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SURFACE TRANSPORTATION BOARD

DECISION

STB Ex Parte No. 664

METHODOLOGY TO BE EMPLOYED IN DETERMINING THE RAILROAD INDUSTRY'S  
COST OF CAPITAL

The Board replaces its single-stage Discounted Cash Flow (DCF) model with a Capital Asset Pricing Model (CAPM) to determine the railroad industry's cost of capital.

Decided: January 17, 2008

**BY THE BOARD:**

For over a year, we have been thoroughly reviewing our regulatory processes for determining the railroad industry's cost of capital. That figure, which we calculate each year, is an essential component of our core regulatory responsibilities. The cost of capital is needed to determine the revenue adequacy of the individual railroads, to resolve rate and trackage right disputes, and to review feeder line and merger applications. In 2006, our cost of capital calculation came under sharp challenge by a group of interested shippers. Given the statutory directive that we "ensure the availability of accurate cost information in regulatory proceedings" (49 U.S.C. 10101(14)) and the industry-wide impact of any change, we instituted a broad rulemaking to obtain public comment from all interested parties on our existing approach and whether and how to reform it. Since that time, we have held two public hearings and reviewed five rounds of written testimony and exhibits to explore this subject fully.

The core debate involves how best to estimate the cost of equity. The cost of equity measures the returns that shareholders require to compensate them for the use of their capital. Together with the cost of debt, this figure is needed to estimate the overall cost of capital. Unlike the cost of debt, however, the cost of equity is not directly observable. This forces us to rely on complex finance models to estimate that component of the cost of capital.

The record reveals that the time has come to replace the single-stage Discounted Cash Flow (DCF) model we have used since 1981 to estimate the cost of equity. That model has been displaced by more current and precise techniques, such as the Capital Asset Pricing Model

(CAPM) or multi-stage DCF models. Moreover, the single-stage DCF model estimates a high cost of equity. It would estimate the 2006 cost of equity at 16.1%,<sup>1</sup> a level for which the reputable finance experts that testified in this proceeding did not provide support. Furthermore, while the Class I railroads were reluctant to disclose their internal estimates of their own cost of equity, BNSF stated that its cost of equity was between 11% and 13%.

Given the benefits to the railroads from the current high cost-of-equity estimate produced by our existing approach, it is not surprising that they have been opposed to a change. Initially, the railroads argued we should continue to use the single-stage DCF model. But, at our December 2007 hearing, the railroads advocated that the agency should also examine a separate issue – the appropriate accounting method (“book value” versus “replacement value”) to be used in the agency’s annual revenue adequacy determination. Alternatively, the railroads maintained, we should incorporate a multi-stage DCF model into our analysis. However, the railroads note that the current record cannot support adopting any particular multi-stage DCF model.

While we may, in the future, explore those arguments advanced by the railroads, additional delay in determining the cost of capital for 2006 would constrain the agency from addressing several important matters before us that require that figure. Moreover, further delay in issuing our 2006 cost-of-capital determination would cause a corresponding delay in our annual revenue-adequacy determination for 2006, which in turn would prevent the agency from issuing the benchmarks needed for parties with smaller rate disputes to litigate those claims under our simplified procedures. We will not permit a significant portion of the work of the agency to grind to a halt.

Further delay is unnecessary because, as this extensive record has made clear, CAPM provides an acceptable and widely used method to estimate the cost of equity. For example, the record reveals that in 2004, the Federal Reserve Board (FRB) conducted an extensive review of existing finance methods for estimating the cost of equity, exploring both the DCF models and CAPM. Based on this review, FRB moved to CAPM, in part because it found that this model was a well-known, widely-used and theoretically sound model that was simple and transparent compared to other approaches. Similarly, our Canadian counterpart – which calculates the cost of equity for the Canadian railroads each year after examining both the DCF and CAPM methods - has concluded that CAPM produces an estimate that best reflects the state of relevant capital markets and is a better indicator of changes in financial markets. The weight of evidence in this proceeding, including the submissions from these agencies, has persuaded us that CAPM satisfies our need for a simple, transparent, current, and more precise replacement for the single stage DCF model.

Accordingly, with this decision we will replace the single-stage DCF model with a specified CAPM model. Parties in the ongoing proceeding to calculate the 2006 cost-of-capital<sup>2</sup> will be directed to submit the information needed to implement this decision. We will, however, initiate a separate proceeding aimed at gathering additional information on the cost-of-capital-

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<sup>1</sup> WCTL Supp. Comments at 4 (filed July 25, 2007).

