you take fifty percent equity at a ten percent cost of equity, put that past an equity component of five percent. If you take fifty percent debt at a five percent cost of debt, multiply the two together, that's a two point five percent cost for the debt component. If you add the two together you get a total-weighted average cost capital of seven point five percent. If you wanted to use that for the railroads we probably wouldn't complain, but note that seven point five percent isn't unrealistic.

Professor Demodaran, on his website, comes in slightly lower for the railroad industry, and that's even removing the tax shield for debt. And that's without treating operating leases as debt per standard financial practice.

Third, where there is extensive, pervasive regulation, as with electric utilities, a MSDCF may actually make sense. Rates are based on costs not the market. There is little if any rate discrimination or differential or Ramsey

pricing. Investors focus on dividends not depreciation, and buy-backs are rare. Under these circumstances, revenues and costs are more predictable. Analysts' projections may be reasonably accurate, and dividends and stock prices may be stable, and the DCF analysis may work. The Browder Group said as much in its report to Canada, but that sort of cost-based, nondiscriminatory rate setting amounts to exactly the sort of regulation that is an afirma to the railroads as you heard at length yesterday.

The reasons that the DCF may work for utilities are the same reason it isn't used for unregulated sectors, and that's why it shouldn't be used for the railroads. With that I'll thank you for listening to me, and I'll ask our experts to speak. Since Dr. Levine has the most pressing scheduling constraint I'll ask him to go first.

DR. LEVINE: Thank you. Thank you and good morning. You can probably tell by looking at me I've been around a long time and my education in the railroad industry started some

fifty years ago when I took an undergraduate course at the University of Pittsburgh called "The Railroad Problem." And you can imagine what it was and remained for quite a while. It was a study of an iconic industry that has both a public interest and a public responsibility that was heading toward financial insolvency. That persisted for many years during my first employment with the New York Central Railroad, where I was the Assistant Director of Pricing Research. I took a position with the Department of Transportation, working in the Secretary's office as a Senior Economist, came to the Interstate Commerce Commission as the Director of Economic Research, and eventually became a Vice President of Economics and Finance at the AAR, where for many of those years the railroad problem still persisted. But as we all know, things are really changed. And might I say, during those years when the Interstate Commerce Commission adopted the DCF model, credibility was not an issue. Everybody knew that the rail

return on investment would always be below the cost of capital. And so as we used to say in the railroad industry, railroad earnings are woefully inadequate. And "woefully inadequate" was just one word.

But in more recent years, as we well know, there's been a great turnaround in the railroad industry. And I just want to go out on a tangent for a second and tell you why, because it has some meaning for the cost of capital and for what we all heard yesterday. It started in 1970 when the railroad industry divorced passenger service from its offerentia. That was costing freight railroads an estimated one billion dollars a year. So with government help that cost was eliminated. And then we all know that in the 1970s, through legislation, bankrupt railroads in both the Midwest and in the East, and their bankrupt railroads are reorganized. Again, with much government assistance, as it should be because that's the nature of the industry. We got the 1980 and the Staggers Act.

There was a DAAR at the time and worked on that, and the Staggers Act, I think people have a misconception as to the impact of the Staggers Act on the industry. In my mind, at least, there were two provisions that really were responsible for a substantial portion of the railroad gains.

First of all there was the adoption of the rail-cost adjustment factor, where railroads could increase rates based on the increases in that factor without interference from the regulatory authority. I know all about that because I was the one that designed the rail-cost adjustment factor. And I had a choice to either think of it as a cost factor or as an inflation factor, because the wording of the Staggers Act was inflationary costs. I opt for the inflation factor so that railroads could raise rates based on inflation not on cost. And there's a huge difference as we know. If labor rates go up three percent but you eliminate four percent of the labor force, you've actually reduced your cost even though you had an inflationary cost

increase. And that gap has remained for thirty-five years where the inflation factor, unadjusted for productivity, has accelerated while railroads have decreased.

And the second factor of the Staggers Act I think was very important was the allowance of contract rates as existed in Canada for many years. And then finally, and I think probably even of greatest importance in terms of the resurgence of railroads, has been the consolidation in the industry. When I started at the AAR in 1979, I think there were 39 Class I railroads, now four dominate the industry. What happened during that time? There has been a huge reduction in the labor force, hundreds of thousands of employees, tens of thousands of miles of track have been eliminated, tens of thousands of grade crossings have been eliminated, and there's even been a shift in investment in rolling stock, from the railroad's, the third-party owners. So while the Staggers Act was important, it's not the sole reason why

railroads have had these insurgents. And the point here is that a sound cost of capital methodology is not a threat to the railroad industry. It's not a threat to the Staggers Act, and it would not change the industry's strong market position. The reason why railroads are in such a strong market position is because they're in a strong market position.

And when I heard yesterday how an accurate revenue-adequacy determination would be in conflict with the Staggers Act, I thought of the analogy of the cost of capital. I don't think the Staggers Act is threatened by either a sound revenue-adequacy determination or an accurate cost-of-capital calculation. Let me just mention a few changes in the railroad that affect the cost of capital. We talked about the increased concentration in the industry. Four railroads dominate the industry as we all know, and on ninety percent of the traffic, and probably control close to a hundred percent. In other words, they're just too big and too

important to fail. So with implicit federal government backing I think that the risk of investing in railroads is even lower than the calculated betas.

Furthermore, only three of these railroads are publicly traded. As we know, the fourth is owned by Berkshire Hathaway. In essence, there is no cost of capital for the Burlington Northern Santé Fe. A cost of capital of that railroad is actually the cost of capital of Berkshire Hathaway, which is often below one point zero. That has to be taken in consideration when developing a cost-of-capital methodology. Since the UP in many ways parallels the operations and finances of the BNSF and its beta, its risk factor has been declining to about 1.0, this means that two-thirds of the railroad industry have a beta that is similar to the market as a whole, 1.0. It's a major factor in determining the cost-of-capital methodology, and it lends itself more to a CAPM than it does to a DCF model.

In my opening remarks I showed that the, I'm going to call it the DCF. I just don't want to say MSDCF. The DCF results on average over the past six years with 32 percent above the CAPM results. Well, you can argue, I guess, that the CAPM results were too low, but I showed that all three components of that CAPM were actually higher than they should have been. First, the Board used, in its methodology, twenty-year bond yields, where if you used ten-year bond yields, and they're used elsewhere, would give you a lower rate. And the railroads themselves by the way, when it comes to risk-free rates, if you look at their annual reports and their proxy statement, they develop risk-free rates based on the award of stock options to their executives. And that's also lower than the 20-year bond rate.

Then for the beta, the second portion of the CAPM, the BNSF beta was excluded, thereby overstating the cost of capital. And finally, in regard to market risk premium, as Robert said, the Board used returns back to 1926, which I

think are inappropriate, because it was before the computer age, before the high-tech age. And I think a shorter time is needed, but still you need stability and you need a length of time. And I would recommend a fifty-year period be used. Still, in spite of those three overages, the record is clear. The DCF approach greatly exceeded the CAPM approach.

I also discussed in my opening statement why the CAPM is superior to the DCF. It reveals the choices through prospective investors. It goes to the primary risk-reward relationship that's at the heart of cost-of-equity capital. It uses readily available and comprehensive data published by experts, Wall Street analysts, financial firms throughout the country, there are many choices. Its components can be benchmarked against available standards. It's applicable to an industry with few major firms, like the railroads with four and only three that are publicly traded. And after much analysis it was adopted by the railroad's

commission in Canada, the Canadian Transportation Agency, as the sole determinate of the cost of capital. It works in Canada and it could work here.

For this hearing the Board asked five questions, which I'll briefly respond to. First it asks how to correct an MSDCF bias. Well it's kind of obvious to me. Get rid of it and rely on the CAPM. The growth rates, I think, in the DCF model are overly optimistic. I felt that way when I was at the AAR. They're kind of frivolous. I used to say at the AAR, well the Wall Street analysts who I talk to all the time are going to come up with a 15 percent growth rate no matter what the operating conditions in the railroad industry. You can plug in that growth rate and figure out the cost of capital. And I asked somebody else, how'd you come up with rate? And it was less than scientific. So I believe that a CAPM is the way to go.

The Board also asked for comments in using a beta of 1.0. Well two-thirds of the

industry is already at 1.0. You know, in the railroad industry, in many ways the business of the economy is a whole. When I was at the association, Alan Greenspan's office, the Treasury Department, used to call weekly for the railroad weekly traffic reports, because it was a concurrent economic indicator, and now with railroads attracting all this oil traffic and a huge increase in intermodal traffic, it's more like the economy than ever. So at a minimum, I think two-thirds of the risk factor in the CAPM, the beta, should be 1.0, and that a Blume adjustment should be made for the other one-third. But I would not be against just a market CAPM for the railroad industry with a beta of one.

Third, the Board asked about the appropriate market risk premium. I think, once again, using the base year of 1926 is inappropriate given technology in a computer age. I would recommend a fifty-year period. I would not object to even a shorter time frame.

Fourth, the Board asked if there's a need for more observations in the cost of equity calculation. Well there's only three now. So the obvious answer is yes. And how do you get those observations? You got to a CAPM and you rely on some larger array of companies like the S&P 500.

Finally, the Board asked about the appropriateness of replacement costs. I think that's been covered quite a bit. I look at this whole proposal of replacement costs as a distraction. It's sort of like having a brother-in-law who's out of work, kind of shows up constantly and there's no value to it. The ICC tried this --- I wasn't around --- in 1913 and kept it for twenty years. Billions of dollars were spent. You can go into the library here and look at all those old evaluation reports. The asset values changed the day after they were valued. The railroad spent a lot of money. It was thrown out and it was never any use for those evaluation reports at all, just billions of

dollars wasted.

Finally, I think that the board, when you consider the methodology here, you should think about benchmarking the results, sort of like a sanity test. I think there are two ways. You know the AAR quoted Professor Stuart Myer, who said only a fool ignores useful information. I agree with that. And there's some useful information that the Board, I think, can use to supplement your cost-of-capital calculation. For instance, the annual reports to shareholders, not the R1's and the proxy reports have a lot of information. In fact, in those reports the railroads reveal what their cost of capital is. They use peer-group analysis. It's almost like a comparative earnings test. Nineteen similar companies or companies with similar financial characteristics are compared against an array of financial indicators. And this is the way executives are paid. Eighty-five percent of executive pay in the railroad industry is based on long-term incentives rather than salary. And

the railroads state in these reports that they're aligning the interest of their shareholders with a long-term executive pay of their executives. Since in some years railroad earnings exceed what their peer groups earn, they've earned their cost of capital by osmosis.

In fact, the Union Pacific Railroad over the period 1911 to 1913 was first in the composite of all of those financial indicators relative to the peer group. Oh, I'm sorry. Did I say 19? Twenty, I'm sorry. That's a senior moment. And finally I think that you shouldn't ignore the market cost of equity capital. It's kind of easy to calculate because all the data is out there. You have a beta of one, you got a risk-free return, you can argue about you used twenty-year notes or ten-year notes, but let's assume it's four percent. In a risk-free return that's published by several firms, it could be four and a half percent. So there's an eight and a half percent return on equity as a standard from which the Board can use as a point of

deportation. You can ask yourself why should the railroads be any different than the market cost of equity capital.

The bottom line is, at least in my opinion, the DCF approach just doesn't suit an industry with three observations. I didn't think it did when I worked in the industry, but it didn't matter. It didn't matter what the result was. Now it matters. The CAPM works in Canada and I think it should be the sole determination of a cost-of-equity capital here. Thank you for your time.

MR. TRIANTIS: Good morning. I'm Alex Triantis. I'm the Dean of the Robert H. Smith School of Business at the University of Maryland. I've been a finance professor for over 25 years, and in my research, teaching and consulting I've focused on the area of corporate finance. Particularly on the evaluation of corporate investments, which involves a determination of companies cost of capital. I'd like to emphasize in my remarks today, my views provided in earlier

written submissions, that the Surface Transportation Board should rely simply on the CAPM to estimate the cost of equity, but with an appropriately adjusted beta and with an MRP which is more reflective of current market conditions.

The current use of the MSDCF model, alongside the CAPM, particularly the way in which the MSDCF model is applied, introduces bias into the cost-of-equity determination. Let me highlight first why the CAPM should be used. It is not only transparent and based on strong conceptual underpinnings, but it is also by far the most commonly used method in practice. This is confirmed by several widely-cited studies of corporate finance professionals which also find that very few firms back up the cost of equity from a DCF model. In fact, in comparing survey results over time, it appears that the DCF method has fallen more out of favor as the CAPM has become more widely adopted. Also, companies that were selected by peers to be best in class for their practice of financial management are even

more likely to use the CAPM than alternative models to compute the cost of equity.

The most recent study of these practices that I've seen, conducted by the Association for Financial Professionals in 2013, finds that eight-five percent of organizations use the CAPM to estimate their cost of equity. While only four percent of companies back out of cost of equity from the dividend-discount model. Thus to the extent that the STB's objective is to track the practices of the financial community, the STB should utilize the CAPM. Furthermore, best practices of how to use the CAPM point to using an adjusted beta and an MRP reflecting a shorter historical time period than the current 1926 to present MRP that is being employed by the STB.

Regarding the former, it is common in practice to use an adjusted beta. This is also called a Blume beta, based on Blume's findings over forty years ago that betas tend to revert to a mean of one. So this gives the historical beta

a weighting of two-thirds, and the average market beta of one, a weight of one-third. This weighting procedure is used by Bloomberg. It is used by Value Line and the 2013 survey of the Association for Financial Professionals confirms the widespread use of the Blume adjustment. If the STB's objective is to reflect the common practices of the investment community, then the STB should include such an adjustment. This adjustment should also contribute to stability in the STB's results over time, since this weighting procedure results in less year-to-year variation in beta estimates. It will lead to a beta that will be closer to one, which seems consistent with the nature of the railroad industry given its relatively correlation with the overall economy.

Regarding the market risk premium or MRP, a fifty-year period of estimating the historical MRP seems most reasonable. The estimation era of beta decreased with the square root of the number of observations points. This

means that adding incremental years after a while has diminishing returns in terms of statistical accuracy. In fact, any advantage from having more time-series data becomes outweighed by the disadvantages of extending too far back in history to time periods that are not really representative of current market conditions.

For instance, stock markets have evolved over time to be more liquid and more transparent, and this lowers the premium investors require to invest in stocks. Investors are now also better able to mitigate risk, including through better diversification using various types of funds that didn't exist fifty years ago. This too means that investors will require a lower risk premium on stocks now than decades ago. These considerations support why many believe that the market risk premium is lower now than it was several decades ago. The equity risk premium puzzle, which stipulates that historical measures of MRP are upwardly biased forecasts of future MRPs, is a well-known

phenomenon in the finance academic literature. Using fifty years' worth of historical data, the MRP estimated by Ibbotson, based on the arithmetic mean of returns is 4.7 percent. This figure is consistent with, if not somewhat higher than, that currently used by financial professional such as CFOs. The MRP from the Graham Harvey CFO Magazine Survey of CFOs has fluctuated over the past fifteen years in the 2.4 to 4.6 percent range, with an average across all quarters of 3.5 percent, with the most recent MRP average estimate at 4.5 percent. By the way, this MRP is based on the excess return over ten-year Treasury bond rates. So one would expect a lower MRP if measured relative to the twenty-year T bond rate as currently used by the STB. In the 2013 AFP survey, the MRPs used by financial professionals averaged somewhere between four to five percent. Again, this is consistent with a fifty-year historical MRP estimate.

So now let me turn to the MSDCF approach to estimating the cost of equity. The

underlying concept behind DCF valuation is sound. Using a DCF model for evaluation, given a set of inputs including the discount rate, is standard fare. However, what the STB seems to do is to use a simplified version of the DCF model in order to back out one single input, mainly the discount rate. My general concern with his approach is that when you're trying to back out a particular input variable from a model that has many input variables you better have very high confidence in the other input assumptions. Otherwise, you're essentially taking all the errors in the other input variable assumptions and then channeling these errors into the one estimate, the estimate of the single variable that is being backed out, namely the discount rate in this case.

For instance, overestimating growth rates perhaps based on an assumption that current growth rates in an industry will be sustained for a long period of time will result in overestimate of the implied discount rate. While one might

hope that maybe the errors in the other input estimates will somehow cancel out, this is not the case for reasons I will expand on soon. As a short passing comment, it is interesting that many practitioners back out growth rates from a DCF model rather than the discount rate. This implies that they believe that the growth rate is harder to estimate than the discount rate for which they simply use the CAPM.

Using the MSDCF model to back out the discount rate makes very strong assumptions that the MSDCF model is what investors use to value stocks, and that we know what growth rates and other estimates they are using in their evaluations. I'll quickly enumerate some of the failings of this approach. First, rather than using careful forecast that cash flows from each year in evaluation time line, the approach takes to shortcut of assuming one growth rate for the first five years and another for the subsequent five years. While this three-stage DCF approach of having two stages followed by a final terminal

stage certainly simplifies the analysis, it is not one that stock analysts or companies would typically use to carefully evaluate an investment.

Second, the first stage growth rate for stock is based on the median of five-year EPS growth estimates provided by a few of the stock analysts covering the stock. The fact that these growth estimates typically vary widely across analysts, and that many stock analysts do not even provide long-term growth estimates given the difficulty in estimating them, should give one pause when considering the lack of reliability in these estimates.

Third, EPS growth is boosted by the effect of stock repurchases. Simultaneous adjustments to the cash flow that have been proposed appear to double count cash flow available to shareholders rather than truly addressing this problem. Fourth, the assumption surrounding the changes in growth rates are unrealistic. Since the second-stage growth rate

reflects the simple average of the median of the growth rate estimates for the individual carriers from the first five-year stage, if companies in an industry, especially small ones, are expected to experience a high growth rate for the next few years, the model then expects the industry to sustain such a high growth rate for the next ten years, which seems quite unreasonable. Furthermore, allowing a single growth rate in the second stage that just drops suddenly at the terminal date seems quite unrealistic. An appropriately structured transition with a growth rate is phased in gradually toward the terminal growth is preferable.

Fifth, the type of cash flow earning metric that is used to calculate the terminal value differs significantly from that used in the first ten years. And it is upward biased, which means that too high of a discount rate will come out of the analysis. These errors or deficiencies in using the MSDCF model to back out a company's cost of equity highlight the risk in

relying on such an approach. While the MSDCF may appear to have the appeal of being able to potentially capture future expectations of the cost of equity, the application of this approach is fraught with error and that's unreliable. The issues raised above help to explain why the cost of equity estimates obtained using the MSDCF in recent years by the STB have been systematically higher than those based on the traditional CAPM approach.

In summary, while it may be enticing to try to try to hedge one's estimate by using multiple models, this only works if the models being used are appropriately applied and properly suited for this purpose. The MSDCF model was not built for estimating discount rates. It's a valuation model, and is being reverse-engineered to try to get a discount rate but without the necessary reliability in all the other input variables, which are difficult to estimate properly. The MSDCF discount rates backed out appear to be erroneously high and inconsistent

with those from the CAPM and the belief of CFOs. They are also highly variable over time, which further introduces more risk into the rate-setting process. In contract, the CAPM is designed to estimate the cost of equity. It is very widely used in practice for this specific purpose. But best practices should be employed here, including using an adjusted beta and using a reasonable MRP that's based on the past fifty years of market data, which also seems supported by surveys of the very people that are making investment decisions in practice. Thank you for the opportunity to express these views today.

MR. NELSON: Good morning Chairman Elliott, Vice Chairman Begeman and Commissioner Miller. I am Mike Nelson, Transportation Consultant for Arkansas Electric Cooperative. With me is Eric Von Salzen, AECC's outside counsel. I'll be presenting for AECC today and Eric will chip in if any legal issues come up along the way.

Yesterday we talked about information

showing that functional revenue adequacy was achieved even before it was indicated by the Boyd's methodology. The Christianson study referenced dates like 1995 for the use of optimal amounts of capital by the railroads, and 2001 for achievement of revenue adequacy under the CAPM standard. The large merger premiums started in the mid- to late 1990s as well. So you therefore have before you considerable evidence, some of it in hindsight, but still authoritative, that the Board's methodology has lagged somewhat in detecting the achievement of revenue adequacy. This demonstrates the need for the review now being undertaken.

The AECC's involvement in the Board's cost-of-capital methodology dates back approximately eight years to the time of the Board's initial adoption of CAPM and its subsequent incorporation of MSDCF. From the outset we've tried to look carefully at the issues that may come up when those financial analysis tools, which are discussed in the

literature and applied in other industries, are applied to railroads. Railroads typically are able to wield large amounts of market power relative to firms in most other industries, and their earnings may vary over time in ways generally not seen in other industries due to factors that affect their exercise of market power. AECC therefore has focused largely on the market power issue and the way it may affect the result to produce by CAPM and MSDCF.

With CAPM we identified the issue that the methodology interprets differences and earnings as differences in risk, but includes no method to distinguish between changes and earnings that reflect true changes and risks from changes that result from changes in the exercise of market power. This led directly to a concern that changes in the exercise of market power achieved by the rail industry could be misinterpreted by the CAPM model as changes and risks that would be reflected in the estimated beta coefficient and thereby impact the estimated

cost of capital. When the Board first was looking at introducing CAPM, AAR's witnesses, including Stuart Myers, an internationally-recognized expert in finance, concluded that the rail industry was less risky than a market portfolio and therefore had a beta value of less than one. That was consistent with AECC's understanding that the Board's ability to meter the railroad exercise of market power provides a potential cushion against earnings reductions that generally is not available in other industries. So we basically agreed with AAR that the true risk of the rail industry was low, but we cautioned the Board that if over time CAPM values started to increase and produce a higher estimated cost of capital, the Board should look closely at the possibility that that was an artifact of an increasing exercise of market power.

The fact that Dr. Villadsen has replicated the growth and measured beta values does nothing to change this. Stu Myers knew what

it meant to tell the Board that the railroad beta was 0.8, and the Board has been provided no credible basis for believing that the entire risk profile of the industry has changed. So rail parties have tried to dismiss AECC's work as a result driven, but they apparently haven't read our material very closely because we also put in the writing that the converse would be true, that if something happened to curtail the rail industry's exercise of market power, CAPM would likely would estimate a lower beta and produce an artificially low estimate of the rail industry cost of capital. We left it as an empirical issue that would be determined by the numbers.

In our opening filing we showed that beta had shown a pattern of systematic increases since the time the Board first implemented CAPM. We also showed how this correlated with the increased exercise of market power by railroads. Indeed for all the rhetoric that has come from the railroads regarding their needs for capacity investment to support future traffic growth, the

fact is that their overall traffic volumes have been basically flat over a period of many years, and most of their growth in earnings has resulted from price increases that have increased the margin over cost for each unit of traffic moved. It would be hard to imagine a clearer demonstration of the exercise of real market power has increased in recent years and that it has had the artificial impact on measured datas that we've been discussing.

AECC's recommendation on this was that the Board should cease its attempt to measure railroad specific betas and should use the Stu Myers testimony or some similar value that reflects the below-average true risk of the railroad industry. Alternatively, the Board should use the market level of risk by applying a beta factor of 1.0. AECC views MSDCF for railroads as even more problematic than using CAPM. As discussed in our filings, one of the most profound problems is that as applied it contains no provision to insure conformity

between the earnings projections upon which it is based, and the Board's obligation to curtail earnings above the revenue-adequacy level that Mr. Von Salzen discussed yesterday.

As a result, even when earnings have been above the revenue-adequacy level, the values used by the Board in the first and second stages of MSDCF have been based on projections that such earnings will experience robust further growth. In other words, they're based on an implicit assumption that the Board will take no action to implement the finding of the coal rate guidelines, that carriers are not entitled to receive earnings above the revenue-adequacy level. Mr. Von Salzen has informed me that this would violate the statute.

We also have identified what I would view as somewhat of a math error in the third stage of MSDCF. Again, with reference to the coal rate guidelines, it would not be legitimate to assume long-term earnings growth in excess of the actual growth rate in the railroad's net

investment base. This is because the permissible level of earnings each year is computed directly from that value and not from any consideration related to general economic growth. Indeed, because of the natural monopoly characteristics of railroads, the Board's expectation should be that needed rail investment will increase less rapidly than the growth rate of the economy as a whole, and we've presented data showing that this is in fact the case.

The problems with MSDCF are so profound that we support WCDL's conclusion that it should be removed. In the event that the Board decides that retention of some form of MSDCF is needed, we've presented the somewhat draconian changes that would be required for MSDCF to conform to the coal rate guidelines. The Board in the past has justified using the two methodologies on the ground that this produces a more accurate result that is less prone to year-to-year fluctuations. However, the deficiencies in the two models basically guarantee that their

average will be inaccurate. And I'm sorry to be giving you more thermometers, but I composed the following examples before yesterday's hearing. If you have a swimming pool where the actual water temperature is eighty degrees and pool thermometers where one measures high by five degrees and one measures high by ten degrees you get a more accurate reading from the one that reads eighty-five than by averaging it with the one that reads ninety. From the fact that MSDCF has produced higher values than CAPM for the entire duration of the time both models have been in use, it is a virtual certainty that they're not measuring the same phenomenon. And given that both are yielding results far above the market level indicated by whatever reasonable values used for the risk-free rate and market risk premium, they should be thought of like the thermometers. Picking the one that is least inaccurate and improving its accuracy is better than averaging the two flawed values.

This discussion is intended to form

AECC's response to the Board's questions regarding Ex Parte 664, MSDCF and the beta issues in CAPM. AECC defers to WCTL regarding the MRP value in CAPM. I also have responses to the Board's questions regarding the limited size of the sample used in the Board's CAPM analysis and the possible need for changes in the Board's determination of return on investment.

On the sample size issue, data for all of BNSF and for the U.S. operations of CPNCN are included from the analysis altogether on the basis of their non-railroad or foreign parent companies. In the case of BNSF this leads to understatement of the true industry cost of capital because it excludes the availability to BNSF of low-cost capital from its corporate parent. And I think WCPL also referenced that earlier. Since the time of BNSF's acquisition by Berkshire Hathaway, BNSF alone has accounted for over forty-eight percent of the increase in total net investment made by the entire Class I rail industry. While Dr. Villadsen has argued that

such things don't matter, the evidence appears to say otherwise. In their advocacy of using replacement cost in revenue adequacy, the railroads have overlooked a series of breaking problems with them after they proposed while mischaracterizing important features of the historical cost method. First of all, as Mr. Rosenberg mentioned, using replacement costs in the return on investment methodology would require estimation of a real cost of capital to avoid double counting the effects of inflation. This was found by the ICC to be one of three key practical difficulties that precluded the use of replacement costs when the ICC investigated that approach in the 1980's. While the railroads now cite the ability to estimate replacement costs in SAT cases and the theoretical benefits of using replacement costs, the board was aware of such considerations in 2008, and it declined to open a proceeding to investigate user replacement costs. Indeed, the railroads have been careful not to highlight the consequences the board envisions

from the one thing that has changed since 2008, the attainment of revenue adequacy. And I'll quote from the board's decision in 2008. "As the carrier approached or reached revenue adequacy, it would have every incentive to hold on to track, bridges, or other facilities that are no longer used or useful because the regulatory framework would allow it to earn a full return on the full replacement costs of those assets. The list of problems with replacement costs has become longer, not shorter, and the board should not reconsider its well-reasoned decision to stay out of that quagmire. Despite all the rhetoric, the railroads have not made a compelling case that there's anything substantively wrong with the use of historical costs or that replacement costs would improve the accuracy of the revenue adequacy calculations, even if their use were less problematic. With historical costs, an investment enters the investment base at the time and in the amount of the actual expenditure, and it is taken out only as the flow of depreciation

charges restores the invested funds to the investor. The funds that haven't been returned or in a market rate of return, the railroads never explained why the railroad would need more than a market return on the actual med investment it makes, or why differential pricing above that level would ever be justifiable.

Railroad investments do not need to provide the up side discussed yesterday by the railroad witnesses, because when they enter the investment base they are, in effect, backed by a license to exercise market power. Nothing more than that is needed. The one change the board should make in the return on investment methodology is to remove the double kind of inflation that has been introduced by the board's current practice of allowing asset values to be written up to the values prevailing at the time of mergers and acquisitions. Because inflation expectations are already embedded in the estimated cost of capital, writing up asset values to account for inflation produces a double

kind of inflation in the calculation of the needed return. As described above, this is one of the factors that has caused the rejection of replacement costs by multiple agencies, and it should cause the board to discontinue asset value write ups as well. This can be done without introducing any delay in implementing the changes in policies and practices required to recognize the attainment of revenue adequacy.

MR. ELLIOTT: Good timing. Thank you very much for your testimony. Mr. Rosenberg, I had a quick question. You mentioned earlier about the use of the S&P 500 for observations because of the limited amount of observations that are available today under our regs. Would we run into any issues legally by looking at a broader observation as opposed to just the railroad industry? Do you believe that that use of S&P could be, I guess, challenged in the courts?

MR. ROSENBERG: I think that may be in part a question for Dr. Levine. You need to be

able to justify the use of your data as its being reasonable. If you start from the basis that the observed data that reflect, for example, the exercise of market power and are not reflective of the inherent underlying risks, then under those circumstances you do have a basis, and a fine basis for using something else. And as Dr. Professor Triantis explained, its common practice to use a Blume adjustment, which is 2/3 observed data and 1/3 of the general economy data of 1.0. That's the standard practice, and that's plainly reasonable. So you're making a determination based upon the data that you have. You also need to, I didn't dwell on it in my statement, you also need to be concerned about the circularity in some of these factors as well, and again, that using the railroads to exercise the market power to enable them to further exploit their market power, and I think it's very reasonable to take some corrective action to that. I think Dr. Levine has something to add.

DR. LEVINE: Thank you. I think there

are two points here. First of all, in a way, because the board uses the Beta approach, the risk factor, you've already broadened out the market. The Beta is based on the variability of stock prices for an individual railroad relative to the market as a whole. So you're comparing all companies, and often it's the S&P 500 or some other broader index. So I don't think that in court it would be an unsuccessful venture. And second of all, if you think of what the cost of capital is, it's an opportunity cost, and what broader opportunities are there than all of the publicly held companies in the United States or the S&P 500. A potential investor looks at all of these things, all of the dividend returns, all of the risk free opportunities, maybe in annuities, although there is a slight risk there, and in the risk premium they have those records and their stock brokers have those records. So I think you would be on very sound ground, not being a lawyer, I'm reaching that conclusion.

MR. ELLIOTT: Okay, thank you. How

about, I understand your point with respect to the S&P. Do you think under our regs we could add in the Canadian railroads at the present time, and also do you think that would be a helpful thing to have those extra observations?

MR. ROSENBERG: That's not something that we've advocated or considered. I think one of the concerns would be are you using Canadian Railroad performance to regulate United States railroads? Mr. Nelson may have given that more thought and consideration, and he may have other views. Our concern is just using the three, four, or five United States railroads you have and coming up with the sound treatment of them.

MR. NELSON: My main concern from the work I've done is with the omission of BNSF because there's pretty clear evidence that they have easier access to capital than, perhaps easier access to capital than perhaps the ones that are included in your sample. I haven't really taken it any further in terms of thinking about inclusion of the Canadian ones. BNSF would

be a big concern for me.

MR. ELLIOTT: Okay, thank you. And I don't believe I was here in 2009 where we went through this exercise of looking at our cost of equity capital. And my understanding is at that time when we added in the MSDCF, well, I think we did a little bit subsequent, that the shippers were not necessarily opposed to it, and if that's correct, has something changed since then that the board isn't seeing in the economic literature, or is it based on what you've seen over the past six years?

MR. ROSENBERG: We were certainly opposed to the inclusion of the MSDCF back in 2009.

MR. ELLIOTT: Okay.

MR. ROSENBERG: And I think we've opposed it every year since. In the rule making proceeding, the X party 664 sub number one, the AAR's expert witness, Bruce Hankel submitted a table reporting to show that very small discrepancy between the CAPM and the MSDCF going

backwards, and the implication is that that small differential would persist going forward. That was not the case. There's been a very substantial discrepancy, very different, I guess, statement is results may vary from past performance, and that's been true in the States.

MR. ELLIOTT: And following up on that, as you mentioned earlier in your testimony, those numbers have been coming closer together, the MSDCF and the CAPM, and my understanding is it's possible that they could even flip next year depending on what happens in the financial community. Does that change your outlook on the use of these models as they do start coming closer together and possibly start to flip?

MR. ROSENBERG: We don't know what the future is going to show.

MR. ELLIOTT: Of course.

MR. ROSENBERG: It's possible with the board's CAPM, which we believe is significantly over stated, particularly in the risk premium, and what happens with stock prices and railroad

stock prices relative to other matters, and what happens with the earnings per share projections. It is possible that the CAPM could come in higher than the MSDCF. We still believe that the CAPM is more accurate, but we think if, you know, any model can be poorly implemented, and, again, we urge the board to revise the CAPM and to get it in at a realistic level. When you're assuming a seven percent risk premium when there is substantial evidence that the market is using a five percent or less, that will greatly increase the prospect that the CAPM could come in higher than the MSDCF.

MR. ELLIOTT: So despite what happens in the near future, if CAPM and MSDCF flip, your preference going forward would be, based on the models that we use presently would be to use just solely the CAPM.

MR. ROSENBERG: Yes, but again, we urge you to implement the CAPM soundly, and we respectfully submit that the current approach is not doing that.

MR. ELLIOTT: Yes, but that wasn't my question. It's just based on the two models that we're using right now going forward. If we were just going to stay with those two models, your preference would be CAPM and not MSDCF?

MR. ROSENBERG: If you're asking me as I sit here today, yes, but you're basically asking me to choose between a pretty poor model and a mediocre model. That's essentially a Hobson's choice.

MR. ELLIOTT: Okay. Okay, you got it. And let me ask --

MR. VON SALZEN: And, chairman, could I just --

MR. ELLIOTT: Yes, sure.

MR. VON SALZEN: That thing that I answered, I think part of the problem is that we see, and everybody at this table agrees that MSDCF can't be fixed to do the job that you want it to do. CAPM can be fixed, but it needs to be fixed. The way it is now it's not doing the job that you want it to do, but it can be fixed. So

it is a Hobson's choice in the sense that we wouldn't want unfixed CAPM, wouldn't want much more, we'd like the unfixable MSDCF. What we really want is a good model, and we think you can fix CAPM so that it is the model that will do what you want it to do.

MR. NELSON: Can I jump in to answer your

MR. ELLIOTT: Yes.

MR. NELSON: I think original question related to the shipper positions back when MSDCF was introduced, AECC expressed concern at the time with both methodologies, and it has taken the passage of time to see the actual results play out to be able to talk about them, you know, the empirical, this is what has happened kind of thing. But if you go back to our presentation back then, we presented because of our findings about the market power effects. We presented a scenario that if the board came to a point of potentially doing something about the exercise of market power, concluding that it was time to

start tightening up or pulling back on the reigns on market power, it prospectively would affect the analyst expectations that go into MSDCF in a way that the MSDCF numbers would go down and it would affect the data used in the CAPM analysis in a way that CAPM would conclude that the railroads were now experiencing lower risks because the market power effect would be translated to the beta and interpreted as risk, so that if you were to pull back the reigns you would cause both methods to nosedive and potentially go below the true value. So what we highlighted back in 2007 and 2008, I think 2008 especially was the instability of both measures over time and the way they could be affected by the types of changes that you properly are considering now, and I think the advantage of going to something like a beta of 1.0 or expanding the field of view, at least, in the calculation of beta to get outside of the rail industry is that you insulate yourself from those scenarios and have a measure that was both stable

and defensively closer to the true value that you're trying to measure.

MR. ELLIOTT: Okay, and one last question. Utilities are obviously regulated on their own. Is there any situation on this panel in the past where utilities have argued in the arenas where they're regulated for the use of MCDCF? I think it was touched on earlier, but I just wanted to hear from you myself that if that's been argued differently in another forum.

MR. NELSON: Yes, I'm aware of AECC has made use of MSDCF as it is used in FERC, but AECC's position here has not been to opposed MSDCF on theoretical grounds, but rather on the application problems that it's had in the rail industry.

MR. ROSENBERG: I haven't studied what every lead member may have said at FERC, or particularly at the state public utility commission, but the AER has done extensive mining of that. It wouldn't surprise me that a pervasively regulated electric utility before a

PUC would advocate for DCF or MSDCF approach, either alone or in conjunction with other approaches. But I tried to explain why electric utility regulation differs so much from railroad regulation, and what why what may be appropriate in the former situation would not be appropriate in the latter.

MR. ELLIOTT: Thank you.

MS. BEGEMAN: Thank you, I'll go out on a limb and just say you've managed to make a really boring issue somewhat interesting, so thank you for that.

MR. ROSENBERG: I've got people back at the office that will be shocked by that, so thank you very much.

MS. BEGEMAN: Well, you served your clients well. I don't have a lot of questions. You certainly, throughout your many filings and your testimony, have made your positions really clear. I know I would benefit if we actually had had a debate among the two sides at the same table. I think that would be really interesting,

to have the two different versions, different viewpoints discussed at the same time. So, maybe for our next hearing we can do that, or we could extend it for another day. Luckily I'm not in charge.

Professor, could you just comment a bit more? I think you said that the multi-stage DCF results in a 32 percent, that it's 32 percent higher than using CAPM. Could you just elaborate a bit on that? I don't know if that is collectively or what that figure was. I thought it was from you, but it might have been from a utility.

MR. ROSENBERG: I think Dr. Levine presented that figure, and I don't want to steal his thunder, but I think that's taking the average of the MSDCF cost of equity values and comparing it to the CAPM, excuse me, the board's MSDCF CAPM values over a period of six years.

DR. LEVINE: Six years.

MR. ROSENBERG: I believe, and so it's been thirty-two percent higher. That average

also includes 2013, I believe, when the values were much closer than in the other years, if you look at just the five years, the figures in excess of forty percent. And, again, that involves a CAPM value that we believe is substantially overstated itself.

DR. LEVINE: Can I just add something to that? Because when you're an economics student, a very stential subject, may I say, you learn that either of these models, and there's a third called comparative earnings, should approximate about the same answer, but during that six year period there was not only a thirty-two percent difference. In one of the years the difference was sixty-five percent, and it's that kind of result, I think, that should trigger the board to ask questions. How can one model produce such a wide variance over the other? And that might lead you to what I had recommended, a benchmarking, the sanity test approach to looking at your results.

MR. ROSENBERG: Actually, if I can

link back to something I said earlier to Chairman Elliot in terms of what the league's position was, it was in part that if there was going to be an MSDCF, it's, you know, it should be reconciled with the CAPM value, and that would be to consider which seemed to be more accurate and reasonable under the circumstances as opposed to an automatic blind average, which is the approach that the board adopted. And I apologize for intruding, but I thought it would link back.

MS. BEGEMAN: You're welcome to intrude, that's not a problem. Could you help me get a better understanding, using the 1926 data versus the 50 year which you are advocating? What is the outcome difference? How skewed, in your view, is the Board's calculation? I mean, number wise? We're off by -- how wrong are the results in your mind by using the calculation that the Board is currently using?

MR. ROSENBERG: Well, if the average going back to, arithmetic average going back to 1926, I believe, is around seven percent. If you

go back fifty years you're closer to 4.7 percent, I believe. And my two experts may have something to add to that.

DR. LEVINE: Well, I don't think this one is results oriented. I don't think the other ones are actually, because what you have to think about, no matter how many years using this calculation, you're giving equal weight to every individual year, and do you want to give equal weight to the years in the 1920's and 30's and 40's before there was such international trade and computers and high technology? So, at a minimum, I think you ought to start your base year after World War II. I never looked at the differences and what the result would be from 1926 through the fifty-year period . I think it's irrelevant, but I may be curious, but I think it's irrelevant to the decision as to what you want to use.