<sup>2</sup> Railroad Cost of Capital – 2006, STB Ex Parte No. 558 (Sub-No. 10).

estimating methodology for possible use by the agency in the future. In particular, this new proceeding will be focused on detailed multi-stage DCF proposals that could be used in conjunction with CAPM in the future. If a suitable model is presented and a record developed demonstrating that using a combination of the two approaches can reduce the potential for volatility and improve the precision of our cost-of-equity estimate, we will consider further modifying our approach. If parties do not provide the necessary record to support such a decision, we will discontinue that proceeding and rely solely on CAPM.

## BACKGROUND

Each year the Board determines the railroad industry's cost of capital. The Board then uses this cost-of-capital figure for a variety of regulatory purposes. It is used annually to evaluate the adequacy of individual railroads' revenues.<sup>3</sup> It is also employed in maximum rate cases, feeder-line applications, rail line abandonments, trackage rights cases, rail-merger reviews, and in our Uniform Rail Costing System (URCS). The 2006 cost-of-capital determination has been on hold pending the completion of this review and decision.

The Board calculates the cost of capital as the weighted average of the cost of debt and the cost of equity, with the weights determined by the capital structure (the fraction of capital from debt or equity on a market-value basis) of the railroad industry. While the cost of debt is observable and readily available, the cost of equity (the expected return that equity investors require) can only be estimated. Because the cost of equity cannot be directly observed, estimating the cost of equity requires adopting a finance model and making a variety of simplifying assumptions.

After considerable public discourse, the Interstate Commerce Commission (ICC) – our predecessor agency – settled upon the simple, original form of the discounted cash flow (DCF) model to derive the cost-of-equity component.<sup>4</sup> The key equation ( $r = D/P + g$ ) estimates the average return on equity ( $r$ ) desired by investors by using the current dividend to price ratio ( $D/P$ ) and a forecast of future growth ( $g$ ).<sup>5</sup> The computation of dividend yield is straightforward. To estimate the growth rate, the ICC and Board have used the average of leading securities analysts' 5-year forecasts for growth in earnings per share.<sup>6</sup> We will refer to this single-stage DCF model as the "1981 DCF Model."

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<sup>3</sup> See 49 U.S.C. 10704(a)(2),(3); Standards for Railroad Revenue Adequacy, 364 I.C.C. 803 (1981), modified, 3 I.C.C.2d 261 (1986), aff'd sub nom. Consolidated Rail Corp. v. United States, 855 F.2d 78 (3d Cir. 1988).

<sup>4</sup> See Railroad Cost of Capital – 1982, 367 I.C.C. 662, 670 (1983); Railroad Cost of Capital – 1981, 365 I.C.C. 734, 741 (1982).

<sup>5</sup> To account for annualized growth in the dividend yield, the agency modified the equation to:  $r = (D(1+0.5g)/P) + g$ . See Railroad Cost of Capital – 1982, 367 I.C.C. 662, 678 (1983).

<sup>6</sup> See Railroad Cost of Capital – 1987, 4 I.C.C.2d 621 (1988).

Recently, the 1981 DCF Model for calculating the cost of equity came under challenge. In the annual proceeding to calculate the 2005 cost of capital, the Western Coal Traffic League (WCTL) argued that there is a mismatch between the 5-year growth rate supplied to the Board by the Association of American Railroads (AAR) and the long run growth potential of the economy as a whole. WCTL cited finance texts for the proposition that an industry's sustainable growth rate cannot significantly exceed the growth rate for the economy in perpetuity.

WCTL recommended that the Board replace the 1981 DCF Model entirely with a Capital Asset Pricing Model (CAPM). The theory underlying CAPM is simple and intuitive, although the actual development of a particular model can be complex and requires the exercise of reasoned judgment. CAPM first determines the return an investor would receive on a risk-free investment by selecting the return on certain risk-free investments like Treasury bills. An estimate of the risk premium associated with the particular investment is then developed by comparing the returns of that investment (in our case in the railroad industry) to the returns of the stock market as a whole. Once the risk premium is quantified, its value is added to the risk-free investment rate to obtain an estimate of the cost of equity.<sup>7</sup>

We concluded that the record in the 2005 proceeding was too bare to support a departure from two decades of established agency precedent, but that the concerns raised by WCTL should be explored in more depth with broader public input.<sup>8</sup> Accordingly, on September 20, 2006, we issued an advance notice of proposed rulemaking (ANPRM) in this proceeding to explore the most suitable methodology for calculating the cost of capital.

In response to the ANPRM, we received comments from Arkansas Electric Cooperative Corporation; AAR; National Industrial Transportation League; Snively, King, Majoros, O'Connor & Lee, Inc. (Snively King); United Transportation Union-General Committee of Adjustment; and WCTL. Several of the comments included verified statements from reputable finance experts, who presented conflicting views on the existing approach and offered possible refinements or alternatives. At a hearing in February 2007, we also received written and oral testimony from the Federal Reserve Board on its experience with both DCF and CAPM, written testimony from the Canadian Transportation Agency (CTA) on its use of CAPM and DCF methods, and written testimony from the United States Department of Agriculture in support of a multi-stage DCF approach. After the February hearing, Board staff met with technical staff of the Federal Energy Regulatory Commission (FERC) to discuss how that agency applies its DCF approach to derive the cost of equity for gas pipelines. Board staff also met with staff of CTA to explore further how that agency derives the cost of capital for the Canadian railroads. Finally, Board staff conducted an independent review of the economic and finance literature on best practices in the calculation of cost of capital.

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<sup>7</sup> See Railroad Cost of Capital – 1982, 367 I.C.C. 662, 669 (1983).

<sup>8</sup> Railroad Cost of Capital - 2005, STB Ex Parte No. 558 (Sub-No. 9) (STB served Sept. 20, 2006), pet. for review docketed, No. 07-1064 (D.C. Cir. Mar. 13, 2007) (Railroad Cost of Capital – 2005).

Based on the evidence gathered in response to the ANPRM, on August 20, 2007, we issued a notice of proposed rulemaking (NPRM), in which we proposed to replace the 1981 DCF Model with CAPM. The evidence we had gathered showed that single-stage DCF models had fallen into disfavor in the finance and academic communities and that CAPM was a more current and widely used approach to estimating the cost of equity. The record indicated that a multi-stage DCF model might also be a reasonable alternative to the 1981 DCF Model, but the record did not produce enough detailed information and comment on a suitable multi-stage DCF model to be useful and permit the agency to make a 2006 cost-of-capital determination in a timely manner. Accordingly, we proposed to use a specified CAPM.

We received two rounds of public comments on this proposal.<sup>9</sup> In those comments, the railroads no longer seriously challenge the need to replace the 1981 DCF Model with more current approaches. Instead, they contend that certain assumptions we proposed for the CAPM model are unreasonable, and they argue we should also use a multi-stage DCF model in our analysis. Shipper interests who commented on the proposal agree that certain technical modifications should be made to the CAPM we proposed, and they do not oppose the use of a multi-stage DCF model as a check on CAPM. (Both sides also raise various ancillary issues that are outside the scope of this rulemaking.) As there were a few meaningful disputes over how to apply CAPM or a multi-stage DCF model, we held a second hearing on December 4, 2007.

On December 18, 2007, we closed the record in this proceeding. Three days later, AAR petitioned the Board to reopen the record to receive a verified statement that responded to material referenced by WCTL at the December hearing. WCTL opposed AAR's petition. AAR argued that it was surprised by our decision to close the record and had anticipated another opportunity to submit comments. But AAR has not justified reopening this record. The verified statement is either duplicative of material already on the record, responds to evidence not materially related to our decision to replace the 1981 DCF Model with CAPM, or is evidence the AAR could have submitted immediately following the hearing, and therefore is not new evidence. Accordingly, AAR's petition to reopen the record is denied.

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<sup>9</sup> The following parties submitted comments or replies regarding the NPRM: AAR; AK Steel Corp.; Alliance for Rail Competition; Arkansas Electric Cooperative Corp.; Atticus Capital, LP; BNSF Railway Co.; Colorado Association of Wheat Growers; Colorado Wheat Administrative Committee; CSX Transportation, Inc.; Greenhaven Associates, Inc.; Honorable Brian Schweitzer, Governor of Montana; Idaho Barley Commission; Idaho Grain Producers Association; Idaho Wheat Commission; Kansas City Southern Railway Company (KCS); Montana Grain Growers Association; Montana Wheat & Barley Committee; National Association of Wheat Growers; National Barley Growers Association; National Grain & Feed Association; National Industrial Transportation League; Nebraska Wheat Board; Nebraska Wheat Growers Association; Norfolk Southern Railway Corp.; Oklahoma Wheat Commission; Partha S. Mohanram; South Dakota Wheat Commission; South Dakota Wheat Inc.; Texas Wheat Producers Association; Texas Wheat Producers Board; The Children's Investment Fund; Transportation Equity Research; U.S. Department of Agriculture; U.S. Department of Transportation; Union Pacific Railroad Co.; United Transportation Union-General Committee of Adjustment; Washington Wheat Commission; and WCTL.