MS. BEGEMAN: Well, I don't disagree with you on that, but I'm just really trying to understand, is it extremely off or is it close?

Is it a difference of twenty percent?

DR. LEVINE: Right, I understand.

DR. TRIANTIS: So I won't comment on that specifically, but rather just to sort of reinforce that, yes, the markets were very different back from 1926 for about fifty years, and it's well known, the financial literature, that if you have more liquidity risk, investors need a higher rate of return. If there's less transparency, not as good disclosure, you need a higher rate of return. If you can diversify risk, you need a higher rate of return. And all of those are characteristics that were in that first fifty of the last hundred-year period that have changed dramatically in financial markets over the last fifty years, and that's why I had forgotten what the number was back in 1926. But I'm not surprised where we're seeing such a difference, which is a large difference, between those first fifty years and the most recent fifty years, which are much lower. There's, as I said, this risk premium puzzle is very heavily studied

effect in the financial literature. There's a lot of reasons that have been given why, going forward. Risk premium are lower than where they have been in the United States. And by the way, it's only been the United States if you studied internationally. We haven't seen those kind of high risk premiums in any developed country other than the United States, and as reasons why, that is believed to be an anomaly. So I could go on and on on that, but it is a relevant difference.

MR. ROSENBERG: I'll go on just a little bit. It's not merely that fifty years is the magic number, it's that that 4.7 percent also aligns with the surveys, it aligns with the Duff and Phelps recommendation, it aligns with what morning star uses. So it's ideally what you want is something that looks forward because investors act on the basis of expectations, you know, past performance can help guide that, but, you know, you've had different inflation values in the past, and inflation is something you might take into account in developing the market premium as

well. We think that there's abundant evidence that is reflective of what investors are expecting today at the same time because it's historical and it's going back fifty years. It's a value that's going to be fairly stable. Because you wouldn't necessarily want the railroad cost of capital to gyrate substantially from year to year as a policy matter.

MS. BEGEMAN: That's all I have for now.

MS. MILLER: I agree with Ann. Actually, this has been quite interesting, and Dr. Triantis, and if you had had a white board and I could have every now and again stopped and asked a question I think I actually would have followed everything you said, which is pretty miraculous. So you all have talked about the Blume adjustment, and I have to say, this is all, like, new terminology for me. I mean, you know, certainly the staff had prepared us, but I know in the pleadings, AAR proposed an adjustment called the Fasicek, I don't even know if I'm

saying it right, F-A-S-I-C-E-K adjustment. I haven't heard you all say anything about that. Do you know what that is? How would it be different from the Blume adjustment?

DR. TRIANTIS: That doesn't ring a bell to me.

MR. ROSENBERG: I may be mispronouncing it. I thought it was Vasicek or something like that.

MS. MILLER: Oh, I'm sure you're much closer than I am in pronouncing it.

MR. ROSENBERG: It's a different form of adjustment. It's a more complicated calculation. Based upon everything I've seen, it's not commonly used over here if you go to value line and Bloomberg, it's a Blume adjustment that is used. The issue of the Vasicek, if I'm pronouncing it correctly, and the Blume adjustment was considered at some length by the Canadian Transportation Agency in deciding how to formulate it's approach, and is opted for the Blume adjustment. So we think that it's much

more standard and much more common. And particularly appropriate here, given the characteristics and the behavior of the railroad industry. Anything further?

DR. TRIANTIS: Well, now that you said Vasicek it did ring a bell.

MS. MILLER: Yes, sorry about that.

DR. TRIANTIS: That's fine.

MS. MILLER: I'm sure I butchered your name too.

DR. TRIANTIS: But I fully agree with Mr. Rosenberg, but, I mean, Blume adjustment is the standard adjustment that, again, was based on these papers back in the early 70's. It's fairly simple to understand that when you see betas that are higher than 1 they tend, over time, to come closer to 1 and when they're lower than 1 they tend to mean revert as well. And so this 1/3, 2/3 waiting is a rough approximation, but it seems to work pretty well, given the data. This is a standard thing when folks go for their CFA training. This is part of the standard correct

CLEM. Again, you know, Bloomberg, Value Line, they all use that, so it really is the standard approach in the industry.

MS. MILLER: Thank you. So, Mr. Levine, I want to go back to this issue of replacement cost, and you compared it to, you know, the uncle you hoped wouldn't come to visit. But could you say a bit more about that? And here's what I'm wondering. So, the assertion yesterday was that everyone concedes that it would be better philosophically to use replacement costs. It's just that it's so difficult, and that's the only reason it's not been used. And I'm wondering, and as far as that's concerned, if others want to comment on that, I mean, would you share that view that the only reason to not do it is the complexity of it, or are there philosophical and practical reasons why it wouldn't make sense to use replacement costs?

MR. LEVINE: I think there are philosophical reasons why you should use it, even

though I would agree with the former about it being impractical. Replacement cost data is not published by companies. Rates of returns are not published based on replacement costs. They're published based on book value accounting costs, the language of the business community in North America. Cost of capital is an opportunity cost wherein we're trying to get into. It's a very elusive concept. We're trying to get into the minds of an investor, find out what's going to draw them into investing in a company. They're not hearing anything about replacement costs from any analyst, from any publication, from any published data, and annual reports, etc. So there is a practical reason also not to use it. Who knows, if one converted all of the book values to replacement costs throughout the United States, you may get the same answer for investors. We don't know, because we don't know what the replacement costs are. So on two scores, and very much again, as far as I'm concerned, it's a distraction from the real issue

of railroad adequate earnings and the real cost of capital. It's just a total distraction.

MS. MILLER: So, Mr. Nelson, I think you made this comment, but, again, if anybody else wants to explain it, and I think what you said was if you're going to use replacement cost then you have to use the real cost of capital because of this double counting of inflation. And so, one, I'd like to understand that better because I'm not sure I appreciated it, and secondly, when you say the real cost of capital, are you saying then you can't model capital the way we're doing it now or even the way you've recommended doing it?

MR. NELSON: Yes, you've --

MS. MILLER: But you have to, I don't know, go out and do some much more extensive record keeping?

MR. NELSON: It would be a thing where your flow chart would have a box that said, and then a miracle happens, and then what comes out the other side is my --

MS. MILLER: That's my favorite Tom Larson comic.

MR. NELSON: You have an estimate of the cost of capital that miraculously removes whatever the investor's expectations of inflation are at any given point in time in the real world data that you use to estimate the cost of capital as its done now. And that's not anything I'm inventing or, you know, introducing as a problem. It's been identified in the past assessments of replacement costs conducted by the ICC. And I'm not sure if that specific issue was talked about at any link by the RAPB or the GAO looked at this also, but it's an issue there, and it's an issue, as I mentioned, with the write up of the asset values because you're compensating them for the investment that's actually made at the time that it's actually made, and for the duration of time that the invested funds are left, you know, in play and not returned to the investor. But then when you come back at the same time and inflate the value of the asset, you're counting inflation

twice because you're letting the asset go up, but you're applying a rate of return that already included the inflationary expectations of the marketplace.

MR. ROSENBERG: I can add to that that the issue is specifically discussed in the railroad accounting principles board, and it comes out that way for the reasons that Mr. Nelson stated. I'll also add when it comes to the nominal cost of capital, and particularly with the CAPM and it's inputs, you know, there are benchmarks that you can find. There's a Duff and Phelps value. There's now, as of this year, a morning star value. If you start looking for the real cost of capital, you're not going to find those things and you're going to have to go through gyrations and it's going to be speculative. It's going to make your life much more difficult, and it's going to be much harder to come out at a reasonable number. And if you do everything right you should come out at the same point. I think there was testimony to that

affect in the early 80's to the ICC. I think the late professor George Gorde submitted the statement to that effect, I think, professor Myers may have also, not working for shippers, submitted a similar statement. And my partner, Kelvin Dowd addressed a replacement cost yesterday, but I don't think that we would rush to agree that it is the ideal or preferred way of doing things. The railroads do need an incentive to make capital investments, but when they actually make those investments it enters the rate day so it becomes part of ERPS, it becomes part of the depreciated asset investment base for assessing revenue advocacy, and that's the way that the regulation generally works in North America.

MS. MILLER: So I think you just answered the next question I was going to ask, so let me ask the question and make sure it's the answer. So the implication yesterday from the AAR was that our process for computing revenue adequacy doesn't properly account for the cost of

maintaining and sustaining the rail network, and I'm wondering what you would say about that?

MR. ROSENBERG: We, of course, disagree for the reason I stated. I think there was discussion of- -

MS. MILLER: And, excuse me, so, because I just want to be sure that I understand this. And so the reason that you stated, and I think what it meant, so correct my understanding, was that when the investment is made, sort of the way the process works, they're getting the credit that recognizes that on the investment side?

MR. ROSENBERG: Right, take for example, I think CSX discussed a bridge that needed to be replaced, perhaps as a result of the hurricanes. So they had a six million dollar value, and then maybe it was --

MS. MILLER: Two hundred fifty million, I think.

MR. ROSENBERG: Okay, it was a large value. When they made that investment it became part of their asset investment base, and so it

would enter into their assets for purposes of calculating ERC's cost, and also the investment base for determining revenue adequacy. If I can go on further, you know, the railroads are, in fact, asking for all of this money to be considered as invested today. When it's not invested today and it may or may not be.

MS. MILLER: May never be invested.

MR. ROSENBERG: Invested tomorrow.

MS. MILLER: Yes.

MR. ROSENBERG: To use, you know, a slightly, well, as a simplified example, suppose, and this is not intended to be a solicitation of bribery that you want a hundred dollars from me ten years from now. I could say yes, I'm glad to do that, but you need to give me a hundred dollars today. That's not the way business is done, but that's effectively what the railroad position is. Anyone else?

DR. LEVINE: I would only say that I don't think there's any evidence whatsoever that the railroads are under-capitalized. One only

has to take a look, as I said before, at the reports to see that they've made their quotas in regards to their target returns, rewarded their executives with maximum compensation, increased their dividends substantially. I don't think you do those things when you're under-capitalized. Now that's more anecdotal than formulaic, but I think it just adds to the discussion.

MS. MILLER: And then, finally, one of the issues that was raised yesterday by the railroads was this issue of deferred taxes. I'm wondering if any of you would like to say anything about that?

MR. ROSENBERG: I for one would be glad to. Deferred taxes are essentially a, you know, a benefit provided by the taxpayers. Because a railroad or other sorts of firms make an investment today, they don't have pay taxes today, they may have to pay those taxes sometime in the future. So it's, in essence, money that's invested that's forwarded by the taxpayers, and deferred taxes and regulation are typically

treated in two ways. One of them is an offset to the investment base, and that's what the board uses. There will be some instances where they are instead treated as a zero cost source of capital because, you know, the taxpayers are providing that money to let the railroads use it without cost. So it's, yes, it struck me as somewhat remarkable that railroads would be asking for a return on something provided by the taxpayers, which would have the affect of forcing the, you know, the public that ships goods, which for this purpose is co-extensive with the taxpayers to have to provide the railroads with a return on money that's provided free to begin with. I think that's remarkably presumptuous and is not consistent with other regulations, to the best of my knowledge. I don't know if Professor Triantis or others would have something to add to that.

DR. TRIANTIS: I wasn't there yesterday, so I don't think I want to comment on the context of that.

MS. MILLER: But do you know anything broadly about this issue, or I don't know, maybe there's not an analog in other businesses in terms of how they would handle deferred taxes, because, you know, I'm sure more than just railroads have gotten deferred taxes for investments.

DR. TRIANTIS: Well, I mean, I just to reiterate what Mr. Rosenberg said, I mean, these deferred taxes are viewed as an incentive to try to provide the ability to push cash flow, to accelerate cash flow to the present time, to push taxes to the future, and so they're already is sort of an incentive built into those.

MS. MILLER: Yes. Thank you.

MR. NELSON: AECC hasn't looked specifically at deferred taxes, so I don't think we have anything to add to what's been said.

MR. ELLIOTT: One last question. Yesterday on the railroad panel one of the economists pointed to a way to figure out replacement costs from, I think, a Department of

Commerce model.

MS. MILLER: Yes.

MR. ELLIOTT: And while the comment was made, I think there wasn't a lot of backing up of using that model, but I was wondering if that was so easy to use, obviously it would have been raised earlier, but I was wondering what you thought about that model and if it's possible to use that in place of what we do now.

MR. VON SALZEN: I'm not familiar with it before hearing about it at the hearing yesterday, and I haven't really had a chance to consider that.

MR. ELLIOTT: Sure. That's fair.

MR. VON SALZEN: If we come up with anything else, if AECC wants to submit something in the fourteen-day period you mentioned yesterday, if we think of anything useful.

MR. ELLIOTT: Thank you.

MR. ROSENBERG: We also are in a similar position, but I don't think that is at all what the railroads have proposed in a

proposal for the current replacement cost presentation, or in their past ones. They're talking to you about some sort of market based valuation that doesn't regularly occur.

MR. ELLIOTT: Okay, thank you very much. Thank you, I really appreciate your testimony and answering our questions. Appreciate it.

MR. ROSENBERG: Okay.

MR. ELLIOTT: Okay, why don't we get started with panel number II.

MR. ATKINS: Members of the board, my name is Ray Atkins. It's my pleasure to appear today on this panel on behalf of the Association of American Railroads to discuss the issues surrounding the cost of equity for the railroad industry. And given the highly technical nature of this debate, I'm especially pleased to be joined by Dr. Bente Villadsen from the Braddle (phonetic) Group. Dr. Villadsen is an undisputed expert in the field of finance. She received her Ph.D. from the Yale University School of

Management and holds joint degrees in economics and mathematics from the University of --

DR. VILLADSEN: Aarhus.

MR. ATKINS: Aarhus in Denmark. She has testified in numerous agencies on how to estimate the cost of equity, including providing detailed reports to regulators in Australia and Canada that we attached to our written testimony. Together, we'd like to try to frame the key issues that are raised in this record and explain why there is no basis for the board to depart from the sound approach it uses to estimate the cost of equity in the railroad industry. The STB has spent an extraordinary amount of time and energy grappling with how to estimate the cost of equity in the railroad industry. You previously held two different rule makings, six rounds of evidence, and several hearings on this question, and during those rule makings you invited comments from experts from the Federal Reserve, you heard from the U.S. Department of Transportation, you heard from world leading

finance experts, and at the culmination of that lengthy process you reached a very logical conclusion, which you stated, "If our exploration of this issue has revealed nothing else, it has shown that there's no single, simple correct way to estimate the cost of equity for the railroad industry, and countless reasonable options are available. And so the board settled on its existing approach to estimate the cost of equity, where it will use an average of two accepted finance models. A multi-stage DCF model and a capital asset pricing model. A CAPM model was designed by the agency in the first rule making. In contrast, the STB decided to adopt an off the shelf multi-stage DCF model that was published at the time by Morningstar and Ibbotson. The agency concluded that it was better to use an established independent method that was applied across a number of different industries than using one of the made for litigation models that had been submitted in those rule makings by both the railroad and shipper commenters.

Now, Western Coal Traffic League has never been satisfied with the STB's approach for one very simple reason. The MSDCF model has been higher than the capital asset pricing model for the last few years. And so our first chart here, we think just sort of describes in a nutshell why we're here today, the light blue line on top shows you the estimate produced by your multi-stage DCF model. The dark line below shows you the estimate from your capital asset pricing model, and the line in red shows you the average of the two models used by the board since 2008. And as you can see, until the last two years, the MSDCF model estimates have been higher than those produced by CAPM. And that gap has prompted Western Coal Traffic League to complain vigorously about how the average, about this averaging approach that the STB uses, and they believe that the gap exists because the MSDCF model is overstating the true cost of equity. But another possibility that we have to consider is that the capital asset pricing model is the

problem child, and that it's actually understating the cost of equity because of the extremely low interest rates during that time period, driven down by aggressive federal monetary policies, and an unprecedented asset purchase program. But it could be that the cost of equity actually falls somewhere in between those two models, or it could be above those two models, or it could be below those two models.

All financial techniques used to estimate the cost of equity are inherently imprecise and produce a range of estimates. So in this second chart, this is a chart that the board itself produced in the AEP Texas case. And what it shows you is the estimates produced by five different models over a fourteen-year span. Now, your chart, when you produced it, it was black and white, so I introduced a little bit of color to help you pull out of there the capital asset pricing model from the multi-stage DCF model. And the line in red is the capital asset pricing model, and as you can see in the earlier

years in 1994, it was well above the results produced by a multi-stage DCF model, and then it fell down well below the results produced by a multi-stage DCF model. But the point is that all of these models are commercially available, are considered reasonable, are used by practitioners, and they produce a range of estimates. Indeed, the board has said in the, and this is not the first time where a shipper has advocated for the use of CAPM, just pointing to the difference between the two models. In the APCO rate case, the board said that we've recognized for years that there could be differences between the figures derived from CAPM and MSDCF, but that is part of the reason we decided to average the two figures to smooth out those fluctuations. We use an averaging method to diminish the chances that one model's results for the cost of equity is either too high or too low. So if we return back to the first exhibit and, you know, the truth of where the actual cost of equity lies is going to be elusive. There's no way to look backwards and

test whether these models are providing the correct or true estimate of the cost of equity. It's one of the unfortunate features about the cost of equities. It never reveals itself, even historically, so we can't even look backwards and figure out what the actual cost of equity was. But that's why there is overwhelming evidence about using multiple models as being superior to using a single model.

In the prior two rule makings you had on this subject, the comments from the Federal Reserve where you invited them to come to the board and talk about their experiences, and they told you to use multiple models to improve your estimated because each model provides you with different information. USDOT strongly urged the board to use multiple models, and in particular, they urged you to use an average of the capital asset pricing model, and the Morningstar Ibbotson multi-stage DCF model. Even Professor Hodder, who was the prior expert for Western Coal Traffic League endorsed using the MSDCF model together

with CAPM. Here's a quote from his testimony. "As I have indicated on several occasions, the benefits of obtaining estimates from both the CAPM and from a multi-phase DCF model is that they use different approaches to very different types of inputs." And, indeed, Chairman, you asked the question what was their position, and they told you they opposed the use of a multi-phase DCF model, but their own witness is on record in that hearing as saying, "I would suggest you mandate a multi-phase DCF model." Nothing has really changed since you went through that elaborate and exhausting rule making, two rule makings and six grounds of evidence to where we are today. Indeed, the FCC, just two years ago, also did its own inquiry looking out to see what is the best practices, how should they estimate the cost of equity, so they canvassed the practices and they canvassed the literatures, and once again they concluded that the best practice is to use multiple models because just using one alone creates the potential to bias the

results and introduce significant error into your estimate. The AER submits that it would be a serious economic and public policy mistake for you to jettison the multi-stage DCF model as urged by Western Coal Traffic League. So what I'd like to do now is turn the presentation over to Dr. Valladsen and she's going to explain why there really is no reason to think that the MSDCF model is understating the cost of equity, and why academics and practitioners are concerned that the capital asset pricing model may itself be understating the cost of equity in our current financial environment. So, Dr. Valladsen?

DR. VALLADSEN: Thank you very much. It's an honor to be before the board today, thank you. Before we get any further into it, I want to talk a little bit about what the models actually do. So let's first take a look at the capital asset pricing model. The capital asset pricing model looks to the railroad industry's relative to that of the market. That is, it determines the cost of equity as a risk-free way

which is measured in the old market, and a market with premium multiplied with a systematic risk of the railroad industry. That is, it is a specific measure of the risk for the railroad industry, not for the market. That is the key of that model. As implemented by the board, the capital asset pricing model takes the current market risk premium and looks to beta's estimate over the most recent five years, and a historical market risk premium. In other words, much of the inputs are historic in nature. In turn, let's look at the MSDCF. The MSDCF takes the current stock price and determines it as a discounted value of future cash flows. The future cash flows can be predicted based on the current cash flow to which we apply a growth rate. The custom equity, which is the R in my little map I put up here is in the discount rate. So in other words, it's determined implicitly from this formula. I should say now that cash flows we are looking at in this case are cash flows that are specific to the railroad companies, and the stock prices are

offered specific to the railroad industry, as is the growth rate. So much of this is specific to the railroad industry, but the growth rates are forward looking in nature, not historic in nature. Then there's also growth rates that's looking to the economy as a whole in this model. That's, of course, in market wide information.

Like all models, they both have pros and cons. And as Ray said, errors in estimating both of them. Therefore, I believe it's important that we take in as much information as possible and rely on more than one model. Let's next turn to the statement, the board asked us where the MSDCF is upward bias. And let's look at that question next. Before we get into the details, it's important to recognize what the MSDCF does. The MSDCF, as implemented by the board, takes a measure of current cash flows and then predicts it out in the future. That's what I've depicted in the light blue line. Specifically, this uses 2009 data, so it's a prediction of the future cash flows. What the

WUCTL criticizes is that the growth rate in stage one are too high because of shared buy backs. They also criticize that the growth rates in stage two are too high because rather than taper the growth rates from the industry's specific growth rates to being near the economy wide growth, it just uses the average of the industry growth that's in that stage too. If we implement the WCTL assets, and I should say I did that, the WCTL did not do this, we get the gray line that I just suggested to you here.

Now, I should mention up front that the fact that this railroads fall back year is an after the fact on exposed realization. There is no analyst out there that says we're going to buy back X, Y, or Z number of shares going forward, so it's in here in after the fact argumentation. Now, if we actually look at the after the fact, well, I say how much cash flow was actually available to the railroads? That is the red line I have here. My red line is that actual total cash available to the railroad during that

period. Clearly, it's higher, not only by what the WCTL wants you to believe it should have been, but also what the board's model predicts. Why is that? Well, first and foremost, growth rates turned out to be higher than expected. Second, as you can see on the left most side of this chart, the starting point for the cash flows, which in the board's model is smooth over the last five years, is below what it actually was, for the reason that if you smooth the growth over a period of time when you have an increase in industry, you're growing that asset out too low. And lastly, and that's actually a minor adjustment. There are sources of cash flows that are not included, and it's important to realize that the MSDCF is an equilibrium model, a model that intends to capture permanent components of cash flows, not temporary issues such as the sale of assets from the railroads or any other issues like that. It's not included. It's smaller amounts. There is estimate recognized in this 2009 adjustment. No adjustments for any working

capital in this model. So, therefore, it's a more temporary issue and we start to look. In other words, there was more cash available than actually what both the WCTL predicted and what the board's model predicts.

I will next address the WCTL's criticism, and specifically show you what would happen if we take an economically sound and consistent method and actually implement their suggestions. What would be the cost of equity if we go out and say let me try to take WCTL on their word and implement those suggestions and see what happens. Again, I should say I did that, the WCTL did not do that. The left most column here shows the MSDCF as implemented by the board. The second column says, okay, the WCTL said we should smooth the growth rate from growing from the industry specific growth to near the economy wide growth over a period of time. Let us do so. If I do so, I also need to take into account that if growth is going to go down to an economy wide growth, we will also expect

that the industry's capital expenditures will reach replacement costs only. There should not be any growth in capital expenditure other than replacing current capital. So that also has to take place. Doing so results in a reduction in the cost of equity estimate, on average, as you can see, but it's not a huge reduction in the cost of equity. And remember, again, only half of that change will go into the model as currently relied upon by the board because you put half weight on this and half on the capital asset pricing mode.

Next, the WCTL criticized that the share buy backs leads to over statement of the growth rate. And my response to that is, well, if we are to sort of reduce the growth rates corresponding to the shared buy backs, which we only now exposed, we also know exposed, as I showed you in the prior slide, that there was significantly more actual cash available to the railroads than what is in the model. So let's approximate that amount also. And we did that in

the share repurchase scenario as I put up here. Looking to that, I'm now back to, on average, 14.5 whereas the board's model showed 14.9. So that's not a huge amount of difference, 0.2 if you average for the capital asset pricing mode. So, what I take from this is that if we economically consistently take the WCTL's criticism into account and try to accurately model what that would mean, that's not a model of difference to your actual model. It is not a huge discrepancy we're finding. The last column I have, column four, in this chart shows you that there might be some arguments about what exactly the whole bias and to what which the railroad to reach a steady state. In other words, how long will it take before the railroads needs to only put in replacement count? How long will they be in a growth mode? And instead of assuming, as the current model does, that that's in year '11, this assumes that's in the year '16. So expand it by five years and see what happens. It makes a small difference, not a huge difference, again.

The key takeaway from this slide is that the WCTL's criticism on the MSDCF is selective. They criticize the growth rate, they criticize some of the cash flow determinations, but if you want to go out and try to adjust for some ex-post or after the fact realizations, you need to look at all of the component that has changed after the fact. You can't just fix one part of the model, you need to fix them all. And if we do take it into account in an economic consistent manner, and internally model internal consistent, it is really not a big difference. I do want to say that this is not a proposal on anything for the board to change. This is simply showing you the impact of some of the criticisms. I think the board's current model, which is an equilibrium model, is far preferable to trying to nitpick each and every little component of the model. Let me next turn to a criticism you heard before, and you heard that Professor Triantis said that our implementation of the share buy back model appears to have double counted the

cash flows. Let me show you why that is not the case. Now I have overlaid on this chart I showed you before, my actually accounting for share repurchases. As you can see, my actually modeling of that fits the actual cash flows extremely well. There is no over counting. My line is actually slightly below that of the actual cash flows. You will also see that because I also account for tapering of the growth rates over time, my line is not as steep as that of the current MSDCF. That is the reason why the actual numbers turned out to be slightly lower.

Let me next turn to the capital asset pricing model. The board's questions regarding the capital asset pricing model all pertain to beta and the market was premium, and so did both the WCTL and the AECC's criticisms of the model. Therefore, I will focus on these two aspects. The board has asked whether it should set the beta equal to one or some other figure. The answer to that question is no. And my response to that is simply that what we are trying to do

in the capital asset pricing model is to measure the risk of the railroad industry relative to that of the market. If we do something else and set it equal to market, we are violating the fundamentals of the capital asset pricing model. So I would strongly recommend against any such thing. Similarly, should we decide to use the S&P 500 as a proxy for the market, again, that could be fundamentally wrong because we are trying to measure the relative risk of the railroad industry. The S&P 500 has many different types of companies, and it's currently quite dominated by financial institutions whose risk profile is very different from that of the railroads. The railroads are capital intensive, financial institutions are not.

And just following up on some of the comments that was coming up earlier where, I think it was Mr. Levine, who was suggesting that we should look into the BNSF. Well, while BNSF clearly is a railroad, using any beta from Berkshire Hathaway would be wrong because

Berkshire Hathaway is obviously a conglomerate consisting of many different types of businesses, including insurance and other financial institutions that has characteristics very different from that of the railroad industry. Turning now to something that seems to concern the board: adjustments, betas, and adjustment of betas. As I explained in my report to the Canadian Transportation Agency, if we are going to adjust betas, using a Vasicek adjustment is far preferable because the Vasicek adjustments take into account the relative procession by which we have estimated the beta of the industry and the beta of whatever we're adjusting it towards. In other words, it looks at how sure are we about our estimates. That is preferable to using the Blume Adjustment. I should also say we've heard that everybody publishes Blume adjusted betas. Bloomberg actually publishes both Blume adjusted and unadjusted betas so that's not a waste.

Looking to the number of railroads,

which was also a question raised by the board, the current industry beta, and we estimated under the forced methodology that using a portfolio of whatever railroads classify as class one railroads. That's the way its currently done. It's one preferable to do it as portfolio compared to anything else because it would use an estimation error. Second, that portfolio includes the majority of the revenue that's generated by freight railroads in the U.S. and the majority of the freight volumes in the U.S. So it is representative of the industry. Lastly, I will address something that was raised again by both the AECC and the Western Coal Traffic League in their presentation, that somehow betas change if the market concentration of the industry increases. There's a good amount of academic literature looking to the relationship between betas and market concentration. There is no evidence that beta increases if the market concentration increases. Rather, the opposite. If there's a relationship, if market

concentration increases, beta stays high, although I would say the majority of the studies find that they can't statistically find any result at all. I would also state there could be many reasons why betas have increased. We know that the volatility in the railroad returns have changed over time, and especially they have increased relative to that of the market. There's also been a significant change in the conversation of load that the railroad carries. I have not studied that in detail, but that is the areas I would focus on if I were to explain the increase in betas.

Looking next to the other aspects of the capital asset pricing model that we had talked about. We've heard quotes from Professor Myers before, and I will also provide you one. Professor Myers has cautiously noted that with extremely low current interest rates would change applications as a pricing model are likely to result in too low estimates. I'm showing you here a chart that shows you the square of the

difference between corporate bonds and government bonds. They're all twenty years, so they have the same maturity. What we can see from this chart is the difference on the return on a corporate bond and a government bond increased dramatically during the financial crisis from 2008 and lasted until, say, 2012/2013. That was an elevated increase. What does that mean? It means that the return investors expected to receive by investing in corporate securities relative to treasuries of government securities increased during that period of time. In other words, it's an indication that the market risk premium was increased, because remember, the market risk premium is the difference between the return on equities and the return on risky rates of treasuries. So that's an indication.

Another chart here, we've heard much about the market risk premium, and this chart shows you first the middle column is simply the annual historical market risk premium as calculated by the board. And there are many ways

to look at the market risk premium, but on the left-hand side, what I look at here is the market risk premium that Bloomberg estimates, it's a forward looking methodology, so it changes day by day and is estimated as a forward looking methodology. I also estimate that my own, that's on the right-hand side. But the thing I want to point to here is that if we look at this period, throughout the period the forward looking market risk premium is higher than the historical market risk premium used by the board. And it's especially elevated in 2012. You can see the difference, it's 8.86, 12.52, and Ableson data has 6.7. So it was elevated in that period. That is a forward looking and contemporaneous estimate of what investors inspect. What this shows me is that while the Western Coal League will have you believe that a market risk premium on top of five percent is excessive. Well, what this shows is certainly there are other estimates that are significantly higher than that. I am not recommending that you go to any of these

forward looking methodologies because they change quite dramatically over time. Instead, what I do believe is that an historical agnatic MRP is reasonable, reliable, and very commonly used. This also, and I'm going you back here to my chart that shows you the elevated scrap back in 2008 to '12, that shows you that risk premiums as looking forward were elevated in 2008, also through '12. That might also indicate that the problem is not the multi-stage DCF, but the capital asset pricing mode is underestimated in these periods.

Lastly, let me turn to the question of multiple models. The academic literature agrees that the use of more than one model is preferable, and the chart we just showed you will illustrate why it is that that is. Here is a quote from Professor Myers, I think. I will end on that, that use more than one model when you can because estimating the opportunity cost of capital is difficult, and only a fool throws away useful information. I think we all would agree.

MR. ATKINS: Chairman Elliott, I have a couple of concluding remarks if you would indulge me.

MR. ELLIOTT: Of course.

MR. ATKINS: Thank you. I'll try to kick myself along. So the AR submits that the record makes three things fairly clear. First, that using multiple models is the soundest approach, and the one preferred by numerous academics and regulators. Second, that the use of this historical approach to estimate the market risk premium is sound, it actually falls below current independent forward looking estimates of the market risk premium. And finally, perhaps most fundamentally is no indication that the multi-stage DCF model is biasing the results. As I talked about earlier, it's frustrating, you can never actually look backward to determine how well a model predicts the cost of equity, but for the multi-stage DCF model, the key input does reveal itself. That's the total cash flows that Dr. Valladsen showed

you. So what we can do is we can look back and say if Western Coal Traffic League is right, the board's model should be predicting total cash flows that are well in excess of what you actually, what were actually realized. And when we do that, we actually can empirically test whether or not there's a disconnect in the key input in the multi-stage DCF model, and when we do that, it shows that Western Coal Traffic league was wrong, and not just a little wrong, that they were significantly wrong. But Western Coal Traffic League clearly disagrees with the position the AAR is taking, but I would note, that I was going to say, their members take different positions before their state regulators. We submitted testimony in November about how they were extolling the virtues of multi-stage DCF, about how they are warning against relying on a single model, and how they advocated market risk premium well above five percent. Well, since November we thought we'd canvas the literature to see have they made any

such statements more recently in 2015, and low and behold they have. So what are they telling their own regulators about using multiple models? I can't see power and light, just telling their regulator. It's prudent and appropriate to use multiple models in order to mitigate the effects associated with any single model. Or you can look at Kansas City Power and Light. It's essential to employ a variety of techniques. Or we can look at Entergy who says that no single approach can be relied upon as wholly reliable. Now, they, Western Coal Traffic League says, well, that maybe the markets there are different, and somehow the utilities are a little bit different than railroads and we can take inconsistent positions. But what are they telling their regulators about the market risk premium? Here there is no plausible argument that the market risk premium should be different for utilities than it is for the railroads. It's the market risk premium. It's the market risk premium for the whole market. Well, what are

they recently telling them? Well, that just two months ago, Kansas City Power and Light was advocating a future forward looking market risk premium of 10 percent. Wisconsin Public Service, just two months ago, in seven or eight percent. Entergy nine percent. Mid America seven percent, Ameren nine percent. Yet Western Coal Traffic League is telling you that the market risk premium in the current environment cannot possibly exceed 4.7 percent. Now, ultimately, the board will have to judge the credibility of the witnesses that come before you, but the AAR submits that the credibility of Western Coal Traffic League is severely undermined by its own members. We would submit they speak the truth to their own regulators while asking you to set aside best practices in the hopes of driving down the cost of equity. With that, we would be pleased to answer any of your questions.

MR. ELLIOTT: I just had one quick question that was related to a question that I asked earlier, and that I think that you touched

on in your testimony about increasing the number of railroads, and my question before to Western Coal Traffic League regarded the Canadian railroads and adding them into the mix, and if that would be helpful or not, and also I think this would be more to Mr. Atkins whether our present regulations would permit that.

MR. ATKINS: Well, I'll ask Dr. Villadsen, first to talk about the need, and then I'll speak to the legality.

DR. VILLADSEN: Well, first, I will note that we do have the majority of the freight volume and the majority of the railroads, which is a key point to me. You must have the majority of the industry. Second, that's a problematic issue with the Canadian railroads, and I have not studied them in enough detail lately to be fully coherent on this. But they face a different kind of regulation, and that might be problematic in that they might not be completely comparable, so we might have to make some adjustments if we were to include those. So, I would say at this

environment we currently have the majority of the freight volume, so that probably is a reasonable approach at this for environment.

MR. ATKINS: And I'd think that our position would be is it would be a mistake both on matter of policy and law to be including the Canadian side of it. You're trying to determine the risk profile of the American Railroad Network, and so including the risk profile of the Mexican railroad is different than the risk profile of the American railroads. The risk profile of the Canadian railroads is different. They live in different environments, they face different financial considerations, they have different marketplaces. And so to import the cost of equity from Canada or Mexico, or you could look in Europe at railroads overseas. We feel that there's no need to expand the portfolio of railroads that you looked at to include the Canadians and as Dr. Villadsen notes, we don't think it actually would have a material outcome on the estimates even if you were to travel down

that path.

MS. MILLER: Wouldn't it be possible, though, to look at the Canadian railroad just in terms of their U.S. operations? I mean, they say they operate separately in the U.S. from Canada, they filed taxes in both countries and separate out their operations, so why is it not possible to look? We look at KCS in this country, but not in Mexico.

DR. VILLADSEN: On forth noting, what we do when we estimate the cost of equity we look at the market data. So we need to have something that's traded like the stock prices trading issue, and the Canadian railroads have only one stock to trade, so they don't have one in each country, so we can't do that.

MR. ATKINS: It's a very good question, if they were separately trading the American portion of it, and it had separate stock price, then we could easily add them into the group, but they don't, it gets woven into a single stock price for the whole company.

MS. MILLER: Could you say a bit more about why you're not concerned about the small number of railroads? And let me play this back and be sure I'm getting it correctly. You're saying that even without BNSF relying on the other three, four railroads, you have the majority of freight movement and majority of revenue or cost, I can't remember how you were saying it, is that correct even when you take BNSF out?

DR. VILLADSEN: That's correct. So you have the majority of the industry even when you take BNSF out. As it's in --

MS. MILLER: It's an awfully big player to take out, though, don't you think?

DR. VILLADSEN: Yeah, and if it --

MS. MILLER: And, you know, one of the things WCTL said, and you know, maybe this is just a snapshot in time, and maybe in some ways it doesn't go into this calculation, but BNSF accounted for something like forty-three percent of the capital investment in railroads. I mean,

that's almost fifty percent of the capital investment is coming from the one railroad we're not even counting. And, excuse me, and I really will give you a chance to answer. And then on top of that I think, you know, one of the concerns isn't just without BNSF in it, can we move forward, but what would happen if we lost another railroad, which is certainly not like a crazy scenario that's likely to never happen, it's a reasonable concern and a reasonable scenario.

DR. VILLADSEN: So let me address first the capital expenditures.

MS. MILLER: Uh huh.

DR. VILLADSEN: That is true that PNSF has accounted for the majority of that, which probably, if anything, would lead us to have an under estimation of the MSDCF numbers because they have had a higher growth relative to the other railroad. So we have tightened that out. We also have taken it out of the capital as a pricing model for most of these purposes. My

real concern is to make sure I have enough of the industry. I want to have the majority of the industry. That's my number one concern. If you ask me as a statistician, I would love to have twenty railroads to do my estimation on. That's not going to happen. So my concern then becomes what is the best alternative, and my alternative currently is to go for some very small line haul railroads, go to the Canadian, or go to the Mexican railroad. That's my alternative currently, because I do need a company that is properly traded so I can do any estimation on it. And I'm not sure that the Canadian railroad's regulation, or that even worse, the Mexican railroad regulation is such that you accurately can compare it to the U.S. railroad industry. And if you look specifically at the Canadian railroad it wouldn't make much of a change actually in the beta estimates. The betas are very close to that of the U.S. Their growth rates are actually slightly higher.

MS. MILLER: So say more about why you

reject the idea of the S&P 500. I mean, I appreciate it's a, you know, it's a broad index of the market and railroads are very capital intensive and everything and S&P 500 isn't capital intensive, but it certainly seems that there are other elements of it that would make excellent sense.

DR. VILLADSEN: We have to remember here that what we really are trying to estimate is what is the inherent risk in the assets we are regulating or the assets we are trying to estimate our cost of capital for. So if I am looking at the S&P 500 I am seeing an awful lot of financial institutions who I would consider to be very, very different from the railroads. If you were to look at some other industries, you would try to look for some industries that were comparable to railroads in some sense. You would look for capital intensive industries, industries where high volatility in their revenues, industries that have similar features to the railroads. That would be what we would be

looking for, not for a broad --

MS. MILLER: Revenue, railroads have a high volatility in their revenues?

DR. VILLADSEN: They have had a high volatility.

MS. MILLER: Over what period of time?

DR. VILLADSEN: If you look back to the financial crisis.

MS. MILLER: Well, everybody had a high volatility during the financial crisis, didn't they? Well, I'm sure not everybody, but broadly across the market there was high volatility.

DR. VILLADSEN: And the number one thing, if you look at the catalyst pricing model, you will look to is also the volatility and the returns to investors. That of the railroad was quite a bit higher than the market in general, and it was extreme if you look at some of the financial institutions, and I don't thing neither the ones who had no volatility, neither the financial institutions who saw volatility of

extreme amounts would be representative for the railroads. So if I were to do something differently, I would look for companies that for some are characteristically similar to the railroad, not for a broad cue of the S&P 500.

MS. MILLER: In WCTL's testimony, one of their areas of emphasis was that CAPM was broadly used by players in the market, not DCF models. You really didn't address that. Do you disagree with that? I mean, the impression given was that by and large, most, I don't know businesses, I guess, is what I should say, who utilize one of the models are going to go to the CAPM.

DR. VILLADSEN: I don't disagree that if you go and ask businesses what model do you estimate, they will say the capital asset pricing model, by far, the most frequently. I also work with a lot businesses, and what they do is they make adjustments to the capital asset pricing model, especially during the most recent period of time when they don't think it actually fits

what they call that hurdle weight, at which weight would they invest. If they come up with a number that's too low, they will subjectively adjust it to fit something they need. Another interesting point I want to make on that is that it is true that very few companies go out and estimate the discounted cash flow, or any version of that, to make specific investment decisions. However, if you look at a textbook, Ellsberg and Demasso, which is a fairly common financial textbook, they show you that, yes, most companies estimate the capital asset pricing model and then most companies look to other factors, whatever that might be.

MS. MILLER: So one of the other things WCTL suggested this morning in their testimony is that we might want to think about some benchmarking. What do you think about that?

DR. VILLADSEN: A lot of that would depend on exactly how you implement that. That is a case where it would all be in the details. So until we have a concrete proposal, and I don't

think the WCTL has brought one forward, I don't think I have specific comments on that. I am not, in principle, opposed to benchmarking, it depends on how we implement it.

MR. ATKINS: And Commissioner Miller, two additional points. One is when I mentioned the FCC report that went out and canvassed the literature, they came back and what they found was that, yes, CAPM is the most widely used model in the business community, but the multi-stage DCF model is the most widely used model by regulators, and they came to the conclusion that using a balance of the two of them is preferable to using either one.

MS. MILLER: Uh huh.

MR. ATKINS: And I think that a little bit of the reason is, the multi-stage, you can't, you couldn't just subjectively adjust the CAPM model if you thought it wasn't quite forward looking enough. You'd have to explain that subjective modification. But if you take a model that's got, based largely on historical

information like CAPM and weave in a multi-stage DCF model you're going to get a range and use an average of the two as being rather reasonable. Second point I'd like to emphasize is, you know, I think it's a broader question of what standard should this board impose on Western Coal Traffic League or the AAR, or even its own staff in terms of when you're going to tinker with the approach that you currently use. Because the one lesson that everybody learned from those prior rule makings was that it's just a huge variety of models and a huge variety of input that can go into those models. So if we don't have a compelling standard and historically you've actually held all the parties to a high bar, you said show me compelling evidence that what we're doing is flawed. If you don't have that high bar then we're going to have two problems. We're going to be here every couple of years with this debate, which I don't think is in the board's interest, and it's not in our interest, plus also you interject into the community unnecessary

uncertainty, which I don't think is in the interest of the community. Some stability in the estimate, I think, is appropriate. Now, take as an illustration, if we lost UP, if UP became a private company and we could no longer perform our approach, we've lost the whole western side, that might be enough to trigger a need to reexamine, you know, do we have to change the model, but I know we lost DNSF, but it wasn't the majority of the industry and AAR feels that we can, you can continue to use the two approaches that you've got.

MS. MILLER: And then could you say a little more about, see, now I'm not going to get it right again, Vasicek? Why you've recommended that. I mean, you know, even with my butchering of the pronunciation, still, I got such a blank stare from the finance professor that it makes me wonder how common this adjustment is over the Blume adjustment.

DR. VILLADSEN: Vasicek, and I think that's the right pronunciation.

MS. MILLER: Vasicek, I'm sure you're saying it correctly.

DR. VILLADSEN: The reason that I think that's a better adjustment is that if it's based on a statistical analysis of what is the persistence in which you estimate your beta for the railroad industry for which you estimate position of any other beta you try to adjust to what. I like that approach, while instead of saying 2/3, 1/3, that's based on data that was estimated from 1926 to 1960, and I'm not sure it still holds. In terms of how useful it is, there's not a whole lot of North American regulators who have used it. It's fairly commonly used in Europe. It's used by the Dutch regulator, it's used by the Italian regulator, it has, until recently, been used by the Spanish regulator, and unfortunately I was unable to read Spanish enough to figure out what the accurate number is.

MR. ATKINS: And another point to make about is my understanding of beta, and Dr.

Villadsen hopefully will interject if I'm wrong, is it all comes around concerns that your estimate of the beta isn't sufficiently accurate. So that there's uncertainty in your estimate of the beta and so they believe that if you're going to use, if you're going to estimate the beta and then you're actually going to use it to set rates for, like, the next five years going out, you might need to put in this adjustment to bring it down towards one because that's what you might think would happen. The more solid you are about your estimate of beta, the less you need to do some sort of arbitrary 1/3, 2/3 adjustment, but also importantly the more frequently you're calculating the beta, you're just going to instantaneously capture changes in beta over time. So you're not being asked to estimate beta today and then hold it constant for the next five years, which is what a lot of utility regulators do when they do their rate process. You're actually calculating beta every year, and it's not just for individual railroads. You calculate

this on a portfolio basis so you have more observations and your estimate is therefore more precise, and the Vasicek, and I'm almost exhaust my knowledge of it by saying it, is the reason it's a little more precise is it doesn't take this arbitrary 1/3, 2/3 number, it actually tries to determine how much precision is your beta estimate. What's your confidence interval? The more imprecise your beta estimate is, the more it will adjust it down towards one, but the tighter your estimate of beta actually is, the less, it'll leave it alone because the model is, we think its predicting the beta most accurately. So, end of the day, because you're using a portfolio and you're estimating beta every year, AAR submits there is no reason to be introducing this complexity, and I end on one last note. They site a lot of survey literature, and they say while the surveys show that everybody uses beta, a Blume adjustment, that's actually not what their survey showed. If you look at our reply of 28, we noted that the surveys say that

fifty percent of those who responded use unadjusted betas. So it's not like it's the predominant approach to use. You know, half use it, half don't. We think you're on solid ground sticking with the actual estimate of betas.

MS. MILLER: What about the recommendation to go to the fifty years, not back to 1926? Maybe I missed it, but I don't think in your testimony you mentioned that this morning.

DR. VILLADSEN: No, but I'm happy to address that. I believe you should use data as far back as you have reliable data. That's the best estimate. And the reason for that is that if you choose some period you are inherently going to have to make a decision on a cutoff. It's fifty years, it's forty years, it's sixty years. I would also like to point out that if you, for example, were to say okay, so the first period, the 20's and 30's were a little bit unreliable, as was World War II, and you go to, say 1947, which is right after World War II, and say let's use from 1947 till today, you would

come up with an estimate of 6.8 percent, very close to what we currently have. If you chose to go in a different direction, which is what a publication by credit twists or the Professor Stimson Martin Staunton do, they go back to 1900, you come up with an estimate that's 6.75 for the U.S. So you can extend it a little bit in either direction, and you are very close to what we currently have. So I would not recommend that you choose fifty years or some other. I would commend to choose some specific date where it says, well, I believe it's as far back as we have reliable data. I believe after World War II, but I think that's what the criteria should be based on. And there's also the simple thing that a friend of mine or colleague, Professor Myers used to say, well, history tends to repeat itself. So whatever historic information we have is useful.

MS. MILLER: And then a final question. Is this a correct assumption on my part, I thought based on something that you said, that you've done some work before the Canadian

regulators?

DR. VILLADSEN: I've done quite a bit of work before the Canadian regulators. I have prepared reports for the Canadian transportation agency that was primarily a survey of what methods are used around the globe, and a description of what is the pros and cons of each of these methods. I've prepared testimony, also a report for the British Columbia Utilities Commission, which by the way decided to use fifty percent CAPM and fifty percent discounted cash flow in its decision, and, again, it was partly a description of what methodologies are being used and partly a description of what are pros and cons of the methodology. We did not, I did not, and my coworkers did not recommend this specific cost of equity in those reports.

MS. MILLER: One of the things I'm wondering, and maybe there isn't an analog in the way the Canadians regulate railroads, but on this issue of for revenue adequacy, whether or not we're using actual revenues, what the heck is the

term that we've been debating back and forth? Replacement costs. Replacement costs, is there an analog in the Canadian approach?

DR. VILLADSEN: The Canadian regulator does not use replacement costs. I don't think I can speak to whether they do anything of analog, I have not studied that issue, so I'm afraid I'll say something that's inaccurate.

MS. MILLER: Okay, thank you.

MR. ELLIOTT: That's it, thank you very much. Okay, we're going to take a half hour break, so we'll be back here around 12:40 for lunch. Thank you.

OFF THE RECORD

ON THE RECORD

MR. ELLIOTT: All right, why don't we continue with the third panel. You may begin.

MR. MORENO: Good morning. On behalf of the Concerned Shipper Associations comprised of the American Chemistry Counsel, the Fertilizer Institute, the Chlorine Institute, and the National Industrial Transportation League I want

to first thank the board for initiating this proceeding and scheduling this hearing. As has been the case without written comments in this proceeding, our testimony today will focus upon the revenue adequacy questions and docket Ex Parte 722. Over the course of our testimony, we will address the following questions from the board's hearing notice: What is the appropriate time period for measuring revenue adequacy, and what is an appropriate definition for a business cycle? Should the board require a revenue adequate railroad to justify rate increases for complaining shippers, and would this be consistent with the statute in a relevant law? Should a revenue adequate railroad's ability to differentially price be limited for all cafted shippers or for a subset most likely to be subject to railroad market power, and is there a way to identify those shippers, most likely to be subject to market powers such as RSAM, RBC's, or the maximum markup methodology? Finally, we will discuss the impact of our revenue adequacy

proposals on the railroads in light of recent service issues facing the rail industry.

As we have watched the rail industry achieve or come close to achieving revenue adequacy through its unprecedented financial success, it is clear that the revenue adequacy goals of the Staggers Act have been, or very soon will be met. As the ICC recognized and coal rate guidelines, the achievement of revenue adequacy opens the door for alternative methods for determining whether the rates charged to cafted shippers are reasonable because, "cafted shippers should not be required to continue to pay differentially higher rates than other shippers when some or all of that differential is no longer necessary to ensure a financially sound carrier capable of meeting its current and future service needs." The revenue adequacy constraint, thus, is a long awaited and economically supportable and judicially supported alternative to standalone costs, or SAC. As demonstrated at the end of yesterday's testimony, SAC has proven

to be too costly, too complex, and too lengthy to be a practical use to all but a handful of cafted shippers. The entire constrained market pricing construct designed by the ICC and coal rate guidelines was to determine the proper level of differential pricing. None of the four rate constraints and guidelines including revenue adequacy is predicated upon rate of return or earning type regulation. The assertions to the contrary in yesterday's railroad testimony are simply an exercise in misdirection.

Specifically, coal rate guidelines states that the constraints in CMP represent different means of approaching the same basic issue, i.e., the extent of unattributable costs to be covered through differential pricing and the portion that can be charged to the shipper involved.

Moreover, each constraint was designed to approach this question from a different perspective. The ICC, again, specifically stated that our guidelines offer the flexibility to approach the rate analysis from various

perspectives. Number one, appropriate level and minimum cost of efficient service to cafted shippers in the SAC analysis. Number two, the appropriate level of carrier revenue needs in the revenue adequacy examination, three, other available means of meeting or eliminating those revenue needs through the scrutiny of the carrier's efficiency, as in the management efficiency constraint, and finally, the phasing constraint, which was the public interest in minimizing economic destructions. Although SAC and revenue adequacy are both constraints upon differential pricing, they were never intended to operate the same way or to produce the same results. Indeed, in guidelines, the ICC stated that the various constraints contained in CMP may be used individually or in combination to analyze whether the rated issue is unreasonably high.

The overarching objective of the concerned shippers in this proceeding has been to provide the board with concrete proposals for implementing the revenue adequacy constraint.

Our guidelines for developing proposals that we will present today have been to make them practical, cost effective, economically supportable, and within the existing statutory parameters. Consistent with guidelines, our focus throughout has been on regulating the level of differential pricing, not rate of return or earnings regulations. Through specific examples today, we will illustrate how our proposals could work and prove that they do not constitute rate of return regulation. Specifically, we will show that the parade of horribles caused by yesterday's railroad economic witnesses cannot come to pass because our proposals protect competitive traffics contribution to revenue adequacy, and do not impose an upper limit on railroad earnings. Our testimony will cover four principle subjects. The critical role of revenue adequacy and implementing Ramsey Pricing Principles in the coal rate guidelines. The proper time period for measuring revenue adequacy, methods by which the board could

implement the revenue adequacy constraint, and the impact of those proposals upon rail service and investment.

Although our focus is on Ex Parte 722, that should not be construed as disinterest on our part in Ex Parte 664. We are very much interested in that proceeding because how the board measures revenue and adequacy is a predicate to determining the applicability of whatever methodologies the board eventually adopts for implementing the revenue adequacy constraint. We had deferred the Western Coal Traffic League to argue the issues in Ex Parte 664 so that we can devote our resources to developing proposals for properly implementing the revenue adequacy constraint upon rail pricing of cafted traffic. We nevertheless desire to express our support for the WCTL petition and the positions that they have advocated in this proceeding, which demonstrate that if anything the board's existing measure of revenue adequacy has established a conservatively high bar.

The Concerned Shipper Associations are represented today by the five witnesses at this table. Together with Paul Donovan, I am counsel to the Concerned Shipper Associations, and we are here to address the legal questions. We are accompanied by three economic witnesses. To my left is Dr. Kevin Caves who will address the role of revenue adequacy in developing more efficient rail pricing, conceptual approaches for applying the revenue adequacy constraint, and the impact of those approaches upon rail investment. To my right is Thomas Crowley, who will provide a practical illustration of how to determine if a rail carrier is revenue adequate for purposes of applying a revenue adequacy constraint. Mr. Crowley also will provide practical illustrations of how to apply the conceptual approaches described by Dr. Caves. To my far right is Jay Roman, who will review key financial metrics for the rail industry, to demonstrate why adoption of a revenue adequacy constraint is unlikely to have any impact upon rail service or investment.

Because each witness covers multiple interrelated topics, our presentation format today will be a little different from your typical testimony. Instead of going down the table with each witness speaking one at a time, we will have a moderated format that rotates among the witnesses according to the topics at hand. Mr. Donovan and Mr. Roman together will begin this testimony by addressing why revenue adequacy constraint will not impact rail service or investment.

MR. DONOVAN: Thank you. I would like to invite the board's attention to page three of its order in this proceeding, and I'll just quote that to you. It's very brief. "Some comments argue that any proposal that would limit the railroad's return on investment would negatively impact the railroad's ability to invest in their networks and expand capacity. Please discuss the impact of your revenue adequacy proposals on the railroads. Again, in light of the recent service issues faced by the industry." I'm going to ask Mr. Roman to present information to you that will

demonstrate, I think to your satisfaction, that the railroad industry is not facing service problems. The railroad industry is creating service problems. With that, Jay?

MR. ROMAN: Okay, thanks Paul. My name is Jay Roman. Pleasure to be with you this afternoon. As Mr. Donovan said, I am going to be going over both the operational and commercial results of the four major class I railroads. We're going to do this for the last ten years, starting in 2005 and ending in 2014. And whenever you're looking at the railroads, one of the first things you want to do is start out with car loads. The illustration on the screen has annual car loads each year between 2005 and 2014. When you say that the car loads varied quite a bit over this time frame, but they ended up pretty much where they began. In the year of 2005 we were looking at 34.7 million car loads on the four major class I railroads. The only year where we exceeded that number of car loads was 2006. After 2006, car loads plummeted. With the

recessionary years of 2008 and 2009, they hit a low point, and then after 2009, car loads were increasing each year. But in 2014, we still have 34.5 million car loads, which is virtually, you know, almost the same as it was in 2005. So when you're looking at the car load information, based upon all the money that the railroads are saying they're putting into the system, you would expect that service has really improved because the car loads are the same in 2014 as they are in 2005. If lots of money is invested in the system, you would expect service to be a lot better, but unfortunately that's not the case.

The service metrics that we're looking at, first off, we're looking at dwell time. Between 2005 and 2014, dwell time is the amount of time it takes a car to get out of the yard, and dwell time increased by 6.1 percent. Okay, that is not a positive for service. Train speed, between 2005 and '14 increased slightly, and chairs has increased slightly here. Am I falling down?

MS. MILLER: That's one of our trick chairs.

MR. ROMAN: Maybe I have this. Okay, train speed has increased slightly over this time frame, but it's not too different from what it was in 2005. Total car loads, which you just looked at on the previous illustration, is down. So when we're looking at operation results of the railroads, they haven't really improved over the last 10 years. Now, what this is demonstrating is that shippers are frequently complaining about what is happening with their service and these metrics give you an example of why. Based upon the rate increases the railroads have had over this time, service really hasn't improved, and you're faced with a dichotomy at the board. You have the railroads coming in and they're saying we're investing all this money in our system, and you have the shippers which are saying, gee, we're not really receiving the benefits of that. We don't see our service improving, and some shippers are complaining that their service is

going down. So to try to get to the bottom of why this dichotomy exists between what the railroads are saying and what the shippers say they're actually getting from the railroads, we looked at what has happened to the change in the railroad's operating profits. We wanted to see where those operating profits were going to, and for that we looked at the primary destination for operating profits, which was capital expenditures and payout to stockholders. And first off, we're looking at the year of 2005. Payout to stockholders includes three things. It includes dividends, it includes stock repurchases, and when we get to 2010 and thereafter it includes the BN's disbursement to the parent company. So if we look at 2005 we see that payout to stock holders was 1.67 billion dollars. Capital expenditures were a little over six billion dollars. It's kind of a twenty-two percent versus seventy-eight percent split between payout to stockholders and capital expenditures. When we then look at the second pie on the chart on

the right, that is for the year of 2014, and we have a very different picture. And one of the reasons we have a different picture is the railroads made a lot of additional profit. Between 2005 and 2014 railroads operating revenue increased about sixty-four percent, while their operating expenses increased about 38 percent. We're dealing with a twenty-six percent difference. So even though the car loads the railroads moved were pretty much the same in 2005 versus '14, twenty-six percent additional revenue generates a lot of additional profit. And there was a lot more that was spent by the railroads on both capital expenditures and payout to stockholders. The pie for payout to stockholders increases dramatically more in 2014 from where it was in 2005. And the reason for that is there was about a five hundred thirty percent increase in payout to stockholders over this time frame. So it caused payout to stockholders to represent a much larger portion of the pie between capital expenditures and what went to the stockholders.

Now, capital expenditures also increased over this time. They went from six billion dollars in 2005 to a little over fourteen billion dollars in 2014. But what this is demonstrating is that the money that has been going to the stockholders is actually increasing dollar values more than capital expenditures. The increase in payout to stockholders was about 8.8 billion dollars here where capital expenditures were just about at eight billion dollars. Well, this is just looking at one slice of time between 2005 and 2014. So we also looked at this over a longer time period. And this illustration is showing what happened to payout to stockholders versus capital expenditures over the time period of 2005 to 2009 in the left pie, and then the more recent time frame is what happened in the 2010 to 2014 time frame. Now what you find in 2005 to 2009 there were 61-1/2 billion dollars that went to one of these two categories, and there was about payout to stockholders was about thirty-five percent of the pie during this time frame, and

the capital expenditures were about sixty-five percent. When we go out to the more current time frame, 2010 to 2014, our pie looks very different, and we're getting pretty close to a 50/50 split. And the reason for that is there was much more money that was put into both of these categories, 103.9 billion dollars, but in the payout to stockholders it increased by 25.5 billion dollars while capital expenditures increased by 16.9 billion dollars. So what this information is demonstrating is that stockholders made out very well from the increase in rail profits. And I'll demonstrate that on the next illustration.

This bar chart is showing, the second bar down is showing the increase in operating profit between 2005 and 2014. Operating profit increased one hundred seventy-three percent. Well, with this increase in profit, railroads were able to give a five hundred thirty percent increase in payout to stockholders. Both of these things cause a dramatic increase in the

value of railroad stock, and the four publicly traded railroads UP, NS, and CSX, the average price of their stock between 2005 and 2014 increased about three hundred forty-five percent. Now, in my written testimony I have a number in there that the railroad stock price only increased one hundred sixty-eight percent, and that's because I made an error. But the reason for the error is pretty important. Because of the big increase in railroad profits, their stock price was soaring. It was going up rapidly, and there were a number of different stock splits that the railroads initiated. In my earlier number, I didn't catch all of the stock splits of the railroad. When you consider all the times that the railroad stock split over the time frame, the increase was three hundred forty-five percent in the value of their stock. So shareholders have obviously benefitted greatly from increased rail profit. The rest of the measures on this bar chart have to do with railroad operations. The next two bars down,

miles of earned track and revenue ton miles were owned by all of the track. These are a little bit different than other things we're looking at. These are AAR numbers. These are not numbers for just the four major railroads, the Association of American Railroads only puts this data out for all the class I railroads, and we didn't have this data available for 2014, so these present changes stop in 2013, but they're pretty instructive.

When we looked at miles of owned track, between 2005 and 2013 time frame, it was down 1.4 percent. So there's less track that the railroads own. When we look at the revenue ton miles, it shows that there's greater congestion because there's more revenue ton miles going across the track they own because that's increased 4.1 percent. The other bars on this chart are things that I've already discussed. Average dwell time is increased 6.2 percent, which means the cars are staying in yards longer. Average train speed was pretty similar in 2015 to

what it was, excuse me, 2014 to what it was in 2005, and car loads were pretty much the same. What this is demonstrating, that the increase in rail profit has not improved operations for shippers. Now, when we look at this data it needs to be considered that there are two different types of capital expenditures that the railroads make. One type of capital expenditure is to maintain the existing infrastructure of the system. There is a different type of capital expenditure that can be made, which is to improve capacity of the system. What these numbers demonstrate is that the capital expenditures the railroads are making are more for capital expenditures to maintain the existing infrastructure of the system. Because service hadn't improved over this time frame, even though the number of car loads that the railroads move is virtually the same in both 2005 and 2014.

Now, I'd like to conclude my testimony here with just saying that the purpose of doing this analysis was trying to explain the dichotomy

between what you're hearing from railroads versus what you're hearing from shippers. And what the results of the analysis show is that rate increases are not necessarily the answer to getting better service. And what the analysis shows is that in order for you to properly control service, it will be very difficult without being able to institute some type of control over how much of the increase in the railroads profit caused by rate increases are put back into the rail system. And that concludes my testimony.

MR. DONOVAN: Thank you. Dr. Caves will now address the role of revenue adequacy in Ramsey pricing, and explain why revenue adequacy constraint provides a more efficient pricing structure than standalone costs for regulating rail rates.

DR. CAVES: Thank you and good afternoon to everybody. I'll first start off by talking about standalone costs. The standalone cost is the hypothetical cost to a railroad,

providing service to only a subset of its full network. By definition, a standalone cost provider is less efficient than the incumbent provider because it has fewer efficiencies available to it in terms of scale and scope economies. The first problem with trying to apply a standalone cost regulation to the rail industry is that its actually designed to solve a problem that doesn't exist in the rail industry in the first place. In particular, and this slide is for later, actually. In particular, the standalone cost framework was developed for use in a fully regulated monopoly, in which regulators set all the prices that the fully regulated monopoly is allowed to charge. Under these specialized conditions, standalone costs will prevent cross-subsidization among different groups of customers. That is the purpose for which the standalone cost test was designed. Of course, that simply doesn't apply here. The majority of rates, as we all know, are fully deregulated. You don't have to take my word for

it. The original author of the SAC test, Jerry Faulhaber, has already submitted a verified statement in which he has debunked the railroad's claims that the standalone cost test is well designed for the rail industry. But just to reiterate, because I've heard these claims repeated by the railroads yesterday, I'll just read a few key passages from Professor Faulhaber's verified statement.

He begins on page one by repeating some of the rather grandiose claims that have been made about the standalone cost test by the railroads, such as the standalone cost tests rest on a sound economic foundation, the standalone cost test is the most accurate procedure for determining rail rates, the standalone cost test is widely and consistently recognized by economists as the gold standard, etc., etc. Professor Faulhaber's response to this is, "As the original author of standalone costs, I would be quite flattered by all of this if any of it were true." And he goes on to explain why it's

not and why it's not accurate. He also goes on to explain that the standalone cost framework "simply does not fit the STB regulated firms. It is not even close. This provides no economic justification for imposing standalone cost regulation. None." That's the first problem with applying standalone cost regulation. The second problem with applying it to the rail industry is that it's not designed to prevent prices to captive shippers from rising above competitive levels. There is nothing in the SAC standard that will prevent prices to captive shippers from rising well above competitive levels right up to the fully monopolistic pricing level.

The SAC standard, in fact, focuses the regular on the inefficiently high cost of the hypothetical network, and inappropriately rewards railroads for their incumbent position by linking their prices to those of a less efficient hypothetical rival. So now I'd like to talk about the alternative, which is, of course, a

revenue adequacy standard. The first thing to clarify about revenue adequacy is that under this standard, by definition, the railroads would always be able to cover all of their costs, all their fixed costs, all their variable costs, and all of their costs of attracting capital. By definition that would be true. And this may well require, this will, in fact, tend to require that the railroad exercise some degree of market power with respect to its captive shippers. However, after revenue adequacy is achieved, the railroad should also face some constraint on the exercise of market power with respect to its captive shippers. Why is this? Well, it's just basic economics. Unconstrained monopoly pricing causes economic efficiency or dead weight loss, and you will find this in any Econ 101 textbook, I can guarantee you.

This brings us to Ramsey Pricing Principles, which are very closely related to revenue adequacy. According to Ramsey Pricing Principles, the objective of an economically

efficient pricing structure should be to minimize the deadweight loss of monopoly pricing subject to the constraint that the railroad must earn sufficient returns to cover all of its costs, including the cost of attracting sufficient capital. In other words, the Ramsey Pricing Framework is an exercise in constrained optimization, and revenue adequacy defines the constraint to the Ramsey problem. And I'll try to go over this in a little more detail and illustrate it in the next slide. Sorry, the previous slide. Yes. So, the idea motivating Ramsey Pricing is very simple. Economic efficiency, according to the very basic principles in economics, is promoted all else equal, by setting price equal to marginal costs. However, when you have an industry with economies of scale and high fixed cost as you do in the railroad industry, marginal costs will tend to lie below average costs, and that means strict marginal cost pricing is not feasible. Any entity that attempted to set all its prices equal

to those marginal costs would go out of business.

So how do you solve this dilemma? Well, there's the profit maximizing solution, which is simple. You set prices high as possible above marginal costs, and just charge whatever the market will bear. The problem with this is what we've already mentioned earlier. If you have a monopoly exercising market power you're going to get monopoly pricing and you're going to get dead weight lost, and that's economically inefficient. So Ramsey Pricing Principles provide a better, more efficient solution to the problem, and it's a very intuitive solution. The idea is, yes, go ahead and set price above marginal costs, that has to be true, but only by enough to cover all of the costs, all of the fixed costs, all the variable costs, all the necessary investment returns. So, again, it's an exercising constrained optimization in which the idea is to move price as close to marginal cost as possible without violating the revenue adequacy constraint. However, as long as that

constraint is satisfied, as long as the railroad is earning sufficient returns, any rate adjustment closing the gap between price and marginal cost is economically efficient. That's what Ramsey Pricing tells us. Any adjustment. Even if the full Ramsey optimum is never achieved.

So suppose we have a shipment and the exact Ramsey price is a hundred dollars, and we have a monopolistic railroad that's charging a thousand dollars. If we move that rate from a thousand to five hundred that would still involve a very substantial improvement in economic efficiency, even if we never get it down to one hundred. So in conclusion, Ramsey Pricing Principles imply a substantial scope for efficiency improvement in railroad rate structures with respect to captive shippers, and these improvements can be realized by lowering prices below the levels implied by SAC and closer to the Ramsey levels, even if the exact Ramsey price is never actually reached.

MR. MORENO: This brings us to the

question of how do you actually implement the revenue adequacy constraint in practice. Dr. Caves, Mr. Crowley, and I have given extensive consideration to how the board might apply the revenue adequacy constraint in a manner that is practical, cost effective, economically supportable, and consistent with the statute. The first step in developing any methodology for implementing the revenue adequacy constraint is to identify the proper time period for assessing the revenue adequacy of a rail carrier, which is a question that the board has posed in its hearing notice. Dr. Caves will address this predicate question, and he will be followed by Mr. Crowley, who will illustrate how to determine the extent to which a railroad is revenue adequate consistent with Dr. Caves' testimony.

DR. CAVES: Thank you. The ICC has previously suggested measuring revenue adequacy over the course of a business cycle, and that is, in fact, an economically valid and supportable approach, essentially because it adopts a

reasonable investor perspective. Investors care about future returns and they face the problem of trying to gauge future performance based on past performance. Of course, the economy is procyclical, it goes through business cycles, it goes through ups and downs. So the railroads profits at the peak of the business cycle are going to tend to over predict its future returns, and their profits at the trough of the business cycle will tend to under predict future returns, obviously. So you don't want to pick one single year if you're an investor trying to figure out whether to invest in the railroad, so if we just take the average performance over the course of the business cycle, that will give a better, more reasonable estimate of expected future returns. Over the post war period, if you looked at the NBR website, the NBR is the official body that dates business cycles. The average business cycle has lasted for about sixty-nine months, so about six years. So this is a reasonable time frame for measuring revenue adequacy. Notably,

the most recent US business cycle includes the great recession of 2007 through 2009. This is universally recognized among economists as the most severe economic down turn in the post war period. In other words, the most severe recession we've had since the Great Depression. It's been more severe in terms of duration and in terms of losses in employment and in output. I bring this up because the railroad's robust financial performance during and since the great recession can and should be seen as powerful evidence of the long-term financial viability and of their ability to compete with other industries for capital in the equity markets.

In fact, if we were to just look at the railroad's returns since the end of the recession, we would find that railroad stocks have gone up since mid-2009 by about two hundred thirty-nine percent. The Dow Jones Industrial Average has gone up by less than half that amount, one hundred ten percent. The S&P has gone up by one hundred twenty-five percent.

Trucking stocks have only gone up by seventy-six percent. Yet, according to the railroads, they can't even earn enough to cover their cost of capital and they're a bad investment. So by that logic, I think they would advise you not to buy their stock in 2009. I think you should have bought it personally. And the other point we'll get into later is if the railroads are not, in fact, earning enough to cover their cost of capital, how, in fact, have they made the investments that they've rightly been proud of and have been reporting to you? For example, since the end of the great recession, they have invested one hundred sixty-eight billion. In the past ten years they've invested two hundred forty-four billion, and in the past twenty years, since 1995, they've invested three hundred ninety-four billion.

Now, over the vast majority of this time period, by the board's own metrics, they were revenue inadequate. And what that tells us is that that revenue adequacy measures that we're

using are a very conservative measure that understates the railroad's true ability to attract capital, and I think it's important to keep that in mind.

MR. CROWLEY: Using actual UP data as the example, plus the six year business cycle that Dr. Caves was talking about, I demonstrate in this analysis how to measure the shortfalls and surpluses related to revenue adequacy on a year by year basis. Column one identifies each of the years in the analysis. Column two identifies the STB's determination of the railroad industry cost of capital for each of the six years in the business cycle. Problem three shows the UP's tax adjusted revenue shortfalls and surpluses by year over the same six years as determined by the STB in its calculation of UP's revenue shortfall allocation method, or RSAM ratios. Specifically, column three shows that UP has generated tax adjusted surplus every year except for 2009 when the country experienced the largest economic down turn in the post-World War

II period. Column four calculates the value of each year's surplus or shortfall in 2014 dollars, using the railroad cost of capital appearing in column two to calculate each value. Line seven, column four shows the sum of the surpluses and shortfalls over the six-year business cycle, and line eight, column four shows the average surplus which was used in later slides.

MR. MORENO: So once a rail carrier is determined to be revenue adequate, as this example demonstrates for Union Pacific over the most recent six year period available, based on the board's revenue adequacy determinations. The revenue adequacy constraint can then be applied to determine the reasonableness of the challenged rate. Dr. Caves has identified two potential approaches for implementing the revenue adequacy constraint, which he calls the yardstick approach and the rebate approach. Dr. Caves will first discuss the conceptual underpinnings and practical application of the yardstick approach, and then we'll turn to the rebate approach after

that.

DR. CAVES: Thank you. So, the all right, we'll stay there for now. So the yardstick approach, the basic idea is to use statistical methods to predict the rates that captive shippers would pay under more competitive conditions, so in essence, you take a sample of comparable competitive rates and you compare it to what shippers are paying and see if there is a significant difference. This appeared to be what some of the railroad's own economists were endorsing during their testimony yesterday. Specifically, I think it was Professor Kalt. In any case, the idea would be to, when you're drawing this sample of competitive shipments to obtain the rates of the competitive shipments, and then to obtain relevant characteristics of these competitive shipments, such as the commodity type, the distance of the shipment, the size of the shipment, cost variables from ERC's, perhaps, that influence the cost of making the shipment and so forth. Once we have this

variable we can build a model that quantifies the relationship between the characteristics of the shipment on the one hand and the actual rates paid on the other. Once the model has been developed, shippers in captive markets could, in effect, take the characteristics of their shipments, plug them into their model, and see what the comparable competitive rate is for their shipments, perhaps through an interactive website. If the shipper's actual rates sufficiently exceeds the predictive competitive rate, then the shipper would have a basis for relief. Of course, if the shippers were already paying something close to the predicted competitive rate, close to the predictive competitive rate, then they would have no basis. The TRB has already endorsed this approach and constructed a prototype model that does exactly this, and you can read about in their full report. They use the Carload Waybill sample to do so.

I will give a highly simplified example in what

follows that sort of follows the broad contours of the TRB while hopefully giving a more intuitive explanation of how the benchmark approach would work. And when I say benchmark, we're going to use benchmark and yardstick interchangeably here. Okay. So here we have a very, very simplified version of what the model would look like for illustrative purposes. On the horizontal axis we have the distance of the shipment measured in miles. On the vertical axis we have the rate of the shipment measured in cents for ton mile, and you can see we have a scattering of blue diamonds that represent a sample of competitive rates. So this would be the blue diamonds are a benchmark sample. And according to this simple model, the actual rate is a linear function of the distance of the shipment. You can see there's a straight line going through the blue dots. In particular, the slope of the line is negative because we would expect that for longer distances shippers would tend to pay lower rates per ton mile, and in

fact, that's what the TRB itself has found in its own work. So once you have the sample and once you've estimated the model, in this case, just a straight line, the potentially captive shippers can compare their rates.

So I have three hypothetical potentially captive shippers here, shipper A, shipper B, and shipper C all paying potentially anticompetitive rates. So let's perform the comparison first for shipper A. You can see that here. Shipper A would first, well, obviously it would know its actual rate. We could just read over to the vertical axis, 14 cents per ton mile, and that's being shipped over a distance, if you read it down to the horizontal axis over roughly 700 miles, and according to the benchmark model, comparable shippers shipping over a distance of seven hundred miles are paying a competitive rate of approximately seven cents per ton mile. So, shipper A appears to be paying about twice as much as what comparable competitive shippers are paying.

Same exercise I'll go through for shipper B. Shipper B is shipping over a longer distance, about a thousand miles. Its actual rate if ten cents per ton mile, and comparable competitive shippers are paying about six cents per ton mile for shipping over the same distance. And once again, for shipper C it's the same exercise, nine cents per ton mile being the actual rate, and four cents per ton mile being the competitive benchmark rate. The other thing to note about shipper C is you can see clearly in the model that there are competitive benchmark shipments that are paying rates higher than what C is paying, right? So if you look over to the left-hand side those two blue diamonds there are both above the red dotted line. So those are competitive shippers who are paying more than ten cents per ton mile, where shipper C is paying over nine cents per ton mile. But, of course, they're shipping over a much shorter distance, so you would expect them to be paying a higher rate.

So now that we've done this comparison

for shippers A, B, and, C we can compute a very simple statistic, which is simply for each shipper the ratio of the rate it actually pays to the rate its predicted to pay under more competitive conditions. So, for shipper A recalled that they were paying fourteen cents per ton mile. The predicted competitive rate was seven cents per ton mile. You divide one by the other and you get a ratio of two. So they're paying twice as much as what the competitive benchmark says. Shipper B, on the other hand, is only paying 1.67 times as much as the competitive benchmark. Shipper C is paying 2.25 times as much, so this ratio is useful because it tells us which shippers are facing the steepest over charges relative to the competitive benchmark. The next step in this method is to select an allowable differential, a maximum value for R that we're going to allow. And this can be calibrated to protect revenue adequacy. When we set the RMAX, when we set the allowable differential, it tells us two things. First, it

tells us how many shippers are going to get relief, and second, it tells us how much relief they're going to get, assuming that they qualify. So, for example, it's very intuitive. If we started out with a low level of our max, such as 1.6, well, it's clear that all three of these shippers would qualify for at least some degree of rate relief because they're all starting out with the ratio above 1.6.

In particular, shipper B would qualify for a modest amount of relief because it would only take a small adjustment in its rate to put it right back down to 1.6. It's starting out at 1.67. Shipper C would qualify for a lot more relief because it's starting out at 2.25. Alternatively, we can select an RMAX equal to 1.9. In this case, only two out of the three shippers would qualify for any rate relief at all because shipper B's ratio is already below 1.9. Shippers A and C would both qualify for rate relief, although they would qualify for less rate relief than they would have qualified for if the

RMAX were 1.6 instead of 1.9. And the same exercise goes through for an RMAX of 2.1. In that case, only shipper C qualifies for rate relief, and it qualifies for less rate relief than it would have qualified for under the other two scenarios. The point of this is, whatever the results of the regression model ultimately adopted by the STB, and we don't know what those are going to be, it would be a much more complicated model. RMAX could always be calibrated to target rate relief to a fixed percentage of potentially captive shippers. As the TRB observed, when it endorsed the benchmark method, the benchmark method "should not threaten revenue adequacy because regulators would be able to set the strictness of the screen, that is, the amount by which a rate can exceed its predicted competitive level before being subject to a challenge."

One approach that the STB could think about taking would be setting a relatively high, so a relatively conservative value of RMAX initially,

engaging the effect, if any, of this rate relief on revenue adequacy, and then gradually relaxing it over time. In conclusion, what the yardstick approach accomplishes is to A, preserve differential pricing to captive shippers because you'll notice no matter where we set our max there is still differential pricing literally built into the system. Everyone is going to be paying more than what a comparable competitive shipper pays for any are greater than one.

So we preserve differential pricing and we also target rate relief to the shippers that face the steepest over charges relative to competitive levels, because, again, no matter where we pick our max the shippers that are facing the steepest over charges are the most likely to qualify for relief, and are going to qualify for a higher level of relief than other shippers. And now I'll turn it back to Mr. Moreno.

MR. MORENO: We believe that the yardstick approach is probably the preferred

approach that we are going to present this afternoon, but the key to the yardstick approach is to be able to identify railed shipments that face meaningful competition because those are the benchmarks in which we're inputting into this regression analysis. That's probably also the most challenging aspect of implementing this approach. The TRB has identified certain fields in the Costed Waybill Sample that are indicators of meaningful competition, and they also link some of those fields to outside data sources to bring in additional information, but that's probably only a start. More information is likely to be useful and necessary to implement this approach. The board itself could expand data needed in the Costed Waybill Sample to capture some of the additional fields or information that would be needed to implement this approach. It also could be appropriate for the STB to conduct studies through formal proceedings, somewhat of a blend of a market dominance determination and a commodity exemption

proceeding, for example. To identify the attributes of affected competition for specific types of commodities that could be applied in an objective manner to declassify the Costed Waybill Sample as either captive or competitive to give you a pretty solid determination of what those are.