## DISCUSSION & CONCLUSIONS

The cost-of-capital determination plays an important role in the regulation of railroads, and it is therefore important that the cost of capital be measured as accurately and practically as possible. The most difficult inquiry involves estimating the cost of equity. Unlike the cost of debt, the cost of equity never reveals itself, not even historically. We are therefore compelled to use sophisticated economic models to estimate the cost of equity.

In this rulemaking, we are considering how best to replace the DCF model we have used since 1981 to estimate the cost of equity with more current techniques. In section I, we discuss our reasons for replacing the 1981 DCF Model and use a specified CAPM to determine the 2006 cost of equity. In section II, we discuss our conclusion that the record is insufficient to support supplementing CAPM with a multi-stage DCF model, and our decision to initiate a separate proceeding to provide interested parties another opportunity to submit and defend a more detailed multi-stage DCF model for consideration in future cost-of-capital proceedings. In section III, we address various ancillary issues raised by some of the parties.

### I. Replacing the 1981 DCF Model with CAPM

The record confirms that our 1981 DCF Model can be improved upon using more precise techniques to estimate the cost of equity. The single-stage DCF model adopted in the 1980s was a common method used to estimate the cost of equity. It required few inputs and few judgment calls, permitting the agency to promptly develop an estimate of the cost-of-equity component of the cost of capital.

The simplicity of this model, however, is due in part to an assumption that the 5-year growth rate will remain constant forever. Yet all the experts agree that the growth rate of a particular industry cannot exceed the long-term growth rate of the economy indefinitely. Thus, in years when the 5-year growth rate is very high, this model may overstate the cost of equity. Similarly, in years when the railroads experience a downturn and the predicted 5-year growth rate is very low, the model may understate the cost of equity.

The record also reveals two other concerns with the 1981 DCF Model that could systematically understate the cost of equity. First, the model assumes that the dividend yield will remain constant over time. This may be an unreasonable assumption in an industry that is making substantial capital investments.<sup>10</sup> If investors expect the railroads to increase dividend payments (and decrease capital expenditures) as the fruits of current capital investments are realized, the constant dividend-yield assumption under the current DCF approach will understate the cost of equity. Second, the model only looks at dividend payments. We are persuaded that a DCF model should consider more than just dividend payments (as stock repurchases are a

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<sup>10</sup> See December Hearing Tr. at 46-47.

routine occurrence not considered in our 1981 DCF Model) to avoid understating the cost of equity.<sup>11</sup>

The record also confirms that current finance practices have changed and that the 1981 DCF model has been widely replaced by more sophisticated and precise techniques to estimate the cost of equity.<sup>12</sup> Given the central role this calculation plays in our economic regulation of the rail industry, the time has come to modernize our approach to address concern over continued use of the 1981 DCF Model.

CAPM is a more current approach that commands great respect in the regulatory and academic community. Having carefully reviewed the public comments, we conclude that the CAPM described below provides a suitable alternative to the 1981 DCF model and we will the CAPM use to estimate the 2006 cost of equity.

Under CAPM, the cost of equity is equal to  $RF + \beta \times RP$ , where RF is the risk-free rate, RP is the market-risk premium, and  $\beta$  (or beta) is the measure of systematic, non-diversifiable risk. There is consensus among the parties on the various elements of this CAPM calculation.<sup>13</sup> For example, WCTL and AAR agree that we should use a constant term in the least-squares regression used to estimate beta. The parties also agree that the beta should be calculated based on monthly risk premiums using short-term interest rates. And they agree that the 20-year Treasury bond is a more appropriate measure of the risk-free rate of return than the 10-year Treasury rate proposed in the NPRM. Finally, to facilitate transparency in the calculation, parties support using the Standard & Poor's (S&P) 500 index rather than the New York Stock Exchange (NYSE) index as the market proxy. We expect that these modifications will have a very small effect on our final calculations and, in light of the agreement among the parties, we will adopt those modifications.