The yardstick approach, although it would require substantial initial investment of time and resources by the board and it's stakeholders. The process would be relatively easy to implement and update thereafter. An alternative to the yardstick approach that could be implemented more immediately is the rebate approach that you've heard so much maligned yesterday. Dr. Caves will begin by addressing the conceptual underpinnings of the rebate approach, and Mr. Crowley would then illustrate two potential ways to implement the rebate approach that are based upon methodologies already familiar to the board and upheld by the courts. Mr. Crowley will refer to these two

rebate alternatives as the proportional reduction method or of the MMM, maximum markup method.

DR. CAVES: Thank you. The rebate approach, the objective of the rebate approach is to combine the efficiency properties of differential pricing with some limitation on the railroad's ability to exploit its monopoly position vis a vie captive shippers. The idea of the rebate approach is to take a portion of the railroad surplus revenue, only a portion, and put it in a pool that is potentially subject to rebating to captive shippers in the form of lower rates. So just to clarify, by surplus revenue, we mean revenue above and beyond what the railroad requires to remain revenue adequate. So the rebate approach takes only a portion of that surplus and protects the contribution made to surplus revenue by any presumptively competitive traffic. There are two approaches, two variations that we'll talk about as to how the rebate approach could be implemented. The first we'll call the proportionality approach. This

one adheres most closely to Ramsey Principles in the sense that shippers with lower demand elasticities should pay higher rates, according to Ramsey Principles. So the proportionality approach attempts to adhere to that.

The maximum market method, on the other hand, targets shippers paying the highest rates, and this is more consistent with what I understand to be the long cannon factors in this statute. At the same time, the maximum markup method is still very much consistent with Ramsey Pricing Principles because, as we saw earlier, any adjustment of price towards marginal costs will increase the efficiency of the pricing system, according to Ramsey pricing. And with that, I'll turn it over to Mr. Crowley.

MR. CROWLEY: Continuing with the fact that actual data shows that UP is revenue adequate over the six year business cycle from 2009 through 2014 I developed the example on the screen to show how the rate reduction would be applied to captive traffic following the

proportional reduction approach. The example begins with actual UP 2014 revenues on line one. The actual average UP revenue surplus over the six year business cycle that I discussed earlier is shown on line two. Line three identifies the percent of aggregate excess surpluses provided by captive shippers. This allocation to captive shippers is calculated as follows: Using the traffic and revenue data from either the railroad's records or the STB's confidential Waybill sample, each movement will be arrayed from highest to lowest based on its RVC ratio. Using one hundred eighty percent RBC as the demarcation point, all movements with RBC ratios less than one hundred eighty percent would be considered competitive, and all movements with RBC ratios equal to or greater than one hundred eighty percent would be considered captive. Using the ERC's based costing approach, the railroad's fixed cost will then be allocated to each movement to develop total cost per movement. The excess revenue per movement will next be

developed by subtracting each movement's total cost from its revenues, and then summed across the competitive and potentially captive groups to calculate net excess revenues for each of the two groups. The potentially captive excess return share will then be calculated by dividing the potentially captive shippers aggregate net access, net excess revenues by the sum of the net excess revenues for potentially captive and presumptively competitive group. For purposes of this example, I have assumed that the mix of traffic handled by UP, ninety percent of excess revenues from captive traffic as shown on line three.

Line four identifies the excess revenues that are available to captive shippers by multiplying line two times line three. Line five shows the 2014 aggregate UP required revenues, assuming the captive excess revenue is line four. I subtracted from the total UP 2014 revenues. The margin adjustment factor is shown on line six. The margin adjustment factors calculated using an

iterative process which reduces all rates above one hundred eighty percent in relative proportion until aggregate UP revenues showed on line 14, column 11, equal UP target revenues shown on line five. In this example, the margin adjustment factor equals 95.1 percent. I next assume that UP handled the seven shippers shown or identified in column one. For each shipper I assumed a column two rate, a column three variable cost, and a column four annual volume. The aggregate revenues in column five for each shipper equal the rate in column two times the annual volume in column four. The total on line 14, column five equals the line one UP total 2014 revenues. The RBC ratio for each movement is shown in column six and is calculated by dividing column two rate by the column three variable cost.

The elasticity margin or the price cost margin is shown in column seven. The first adjustment is made to the column seven elasticity or price cost margin ratios through application of the margin adjustment factor appearing on line six. The

margin adjustment factor reduced the base elasticity margin, column seven, to the adjusted elasticity margin, column eight. By applying the same margin adjustment factor to all above one hundred eighty percent shippers, the elasticity margins remain in relative proportion to each other. Once the column eight adjusted elasticity margin are identified, the adjusted rates, RBC ratios, and total revenues can be calculated as shown in columns nine, 10, and 11. Also note that the total adjusted revenues on line 14, column 11 equal the UP required revenues calculated on line five above. In this example, shipper A is the complaining shipper, and therefore, the only movement whose rate is subject to relief. This is reflected in column 12 with only the revenues for shipper A reflects a revenue reduction. The total surplus revenue subject to rebate, line four, would be exhausted only if shippers B, C, and D also filed complaints and could prove market dominance. Otherwise, UP would retain that revenue for

itself. In addition, UP retains all the surplus revenue attributed to the below one hundred eighty percent traffic, shippers E, F, and G in this example, which means that UP's revenue would never be kept at the revenue adequacy level, which is line one minus line two.

The second example following the rebate approach is the maximum markup methodology, the example is similar to the example we just discussed from an input standpoint. The primary difference appears in columns six where the MMM approach that the STB has developed in its standalone or simplified standalone models is used to allocate the surpluses. Otherwise, all of the facts that I just discussed would apply equally here. For time reasons we'll pass it back to Mr. Moreno.

MR. MORENO: In developing both variations of the rebate approach, we wanted to respond to railroad concerns that a revenue adequacy constraint would be tantamount to rate of return regulation, that deprives them of

incentives to invest in their infrastructure. Dr. Caves will explain how our proposals are different from rate of return regulation, and also discuss the impact of our proposals on the railroad's ability to invest and expand capacity in response to this specific question which was raised in the board's hearing notice.

DR. CAVES: Thank you. Under rate of return regulation, the regulator adjusts all of the prices that the utility or the regulated entity is allowed to charge, to guarantee a fixed return on the utilities assets. This is not what either of the methods we are doing proposes, just to be very clear. The yardstick approach, or the benchmark approach clearly doesn't do this. It makes no reference to returns of any kind. It's simply a method for setting competitive rates in areas where competition does not appear to be present. Economists would call that price cap regulation, which is not the same at all as rate of return regulation, and it's generally preferred by most economists as doing a better

job of preserving railroads incentives or the regulated entities incentives to achieve profitability and efficiency.

So that covers the benchmark approach. The rebate approach is also not equivalent to rate of return regulation. Most fundamentally because the rebates only include surplus revenue that can be attributed to potentially captive shipments. All of the railroad's surplus revenue, as we've just reviewed, all of the railroad's surplus revenue attributable to competitive traffic is completely off limits under the rebate approach. So we just want to make that absolutely clear. Therefore, the more profit the railroad can earn from its presumptively competitive routes, the less there will be available for rebate under that approach. In addition, of course, under the rebate approach, all rebates would remain purely hypothetical unless and until a shipper successfully brought a case before the STB. And similarly, for the yardstick approach, no shipper would be able to actually receive any rate relief

until it proved that it was paying rates substantially above the competitive level and it would also have to show market dominance as well, of course.

So just to wrap up, the other fundamental reason why our proposals would not limit returns and would not discourage investment is that, again, by definition, the revenue adequacy standard protects a railroad's ability to remain profitable and attract investment. And it does this in a conservative way because as I alluded to before, the STB's revenue adequacy determinations are themselves conservative. We can see this very clearly, because according to the STB's revenue adequacy determinations, the industry should not have been able to attract the billions of dollars in investment in capital. But it has, in fact, attracted over the recent decades.

The economist for the AAO yesterday made this point fairly clearly. When Dr. Brenner pointed out in his testimony that the railroads,

as rational firms, would not and should not make investments in which the rate of return is less than the cost of capital, and if I could continue just for one more moment to finish my thought. Thank you. So Dr. Brenner pointed out that the railroads would not make investments in which the rate of return is less than the cost of capital. I most certainly agree with that. That is very much consistent with basic principles and economics. The railroads and their investors should only be willing to make investment for which the rate of return exceeds the cost of capital. But guess what? As the railroads have reminded us, they have, in recent years and decades, made enormous multi-billion dollar investments. So while telling us all about these investments, the railroads and our economists want us to believe that they've also consistently failed to earn sufficient returns to cover their cost of capital over the same time frame. If that's true, then why in the world did the railroads keep making these billions and billions

of dollars in investment year after year, decade after decade? Again, I'll just give you the figures, one hundred sixty-eight billion since the great recession, two hundred forty-four billion in the last ten years, and three hundred ninety-four billion in the past twenty years. The vast majority of that time they would have been found revenue inadequate. So why did the railroad's project manager keep recommending projects that didn't return enough to cover their weighted average cost of capital, and why on earth did the executives keep approving these multi-billion dollar boondoggle investments? And how on earth did the railroads manage to keep going back to the capital markets year after year raising billions of dollars to fund these supposedly awful investments? Well, the reality has to be that the railroads and their economists are either underestimating the true returns to investment, over estimating the true cost of capital, or both. And the reality also has to be that the STB's revenue adequacy determinations

are very conservative, they tend to understate the railroad's ability to attract capital, historical data prove that. Therefore, the STB should have greater confidence in adopting this highly conservative standard if it decides to regulate based on revenue adequacy.

MR. MORENO: In the interest of time, I'll just mention very quickly that we also have proposed an alternative for shippers to contest just the rate increase. This is essentially the same alternative that Western Coal Traffic League proposed yesterday. Once a captive shipper demonstrates market dominance and revenue adequacy at current levels, the STB may reasonably conclude that further increases in the differential pricing are presumptively unreasonable. Chairman Elliott, yesterday you asked the question about are rebuttable presumptions consistent with the APA. If you're still interested in that I invite you to ask me the question. I won't take up more time on that at the moment, and I would just quickly wrap up

by noting that prior to this hearing we submitted a more detailed and written explanation in a narrative on today's testimony into the record. This was submitted, I believe, on Monday. That narrative contains a further detailed explanation to help you work through the examples we've done today, and our proposals for implementing, and we encourage the board to consult that narrative to better understand what we have proposed. With that, I'll defer to the board to any questions you may have.

MR. ELLIOTT: Thank you very much.

MS. BEGEMAN: First, thank you for the effort that you went to to respond to the board's request for ideas and comments and testimony. Certainly, what you supplied earlier this week is helpful in understanding your creative proposal.

MR. MORENO: I'm sorry, could I ask you to speak more directly into the microphone. I'm having a little difficulty.

MS. BEGEMAN: Okay. I'm not sure if this is for Mr. Crowley or for you, sir, but I

think that in your testimony, with respect to the rebate reduction approach, really, whichever version I think the question applies to, but I think that you said that the board would have the ability to determine what portion of revenues would be included in the rebate reduction approach. So you could, rather the board could, sort of control how much of the excess revenues would be at risk or at issue, but then, I think Mr. Crowley when you walked us through your proposals it seemed like it was a pretty clear number based on mathematics, and so I'm not really sure which I should believe.

DR. CAVES: Yes, I think I can clear that up. The situation in which the board would be able to sort of calibrate the RMAX, I believe that's what you're referring to. That was actually referring to the yardstick approach. So under the yardstick approach, the RMAX that the board is able to set, that defines the extent to which a shipper's rate, captive shipper's rate is allowed to exceed the competitive benchmark.

That only applies to the yardstick model.

MS. BEGEMAN: Okay.

DR. CAVES: So the other percentage, you're quite right, is based on a calculation that Mr. Crowley can describe in more detail.

MS. BEGEMAN: It's more firm?

DR. CAVES: It's, well, Yes, the data tells you what it is, Yes.

MR. MORENO: Tom, do you want to add anything in terms of how the rebate approach, which is more quantitative?

MR. CROWLEY: In the example we had ninety percent as the factor, and obviously that was an estimate. We don't have the data to make the actual calculation, but the idea is you could make the actual calculation based on the assumptions that we outline in our testimony. We start with one hundred eighty percent is the demarcation point and anything to the left of one hundred eighty percent or anything with RVC ratios less than that would be presumptively competitive traffic, and anything to the right of

that or greater than one hundred eighty percent would be presumptively captive. And you can calculate for each one of those movements the amount of revenue over total cost per movement that exists, and by summing those up and each of those two parts, you get two parts of money and captive divided by the sum of the two parts equals the ninety percent I was explaining to you, so that could be done each year for each carrier and apply to the surplus revenues resulting from revenue adequacy calculations.

MS. BEGEMAN: So it's a limit or a cap ultimately?

MR. CROWLEY: It's kind of a floor. In other words, through this methodology, we will not assign any revenues that were contributed by competitive traffic to captive traffic through this application.

MR. MORENO: And if I can go back to one of the examples that we were using I think it's important to note Mr. Crowley identified to types of money, the below one hundred eighty,

which we're calling the presumptively captive traffic because of the jurisdictional threshold, and the, or excuse me, presumptively competitive traffic, and the above one hundred eighty, which we are describing as the potentially captive traffic, same phrase the board has repeatedly used to describe it. We are not touching the pot of money in the presumptively competitive group at all. And when we're looking at the, so none of that gets redistributed. And when we were looking at the above one hundred eighty group we are allocating, we're taking the contribution to unattributable costs from just that group and then spreading it back by one of the two methods, proportional or the MMM method across all of the one hundred eighty traffic, so to take this example that we have up here, let's assume that get shippers A, B, C, and D, if you look at column 11 you see, and you compare that to column five, the approach distributes the excess revenue back to all of shippers A, B, C, and D. Now, but first of all, we only have one complaint in this

example, A, so in the example, A is the only one who gets any relief. Number two, let's assume that B, C, and D --

MS. BEGEMAN: Don't you think the other letters will pay attention?

MR. MORENO: I'm sorry?

MS. BEGEMAN: Don't you think the other letters will pay attention?

MR. MORENO: Yes, yes, so that's where I'm going now. Now, assume B, C, and D also file complaints. Well, first of all, each one of them has to prove market dominance. Let's say B filed its complaint and it cannot prove market dominance. The railroad contains that excess revenue that's otherwise allocated to shipper B. And let's say, but if C files a complaint and it prevails and by showing market dominance it would be entitled to its allocated share here. The point being that shippers who don't bring complaints and shippers who don't prove market dominance above the one hundred eighty group, the railroad keeps that revenue because we have made

sure that the entire pot of money is at least hypothetically distributed across every above one hundred eighty shipper. And only those who prevail on a complaint get their allocated portion of that. So there's no way we can drain the swamp unless every single above one hundred eighty shipper files a complaint and proves market dominance. And in that case, the swamp should be drained, under an example, but that's unlikely to happen.

MS. BEGEMAN: Could you help me understand dead weight loss?

DR. CAVES: Dead weight loss, oh, sure. I could really use another slide now.

MS. BEGEMAN: That's okay, I mean, I have them all here.

DR. CAVES: Okay. No, I mean, it's just easier if you draw it on a white board. But the basic idea when economists talk about efficiency, the idea is you're trying to figure out that you have a market for any good, right? You've got an upward sloping supply curve, you've

got a downward sloping demand curve. If nothing interferes with supply and demand, then wherever those two intersect is going to be where you find an equilibrium, and that's going to tell you the price and the quantity. The price at which the good will be sold and the quantity is sold. And as long as supply is meeting demand, then there's no dead weight lost in the system. And the reason is every single unit of the product is produced as long as the value to society of producing that unit is greater than the cost to society of supplying the unit. So that's the basic way to measure efficiency in economics. If the benefit is bigger than the cost it's efficient for that thing to be produced, for that item to be brought to market. So the problem that comes up with monopoly pricing is that the monopolist does not want to charge a competitive price. The monopolist wants to charge the monopoly price, which is significantly higher. Why? Because that'll maximize the monopolist profits. And the reason economists don't like

monopoly pricing is not so much that the monopolist gets a "unfair amount of profit." The problem is that the only way the monopolists can earn that profit is by restricting the quantity supplied below the competitive level, right? That's how you get prices higher, you've got to restrict supply. And as soon as you start restricting supply you're going to be producing fewer unit than you would under a competitive situation. And that means there are going to be a whole bunch of people that don't get to buy the unit, even though they value it more than it costs society to provide it. It's sometimes referred to as, I wish I had a whiteboard. You refer to --

MS. BEGEMAN: I'm glad you don't.

DR. CAVES: But I can assure you, if you look, if you talk to any of the economists in this room or if you look in any economics textbook, that's a very fundamental premise of microeconomics.

MS. BEGEMAN: Mr. Roman, I don't mean

to put you on the spot, but the last sentence of your testimony -- I don't know if you were reading from a written testimony, but could you repeat what you said, or maybe you were just going off the top of your head, but --

MR. ROMAN: No, the last sentence I said in order for the board to control service it's going to need to have some type of control over how much of the increase in profit the railroads are making from rate increases go back into the system. My testimony demonstrated that there was a very large portion of operating profits that the railroads made, which were going to the stockholders, leaving the rail system, and there isn't any, as far as I know, isn't any regulation to try to regulate that. I think the railroads are --

MS. BEGEMAN: I think that's probably a good thing.

MR. ROMAN: I'm sorry?

MS. BEGEMAN: That there's not regulation to regulate that. But back to some of

your pie charts. I know you were trying to make a point, but to say a car load is a car load doesn't seem like a fair statement. I think you used BNSF as the example, what car loads they were moving, although the number may be very comparable to 2005 to 2014. The makeup of those car loads are very different in the type of investment or the type of service. I mean, with the crude oil in North Dakota, all that they've had to do to accommodate those requests for service. Certainly, there's a lot more to it, I think, than just what you were showing on your pie charts.

MR. ROMAN: Well, actually, the line graph, we've had the annual car loads each year with the railroad. I mean, your point is if a car load is not a car load in 2014, even though the car loads were the same, very similar to 2005.

MS. BEGEMAN: In number.

MR. ROMAN: Different distribution on the railroad system, it could be more intermodal

or less intermodal. It could be a lot of different things. The point being raised is that the railroad's capital investments appear to be maintained in existing systems. Specifically when you get into the crude oil and you get into the frac sand movements, which are probably more important to rail than the crude as we go out into the future. Investments could have been made for that years before all these movements actually started. They knew a lot of this was going to happen, but the railroads held back investing capital in a lot of areas. And that was the reason that you had service issues out there. It didn't have the infrastructure to support it. So it's a question of are the railroads investing to maintain the existing system, or are they investing to increase the capacity of the system for what could be happening next year or the year after, or five years from now. And the service parameters that we looked at there demonstrated that service isn't improving and those capital expenditures

appear to be going in the direction of just maintaining the existing system.

MS. BEGEMAN: Well, maybe you could help me understand it if I ask it a different way because I'm not quite following. But I think that the advertisement on WTOP is that the railroad industry is putting in twenty-nine billion dollars this year of investment, and you're saying that the board should ultimately control and dictate even more for investment purposes rather than it going to the shareholders?

MR. DONOVAN: No, that's not the position of the concerned shippers. Sorry, Jay.

MS. BEGEMAN: Okay, because that was actually the message I was getting.

MR. DONOVAN: I understand that last sentence in this testimony I hadn't heard before.

MS. BEGEMAN: Okay.

MR. DONOVAN: I think Dr. Caves just gave you the economic reality of what happens with dead weight loss. And the point that he

made there is that when monopolists go up to the monopoly price they do not want to increase supply. In the railroad industry that means they do not want to increase their capacity to move more traffic. So, Jay Roman's data reflects, I think clearly, that the railroads have not expanded their capacity over the last ten years even though they've made a lot of money. They have put twenty-nine billion, whatever the number is, into maintaining new tunnels --

MS. BEGEMAN: That's just for this year.

MR. DONOVAN: Well, whatever, but new tunnels, you heard two hundred fifty million dollar tunnel. Well, the tunnel is going to fall down. Of course they had to replace the tunnel, or whatever other infrastructure investment you need to make to keep the system running. That could be a lot of money. The railroad is highly capital intensive. We know that. That doesn't mean that the railroad industry is going to expand its capacity. Now, we're not here to tell

you that you should regulate how the railroads invest their money. That's not what we're doing here.

MS. BEGEMAN: Okay, good.

MR. DONOVAN: What we are doing here is saying we saw a parade of economic witnesses and others come in yesterday and say oh, my god, don't reduce our rates because if you do we will not have money to expand our system, and what Mr. Roman's numbers show you is that they're not expanding their system, and what Dr. Caves tells you is they won't expand their system. There is no economic incentive for these four effectively monopoly railroads to expand their systems. So don't think that by putting in a revenue adequacy test or restraint or constraint that somehow or another you're going to prevent the railroads from expanding their systems because they're not going to expand their systems.

MS. BEGEMAN: But by expansion do you mean that they have to have more miles in operation? Technology, I think, is one of the

reasons that they haven't had to expand.

MR. DONOVAN: That may be true, but you're having service problems. How are you having service problems when they've got all this money? The fact is, they're not interested in expanding. Even the TRB report says they don't understand why the railroads aren't putting more money into their system so they can serve all the profitable traffic. They're not doing that because they don't want to do that. Dr. Caves explained why they won't do that. They're monopoly pricing. They love that dead weight loss, but the shipper, i.e., the society, i.e. our economy, doesn't love that loss. That's the point we're trying to make. We're not telling you to regulate investment, no. But we are telling you is don't think that you should not put in a revenue adequacy constraint because somehow it's going to prohibit the railroads from investing money that they're not going to invest anyway.

MS. BEGEMAN: I'll turn it over to you

at this point.

MS. MILLER: So, Dr. Caves, I want to go back and make sure I was understanding this correctly. I thought, if I get on my right page, that the point you made when you said the total amount that railroads had invested since the recession, 168 million over two years, two hundred forty over twenty years, three-hundred ninety-four --

DR. CAVES: Oh, Yes.

MS. MILLER: Is what you were saying, is the sheer fact that those numbers are out there tells you that they must be revenue adequate because they wouldn't do that if they weren't revenue adequate? Is that what I understood you to say?

DR. CAVES: Yes, it tells me that a measure of revenue adequacy that says that the railroad is revenue inadequate, and therefore unable to attract capital must be conservative if the railroad were, in fact, attracting sufficient capital to make these investments over that time

frame.

MS. MILLER: And if it's not possible it's not a big, can you go back to one of those charts, one of Dr. Crowley's charts? On the rebate approach. Okay, so this one. Is line number five, are you saying that's the amount that they would have charged to their competitive traffic, and as a consequence that's an amount that should clearly be retained and not a part of the calculation?

MR. CROWLEY: On line five?

MS. MILLER: It's called UP required revenues.

MR. CROWLEY: That's the amount after you strip out the contribution to the surplus by the competitive traffic. So that's amounts that --

MS. MILLER: You're saying that what you're calling the surplus came from competitive traffic, not from captive traffic?

MR. CROWLEY: No, the surplus in total is shown on line two.

MS. MILLER: Line two.

MR. CROWLEY: And what we want to do is take out of line two that portion that was contributed by competitive traffic, so we strip that out.

MS. MILLER: But is that line five?

MR. CROWLEY: And that is line five.

MS. MILLER: Okay, so you'd say that that amount in this case, 22.7 --

MR. MORENO: Yes, mathematically, those lines actually follow one another. You start with UP's total revenues of 23.8 million in line one. We've calculated the surplus as 1.273 million dollars. Now, and what we've now taken is line three takes ninety percent of line two to generate line four. And line one minus line four equals line five. So what that ninety percent represents, and this is a hypothetical, the ninety percent is the portion of line two that was contributed by above one hundred eighty shippers.

MS. MILLER: Okay.

MR. MORENO: So that creates the above one hundred eighty pod of money.

MS. MILLER: Okay.

MR. MORENO: And everything that's left over is the below one hundred eighty.

MS. MILLER: Okay.

MR. MORENO: Now, whether ninety is the true number or not, we don't know, that's a number we picked out of the air.

MS. MILLER: Yes, okay. So, one of the things that I'm curious about, going back to the TRB study and the way you've looked at doing this, they also said that URCS is desperately flawed and you shouldn't try to fix it, but the one hundred eighty comes out of URCS, correct? So are you uncomfortable with the notion that our current way of figuring out who's above and below one hundred eighty is coming from a system that, at least, you know, some set of researchers?

MR. MORENO: I would add at the beginning, the pretext or the guidelines that we used for calculating this, one of those

guidelines enumerated up front is consistent with current statute.

MS. MILLER: Yes, true.

MR. MORENO: What the board can do today. You know, what the TRB is concerned about is a policy debate that can be had down the road, but we need to deal with what we have in front of us right now and the tools that we have, and that's how we come up with this approach.

MS. MILLER: And then, particularly, I guess, it would be on the benchmarking approach. In order to do that, I mean, the way I understood what TRB did was they used the information that could be derived from the waybill sample.

DR. CAVES: Combined with some other data, Yes.

MS. MILLER: And if we were truly going to use this as our method for regulation, is the information available through the waybill sufficient to create this kind of statistical model to predict what a competitive rate would

have been?

DR. CAVES: No, it'll get you most of the way there, but the TRB had to go outside the waybill, and they were able to go outside the waybill. They obtained information to try to approximate the availability of competitive alternatives from external data set. So they would take the location of a station, they would map it to a latitude and longitude from some other database and then figure out, okay, they basically constructed a crude metric. How many class one railroads are within ten miles? How many ports are within twenty miles? Mr. Moreno earlier was making the point that that's where you would probably want to consider something a little more precise. After all, the TRB was doing it illustratively.

MS. MILLER: Yes.

DR. CAVES: But that should be feasible. There would be some up front cost to it for sure. But supplementing the CWS with some reliable indicator of effective competition

should not be insurmountable. And we have more details on that in our written testimony.

MS. MILLER: So if one were interested in pursuing this sort of an approach, part of what it would require is, you know, sort of then figuring out where your comparable traffic is so you're comparing the rates back to comparable traffic?

DR. CAVES: Are there complications to that, you know, just sort of knowing what you really could call comparable and not comparable? Is that something that could be debated for years?

MR. MORENO: It's similar to a market dominance determination that you do in a rate case. It's similar to commodity exemption.

DR. CAVES: Oh, but it's more transparent than that, right? Sorry to interrupt. But at least, if you estimate a reliable model then you have a very transparent way of determining what traffic is comparable, right? Because the model tells you how the

different shipment characteristics relate to the rates.

MS. MILLER: Yes, so you would know what the characteristics are?

DR. CAVES: Yes.

MS. MILLER: So you're saying it's transparent because you can make a judgment call if you felt like, in fact, those characteristics were the same?

DR. CAVES: Well, and the model will tell you. You know, if there's some characteristic that doesn't matter, the model will tell you, hey, this coefficient is insignificant. Drop it out of the model, we don't need it. That's an objective standard that you can get. Sorry to interrupt.

MR. MORENO: And the illustrations that Dr. Caves used, he created very simplistic one that assumed there's just one variable of distance. Obviously, when we get into this you're going to have to come up with several variables.

MS. MILLER: Yes, so it was, I thought it was great that Vice Chairman Begeman asked about dead weight loss because I had that on my list too, but unlike her I wish you did have a whiteboard because, again, I'm pretty sure I would have understood it better if you were drawing on a whiteboard and by the time Mr. Donovan was finished with us I concluded that actually was a fairly important thing to understand.

MR. MORENO: He's creating his own whiteboard right now.

MS. MILLER: I know, I see that.

MS. BEGEMAN: I didn't wish to imply that I didn't think it was important to understand.

MR. CAVES: Is there a projector or something I can use? I can just kind of hold it up.

MR. MORENO: We don't have an opaque projector, but.

MS. MILLER: You can just come up

here.

MS. BEGEMAN: You can approach the bench.

DR. CAVES: All right, I can approach the bench? Okay. All right, so here's the way it works.

MS. MILLER: Do you want a microphone?

DR. CAVES: So I'm showing a supply and demand graft here. You've got upward sloping supply which shows the marginal cost of producing some product, it doesn't matter what it is, you've got demand, which shows how much people, consumers, society value the product, right? The more of the product that's produced, generally, the more it costs to produce it.

MS. MILLER: The more that's produced the more it costs to produce it?

DR. CAVES: Right, so marginal cost tends to increase. At some point, for example, the railroad just hits capacity and can't accept anymore shipments on this railroad, so the cost goes up. The cost curve could look different,

but that wouldn't materially affect it. Because you're right, the marginal cost tends to go downward, but this will make it more concrete. The demand curve slopes downward because the more you sell the lower the price you can sell it at is the basic idea.

MS. MILLER: Yes.

DR. CAVES: If we produced only this much, so suppose we're way back here at this quantity level, the demand would be very high. People would be willing to pay a very high price because it's in such short supply. On the other hand, the cost of producing that much is relatively low. So that tells us it's not efficient to be at this production level. You need to keep on moving to the right here until you get to this level, because when you're at this level you know that you've gotten to the point where it's the value that someone places on buying that product is just equal to the cost of producing that product. And the problem with monopoly pricing or any, you know, distortionary

taxation can do the same thing is that it will move you away from this optimal quantity, and there will be all this output that never gets produced, even though the benefits of producing it are greater than the cost of supplying it. So that's it.

MS. MILLER: Thank you.

DR. CAVES: Yes.

MS. MILLER: Okay, I'm done. Thank you.

MR. ELLIOTT: I think we'll probably have to enter that into evidence just because it was described and, I mean, take your time. I don't think it'll be controversial because you were explaining, I think, a basic economic principle.

DR. CAVES: That should be very uncontroversial, yes.

MR. ELLIOT: But I think just because it was a little unorthodox that we should at least have the exhibit in evidence for reference of the other parties. I just had a few

questions. First, with respect to the rebate. Yesterday we were discussing similar rebate proposals with the carriers and the carriers' one concern was it would have an asymmetric problem. Do you agree with that statement that you're only going to be recovering on the high end above revenue adequacy, but what are you going to do below it?

DR. CAVES: Is there going to be a problem? Which method were you asked about?

MR. ELLIOTT: The rebate.

DR. CAVES: The rebate method? So, of course, the issue here is that you will never, it doesn't really apply because regardless of whether you're on the upside or the downside you never go so far on the down side that you have a dis-incentive to invest. I think that's really the answer. The asymmetric regulation argument assumes that once you go on the downside, oh my gosh, your returns are so low that you're not earning it above your cost of capital, so why would we make a productive investment? But if

your returns never get that low it's a non-issue.

MR. MORENO: And under the rebate approach, the railroads can still earn above their cost to capital and retain that excess earning. All we're rebating here is the excess contribution from the captive shippers, the above one hundred eighty shippers. The railroad keeps the excess contribution from the below one hundred eighty shippers, and it also keeps the excess contribution from the above one hundred eighty shippers who aren't truly captive because they can't produce, or because they can't show market dominance. So to the extent the railroad is engaged in halves pricing of its competitive traffic, which is what UP, for example, in this proceeding, has attributed most of its financial success to. It keeps that revenue. We're not touching that. We're dealing with differential pricing of the truly captive market dominant shippers and refunding only their excess contribution.

MR. ELLIOTT: And back to the

benchmark model that you explained that was, I guess, also in reference to the TRB model, talking to the economists about -- I asked questions about that yesterday. With respect to their analysis they did not have a huge problem with it, the model itself, but their conclusion was that it would lead you back to something that's complex or similar to SAC. Do you agree with that, their analysis?

DR. CAVES: I don't agree. I don't agree and the TRB doesn't agree. The TRB had a long time to think about these issues and a long time to put that report together, and they had a various distinguished group of economists working in a, I think it was Dr. Colquitt in a non-disputatious environment, which is what he said he preferred, and they concluded that the yardstick approach was the way to go.

MR. ELLIOTT: Thanks. And also with respect to the yardstick approach, I know we're talking about it in the context of revenue adequacy, but were you looking to use that as a

broad measure or to be a trigger by revenue adequacy, just so I'm clear on that.

DR. CAVES: I mean, I think, well, I don't know what the official position is, but I think none of this stuff could be triggered until revenue adequacy were received, right?

MR. MORENO: Right, it would have to be revenue adequate in order to even employ the yardstick approach.

DR. CAVES: Yes.

MR. ELLIOTT: Okay, thank you.

DR. CAVES: And we would advocate using the methodology that Mr. Crowley demonstrated early on as to how you calculate revenue adequacy using the six year rolling average that you use the UP as an illustration.

MR. ELLIOTT: Final question, not completely on point, but we've been talking about the SAC test, and as you mentioned earlier in your testimony, I think you led off with it that it doesn't seem to be effective. You've been a very active practitioner on behalf of your

clients in these types of very complex chemical cases, and is there a reason why -- I can see that the SAC tests that you've brought are very, very complicated. Is there a reason why the shippers that you represent aren't bringing simplified SAC cases just to take some of the complexity out of it?

MR. MORENO: Yes, there's a couple reasons I can say about that. One is simplified SAC. The simplications in simplified SAC tend to generate even higher rate levels simply because the primary simplification is the elimination and the opportunity to remove inefficiencies from the system for the SAC analysis. So, we start out probably at a higher rate level. Number two, the duration of the rate relief is only for five years as opposed to ten years in a SAC relief. Simplified SAC, although simplified, is still expensive. It's still over a million dollars, probably closer to two or three million dollars in actuality, and the Board recently made it more complex by even changing the road property

investment simplifications by making it more complex. So the amount the litigation costs of litigating simplified SAC for a return that is less for a short, that is a smaller return over a shorter period, it doesn't make the internal cost to capital from our client's perspective. I think it would be helpful if the board were to extend the duration and the remedy to ten years because I think it would make the economics of bringing a simplified SAC more attractive.

MR. ELLIOTT: Thank you, that's very helpful. Any other questions?

MS. BEGEMAN: Yes, could I?

MR. ELLIOTT: Sure.

MS. BEGEMAN: I might have two quick questions. A few times you mentioned the hurdle that each shipper would have to prove market dominance. I realize that it's not an automatic that a party is market dominant, but certainly the board has gone out of its way. I have not always agreed with what the board has done, but it has created a new limit price approach. Are

you suggesting that somehow the board's approaches for considering market dominance are overly restrictive? I mean --

MR. MORENO: No, I'm not here and I'm not intending to critique, in any sense, the Board's approaches to market dominance. I'm just making the point that market dominance must be proved before any shipper is entitled to their hypothetically allocated share of the rebate, otherwise the railroad retains that.

MS. BEGEMAN: Right, it's just that part of achieving that certain figure was that you'd already assumed they were within that captive traffic group, so --

MR. MORENO: Well, they were potentially captive.

MS. BEGEMAN: Right.

MR. MORENO: Right, above one hundred eighty is potentially captive, below one hundred eighty is presumptively competitive.

MS. BEGEMAN: Right.

MR. MORENO: There's probably captive

shippers below one hundred eighty too.

MS. BEGEMAN: Right.

MR. MORENO: We have to make some simplifications.

MS. BEGEMAN: And then just one last thing. With regard to the revenue adequacy constraint, from the very beginning of your testimony, I think you said that you supported Western Coal Traffic League's proposal?

MR. MORENO: We support Western Coal Traffic League's position in Ex Parte 664, and also that we had advocated a similar revenue adequacy constraint to Western Coal Traffic League as a constraint or limit upon rate increases once around.

MS. BEGEMAN: That's actually what I wanted to clarify, so you see it as a constraint on an increase?

MR. MORENO: Yes. And that would be an alternative. A shipper might decide, look, we don't want, it's still too complicated, too much time, we're not really interested in going and

trying a rebate approach or the market approach. We just want to keep our rates at a reasonable level and minimize the level of differential pricing. If a carrier is already revenue adequate it should not be entitled to additional levels of differential pricing and that's the presumption that would come about as a result of this rate increase limitation.

MS. BEGEMAN: Thanks for clarifying that.

MS. MILLER: I wanted to go back because I'd meant to ask this earlier. And so in terms of the time frame you would recommend six years and to do it as a rolling average as opposed to one of the parties yesterday was saying four years, but your recommendation says --

MR. MORENO: And I think we probably haven't made this point abundantly clear, but we believe measuring revenue adequacy should be based on a rolling six year basis because that's the average length of the business cycle in the

post-World War II area. We would then, on the flip side say that the rate prescription that comes from either the yardstick or the rebate approach would be for six years.

MS. MILLER: For two six years?

MR. MORENO: No, excuse me, would be six years.

MS. MILLER: Oh, thank you.

MR. ELLIOTT: Thank you very much for your testimony. Very much appreciated. Okay, why don't we begin with panel four?

MR. BISCHLER: Okay, great. Good afternoon, Chairman Elliott, Vice Chairman Begeman, and Commissioner Miller. My name is Paul Bischler, I'm the vice president of finance and the chief sourcing officer at BNSF Railway, and in my role I oversee the treasury group which handles the debt placements we do in both the private and public markets. I also oversee the risk management function, as well as the financial analysis that's done when we look at determining whether or not a project exceeds its

hurdle rate. Also, I've got the purchasing organization which supplies many of the resources we use to supply our capital infrastructure projects. So before I get started I did just want to comment on a few things. I appreciated, frankly, yesterday at the beginning of the testimony Chairman Elliott, you said that you wanted to make sure there was a thoughtful balance decision making in this proceeding, which I very much appreciated. Same thing to you, Commissioner, and Vice Chairman, and your comments around making sure we don't roll back the railroad industry. I've been in the industry now for twenty years and I can tell you during many times during that part of our career, some of our aspirational goals were to grow. We hope to grow, we hope to invest, and that's what we talked about. So my testimony today is really going to focus on two key points that we think are important. One, investment, and two, regulatory balance. So first, BNSF's investment has been unprecedented, and our customers have

responded by making their own investment of capital and volumes on our railroad. The current regulatory environment is generally working exactly as it should. We have a safe and reliable railroad that over time has been able to handle our customer's growth with improving operational efficiency. Second, the board must continue to strike the proper regulatory balance. We are very concerned with some of the proposals to adopt industry or commodity wide caps because we believe that will disrupt our business model which focuses on growth and investment.

However, we understand the board would have concerns about unlimited rate increases for certain shippers if and when railroads consistently earn revenues significantly in excess of a reasonable return. We believe the board should continue to address rates that are excessive through an individualized analysis. So I want to start by talking about investments, and up on the slide there you can see BNSF's business model. Frankly, it's focused on growing with our

customers. We will invest, if we're able to grow our business, improve our operational efficiency, and receive appropriate value for our services. This enables us to earn appropriate returns, which creates an incentive for us to further expand and continue this virtuous investment cycle. BNSF has had a long history of investing to improve and expand our network to the benefit of our customers and the overall economy. Since 2000, we have invested over fifty billion dollars in infrastructure and equipment. Since that time, we've replaced approximately forty-four million ties, over 11,000 miles of rail, and added more than thirty million tons of ballasts.

I did just want to pause here given the comments of the preceding panel. You know, one of the things that's important that I thought was overlooked, if you look at that blue line, that's growth. And when we talk about investment, that's why we've been investing a large portion of our funds. It's to help ensure we're able to be there as our customers are

growing. And Bystrum and Begeman, you correctly pointed out they arbitrarily picked 2005, which was one of the high points of car loads. The mix of business on a railroad has dramatically changed. A lot of our investment has gone into the northern corridor, which is where a lot of our newer volumes are moving now. And the last thing, they talked about service, and the fact that service isn't improving despite the investment we're making. The simple fact of the matter is when we look at our customer surveys across our broad base of customers, that's not what we hear. Over time, the marks we've gotten have improved. Now, I will say 2014 was a horrendous year and you certainly wouldn't have seen that from our customers, but prior to that time you saw consistent improving service marks.

With regard to adding new capacity, BNSF has added 536 miles of double and triple track, constructed 33 new passing sidings, and extended thirty-five sidings. These projects, along with targeted terminal expansion projects

and signal system upgrades have allowed BNSF to accommodate business growth on a continuing basis. As demonstrated by our plan to invest in industry records six billion dollars in 2015, following our record 5-1/2 billion dollar investment in 2014, we will reinvest in the business when we have a reasonable degree of certainty that will be able to achieve a reasonable return on our investment. Today, our 2.9 billion dollar maintenance program is what our entire capital program was just ten years ago. Our customers are also investing in our future. My colleague, John Miller, appeared before the board last month in the grand proceeding. He talked about how BNSF's agricultural customers were responding to our level investment by making their own significant investments in BNSF served facilities. We believe that our customer's investments are indicative of their belief in our ability to provide excellent service over the long-term at market responsive rate levels. We see this kind

of investment from customers across all of our business units. Since 2000, we've increased the volume on our railroad by over 2.1 million units, and every year since 2010 our volumes have grown year over year.

The slide that's up now highlights our investments since 2010. Because of the anticipated growth of our customers, you've seen broad geographic investment across our entire network, this will benefit all of our customer's business. It is well known that most forecasts of future traffic trends so that there will be an ever increasing demand for rail services, and thus a need for additional rail infrastructure in the U.S. At BNSF we certainly believe demand for our services will continue to grow, and the strategic investments made by BNSF will enable us to meet this ever increasing demand for our services. But while our belief and our customer's future growth has driven us to invest, a critical factor allowing us to make these private sector investments is that we've had a

relatively stable economic regulatory environment that's been conducive to investment. I want to emphasize how important regulatory certainty is in our investment decisions. The principles embodied in the Staggers Act appropriately balance the needs of certain customers to access rate relief with the recognition that our industry must be permitted to earn revenue sufficient to justify reinvestment. Those principles have incubated the growth and investment we've experienced in the past decade and supported BNSF's model focused on growing with our customers.

The board is very familiar with the service deterioration experienced by BNSF customers at the end of 2014 and 2014 as a result of significant, unanticipated volume growth that exceeded available capacity in key areas of our network, combined with harsh winter operating conditions. The dramatic and persistent down turn in velocity across our network, in combination with growing volumes, left us with a

choice. Either we respond with investment to build the capacity that will restore and ultimately improve service for all our customers, or operate with insufficient capacity to serve all of our customers current, much less, their future demands. We chose to respond with massive investment, and that strategy is working. We've experienced notable performance improvements in all key measures.

As you can see in the attached slide, our overall train velocity, as measured in miles per hour, has improved by eleven percent since last summer. We have, in turn, seen a dramatic reduction in the average terminal dwell experienced on shipments moving across our system. Our customers have already begun to feel the positive impact of these investments in a form of improved service and increased reliability, but the benefit of these investments are not short-term. The investments we made in 2014 and 2015 will benefit our customers and the U.S. supply chain for decades to come. However,

it is important for the board to understand that when we decided to make these large capital investments in 2014 and 2015 each individual project had to undergo a rigorous financial analysis. Will the projected returns justify making the investment? Unfortunately, when we perform these financial analyses, we don't have certainty into whether or not the estimates of future volumes, market conditions, and costs are accurate because of the long time horizon that requires they ultimately pay us back for these multi-million dollar projects. Many of our projects require decades to achieve a reasonable rate of return, and many of the markets we serve go through business cycles and are subject to disruption. The testimony I heard from the coal groups is a great example of long-term investment risks faced by BNSF.

A decade ago, when we began increasing our investment in our coal business no one could have predicted the down turn we are seeing now. Even as late as 2014, coal customers were

demanding that BNSF invest and add more capacity for coal. Yet, in the past year, BNSF has seen a structural change in the long-term outlook for our coal business. We expect that we will see a drop in these long-term investments. Coal is not the only market where we've seen the risk profile change. As we sit here today, it is already clear that many of those projects that we invested in during 2014 and 2015 will take longer than we anticipated to achieve a reasonable return. And there is no certainty that it will happen. That's frankly the challenge that we face when we make these long-term infrastructure decisions. When should I make it? Where should I make it? And can I count on the earnings to occur over a long period of time? Uncertainty about possible regulatory changes creates another layer of risk on top of those business risks I just described, and there is always a risk of regulatory processes such as environmental permitting causing unanticipated delays and getting those projects off the ground. As a

result, we have to make investment decisions based upon a risk adjusted threshold. The greater the risk the higher return we will require on the project. If the types of artificial rate caps now being proposed had been in place in 2013 and 2014, we simply would not have been able to respond to the service degradation that we experienced with the same level investment. We would have placed a higher degree of risk in our financial analysis, and that likely would have led to lower investment in those years.

It is important to note that despite being a subsidiary of Berkshire Hathaway, we are still subject to similar market forces to compete for capital. We must demonstrate our ability to generate returns and cash flows required to service our capital requirements. If we don't, our investors will find other alternatives for their capital. Keep in mind, our investors are not just Berkshire Hathaway. We also have investors in our public and private debt. Rating

agencies monitor BNSF's financial health, including cash flows and earnings relative to borrowing levels. If not managed properly, that can impact the cost of our debt, and ultimately our ability to find our investment. Therefore, BNSF's approach to our investment decision works exactly the way it did before the Berkshire Hathaway acquisition. Each capital projects, whether small or large, must undergo the same rigorous financial analysis. As I mentioned earlier, my team performs the analysis on all projects to ensure they provide for reasonable rate of return. Once complete, projects generally require approval by a cross-functional team of our executives. All of this ensures we make the best decision possible, given the facts and circumstances at that point in time.

In summary, I would just say every decision, whether or not we invest, is all about risk and returns. Because we are investing in long lived assets and spending is front end loaded, but the returns are earned over the life

of the asset, significant risk already exists when we invest in our infrastructure. As I mentioned earlier, one of the key aspects of our business model in this virtuous cycle of investment is ensuring we drive operational efficiencies. Operational efficiencies help us increase the value of our service to our customers and offset cost pressures and inflation. This has a significant impact on our ability to achieve reasonable returns. Each year, we analyze numerous investments geared toward generating operating savings out into the future. We assess those projects to ensure we will achieve a reasonable return on the capital spent. These type of projects are great for our customers, as they generally involve improving the fluidity and efficiency of our railroad. Another important aspect of incentivizing lower costs and innovation is it drives our suppliers to develop new and innovative products. As the railroad industry has grown, so have the resources and the capability of our supply base.

I see this firsthand today in my job the amount of innovation our supplier is doing is greater than it's ever been. Today, our suppliers understand we expect them to continually enhance their products to grow with us. As you can see from the slide, the number of rail equipment incidents and the reliability of our railroad has improved substantially in the last ten years. The joint efforts of the railroad and rail supply industry to innovate has been a main driver of this improvement. From higher quality rail to railroad tie life extension, to improve methods to enhance the surfacing of our railroad to the massive technology that is being invested, all of it happens because we work together with our suppliers who drive improvement. Today's regulatory environment permits exactly the type of behavior the board and the railroad's customers would want to see from us. We constantly challenge ourselves, can we do better?

However, proposals that we have seen from participants in this proceeding represent

significant risks in our ability to continue the current level of investment. RBC based proposals, in particular, have very negative consequences that are contrary to the public interest and the interests of our customers, and have the unintended consequence of penalizing railroads who made efficiency investments. To conclude, I would like to take us back simply to our core message today about investment and regulatory balance. BNSF has heard the complaints from some shippers about their inability to access the board's existing rate review procedures and would support efforts to address those concerns. But BNSF strongly opposes the adoption of any company-wide or commodity wide cap on returns like those that have been proposed by several commenters in this proceeding. BNSF understands that the board might be concerned about the highest of the high rates charged by a revenue adequate carrier to certain shepherds, but the board should not overreact with regulations through firm wide

constraints or rate caps. Those rates should continue to be addressed through an individualized analysis that does not disrupt the important regulatory balance that currently exists.

I will end by reiterating BNSF's business model is focused on growing with our customers. We have made unprecedented investments that have allowed us to grow and improve our service and efficiency. Our customers have responded with our own investments and increasing volumes on our network. This investment cycle is precisely what board policy should continue to encourage going forward. That's the end of my testimony and when we have questions Jill Mulligan will assist me.

MS. RINN: Jill, could you pass the clicker down please? Good afternoon, I'm Lou Ann Rinn, and we are very pleased, Union Pacific, to have the opportunity to address the very interesting and compelling topics that are the subject of this hearing. I am particularly

pleased to be able to introduce our two witnesses. The first is Professor Kevin Murphy, who is a professor of economics for the University of Chicago, and also affiliated with Charles River Associates. It's been a long two days, so I am not going to try to reprise his very extensive qualifications and credentials. I'll take a little bit longer, however, to introduce my colleague, John Panzer. John Panzer and I first began working with each other when we were investor relations together. He went on to other responsibilities in the finance department and then spent over a decade in interrole marketing and chemical marketing before returning to finance recently to take over as vice president of planning and analysis. John is going to discuss how Union Pacific addresses or deals with how we make investment decisions, and what the implications are for the issues that you are dealing with here. Professor Murphy is going to take a step back and look at some of the broader policy issues and address some of the

questions that you've been raising over the last two days. John?

MR. PANZER: Thank you, Lou Ann, and thank you for the opportunity to speak to you today. My responsibilities at Union Pacific include capital budgeting, which involves analyzing potential capital projects and determining which ones get funded and which ones do not. I understand that the board is considering proposals to impose new constraints on rail rates and revenues once railroads achieve so called revenue adequacy. If adopted, such proposals would impact our capital spending decisions and force us to reduce our capital investment, especially in projects involving new capacity. In my remarks, I'll describe Union Pacific's capital budgeting process and how demand for capital spending has changed over time. Then I'll explain how the types of rate constraints being considered by the board would affect our analysis of projects and force us to reduce investment. At Union Pacific, my team

analyzes proposed capital investments using the same valuation in capital budgeting techniques that are very common in those corporations. We're presented with a proposed project, we calculate the expected return on investment, or ROI, which is based on the size and timing of future expected financial benefits. We then consider where the ROI is sufficiently high to justify making the investment. The forward looking analysis we use in evaluating ROI's, and whether to make investments is very different from the backward looking historical analysis that the board uses in its annual revenue adequacy calculations. The board is measuring the rate of return generated by all existing assets in our entire enterprise, and we call that return on invest to capital, or ROIC, but it's a measure of past performance. New assets are added to our total investment base through our capital spending program to ensure that our ROIC remains above our cost to capital we have to ensure that each new investment that we make

generates an ROI that at least achieves our cost of capital. And at this point, I want to make a comment because it was discussed extensively the last couple of days about deferred taxes.

Deferred taxes are an outcome of what we call bonus depreciation, which is rules established by the IRS that encourages company to spend money or invest today by giving them tax benefits on those investments that occur sooner than they would otherwise. And that effect of all that is for bonus depreciation to increase the expected returns on projects and so by excluding deferred taxes from the ROIC calculation the board is effectively eliminating or reducing that incentive as created by the IRS to make near term investments. The distinction between the forward looking ROI and backward looking ROIC calculations is important to understand. In fact, it answers the question about how the railroads have been able to invest in projects, even before they became revenue adequate. And that's because future investments

are all based upon forward looking economics, not backward looking. Since ROIC is measured by the board as backward looking, it really provides no useful information about the prospects for earning a good return on future investments. And this difference helps explain why the board focusing on what is called revenue adequacy could depress returns on future capital investments and reduce the railroad's opportunity to meet customer's needs for capacity and service. Union Pacific generally classifies capital investments as either replacement or growth. Replacement capital projects are investments to replace worn or retired assets that continue to be needed for operation of the railroad. These projects carry relatively low risk because they're intended to allow us to continue to handle established traffic. Growth capital projects are investments to enable the railroad to grow the volume of business we handle, improve service for our customers, or increase efficiency. Most of my team's efforts are

dedicated to analyzing growth investments. These projects require more scrutiny because they're often associated with new sources of revenue or significant operating changes. This makes them inherently more risky than replacement projects and the potential future benefits are more difficult to analyze. To the extent that we have funds available to make investments, but there are not enough projects that will deliver adequate returns, our shareholders expect us to return cash back to them through dividends or shared buybacks. This allows them to invest in other activities that have greater prospects of generating higher market based returns. Union Pacific is experiencing high demand for investment and growth capital. In my job, the challenge is ensuring opportunities for growth, result in benefits that are sufficient to provide a return on those investments.

In the years following deregulation of the railroad industry, relatively few growth capital projects were undertaken. Railroads were

forced, instead, on increasing productivity by rationalizing their networks and eliminating unprofitable line segments. The need for growth capital increased following the UPSP merger, as we undertook new construction projects to connect the two railroads, and to support the then growing demand for powder river basin coal. Spending on growth capital then slowed until the mid-2000's, when rising demand supported increased rates, helping generate a level of expected returns that justified additional expenditures and growth capital. Since 2003, Union Pacific has spent over six billion dollars on growth projects such as adding new track, yard, and ramp capacity. I'll mention while our total volume since 2005 have not grown, our service has improved dramatically, and also the demand on our network has shifted. It started in the early 2000's to be more Midwest oriented, to support coal growth, and then more westerly to support intermodal, and now we're seeing increased demands in the southern part of our

railroad to support energy and chemical markets. So the capacity has been added, it's just the demand across the river has shifted.

But with these opportunities come challenges. The cost of adding capacity in our system is rising, we've constructed sightings, crossovers, and connections where they've had the biggest impact on through put, but to make equivalent impacts in the future we'll have to make even more extensive investments, like adding miles of double track. Investment requirements are also increasing because demand is rising in congested areas. For example, in Texas and Louisiana we face high land acquisition costs and other factors that make construction more challenging, including moving a large number of pipelines and dealing with environmental and permitting challenges. The challenge isn't finding investment and opportunities, but finding projects that generate sufficient return to justify these increasingly costly investments. The new rate constraints proposed in this

proceeding would increase the challenge in finding projects whose ROI would justify the investment. Such constraints with reduced capital expenditures in our rail network by reducing the number of projects that deliver adequate returns. As I've explained, when we're deciding whether to fund a project, the question isn't whether we have a particular system wide ROIC, however you measure it. The question is whether the project is expected to deliver sufficiently higher returns when looking only at the future investments that that project would generate.

When we invest in growing our network, we expect the investments will help us handle traffic, a sufficient level of profitability to make the investments worthwhile. If rates are subject to new constraints based on concepts of revenue of adequacy, fewer projects will produce sufficiently higher returns, and fewer projects will be funded. Again, this has nothing to do with our historical overall level of return or

our ability to access capital. It is probably easier to see how this is true for projects that would directly benefit traffic that is subject to rate regulation. For example, an investment that primarily benefits an exclusively served chemical facility might not be undertaken if rates were capped under revenue adequacy constraint and our expected return is too low to justify in the investment. But as I understand the proposals before the board, application of a revenue adequacy constraint would also reduce our investments in projects that would directly benefit exempt commodities or business under contract. If earnings from those investments are used to provide refunds or trigger rate caps for other traffic, then that regulatory tax would reduce our expected returns, and inevitably we would be left with fewer projects.

Most investment opportunities involve circumstances somewhere in between my two examples. They would directly benefit some traffic subject to regulation, and some that is

not. But in every case, the type of new constraints that are being proposed would reduce expected future benefits, and therefore force us to reduce investment. And even when we invest, the types of constraints being discussed could distort those decisions. If one project with otherwise high returns faces greater regulatory risk, then that project may not be undertaken in favor of another project with lower returns, but lower risk. In other words, new constraints would change the flow of capital dollars by overriding market signals. In summary, we believe that continued capital investment is critical to meeting the ever changing demand for rail service. Our capital spending increased substantially in the past decade in response to shippers demand for new capacity and improved service. But sustained high levels of investment are only possible if expected returns are sufficiently high to drive dollars back into our network. The types of new constraints being discussed in this proceeding are especially

troubling because they are focused on historical returns which have nothing to do with the forward looking analysis that we use to make investment decisions.

Use of the concept of overall revenue adequacy would interfere with market signals that identify what would otherwise be sound investments. Interfering with the free flow of capital to the best projects will distort investment decisions and inevitably reduce capital investment in our network. Thank you for your attention.

MR. MURPHY: Okay, sorry about that, I saw the light wasn't on, so I guess the light just doesn't work. Anyway, well, thank you very much for having me here today. It's really a pleasure to have the opportunity to talk. I'm going to try to go through much of what was in my written work, but also try to tailor it around answering some of the questions that have come up over the last few days. And if there are any additional questions or further clarification I'd

be happy to answer those after I'm done. Anyway, one of the things we've heard a lot about is, well, the railroads have had a lot of big improvement in their performance, haven't they? Don't they have plenty of money to make the investments that are needed? And I think it's important to do a couple of things. One is think about a little history and how we got here, and also to go back and review the underlying economics of investment, much of which John just talked about. So in terms of the history, the largest historical improvement for railroads came from rationalization of the network and improved operations that came after the Staggers Act in partial deregulation. Over time, excess capacity has been reduced, and many of the bottlenecks have been removed. This has led to higher productivity and lower rates to shippers. That's a history you're well familiar with.

However, there's a flip side to this. This has left the railroad industry in a situation where further progress cannot be

obtained simply by rationalizing what we have. Further progress requires that we make even larger investments going forward. That's, I think, what John just talked about here. And I have a chart that kind of illustrates that. This chart looks at the amount of expenditure per track mile over time for UP's network. And I think what you can see is that the amount of investment, the intensity of investment is much higher today because we're not just taking a network that had a lot of excess capacity and rationalizing it. In order to meet the ever changing nature of demand today, you have to build new things. You have to add new capacity in different places. And it's important to remember it's not just about total carloads. I think this came up earlier. When demand shifts, when we switch from Western Coal to Shell gas, that requires additional investment because they don't reutilize the exact same assets that were used before. And so you have to take this into account. So, you know, the fact that railroads

are revenue adequate doesn't mean that investment is insensitive to what you do, that somehow well, they're making enough money, returns are high enough, that's not a concern we have to have, okay?

So I'm going to go ahead. Another key point is that the improvement over time and investment is not just about meeting a specific customer's needs. One of the things that happens through investment is you're able to improve the overall efficiency of the network, make the network run better. And the charts I've put up here on the left actually measure two service quality metrics. One is slow order miles and slow order delay hours on the left, and how they've changed over time, and you can see that while they did take up in 2014, that followed a prolonged period of improvement in the slow order miles on the UP network. The one on the right is the customer satisfaction index. Again, I think that other railroads have referred to some of these same things. Again, those show

improvements. And what this means, and you have to remember, railroads are a network industry. So if you fail to make investments in one part of the network, or for one shipper, often that will spill over to affect other traffic. And that's an important thing to keep in mind. It's not, you know, that don't intend to have pretty broad effects on the networks.

So it's not about, when you think about investment, another important thing to remember, it's not about whether the railroad has the money. It's as John said, look at that's now how they make the investment. They don't say, god, we've got enough cash, let's make the investment. They look at it, what's the return? Is the return there? So when you think about regulations you want to think how was regulations going to affect the return in the allocation of investments? So that leads me to a second question. You've heard a lot from the railroads over the last couple days that many of the shipper proposals amount to some broad based rate

of return regulation, and you've heard other arguments to the contrary. And you also heard the fact, and this is a question I think was raised yesterday is, well, isn't this a small segment of the marketplace, and therefore not such as big of a concern as it might otherwise be? That is, is this regulated traffic very small? And the question you have is, well, which is the right way to think about it? Well, the key thing to remember about rate of return regulation, it's most pernicious effects come because you're monitoring the returns. You've now changed the company's incentives to not what's best for their business, but what fits best with the regulatory environment. That is, they tend to invest in things that are measured or even over measured in the measurement of returns, and they under invest in things that don't count. If you start linking things too tightly to RVC ratios, well, there's two parts of the RVC ratio, there's the cost and there's the revenue, and one way to make sure your RVC ratios

aren't too high is to make sure your costs are higher. Again, you've got to be careful about the incentives that are induced.

And the thing about a revenue adequacy based constraint, whether it's something that explicitly looks at the surplus over revenue adequacy, or something that's triggered by revenue adequacy is that revenue adequacy is a company-wide measure. And therefore, if you link something, you do something, you'll be regulated more heavily, you'll be subject to price caps, whatever it is, and you say that's linked to the attainment of revenue adequacy. That company's going to have an incentive to try to avoid revenue adequacy. And you can avoid revenue adequacy not just by changing what you do on captive traffic, but changing what you do on any traffic in your network, because that's how you're measuring revenue adequacy. And to me, that raises this issue. It says I've got this small segment, maybe it's five percent, maybe it's twenty percent, whatever you want to say it

is, I'm worried about that, but I'm going to link it up to this broad measure of revenue adequacy, and all those well documented and well understood adverse effects of rate of return regulation that have been, you know, we've seen them in other industries, they're well established in the economic literature, are then going to be present across the system, not just on the regulated fraction of the traffic.

Secondly, you have to take account of the fact that the regulated part of the traffic is not a constant. That is, there's going to be incentive effects. That is, more and more people, you make it attractive to be under the regulatory regime. More and more people are going to go there. So maybe it's five percent at one measure, it won't stay at five percent if you change the picture. Let me make sure that covered what I wanted to say here. It's also important to remember that the impact of regulation is not about whether we will drive railroads below revenue adequacy, and that's an important point. That is, it's not

like there's revenue adequacy and then revenues above that are kind of this extra that really aren't needed to support investment. That's just not the right way to think about it. Think about what John talked about a minute ago, or what was brought up yesterday in Dr. Brenner's testimony. The way a company does its capital investment decisions is they have a hurdle rate. Let's just say it's eleven percent, just because that's what Dr. Brenner used yesterday. I'm going to stick with the eleven percent. You have eleven percent hurdle rate, you have an investment that has a return of thirteen percent, you'll do it. If you make changes to the regulations by taxing the returns implicitly through revenue adequacy constraint or lowering the rates that you can charge, then the shipper is served by that, and that falls to ten percent, that company will no longer make that investment.

That will be true even if the overall average return is still above revenue adequacy. That is, you will still lose investments, even

though overall you're above revenue adequacy. That's not how pros think about it. They don't say on average are we covering it? They ask for this project are we covering it, so you have to worry about that side of it as well. And I think that's an important thing to keep in mind when you think about the investments that, and the potential effect on investments. It's not about, well, they'll still be revenue adequate, we're not going to take it all away, so they'll still be above. That doesn't tell you you're not affecting investment. In fact, you will be affecting investment as long as you affect the returns on individual projects.

Again, the other side is, well, don't they have plenty of money they're paying out to shareholders? But, again, it's not in a health, well run business, investment is not determined by how much money you have, it's determined by the return on the investments you're examining. And so the fact that there's "plenty of money" doesn't mean you're not going to affect

investments. I think, now one thing you might ask yourself is, well, geez, you know, we heard a lot about SAC. People talked about SAC yesterday, talked about SAC today, and I think there's no question that the SAC process needs to be improved in some ways. I mean, it's a difficult process, it's a costly process. And the question is, well, aren't these other alternatives, aren't they a substitute for SAC? Aren't they an alternative way of doing what SAC tries to do? And in many ways these proposals aren't really a substitute for SAC, and I'll try to go through them and explain why.

First of all, SAC has two key economic features to it. First, it asked about, it tries to look at competition. What rates would competition generate? And in particular, it says if this were, if there were no barriers to entry, this was a contestable marketplace where anybody could come in and compete for the business by building the capacity, what would prices have to be? What would be a constraint on prices?

That's the nature of the SAC test. It's about a competitive stand. And one thing we've learned in economics is that competition of that type, real world type competition, that is competition that is focused on what would private enterprises, what would private individuals want to do is a great benchmark because it gets us away from kind of the tinkering that comes in when you try to be a social planner and decide, well, what would be a better thing to do than what a market would generate. Those are very, very difficult questions to ask. The second thing is SAC focuses on the rates being paid by an individual shipper. They ask is that shipper paying more or less than what would be that competitive benchmark?

Now, proposals that simply say to get a benefit, you just need to do two things. You need the railroad to be revenue adequate, and you need to be established market dominance, cut out both of those things. They don't ask about what the competitive price would be, they don't ask

whether your rates are above or below the competitive levels. And therefore, they're not really substitutes because they're not trying to establish the same results. Now, you might say, well, aren't they a close approximation? Isn't it really probably an okay assumption? Well, there's two implicit assumptions in those approaches. One is the achievement of revenue adequacy and the fact that railroads are revenue adequate tells us that somehow they've collected too much from the captive shippers. And secondly, that in so, let's think about that one first. So the fact is, well, what does the data say? Well, the data says that in fact, over time, and this is what we've talked about before, the biggest growth has actually been if you look at margins, the biggest growth in margins was actually on the exempt traffic. Much bigger than it was on the non-exempt traffic. So the fact that railroads have become as measured by the board, revenue adequate doesn't really tell you that there's been an overcharge to an individual

potentially captive shipper, or even to them as a group, and that's exacerbated by the fact that the vast volume of traffic and the vast amount of dollars is actually from those exempt and otherwise presumed competitive categories of business.

Secondly, if you look at the distribution of, for example, just RVC ratios, there's enormous overlap between the presumed competitive traffic and the competitive traffic or exempt traffic, and the what you might call potentially captive traffic. There's enormous overlap between those two things, which isn't that surprising, but what it means is establishing that you're somehow potentially market dominant isn't enough to say by in itself you're paying too high a rate. It's not a very close correlation between the two. Now, one set of proposals that tries to look at individual rates are the comparables approach. And that was what was talked about in the TRB paper. In principle, the comparable's approach is something

you could look at, and in fact, I have experience in other industries that use the comparables approach. And one thing I'll tell you based on that, it's not without its own sets of disputes and battles, and the battles get messy and it's not like oh, good, we just get from here and there's the answer, and guess what, we're done. It's not, doesn't tend to work that way. There's a lot of problems.

Secondly, when you think about it applied to this industry, there's some particular issues. One is the fact that you don't have competition means you're probably not in some fundamental sense comparably situated. That is, there's a reason why you're in a different market structure. You have a different cost to serve, you have different alternatives. There's just so many differences out there. Well, then the answer is well, can't I correct for those things? Well, but once you start correcting for those things, like, Professor Kalt said yesterday, you're sort of pushing yourself back in the SAC direction of

oh, I've got to take account of this additional cost because it's a low density market and I've got to take account of this additional cost for another reason, that really gets you back into almost the SAC type analysis and you've saved much less than you thought.

Secondly, and I think this also came up yesterday, and I want to reiterate it. There are incentive effects that come about when you have comparable regulation. In particular, if I'm a railroad and I'm asking do I want to give a low rate to this guy over here, oh, you better be careful if that's going to turn out to be the comparable that drives the rates that everybody else looks like they're going to try to get. So you've got to worry about that. Finally, and second to last thing I'd like to talk about, and this came up yesterday, is this question about replacement costs. First, I think there's a fair amount of confusion that's, and I don't think it's your fault, I think it's just everybody's talking about different things, and I think it's

led to some confusion. What do we mean by replacement costs? Take the example of a ten-year old locomotive. Moving to replacement cost doesn't mean substituting a brand new locomotive for a ten-year-old locomotive. It means valuing the ten-year-old locomotive at what it would be worth today. That's the opportunity cost of the asset if you think like an economist. That's what's really the amount that people have invested. It's what it's worth today, what those assets sell for in the marketplace today.

Now, the second critique is that it's really hard to do. Okay, I'll just, can I have a couple minutes.

MR. ELLIOTT: Go ahead.

MR. MURPHY: It's really hard to do and the answer is depends on how you do it. If you do, there's an easy way to do it, a fairly straightforward way to do it and one is what you do is you do the same thing you do for historical cost calculations, it's just when you take those fast investments, the investment that happened

ten years ago, you bring it up to current value using a price index, so what would that same investment cost today? So how much would it cost and then depreciate it back reflecting its age. That will give you today's value of a ten-year-old locomotive, for example. So it doesn't inquire additional data beyond what you need to go in, other than the prices. Other than the price index, that's all you need. So if you have your assets divided by categories you can construct it, and Dr. Brenner kind of described that. It was also a discussion about well, geez, once you do that don't you have to use a real rate of return? And the answer again is no. The way you have to do it is just adjust the depreciation to reflect real depreciation as opposed to the nominal depreciation used in the original calculation. Once again, that's not a separate calculation. Once you've constructed the capital stack series you have the implied depreciation, just automatically, so you can correct the numerator in a way that's going to

actually generate a nominal return that can be then compared to the nominal return on capital. So it doesn't necessitate a whole new exercise to estimate real returns. I can put this together for you and describe all that if you're interested.

So finally, where does this leave us? Well, I think it leaves us at a point that I would say it is important. You can't say that revenue adequacy is eliminating concerns over investment, using revenue adequacy as a trigger or as an element of a rebate or CAP program, is going to extend the adverse effects of rate of return type regulation across the company, and because of the fact that people make decisions on a project by project basis, you're going to affect investment even if overall the railroads remain revenue adequate. Thank you.

MR. ELLIOTT: Just to follow up on your replacement cost example, is that similar to the method that Department of Commerce uses that was being described yesterday in the testimony?

MR. MURPHY: That's essentially what they do.

MR. ELLIOTT: Okay.

MR. MURPHY: They're basically valuing past investments, they're getting the real value of past investments and depreciating those rather than a nominal value of past investments and depreciating those. And then that gives you your replacement capital stock today, and then the amount of depreciation that you've accumulated in there tells you how much depreciation to put into today to measure today's net return, net depreciation. And that can be compared to a nominal rate of return.

MR. ELLIOTT: Thanks.

MS. BEGEMAN: I thought his testimony was very complete.

MR. ELLIOTT: I have no further questions, so thank you very much. That was a very interesting testimony.

MS. MILLER: You guys got off easy.

MR. ELLIOTT: Why don't we bring up

the final panel, panel number five?

MR. MACDOUGALL: I hope there's no fire drill this time. I'm here on behalf of Samuel J. Nasca, who is the New York State legislative director for Smart, and he filed a statement on November 4th of last year, it's four pages, and I'm not going to repeat it. The main thing that the union is concerned about is the differential pricing. Also, I might say that whenever there's a congressional problem involving labor and management situations or a presidential review board, the issue of railroad adequacy always comes up. Can the railroads pay for what they're asking for? So there is an interest in the subject. I thought I might contribute to this by explaining, because I haven't heard it here, what the actual situation was and is now with respect to the way revenue adequacy is administered. It is, we all have a book, we got those out of what practitioners call reasonable freight rates, and I suggest it's a good handbook to have. It's the type of things

that ordinary practitioners, people from Montana have, I see you would get educated by it, and there's a section in there on how revenue adequacy is dealt with. And generally, it's just a policy situation. It is not something where, in fact, a general rule is that financial condition of the railroads is of little probative value in determining rate reasonableness. There's an exception, and the exception is called, and even that is in reference to the entire system of railroads in a particular coal field. And it is not to be used in particular line segment reasonableness. And this is what it's been for years and years, and the book has about twenty cases in it. If you want to look at it you can see the way it's been administered. And in the past, when the railroads were in trouble we had Ex Parte increases. And this agency or the old ICC put out a publication, one hundred pages, showing all the general rate increase adjustments since Lewis Brandize back in 1914, all the way up to Ex Parte 267 in 1971.

And there's a date that is a page reference to the ICC reports, and even the tariff publications. And there were rate decreases, but they're always on a general basis. But for individual rates, the condition of the railroad because it's just not relevant. It's a policy directive. That's all. And it's worked for many, many years, and I suggest that they take a look at it, and I just don't think there is a policy to adopt a policy to get a used revenue adequacy in individual point to point rate adjustments. It has to be for the whole system or for the whole region, and involving more than one railroad.

The other quick subject I'd like to mention is what happened on June 10, and Ex Parte 665 said one that was your great transportation, having all of a sudden we woke up and we came in and there is the TRB report, unannounced, presented, given all kinds of press releases to the public, and we've never had an opportunity to go into it. We've never had a hearing on it, but

it was actually this agency and its predecessor that caused the TRB report. And, in fact, initially we had Ex Parte 658, ten years ago, and Board Member Melvin gave six speeches on it. We've got to have a proceeding that's suggestive that the TRB should consider proceeding with this prior congressional experience.

He asked for a request of 1.8 million dollars to hire these professors to go and do a study, basically, of the Staggers Act, but they didn't turn out to be the Staggers Act because it's a general, I guess we all know what happened and came out. And a number of us filed comments in Ex Parte 658 questioning whether this was just going to be another executive branch attack on the STB. And that the government also did that when the ICC existed. There was a rivalry between one branch of government and the other branch of government, and they felt that the ICC was wrong and the current DOT felt the STB is wrong and the professors always think it's wrong. And the now retired vice president of the UTU

said this in a statement. His name is John Fitzgerald, which we filed in Ex Parte 658. It's only about five pages, and we predicted what had happened. All of a sudden we got hit with a big thing, not on grain transportation, but a big attack and I'm having a whole new system of giving wayward revenue accuracy, in fact, criticizing the STB's handling of rates. So I think it's an order you might want to think to allow comments on that TRB study, which is really a DOT finance study because it's come up in a number of your Ex Parte cases, including this one, and these economists don't have the last word, and I think they should be, we should have a hearing on that, or at least an opportunity to file comments on it because you people, Mr. Mulvey and also Chairman Norberg gave one talk saying let's have TRB, you know, give a study, give us some money. So you were really the major, in fact, Mulvey was a major force in getting that budget, 1.8 million dollars to study the Staggers Act. Thank you.

MR. ELLIOTT: Thank you very much. All right, thank you, Mr. MacDougall, and thank you everyone for coming, for your testimony. Thank you staff for all your efforts to make this a successful hearing, and the hearing is now adjourned. Thank you.

(Whereupon, the above-entitled matter went off the record at 3:27 p.m.)

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C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Railroad Revenue Adequacy

Before: Surface Transportation Board

Date: 07-23-15

Place: Washington, DC

was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate record of the proceedings.