The parties, however, did not agree on all points. Two points of disagreement remain: how to estimate the market-risk premium and how to estimate beta. We discuss each dispute in turn below. We also discuss the railroads' argument that we consider a range of CAPM cost-of-equity estimates and use a figure in the upper portion of that range.

#### **i. Market-Risk Premium**

The equity-risk premium measures the additional return (over and above the risk-free rate) that an equity investor requires as compensation for the greater risks (including the risk of bankruptcy) associated with equity. In the NPRM, we proposed to estimate the market-risk

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<sup>11</sup> See December Hearing Tr. at 46, 55.

<sup>12</sup> At our December 2007 hearing, AAR counsel attempted to resurrect the AAR's initial opposition to replacing the simple DCF approach. December Hearing Tr. at 214. But none of AAR's finance experts continues to recommend that we continue using a single-stage DCF model.

<sup>13</sup> See WCTL Written Hearing Testimony at 5-6 (Nov. 27, 2007).

premium based on the performance of the stock market over the past 50 years, which equates today to a 5.2% equity-risk premium. The railroads argue that a 50-year period is too short and that our proposal thereby understates the market-risk premium.

The railroads have demonstrated that a far more common practice is to estimate the market-risk premium going back to 1926. The 1926 date corresponds to the stock market database constructed and maintained by the Center for Research in Security Prices (CRSP), a part of the Graduate School of Business at the University of Chicago. The CRSP database is widely regarded as the gold standard of financial information and the source for nearly all financial data used in academic studies. Studies that rely on the 1926 date do so because they seek to use all the available and reliable data. Prior to 1926, the data are unreliable.<sup>14</sup>

WCTL supports using a 50-year average and opposes using 1926 as the starting point for estimating the market-risk premium. It submitted testimony to suggest that the market-risk premium has been trending downward over the past century and that forward-looking investors would take this trend into account.<sup>15</sup> Yet, as AAR has observed, WCTL's own members (who are themselves regulated utilities) regularly advocate using the longer time horizon to calculate the market-risk premium in proceedings before their state public utility commissions.<sup>16</sup> Moreover, WCTL has recently endorsed the use of the 1926 starting point as the "best practice" to calculate the market-risk premium.<sup>17</sup>

We are now persuaded that basing the equity-risk premium on returns dating from 1926 is the superior and more standard approach. We are cognizant of the literature, cited by several parties, indicating that some experts believe that the forward-looking equity-risk premium should be lowered to reflect the impact of higher price/earnings ratios. For example, the expert for the AAR directed the agency to an adjusted equity-risk premium published by Morningstar/Ibbotson that seeks to reflect the upward trend in price-earnings ratios and reduces the forward-looking equity-risk premium. We acquired the cost-of-capital book published by Morningstar/Ibbotson so that we might carefully review that alternative figure. But while Morningstar/Ibbotson does report such a figure, which falls in the 6% range,<sup>18</sup> the company itself continues to rely on returns dating from 1926 in its own CAPM calculations.<sup>19</sup> Moreover, WCTL submitted evidence

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<sup>14</sup> See December Hearing Tr. at 50, 101-105.

<sup>15</sup> At the December 2007 hearing, WCTL's witnesses presented an exhibit summarizing some of the literature to support its position.

<sup>16</sup> See AAR Written Hearing Testimony at 3-4 (Nov. 27, 2007).

<sup>17</sup> AAR Open. at 23 (citing prior verified statement by WCTL witness, who twice testified recently that the "Ibbotson calculation of the equity-risk premium is widely considered the best estimate of the equity-risk premium available").

<sup>18</sup> See Morningstar/Ibbotson, Stocks, Bond, Bills, and Inflation 2007 Valuation Edition Yearbook at 98 (2007).

<sup>19</sup> See Morningstar/Ibbotson, Cost of Capital: 2006 Yearbook at 38 (2006) (using an equity-risk premium of 7.08% based on historical returns dating from 1926).

showing that most commercial vendors of cost-of-capital information use this same figure in their CAPM calculation.<sup>20</sup> Accordingly, we will follow the standard approach and use the historical average from 1926. If another approach (other than the use of this historical average) becomes the industry norm, parties should petition us to modify our approach in keeping with current practices.