Neal R. Gross

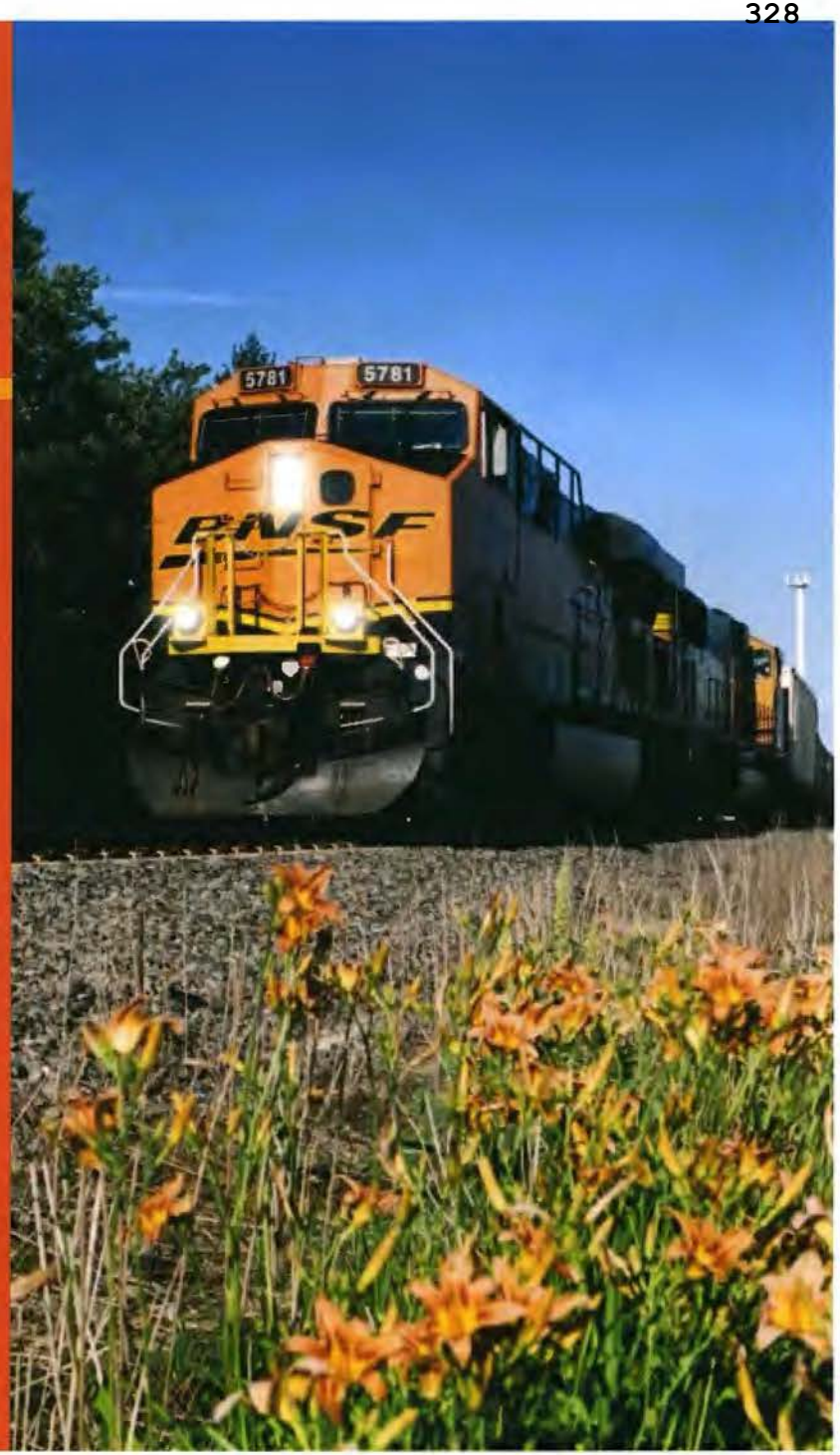
Court Reporter

BNSF Railway

Docket No. EP 722
Railroad Revenue Adequacy

Ex Parte 644 (Sub-No. 2)
WCTL Petition – Cost of Capital

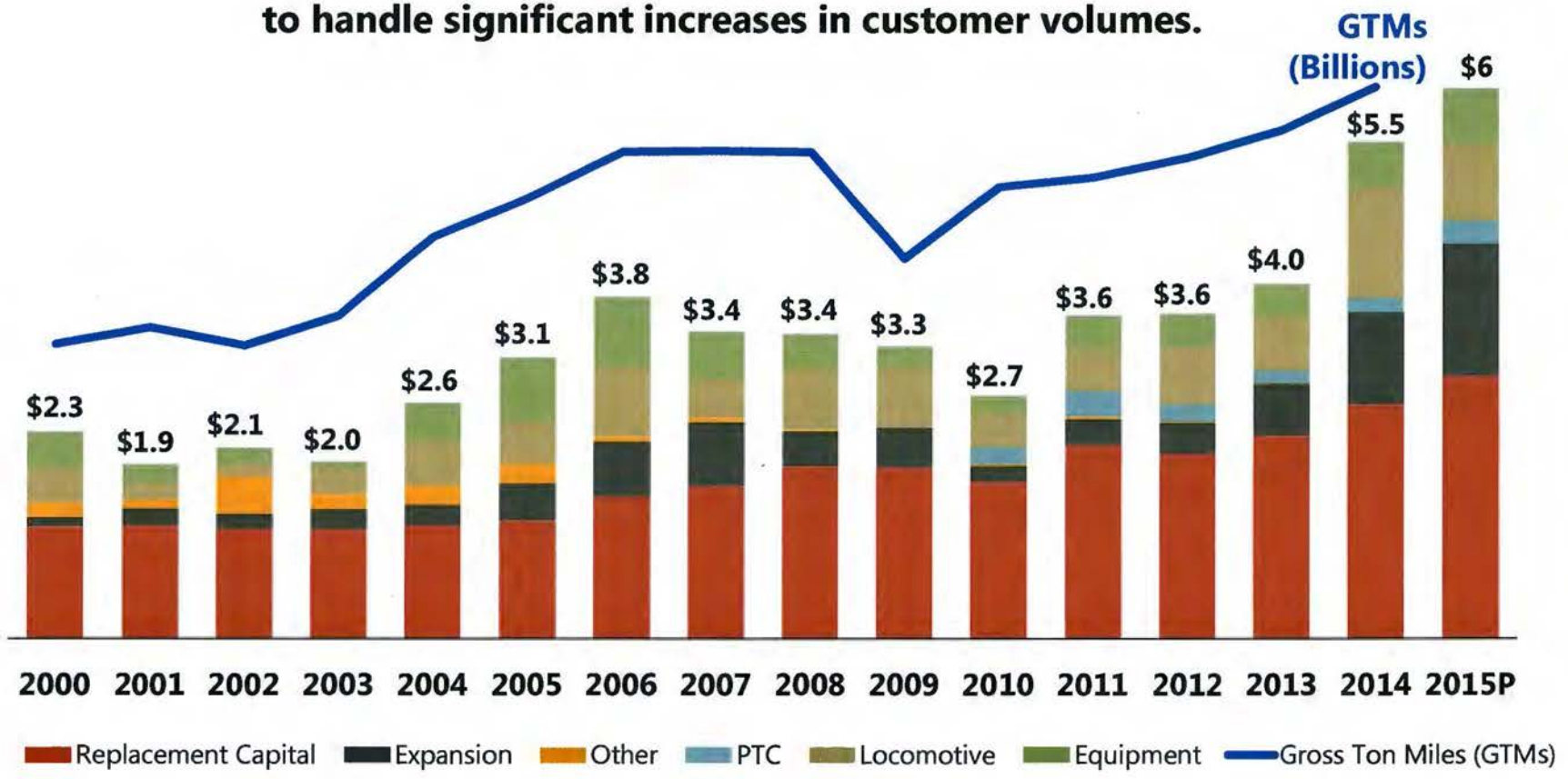
July 22-23, 2015



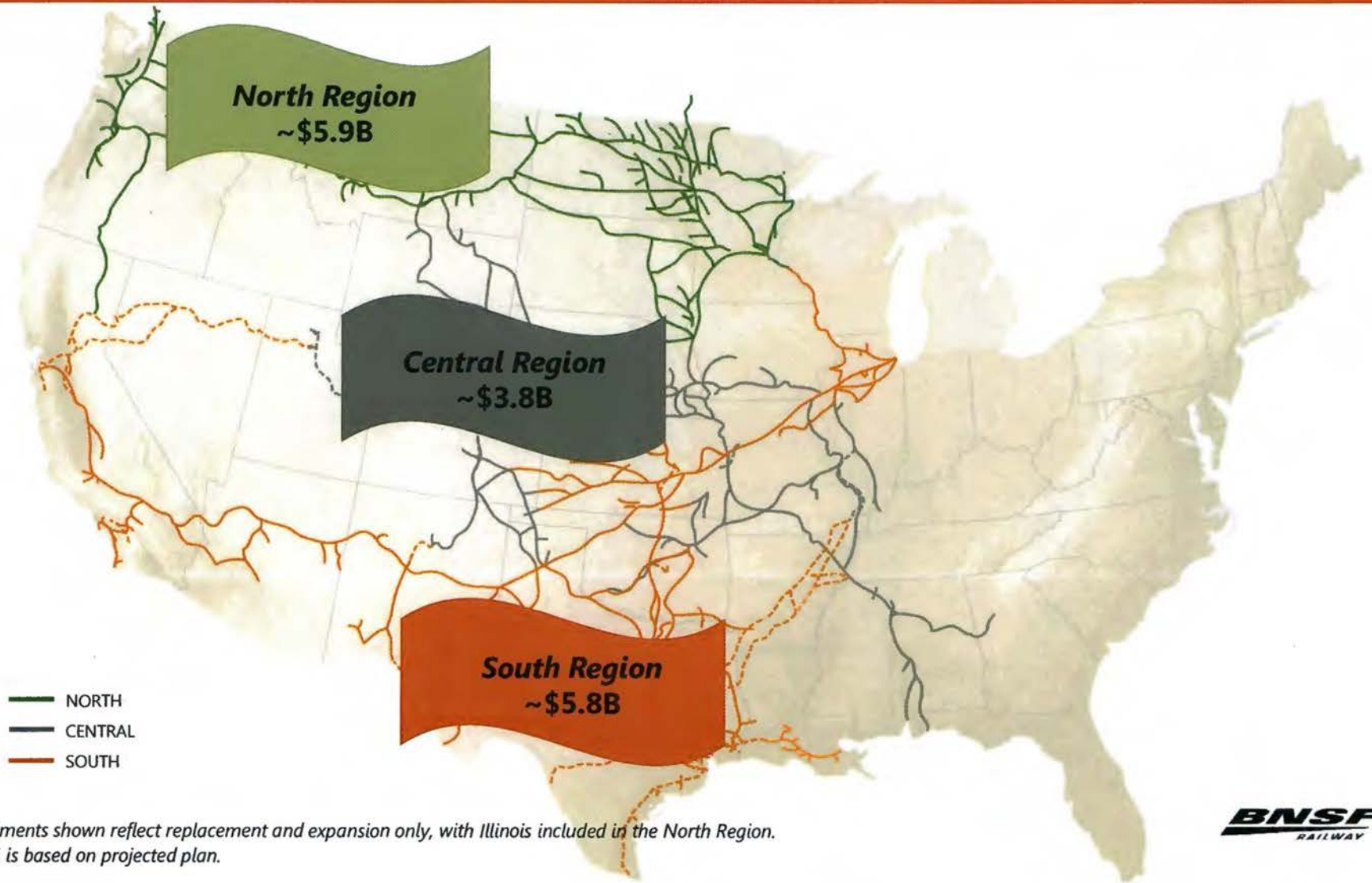
BNSF's Business Model is Focused on Growing with our Customers

BNSF is Investing for Growth

Since 2000, BNSF will have invested over $50 billion to handle significant increases in customer volumes.



2010–2015P* Capital Investments by Region

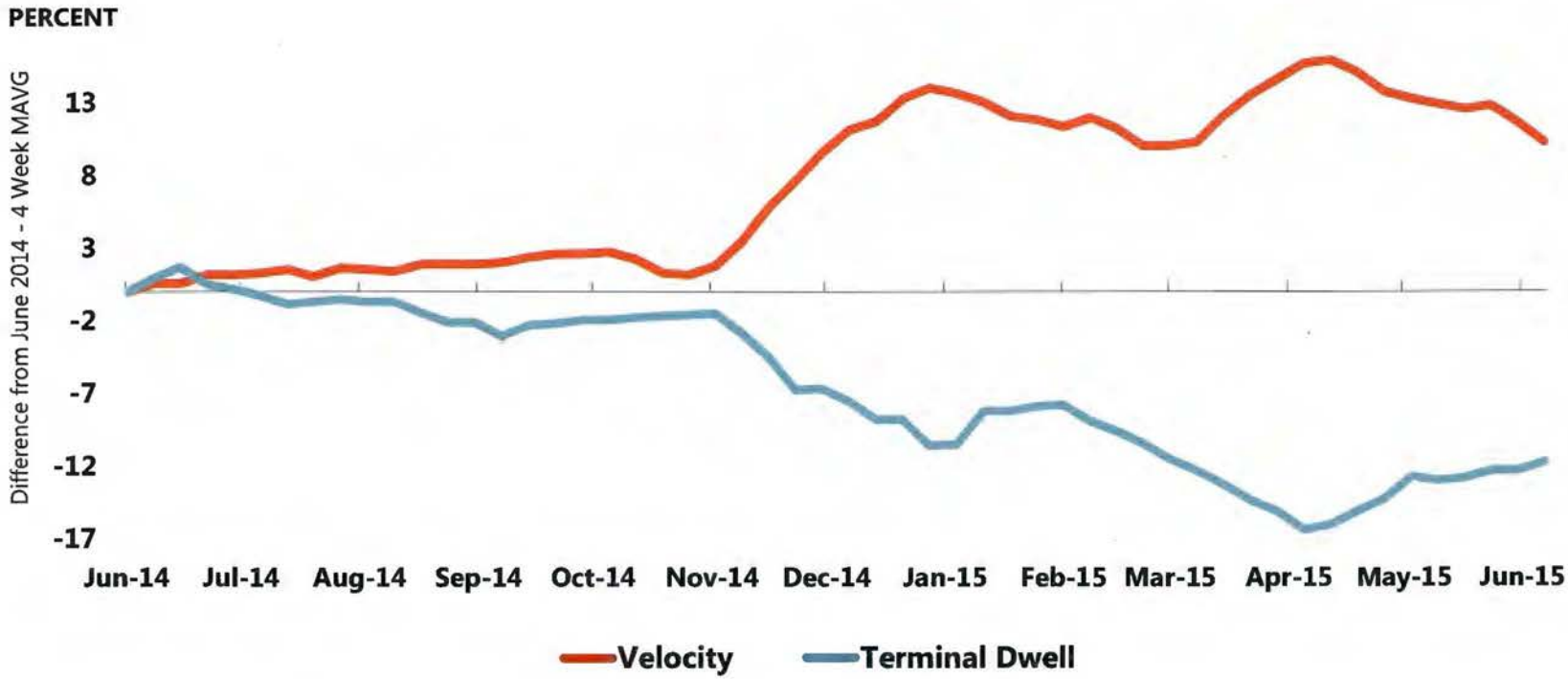


Investments shown reflect replacement and expansion only, with Illinois included in the North Region.
**2015 is based on projected plan.*

BNSF RAILWAY

With Added Capacity Comes Improved Performance

BNSF Velocity (ALL TRAINS) and Weekly Average Terminal Dwell
Indexed to June 2014*

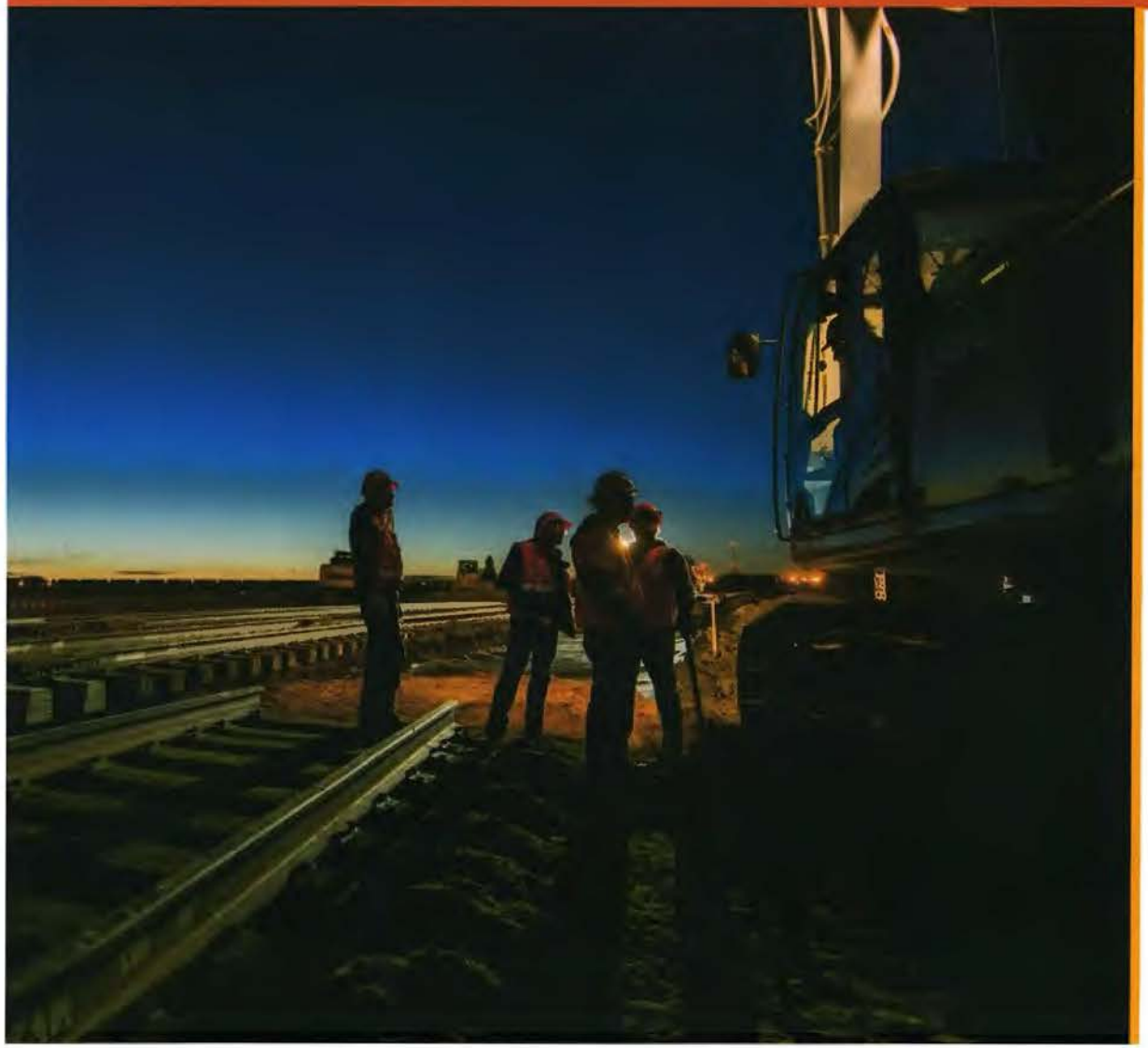


*Four-week moving average [measured in miles per hour (velocity)/hours (terminal dwell)] ending on the dates shown versus the average train speed/average dwell hours recorded for the four-week period ending June 27, 2014

Source: AAR through July 3, 2015

BNSF RAILWAY

Capacity Expansion Decision

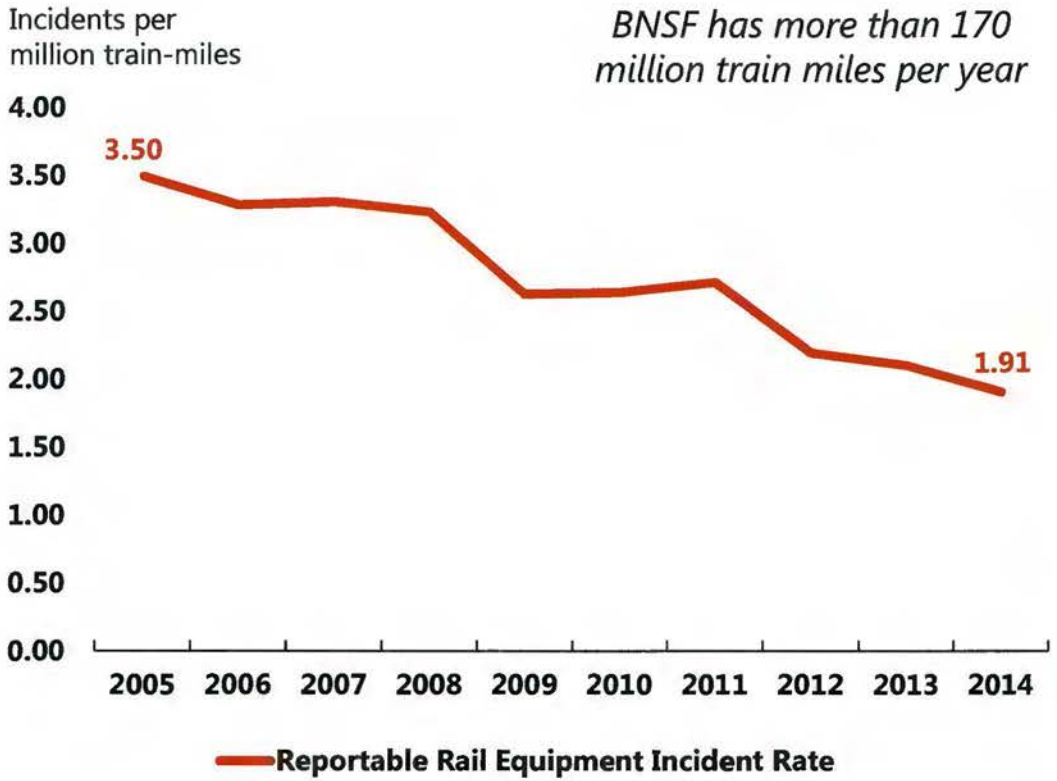


- Investments must earn adequate risk adjusted return
- Significant risk already exists
  - Regulatory process risk
  - Business risk
- Rail assets are long-lived
- Spending front-end loaded
- Returns earned over asset's life

BNSF RAILWAY

Investment Drives Innovation, Innovation Drives Improvement

Capital investments are driving efficiency and reliability. BNSF reportable incidents are declining to record-low levels.



Source: FRA

Any Changes in Regulatory Policy Should Not Threaten Investment and Growth

1) BNSF's investment is unprecedented.

2) Investment is driving improved service & efficiency for customers.

3) Customers are responding with investment and volumes on our railroad.

4) Stable regulatory environment allows investment & innovation. This incents the right behavior for railroads and suppliers.

5) Regulatory changes that disrupt the current balance will have unintended consequences & lower capital investment.

6) Any Board consideration of long term revenue adequacy should only occur within individualized rate review process.

BNSF RAILWAY


BNSF®
RAILWAY

Presentation by Professor Kevin M. Murphy

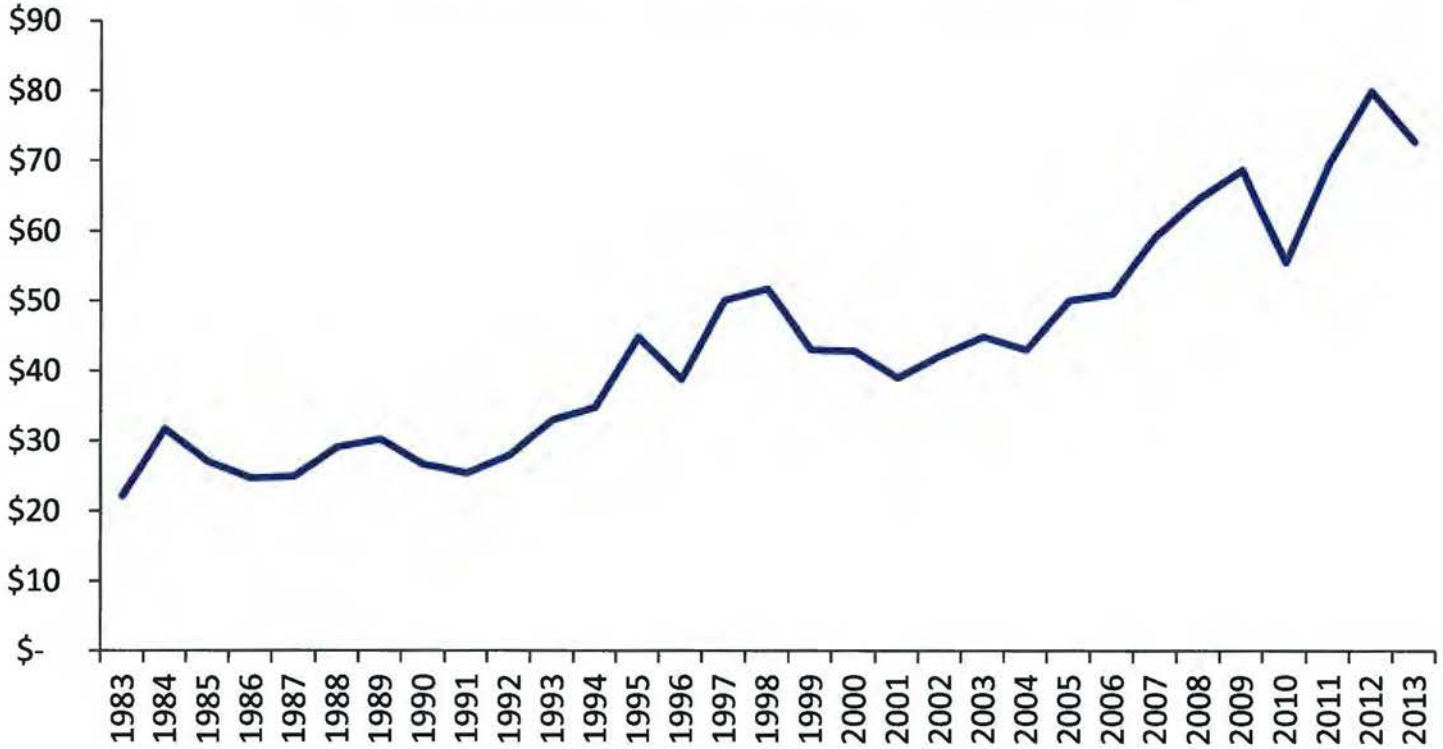
University of Chicago and Charles River Associates

On Behalf of
Union Pacific Railroad Company

STB Ex Parte No. 722
July 23, 2015

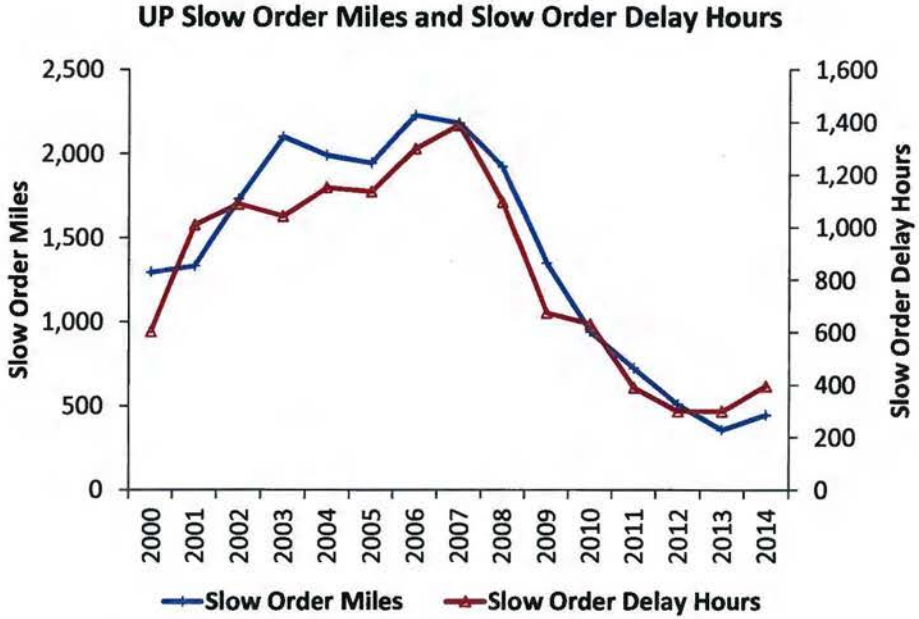
UP Must Invest More Intensively to Continue to Improve Service

UP Capital Expenditures Per Track Mile Operated
(2013 Constant Dollars in Thousands)

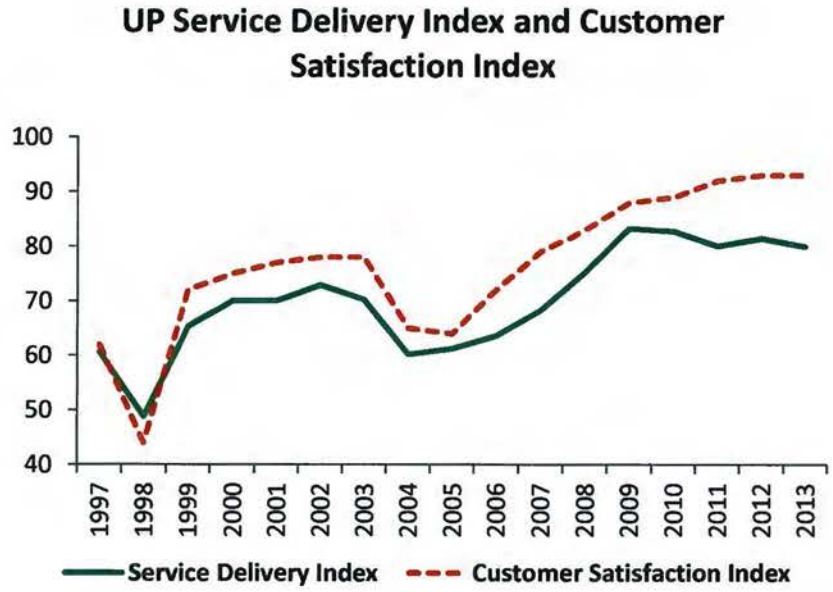


Source: Figure KMM-10. AAR Analysis of Class I Railroads and UP Annual Report R-1 data; U.S. Department of Commerce, Bureau of Economic Analysis (GDP implicit price deflator). Historical data include railroads that later merged with UP.

UP's Investments Have Improved Its Service Quality and Benefited Shippers



Source: Figure KMM-13. UP.



Source: Figure KMM-15. UP.

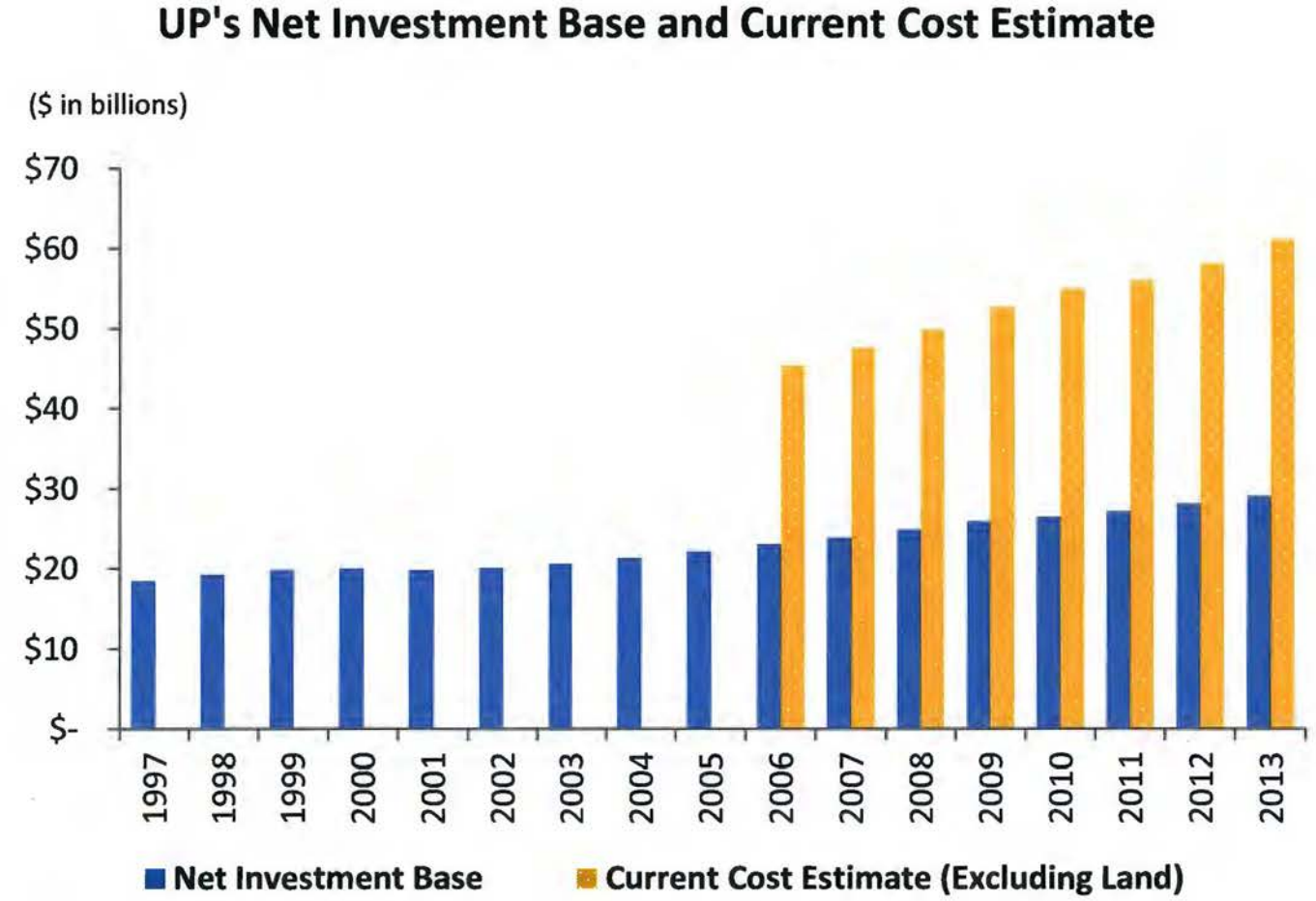
Rates on UP's Non-Exempt Traffic Have Not Increased Disproportionately Relative to Cost Changes

UP Contribution Margin Change From 2004 to 2012 by Type of Traffic

Type of Traffic	2004	2012	Percentage Point Difference
Non-Exempt	33%	41%	8%
Exempt	20%	32%	12%

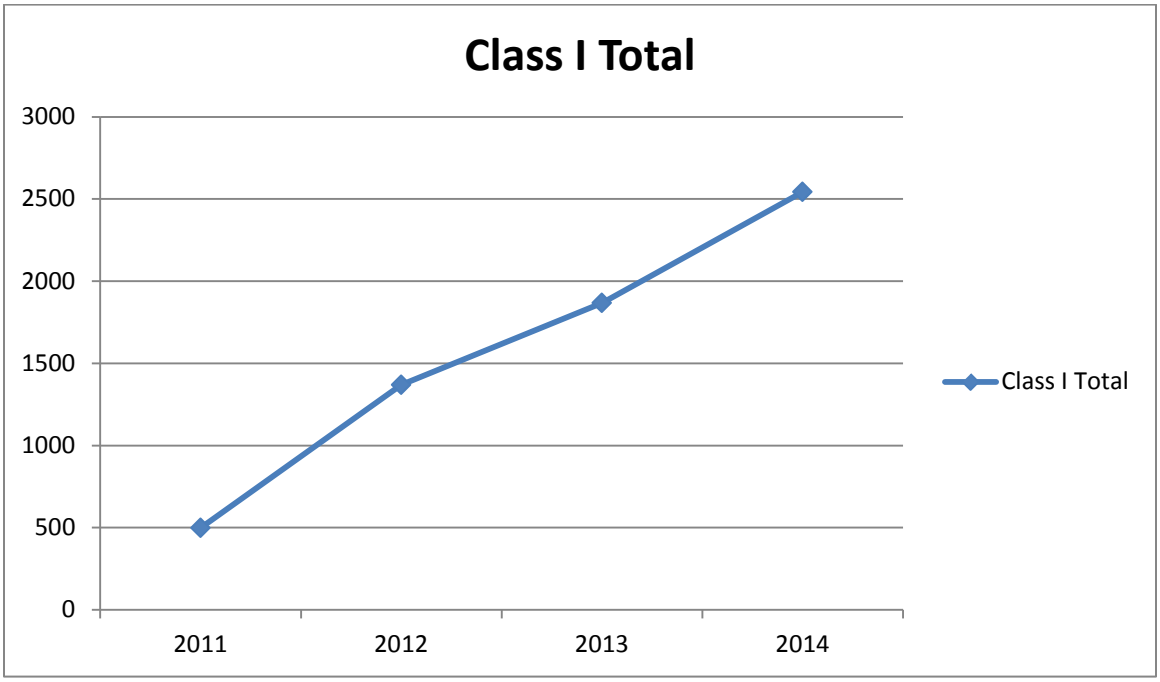
Source: Figure KMM-18. STB waybill sample data for UP.

The STB Measure of UP's Net Investment Base Vastly Understates Replacement Costs



Source: Figure KMM-11. UP.

Rail Industry Earnings Above Revenue Adequate Level, 2011-2014 ($ Millions)



Source: 2011-2013 Opening Comments of AECC (9/5/2014), Appendix A, Table A-1

2014 STB Docket No. EP 558 (Sub-No. 18), Reply Comments of AECC (5/11/2015) at page 4, fn4

Testimony of the Concerned Shipper Associations

The American Chemistry Council
The Fertilizer Institute
The Chlorine Institute
The National Industrial Transportation League

Submitted to the Surface Transportation Board

July 23, 2015

Caves EXHIBIT 1
Ramsey pricing principles

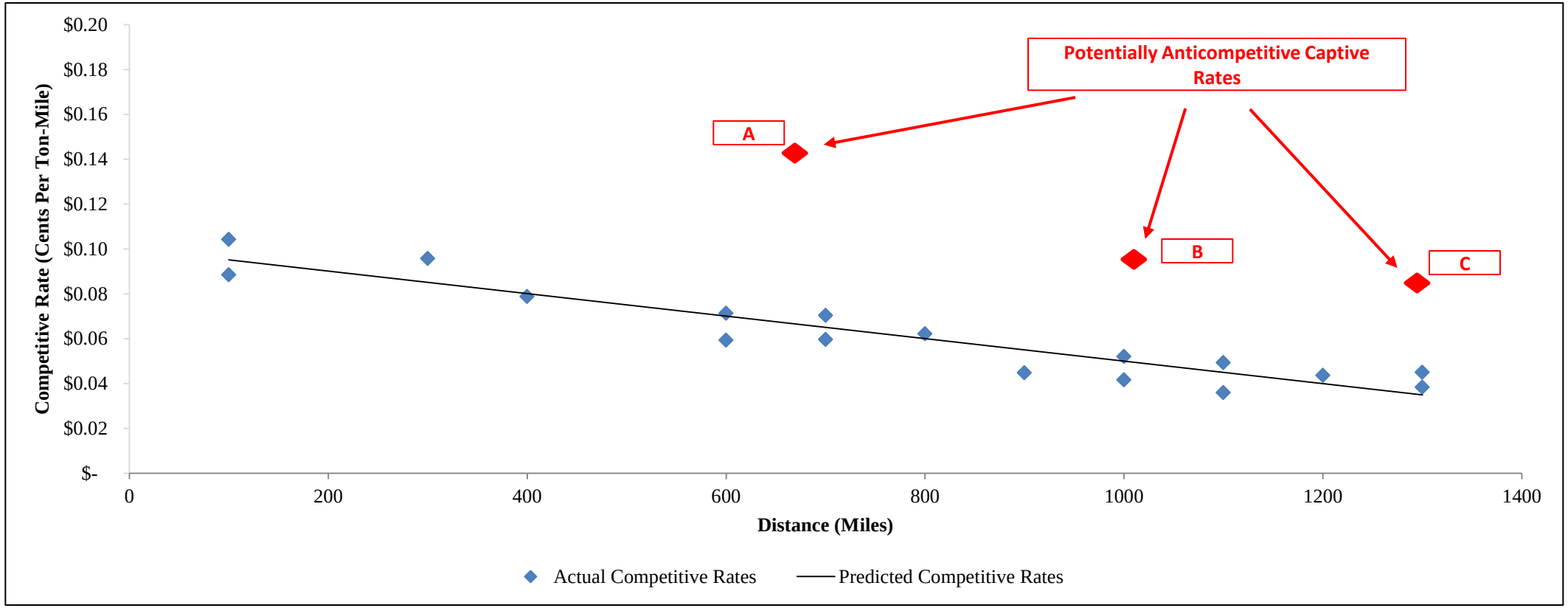
- Economic efficiency ↔ Marginal cost pricing (P = MC)
- Economies of Scale (high fixed costs) → MC < AC
  - Marginal cost pricing not feasible
- Profit maximizing solution→ Set P as high as possible above MC
  - Economically inefficient
- Ramsey Pricing Principles:
  - Set P > MC, but only by enough to cover all relevant costs (fixed, variable, investment returns)
  - Constrained optimization: Move P as close to MC as possible without violating the revenue adequacy constraint
  - Any rate adjustment closing gap between P and MC is economically efficient, even if the full Ramsey optimum is not achieved

Union Pacific Net Revenue Adequacy -- 2009 to 2014 Business Cycle
($ in 000)

Year		Cost of Capital	Tax Adjusted (shortfall)/surplus	Present Value of Tax Adjusted (shortfall)/surplus
(1)		(2)	(3)	(4)
1.	2009	10.43%	-$767,046	-$1,259,671
2.	2010	11.03%	219,718	333,908
3.	2011	11.57%	682,782	948,254
4.	2012	11.12%	1,638,241	2,022,844
5.	2013	11.32%	2,027,153	2,256,626
6.	2014	10.65%	3,336,358	3,336,358
7.	Total	xxx	$7,137,206	$7,638,319
8.	Average	xxx	xxx	$1,273,053

Caves EXHIBIT 2
Yardstick/Benchmark Method

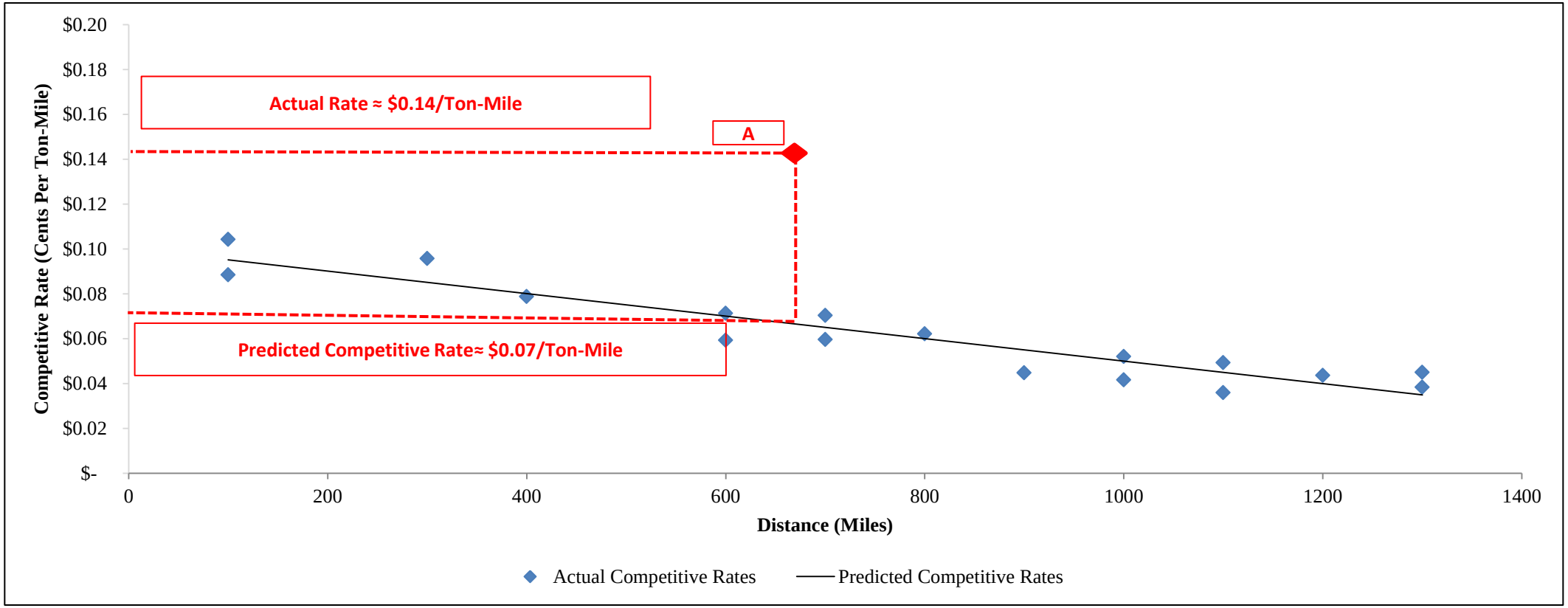
- Predict competitive rate, given shipment characteristics:
- $Actual\_Rate_i = \beta_0 + \beta_1 Distance_i + \varepsilon_i$



Caves EXHIBIT 2
Yardstick/Benchmark Method

– Compare actual captive rates to predicted competitive rates:

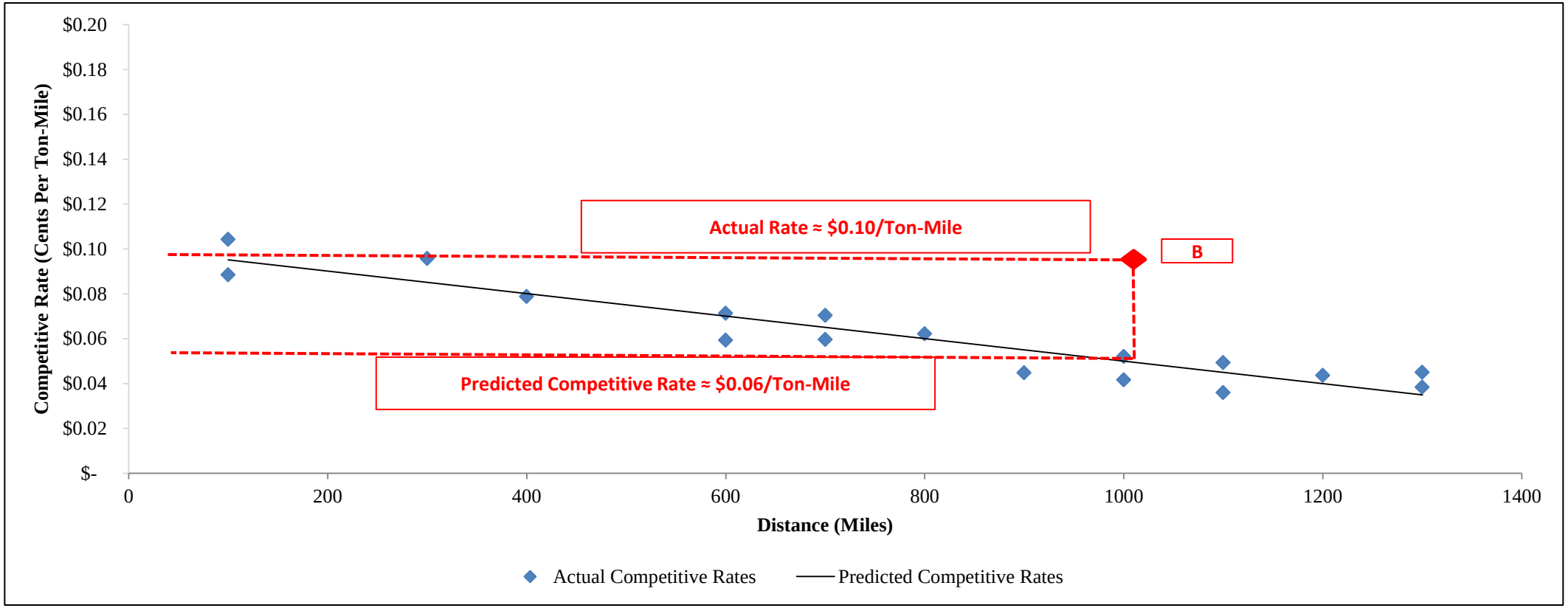
$$Predicted\_Rate_A = \beta_0 + \beta_1 Distance_A$$



Caves EXHIBIT 2
Yardstick/Benchmark Method

– Compare actual captive rates to predicted competitive rates :

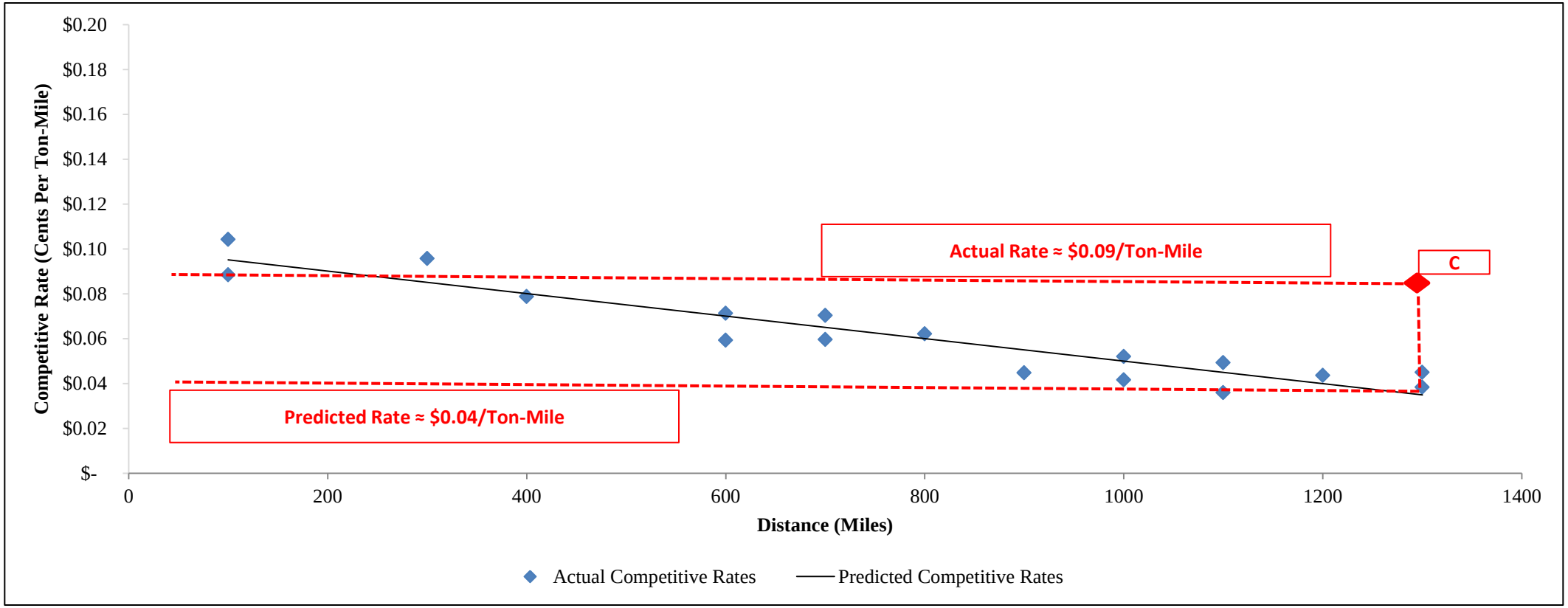
$$Predicted\_Rate_B = \beta_0 + \beta_1 Distance_B$$



Caves EXHIBIT 2
Yardstick/Benchmark Method

– Compare actual captive rates to predicted competitive rates :

$$Predicted\_Rate_C = \beta_0 + \beta_1 Distance_C$$



Caves EXHIBIT 2
Yardstick/Benchmark Method

- R = (*Actual_Rate*)/(*Predicted_Rate*)
  - $R_A \approx \$0.14/\$0.07 \approx 2$
  - $R_B \approx \$0.10/\$0.06 \approx 1.67$
  - $R_C \approx \$0.09/\$0.04 \approx 2.25$
- R_{MAX} = "Allowable Differential"
  - $R_{MAX} = 1.6$ → All rates reduced
  - $R_{MAX} = 1.9$ → Only 2/3 reduced
  - $R_{MAX} = 2.1$ → Only 1/3 reduced
- R_{MAX} calibrated to protect revenue adequacy

Rebate Reduction Approach Based On Price-Cost Margins
For UP Based on 2009 to 2014 Business Cycle

1.	**UP 2014 Revenues (000s)**	$23,876,553
2.	**Average Surplus (000s)**	1,273,053
3.	**Potentially Captive Excess Return Share**	90%
4.	**Surplus Available to Potentially Captive Shippers**	1,145,748
5.	**UP Required Revenues (000s)**	$22,730,805
6.	**Margin Adjustment Factor**	95.1%

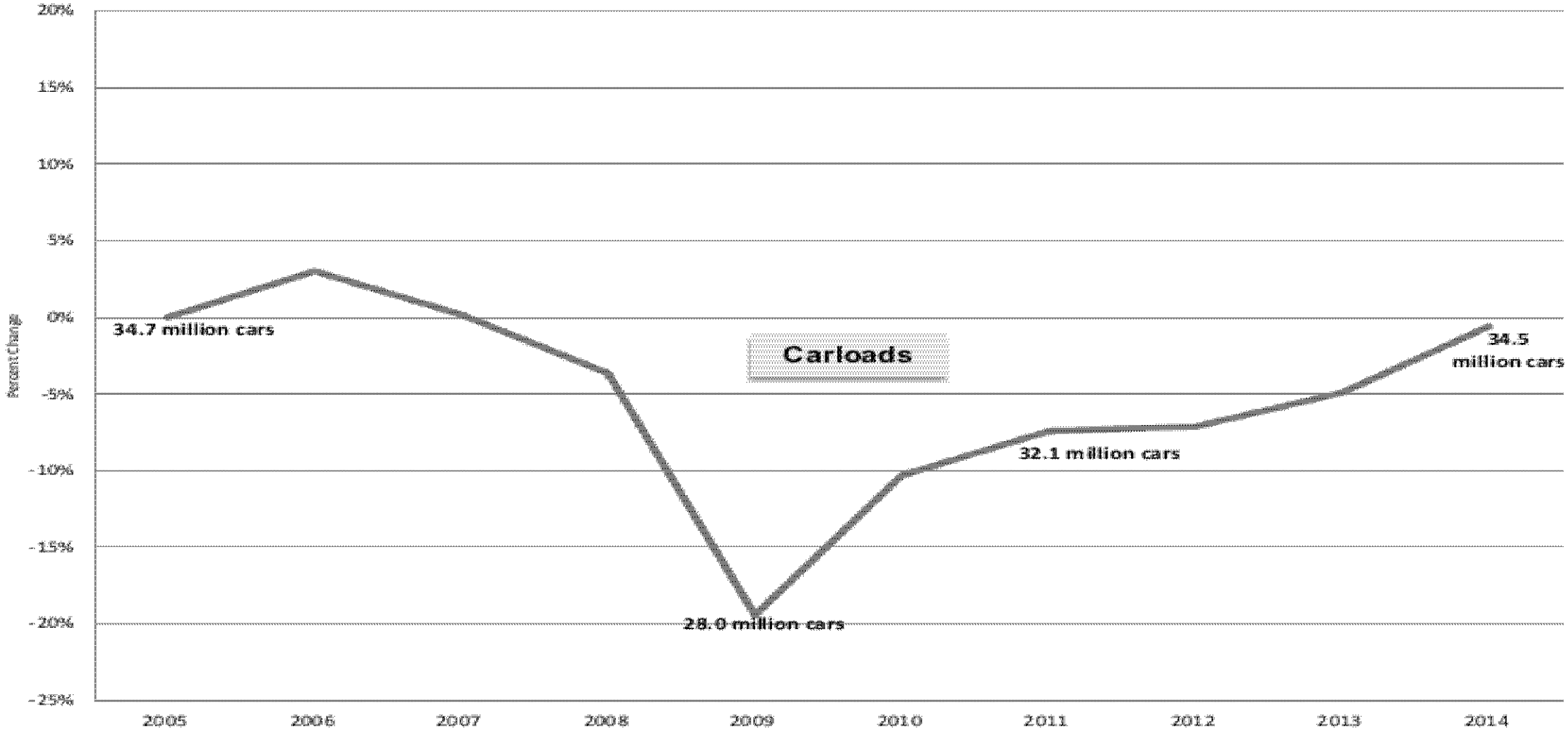
		Base						Adjusted				Actual Adjustments
	Shipper	**Rates**	**Costs**	**Tons (000s)**	**Total Revenue (000s)**	**R/VC Ratio**	**Elasticity Margin**	**Elasticity Margin**	**Rates**	**R/VC Ratio**	**Total Revenue (000s)**	**Revenue Reduction**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
7.	A	$7.00	$3.00	1,000,000	$7,000,000	233.3%	57.143%	54.349%	$6.57	219.1%	$6,571,562	$717,310
8.	B	$11.00	$5.00	500,000	$5,500,000	220.0%	54.545%	51.878%	$10.39	207.8%	$5,195,167	$0
9.	C	$10.00	$4.00	500,000	$5,000,000	250.0%	60.000%	57.066%	$9.32	232.9%	$4,658,334	$0
10.	D	$8.50	$4.50	200,000	$1,700,000	188.9%	47.059%	44.758%	$8.15	181.0%	$1,629,189	$0
11.	E	$8.00	$6.00	100,000	$800,000	133.3%	25.000%	25.000%	$8.00	133.3%	$800,000	$0
12.	F	$8.00	$7.00	100,000	$800,000	114.3%	12.500%	12.500%	$8.00	114.3%	$800,000	$0
13.	G	$3.23	$7.00	952,888	$3,076,553	46.1%	-116.808%	-116.808%	$3.23	46.1%	$3,076,553	$0
14.	Total		xxx	3,352,888	$23,876,553	xxx	xxx	xxx	xxx	xxx	$22,730,805	xxx

Rebate Reduction Approach Based On Maximum Markup Methodology
For UP Based on 2009 to 2014 Business Cycle

1.	**UP 2014 Revenues (000s)**	$23,876,553
2.	**Average Surplus (000s)**	1,273,053
3.	**Potentially Captive Excess Return Share**	90%
4.	**Surplus Available to Potentially Captive Shippers**	1,145,748
5.	**UP Required Revenues (000s)**	$22,730,805
6.	**MMM R/VC Ratio**	218.1%

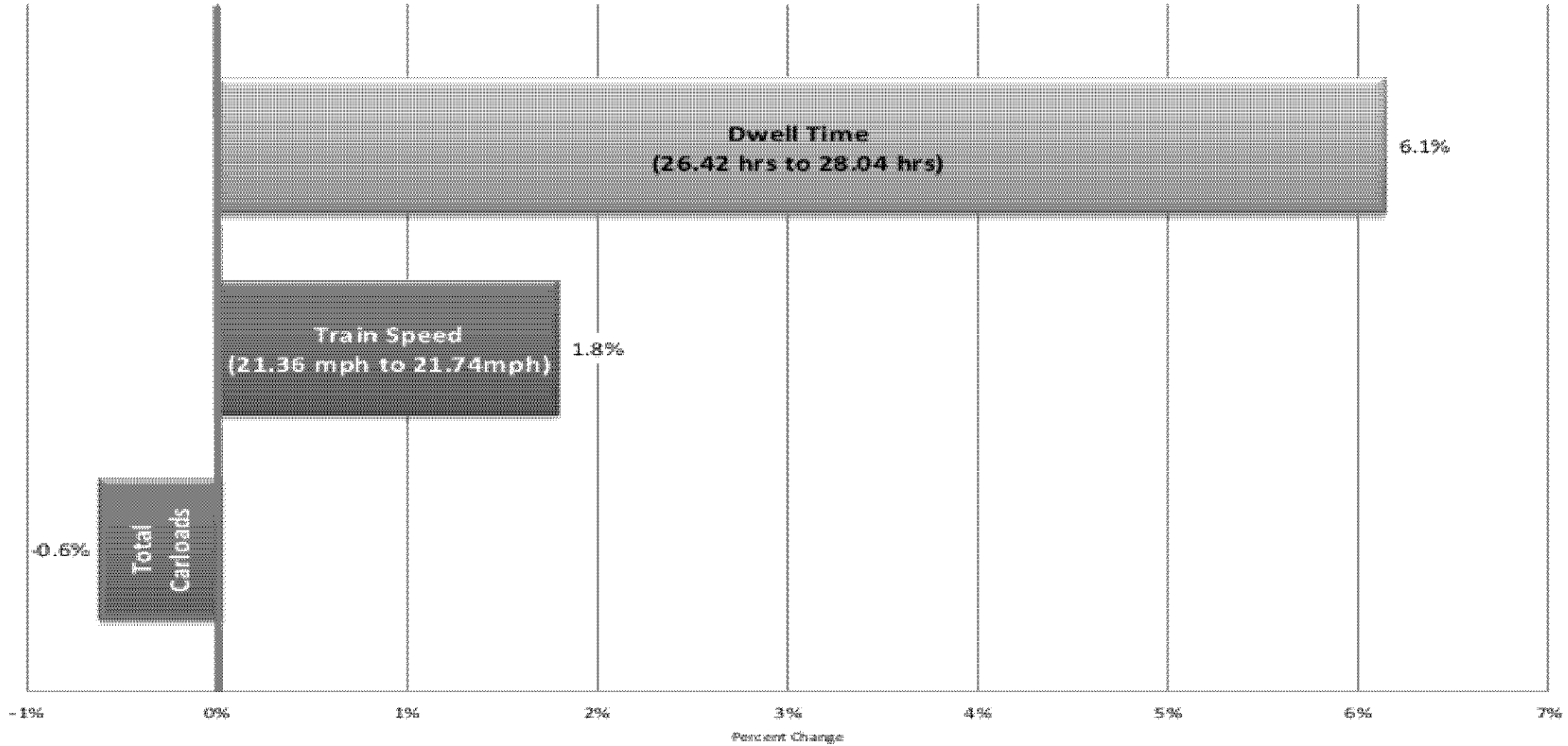
		Base					Adjusted			Actual Adjustments
	Shipper	**Rates**	**Costs**	**Tons (000s)**	**Total Revenue (000s)**	**R/VC Ratio**	**R/VC Ratio**	**Rates**	**Total Revenue (000s)**	**Total Revenue**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
7.	A	$7.00	$3.00	1,000,000	$7,000,000	233.3%	218.1%	$6.54	$6,541,701	$687,449
8.	B	$11.00	$5.00	500,000	$5,500,000	220.0%	218.1%	$10.90	$5,451,417	$0
9.	C	$10.00	$4.00	500,000	$5,000,000	250.0%	218.1%	$8.72	$4,361,134	$0
10.	D	$8.50	$4.50	200,000	$1,700,000	188.9%	188.9%	$8.50	$1,700,000	$0
11.	E	$8.00	$6.00	100,000	$800,000	133.3%	133.3%	$8.00	$800,000	$0
12.	F	$8.00	$7.00	100,000	$800,000	114.3%	114.3%	$8.00	$800,000	$0
13.	G	$3.23	$7.00	952,888	$3,076,553	46.1%	46.1%	$3.23	$3,076,553	$0
14.	Total		xxx	3,352,888	$23,876,553	xxx	xxx	xxx	$22,730,805	xxx

The Four Major Railroads Consistantly Carried Fewer Carloads Between 2005 and 2014



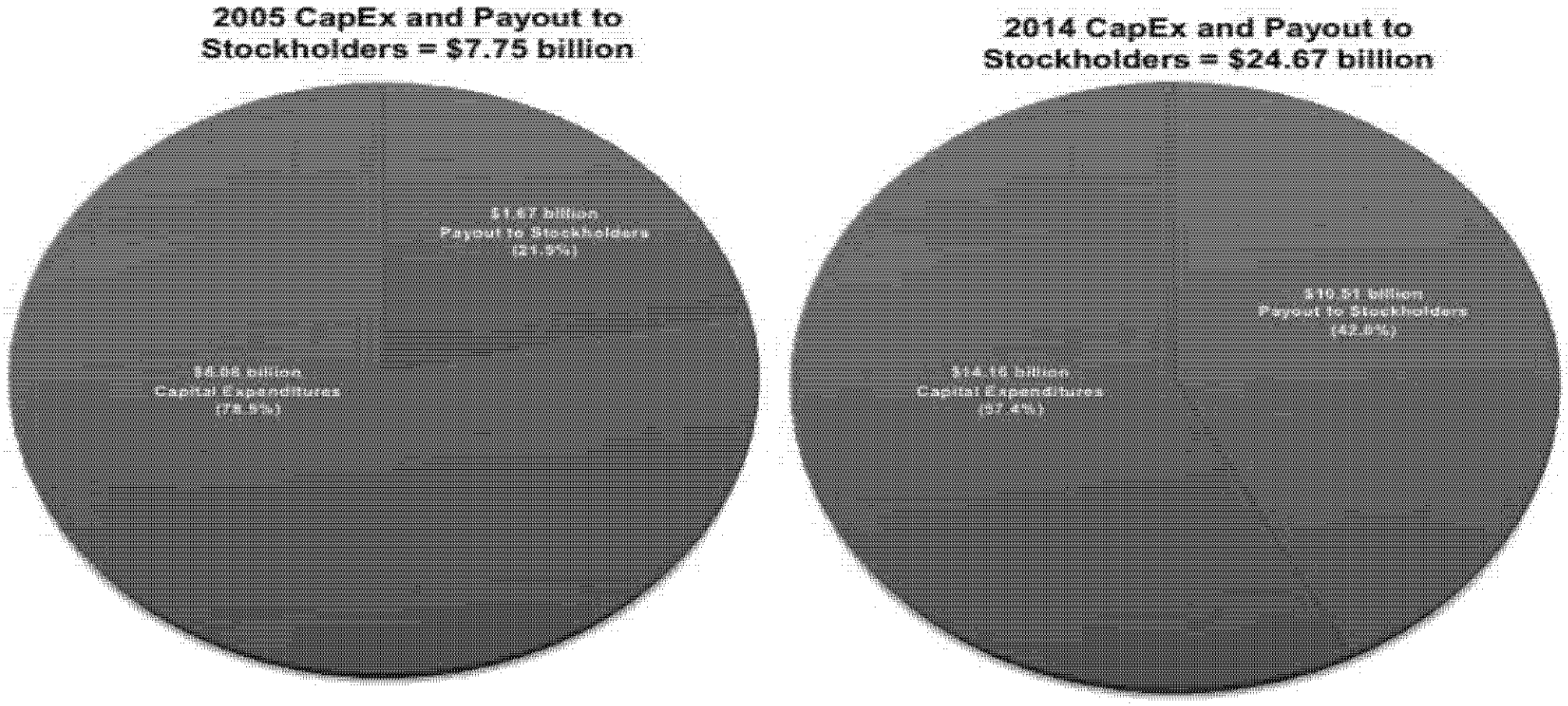
Source: Railroads' annual SEC filings for BNSF, CSXT, NS and UP.

Operations on the Four Major Railroads Have Not Improved Between 2005 and 2014



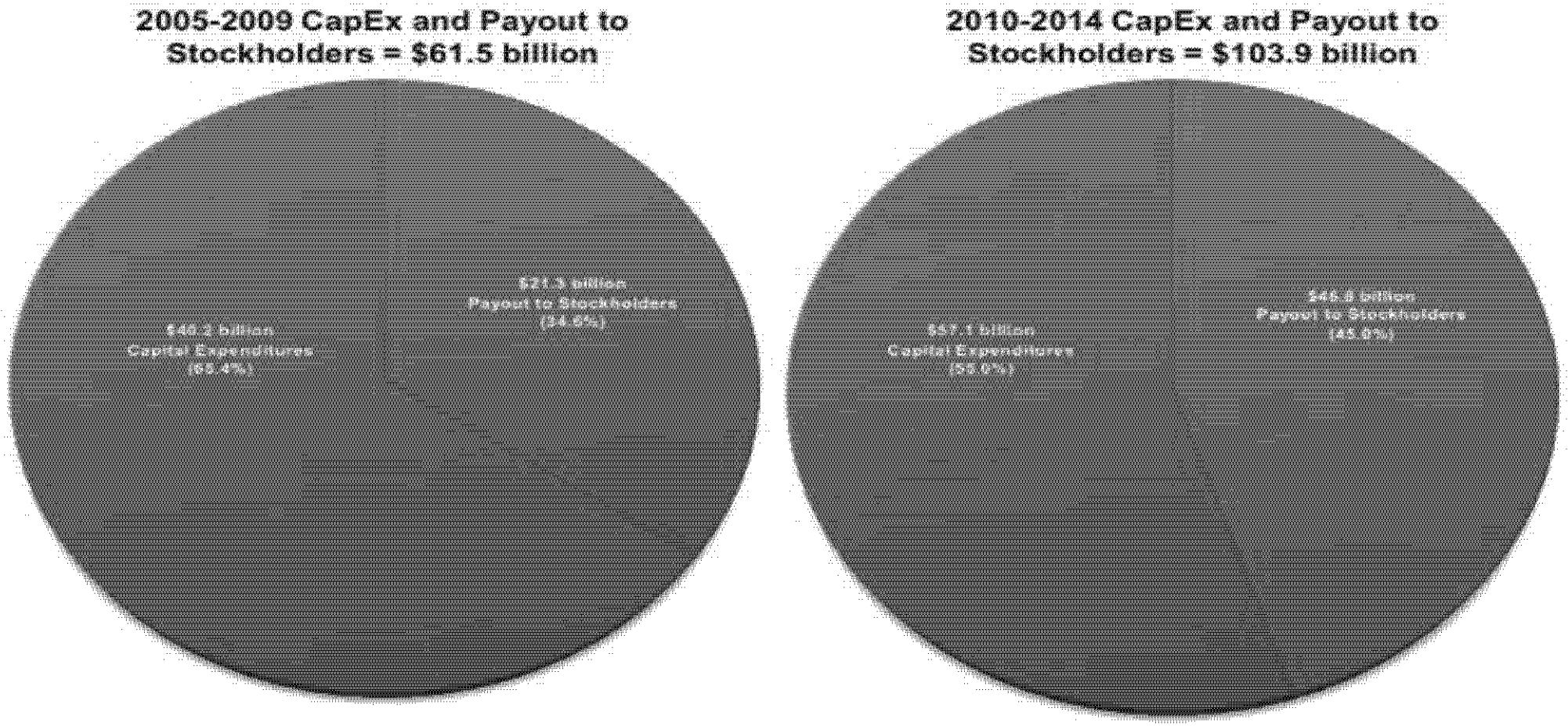
Source: Average Train Speed and Dwell Time are from the AAR's weekly Performance Measure filings for BNSF, CSXT, NS and UP.
Carloads are from BNSF, CSXT, NS and UP annual SEC filings.

The Four Major Railroads' Primary Use of Operating Profit has Changed



Source: The BNSF, CSXT, NS and UP railroads' annual SEC filings.

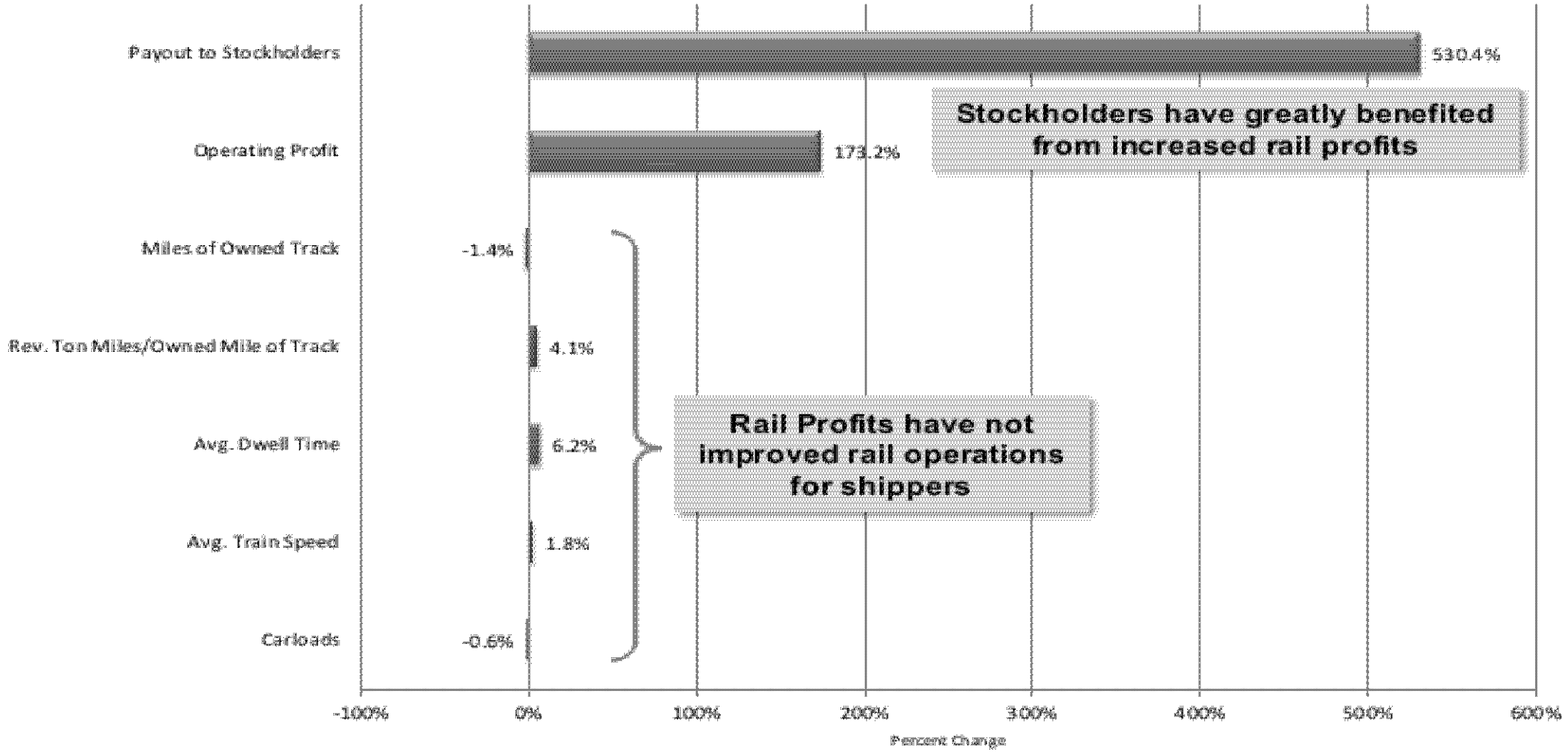
The Four Major Railroads' Primary Use of Operating Profit has Changed



Source: The BNSF, CSXT, NS and UP railroads' annual SEC filings.

Capital Expenditures Have Not Increased Rail Capacity

Operational versus Commercial Changes of the Four Major Railroads Between 2005 and 2014



Source: Carloads, Operating Profit and Payout to Stockholders are from railroads' SEC filings, Train Speed and Dwell Time are from the railroads' weekly filings to the AAR. The percent change in Owned Miles of Track and Millions of Revenue Ton Miles Per Owned Mile of Track are between 2005 and 2013 as these are AAR values for all Class I railroads and are only available through 2013.

Summary of Big 4 US Railroads' Operational and Commercial Changes Between 2005 and 2014

Operational Changes	2005	2014		Difference	Percent Change
Carloads (000)	34,705	34,497		-208	-0.6%
Avg. Train Speed (mph)	21.4	21.7		0.4	1.8%
Avg. Dwell Time (hours)	26.42	28.04		1.62	6.1%
Miles of Owned Track *	164,291	161,980		-2,311	-1.4%
Millions of Rev. Ton Miles Per Owned Mile of Track *	10.33	10.75		0.42	4.1%

Commercial Changes	2005	2014		Difference	Percent Change	Total $ 2005-2014
Operating Profit (millions)	$8,401	$22,954		$14,553	173.2%	$157,320
Payout to Stockholders (millions)	$1,667	$10,508		$8,841	530.4%	$69,152
Capital Expenditures (millions)	$6,080	$14,156		$8,076	132.8%	$89,995
Operating Revenue (millions)	$43,569	$71,520		$27,951	64.2%	$571,088
Average Revenue Per Car	$1,255	$2,073		$818	65.1%	$1,735
Average Stock Price	$50	$134		$84	167.8%	$75

All values are for the combination of BNSF, CSXT, NS and UP except for miles of Track Owned and Ton Miles Per Owned Mile of Track which are AAR values published for all Class I railroads.

Commercial changes are taken from the BNSF, CSXT, NS and UP annual reports (10K's) along with annual carloads. Annual Average Train Speed and Dwell Time are taken from the AAR's weekly Performance Measure filings and an average is calculated for each year.

Average Stock Price is the average for the CSXT, NS and UP.

* Values for Owned Miles of Track and Millions of Revenue Ton Miles Per Owned Mile of Track are for all Class I railroads and are only available from the AAR through 2013. These changes are, therefore, between 2005 and 2013.

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STB Ex Parte 664-2 (Sub-No. 2)

ON BEHALF OF:

The Association of American Railroads

PRESENTED BY

Bente Villadsen
The Brattle Group

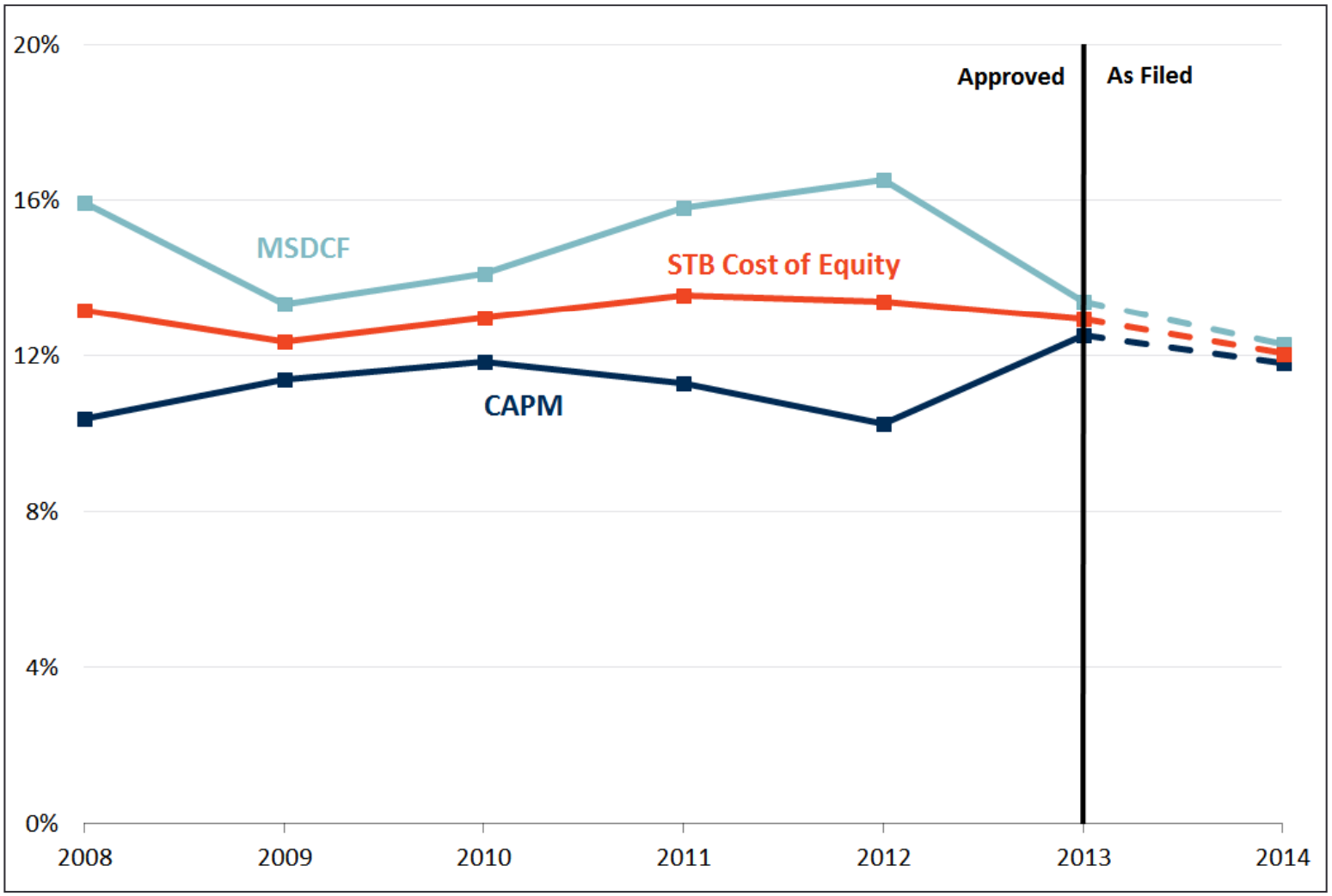
Raymond Atkins
Sidley Austin, LLP

July 23, 2015

THE Brattle GROUP

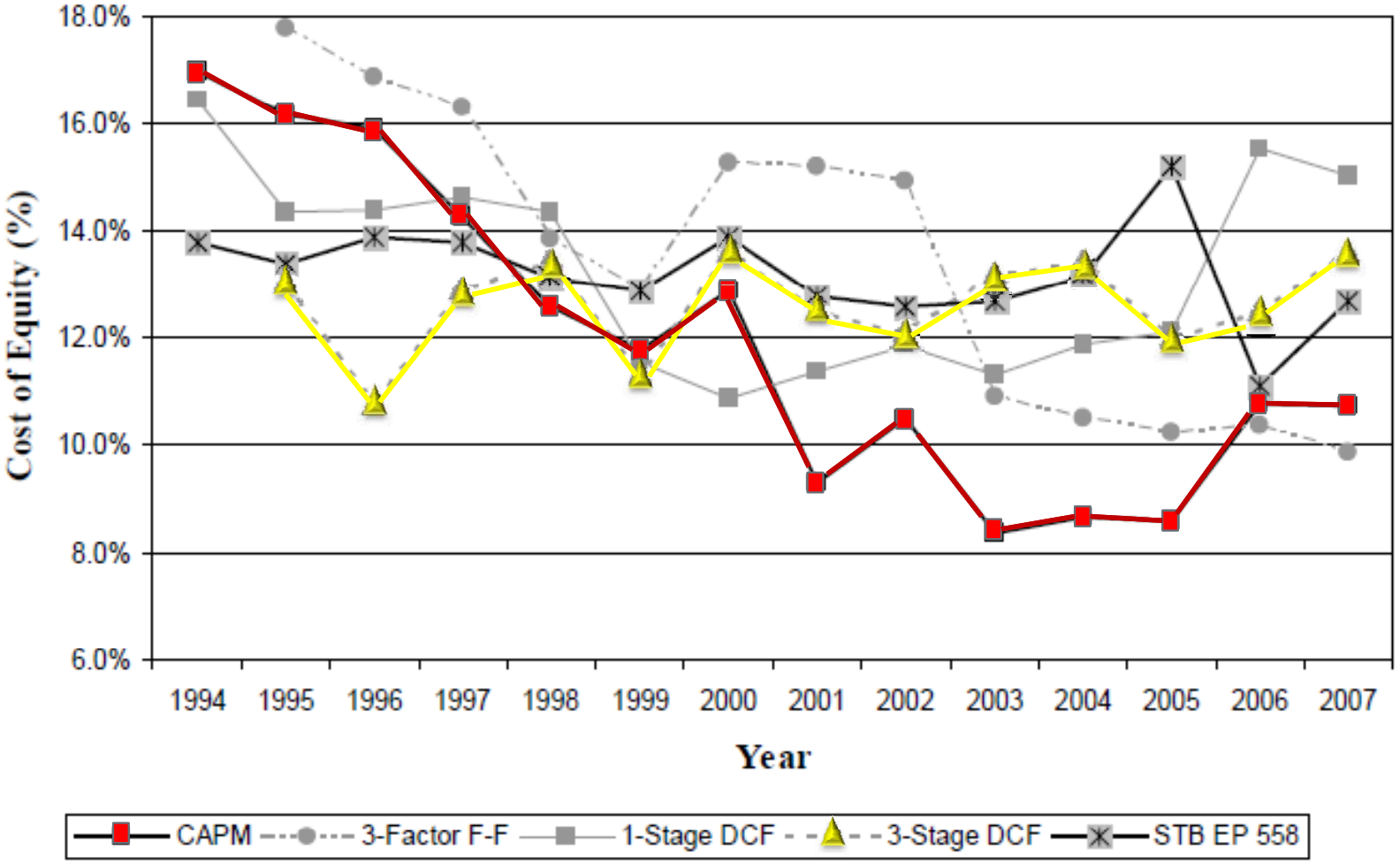
SIDLEY AUSTIN LLP
SIDLEY

STB CAPM and MSDCF Model Results for 2008 – 2014



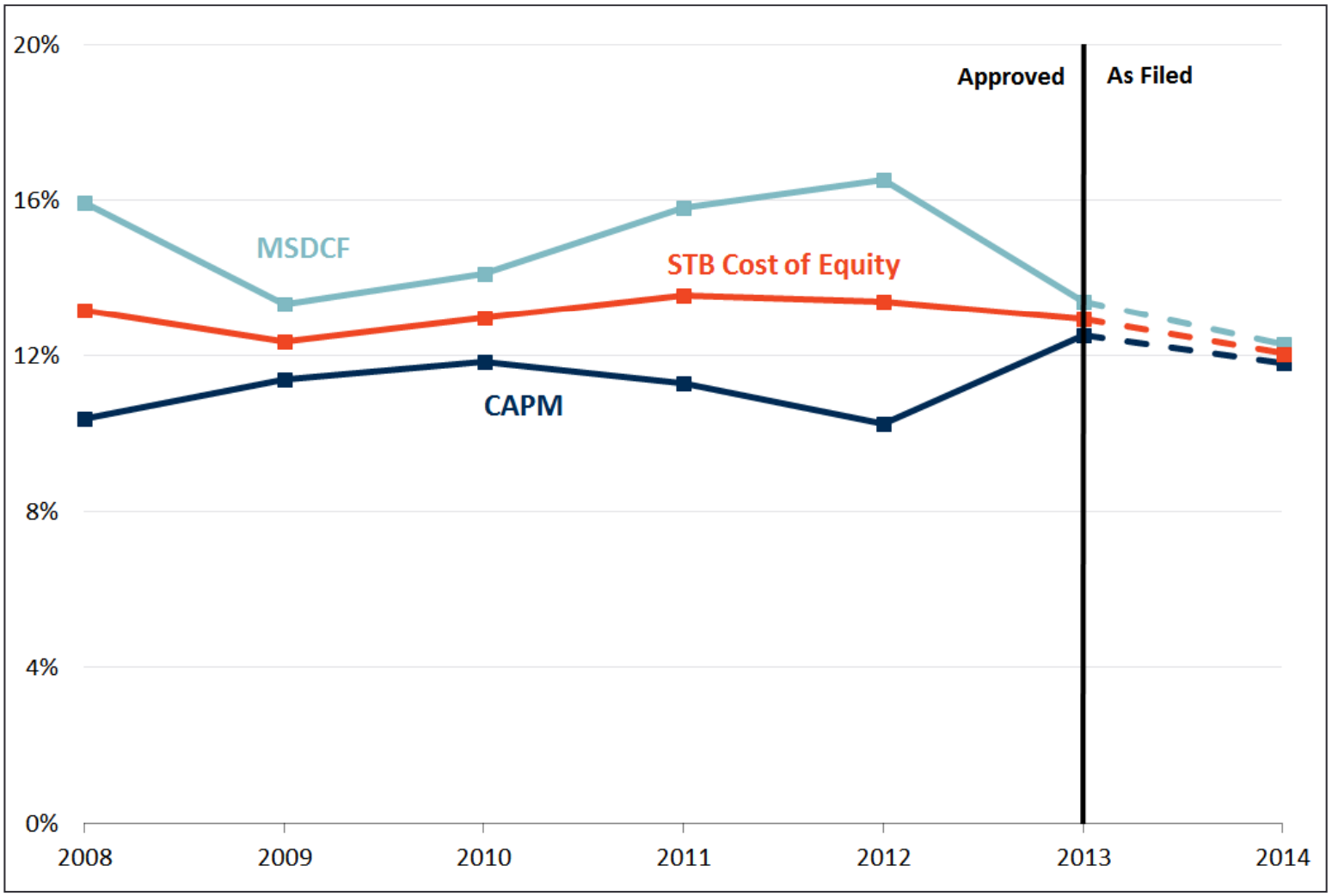
Sources: STB Cost of Capital Decisions 2008–13; AAR filing for 2014

Models Only Provide a Range of Estimates



Source: STB Docket No. 41191 (Sub No. 1) (May 15, 2009)

Using an Average is Reasonable

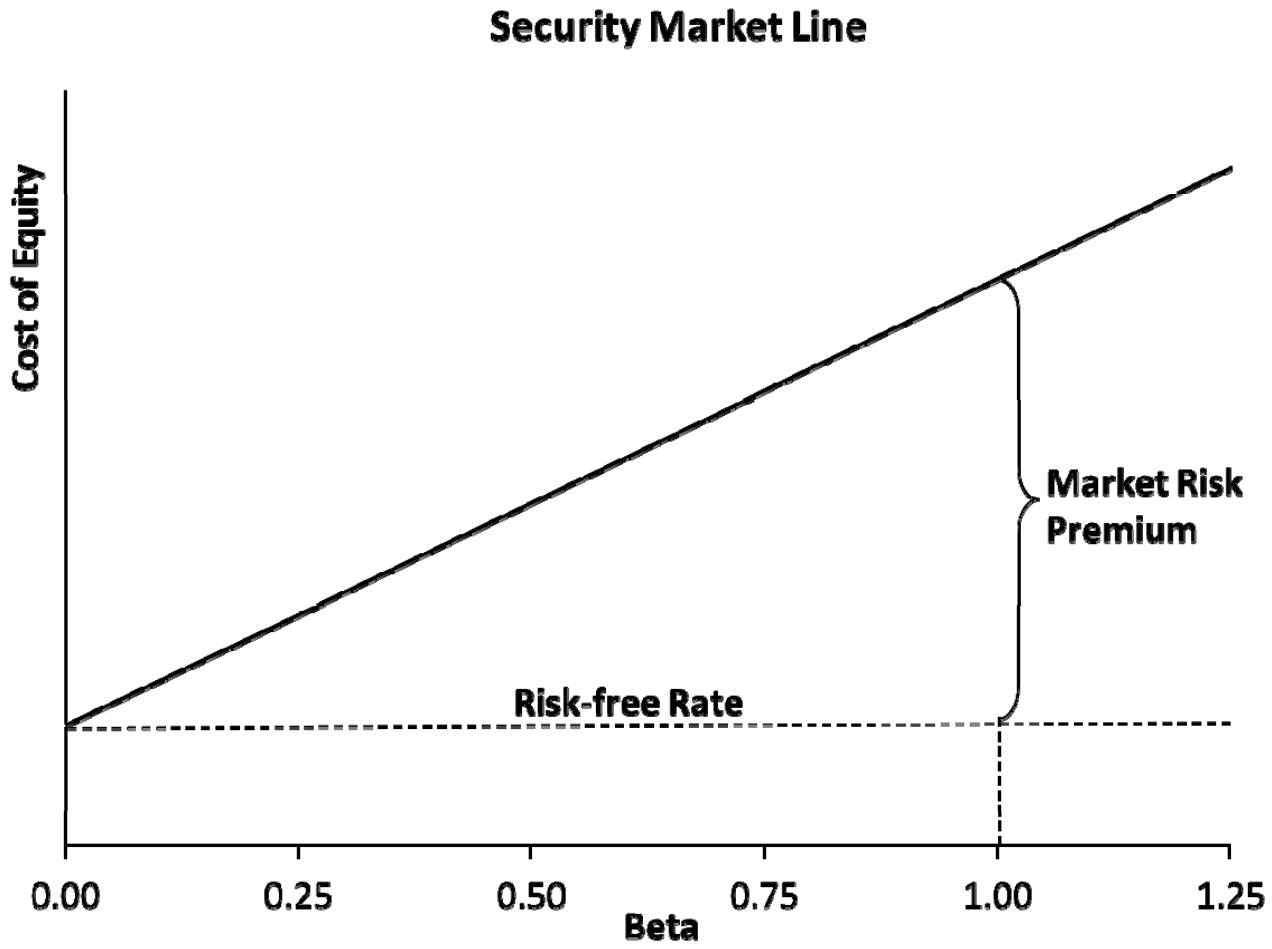


Sources: STB Cost of Capital Decisions 2008–13; AAR filing for 2014

Dr. Bente Villadsen
The Brattle Group

The CAPM Model for Estimating the Cost of Equity

Cost of Equity = Risk-free Rate + Beta × (Market Risk Premium)



The DCF Model for Estimating the Cost of Equity

Basic formula for DCF valuation:

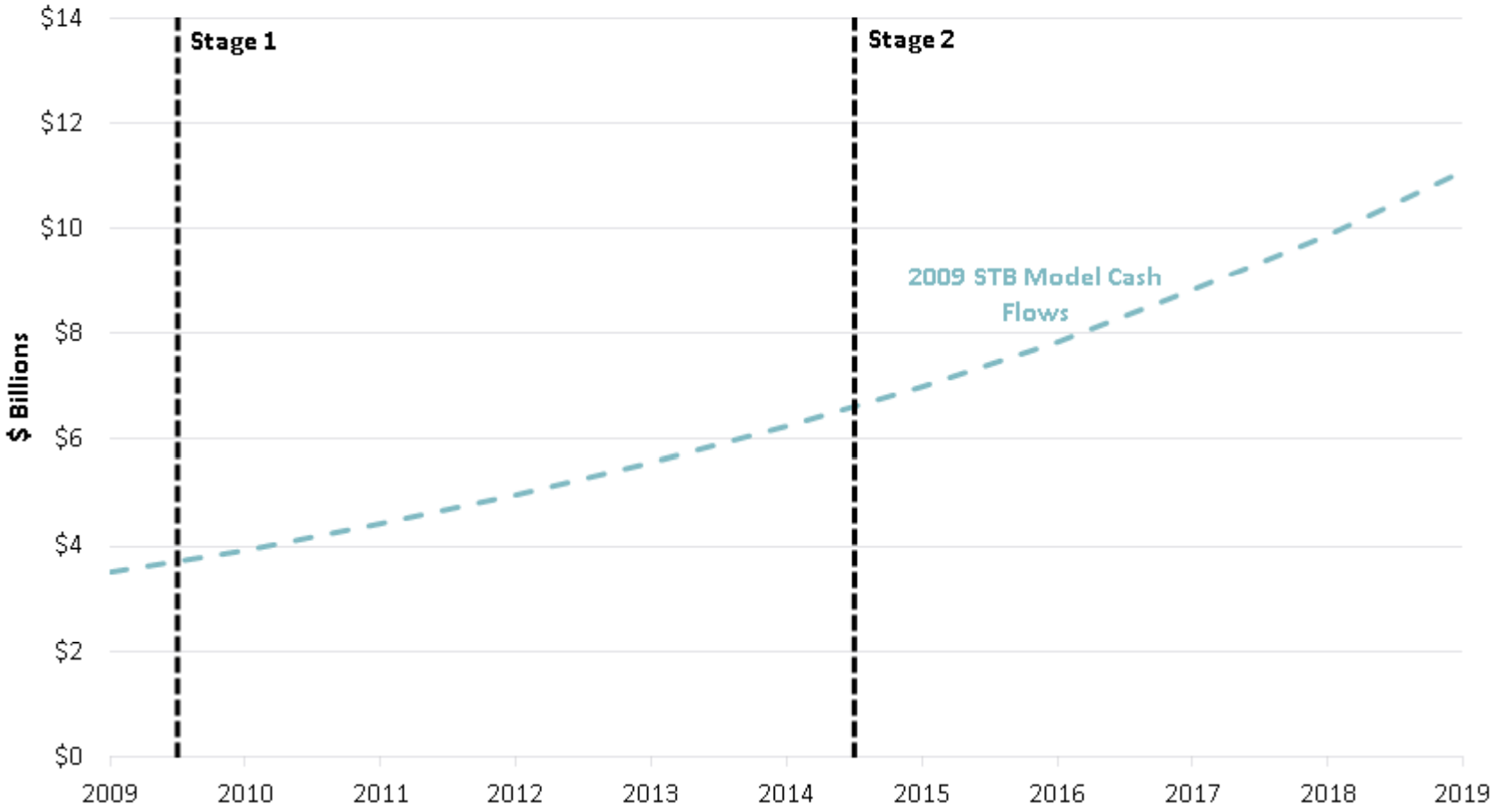
$$V_0 = \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3} + \cdots$$

- C_t represents expected cash flow to shareholders in year t
- V_0 represents the current market value of the firm's equity
- r is the opportunity cost of equity capital

- The DCF is based on the basic finance principle that the value of a firm's equity is the present value of the expected cash flows to its shareholders.

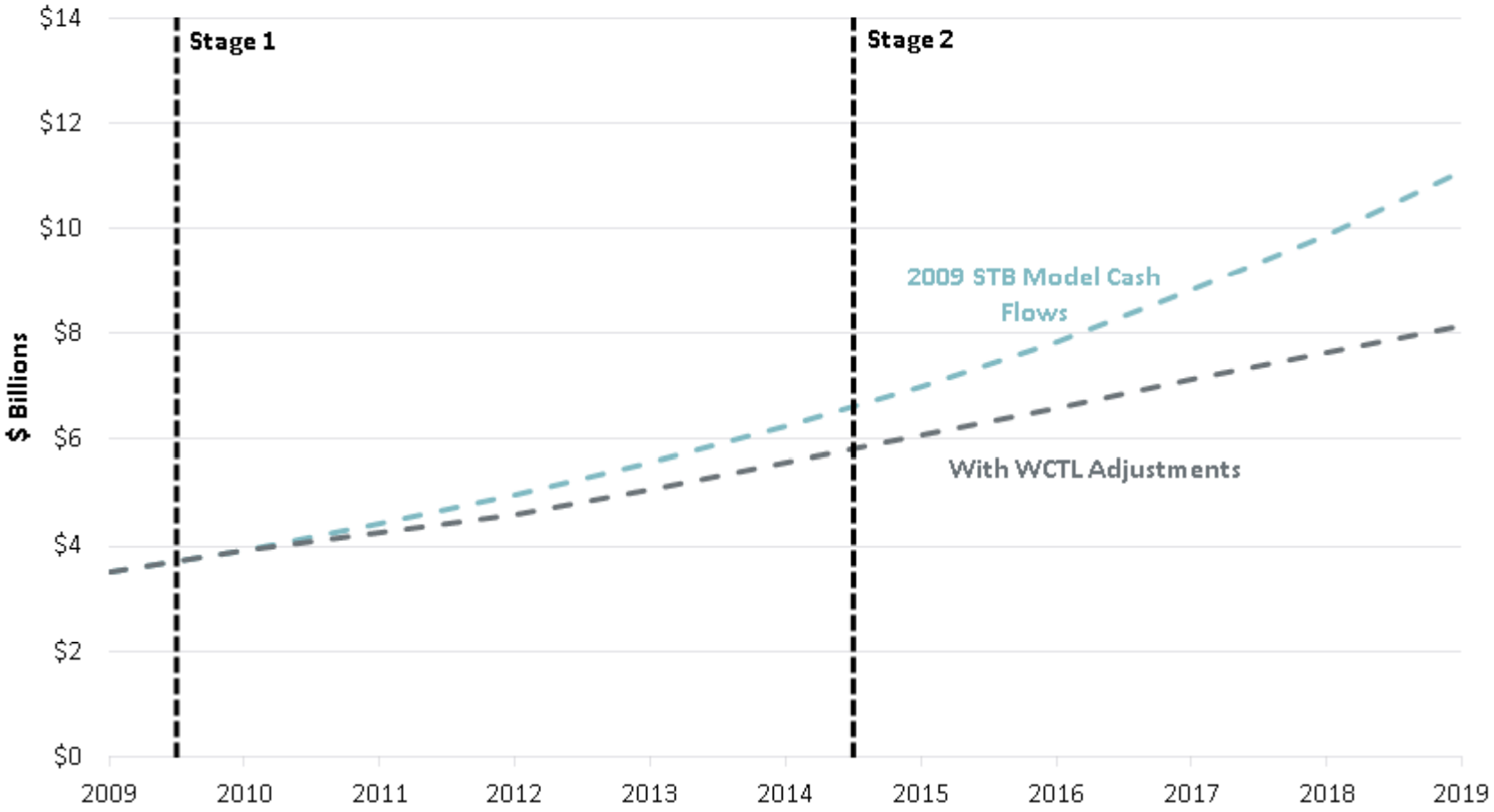
- Estimate cash flows and solve for the implied discount rate that makes this statement true.

WCTL Argues that the Board's MSDCF Overestimated Actual Cash Flows



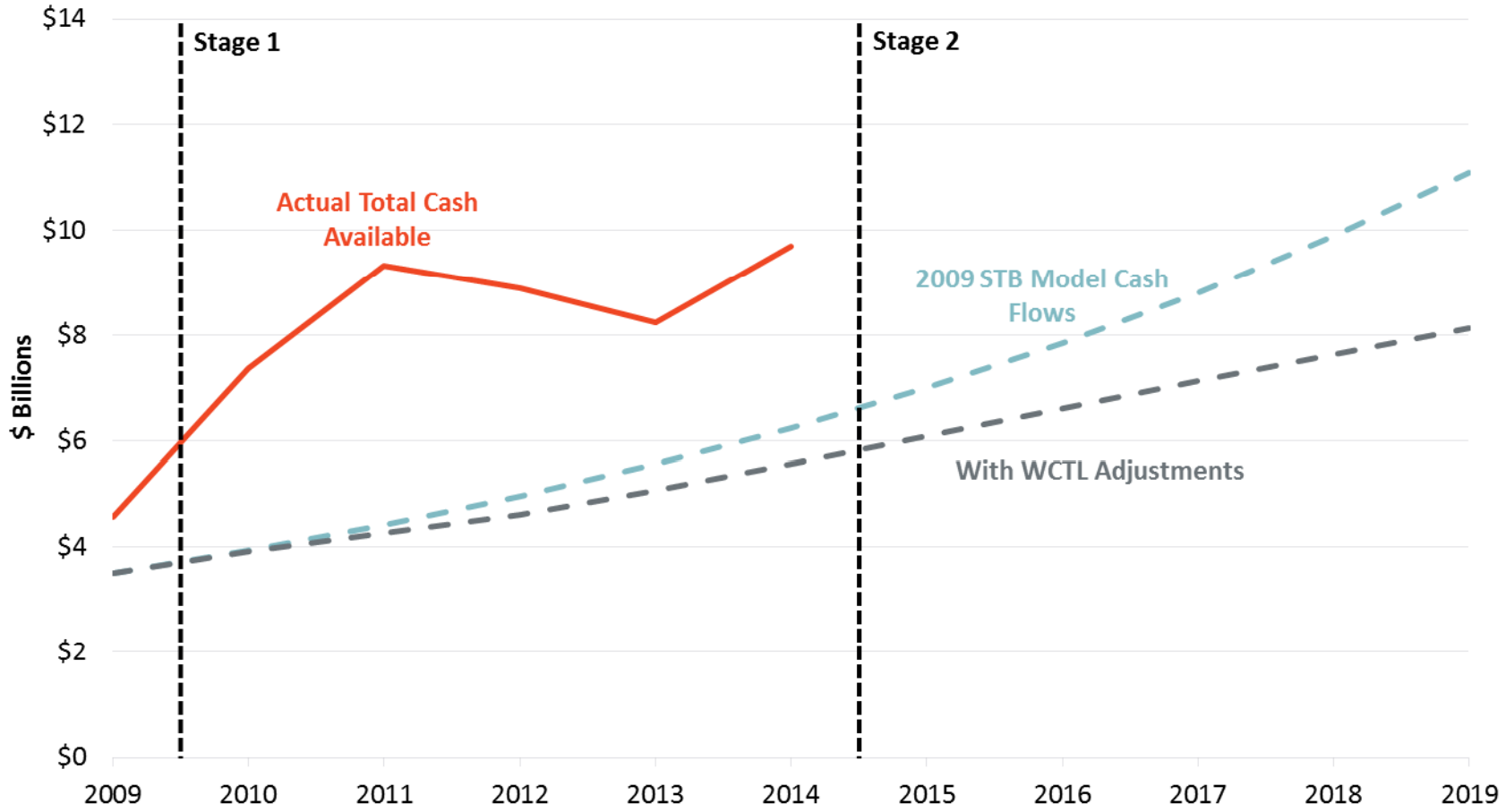
Sources: Dr. Villadsen's Workpapers and Railroad Financial Statements

WCTL's Adjustments Are Selective and Lack Internal Consistency



Sources: Dr. Villadsen's Workpapers and Railroad Financial Statements

Actually the STB MSDCF Has *Under*predicted Available Cash



Sources: Dr. Villadsen's Workpapers and Railroad Financial Statements

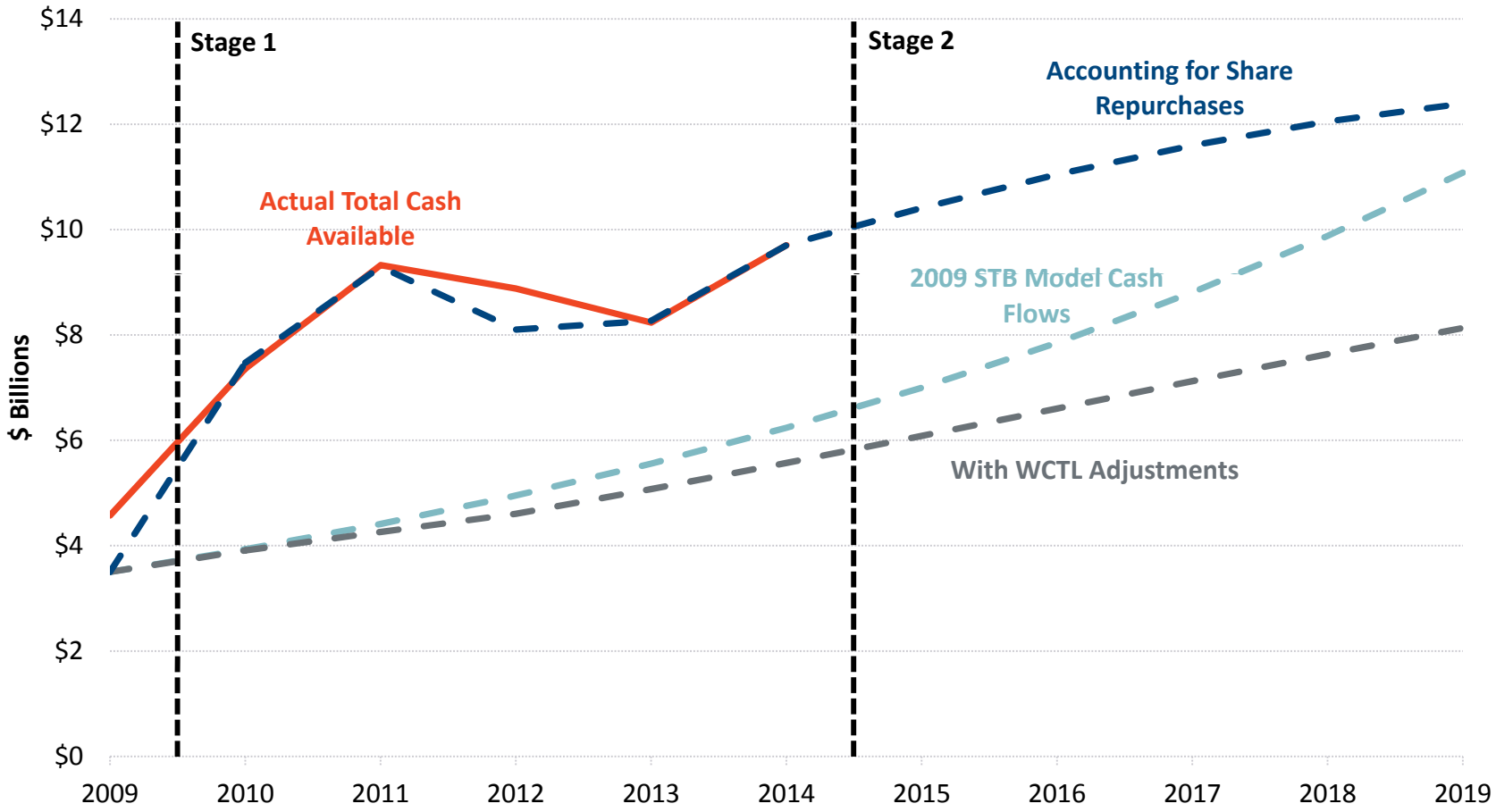
WCTL Criticisms of the MSDCF are Immaterial

	STB MSDCF	Smoothed Growth and Cash Flows	Share Repurchases	15 years to Steady State
2008	15.95%	15.16%	15.77%	16.61%
2009	13.34%	12.47%	13.19%	13.59%
2010	14.13%	13.60%	13.90%	14.35%
2011	15.83%	14.96%	15.10%	15.79%
2012	16.53%	15.77%	16.08%	16.71%
2013	13.40%	12.72%	12.72%	13.09%
Average	**14.9%**	**14.1%**	**14.5%**	**15.0%**

Source: Villadsen Verified Statement Table 5

The Board's MSDCF remains the superior model.

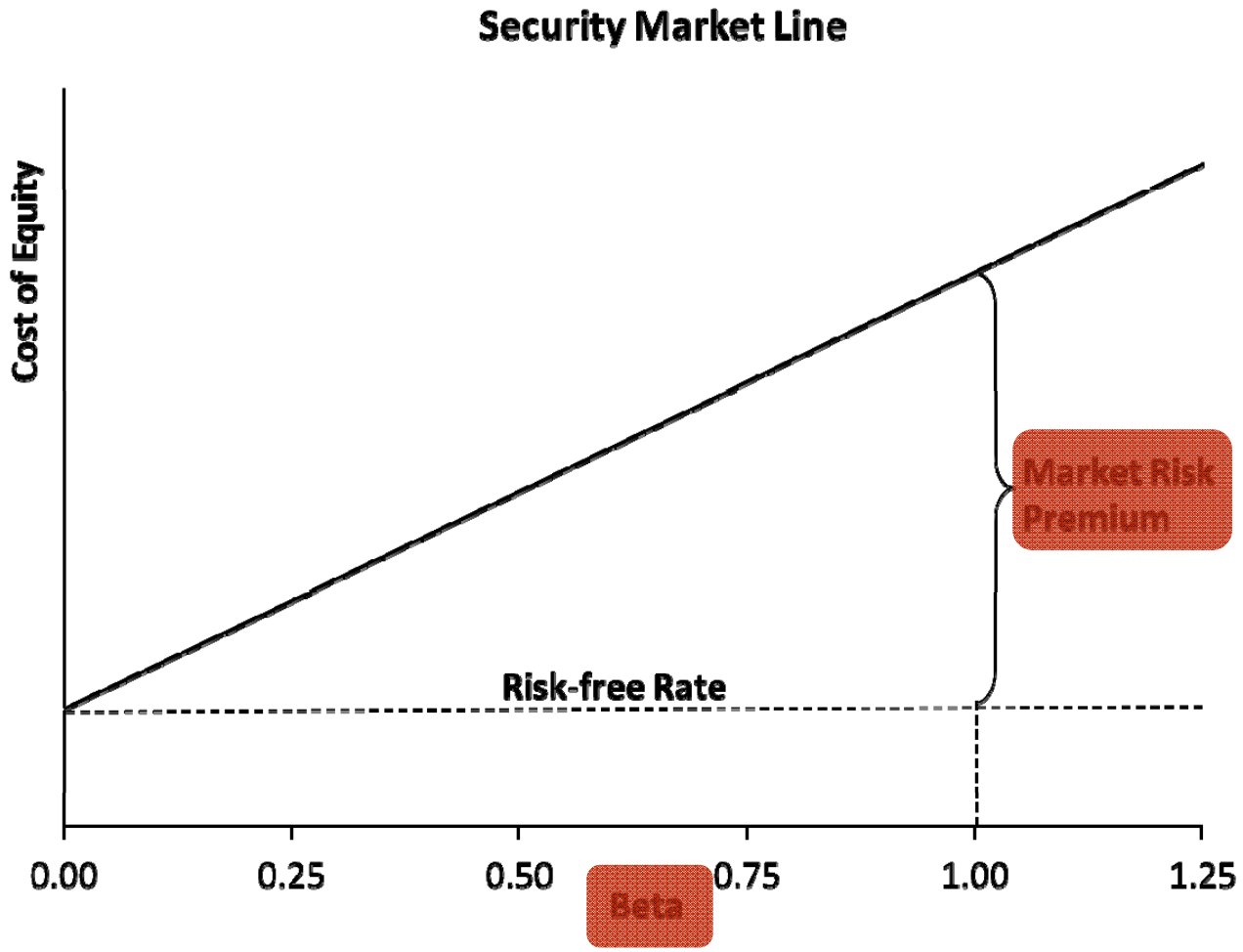
Dr. Villadsen's Analysis Does Not "Double Count" Cash Flows



Sources: Dr. Villadsen's Workpapers and Railroad Financial Statements

Estimating CAPM Inputs

Cost of Equity = Risk-free Rate + Beta × (Market Risk Premium)



The Board should maintain its straightforward approach to measuring beta for the railroads

1. A beta of 1 violates CAPM fundamentals.

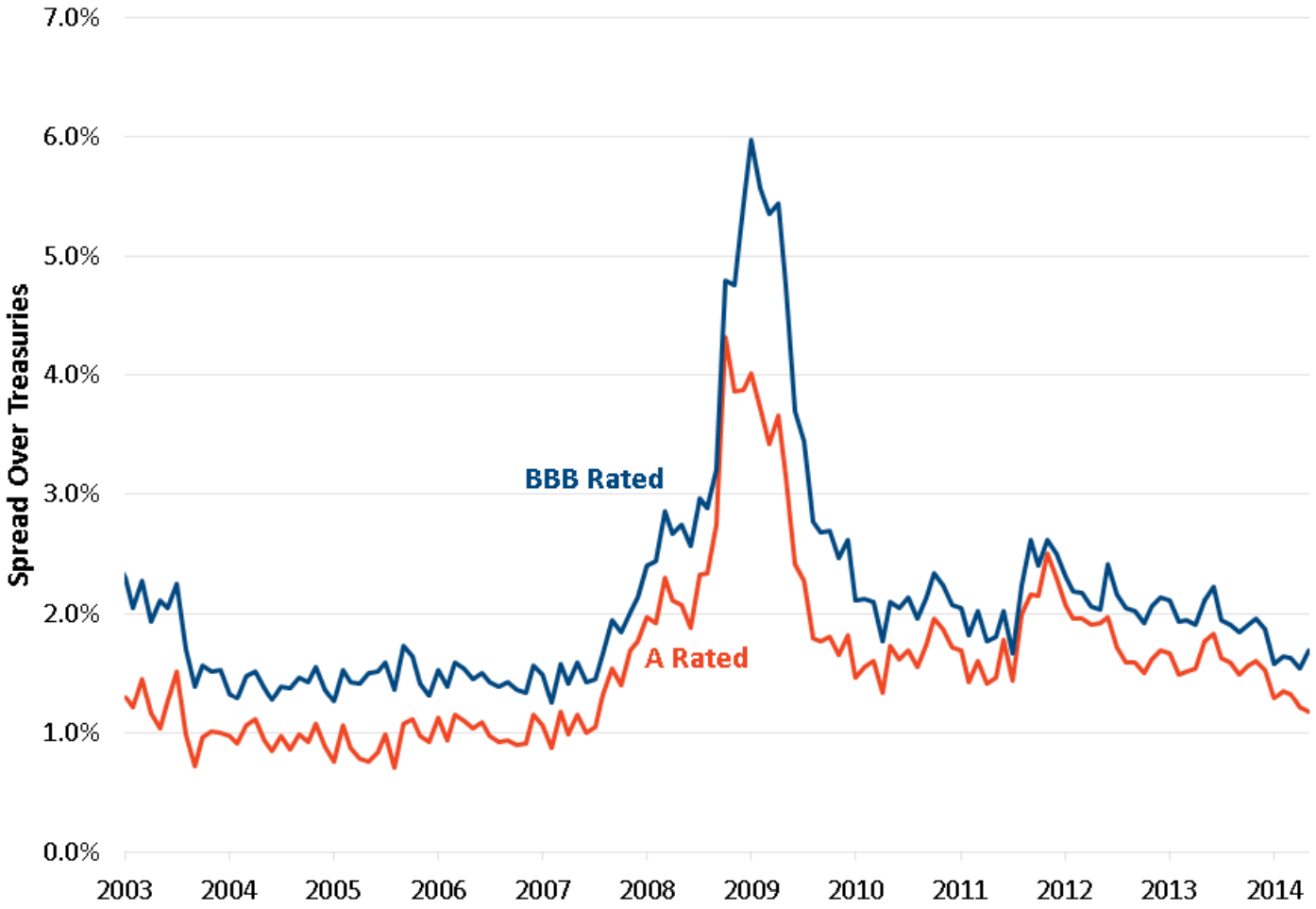
2. Betas do not need to be adjusted.

   - the Vasicek adjustment is theoretically preferable to the Blume adjustment

3. There is no need to expand the number of railroads.

4. The Board should not replace railroads with the S&P 500.

Following the Financial Crisis, Government Bond Yields May Not Be a Good Measure of Required Corporate Returns



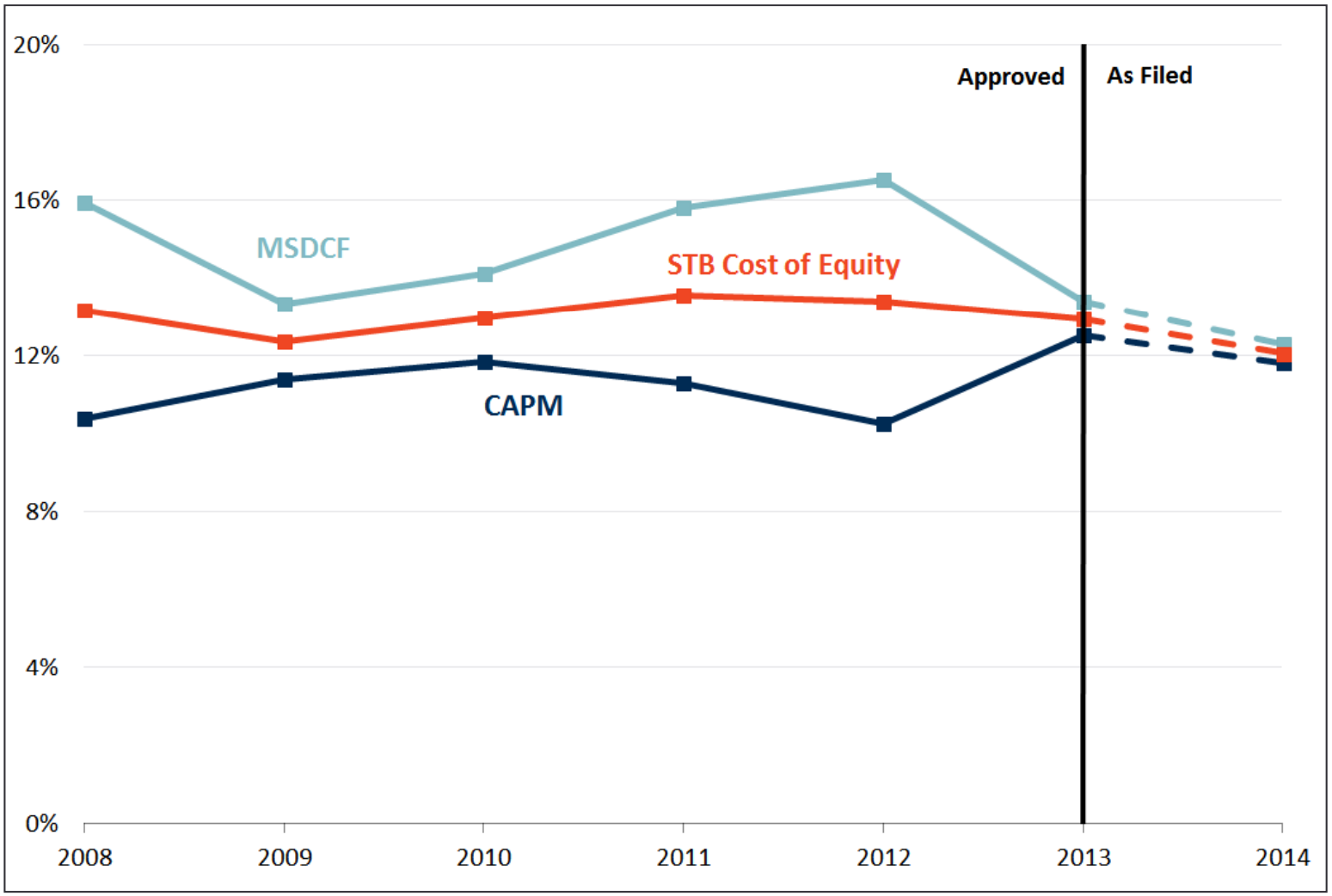
Source: Villadsen Verified Statement Figure 1

Forward-looking MRP Estimates have Exceeded Historical Averages

Year	Annual Forecasted MRP (Bloomberg)	Annual Historical MRP (Ibbotson)	Forecasted MRP (Value Line)
2008	7.83%	6.47%	
2009	8.55%	6.67%	
2010	8.03%	6.72%	
2011	7.97%	6.62%	
2012	8.86%	6.70%	12.52%
2013	7.72%	6.96%	9.97%
2014	*7.20%*	*7.00%*	*9.67%*
Average	*8.16%*	*6.73%*	*nmf*

Sources: Villadsen Verified Statement, Table 2; Ibbotson SBBI 2014; and Bloomberg, June 2015

The Board's CAPM May Have Been *Under*stating the Cost of Equity in the Recent Past



Sources: STB Cost of Capital Decisions 2008–13; AAR filing for 2014

"Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information."

Professor Stewart Myers

Raymond Atkins
Sidley Austin, LLP

What do WCTL's own members say about using multiple models?

"[N]o individual model is more reliable than all others under all market conditions. Therefore, it is both prudent and appropriate to use multiple methodologies in order to mitigate the effects of assumptions and inputs associated with any single approach."

Kansas City Power & Light (January 2015)

Direct Testimony of Robert Hevert on behalf of KCP&L, January 2, 2015

"It is essential that the Commission employ a variety of techniques to measure the Company's cost of equity because of the limitations/infirmities that are inherent in each method."

Wisconsin Public Service Corporation (April 2015)

Direct testimony of Paul R. Moul for Wisconsin Public Service Corporation in application for Authority to Adjust Electric and Natural Gas Rates, 6690-UR-124, April 17, 2015

"Despite the theoretical appeal of, or preference for, using a particular method to estimate the cost of equity, no single approach can be regarded as wholly reliable."

Entergy Arkansas, Inc. (April 2015)

Direct Testimony of Bruce H. Fairchild on behalf of Entergy Arkansas, Inc. before the Arkansas Public Service Commission, Docket No. 15-015-U, April 24 2015.

What do WCTL's own members say about the Market Risk Premium?

Year	WCTL Member	Recommended Market Risk Premium
2015	Kansas City Power & Light	10.47% – 10.58%
2015	Wisconsin Public Service	7.55% – 8.03%
2015	Entergy	9.10%
2014	MidAmerican Energy	7.0%
2014	Ameren	9.28% – 10.02%

"[T]he Market Risk Premium in the current environment should not exceed 4.7%."

WCTL Opening Submission to STB (September 2014)

"As there are many different ways to estimate the cost of equity, the Board must take great care not to swing back-and-forth between parties' preferred methodologies based on the results of the different approaches."

Surface Transportation Board (2007)