## ii. Beta

To calculate the beta for each carrier, our NPRM proposed to use that carrier's monthly, merger-adjusted<sup>21</sup> stock return data for the prior 10 years in the following equation:

$$R - RF = \beta (RM - RF) + \varepsilon$$

R	=	merger-adjusted stock return for the railroad;
RF	=	10-Year U. S. Treasury bond rate;
RM	=	return on the NYSE; and
$\varepsilon$	=	random error term

We proposed to estimate  $\beta$  – the coefficient of systematic, non-diversifiable risk – using a simple, ordinary least squares (OLS) regression technique.

At the suggestion of the parties, we will make certain minor technical changes to this computation. We will include a constant term and use monthly risk premiums that rely on short-term interest rates. At the recommendation of the parties, we will also use S&P 500 data, which are more readily available than NYSE data. In addition, we will pool the performance data of the carriers and estimate a single beta for the railroad industry.

A slightly more contentious debate concerns whether we should use a 5-year or 10-year estimation period to estimate the systematic, non-diversifiable risk of the railroad industry. The carriers argue that when an industry undergoes major structural changes like those experienced by the railroad industry in recent years, an overly long estimation period for beta can introduce significant bias into the estimate.<sup>22</sup> AAR's witnesses submitted evidence that, although there is no hard and fast rule, using 5 years of historical data to estimate beta is the common CAPM practice.<sup>23</sup>

WCTL takes the position that, while a 10-year period is reasonable, it is "towards the longer end of what is generally considered reasonable,"<sup>24</sup> and that a measurement period of 5

<sup>20</sup> See WCTL Reply, V.S. Crowley/Fapp, Exh.7.

<sup>21</sup> "Merger-adjusted" means that data for the shares of predecessor railroads are included in such a way as to show total performance as if the merger had already occurred.

<sup>22</sup> AAR Open. at 25-26.

<sup>23</sup> AAR Open., V.S. Hubbard/Stangle at 8.

<sup>24</sup> WCTL Open. V.S. Hodder at 3.

years would be reasonable. WCTL observes that a 5-year period is the approach used by Moringstar/Ibbotson and other notable providers of cost-of-capital estimates.<sup>25</sup> WCTL did cite one article indicating that betas longer than 5 years are more accurate than shorter betas, but also noted that using the shorter period has only a modest impact.<sup>26</sup>

We will use a 5-year time period to estimate the beta for the railroad industry. Our objective in proposing a longer period was to eliminate statistical noise and achieve stability in the estimate, while allowing for the fact that beta may change over time. We are persuaded that using weekly data can address our concern over statistical noise,<sup>27</sup> and that a 5-year period is more common and will provide a more forward-looking estimate that will better and more quickly reflect the changing nature of the rail industry.<sup>28</sup>

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<sup>25</sup> WCTL Open. at 7; V.S. Crowley/Fapp at 17.

<sup>26</sup> WCTL Reb. at 15.

<sup>27</sup> Using weekly data can be problematic where there is insufficient trading of the stock in question (i.e., there is not enough liquidity). However, we have reviewed publicly available information on the amount of trading in Class I rail carrier stocks, and we conclude that there is sufficient liquidity to permit using weekly data, where the larger number of observations will improve our estimate of beta.

<sup>28</sup> BNSF argues that any beta estimate below 1 is unreasonable and inconsistent with the reality of the rail sector. See BNSF Open., V.S. Hund at 9. The finance experts sponsored by the AAR disagree and testified that they would place the beta in the 0.8 range. December Hearing Tr. at 98. Moreover, beta seeks to estimate the measure of non-diversifiable risk of the railroads, as compared to the market as a whole. So while the anecdotal evidence of risks facing BNSF and other carriers are unquestionably genuine (see id. at 7-8), the question is whether investors can diversify those risks and how those risks compare to the market as a whole. BNSF has offered no persuasive reason why beta cannot fall below 1, as was reported by many independent commercial vendors. See WCTL Reply, V.S. Crowley/Fapp, Exh.7.

Accordingly, to calculate the beta for the railroad industry, we will use a portfolio of weekly, merger-adjusted stock return data for the prior 5 years in the following equation:

$$R - RF = \alpha + \beta (RM - RF) + \varepsilon$$

$\alpha$	=	constant term;
$R$	=	merger-adjusted stock returns for the portfolio of Class I railroads that meet the screening criteria set forth in <u>Railroad Cost of Capital – 1984</u> , 1 I.C.C.2d 989 (1985); <sup>29</sup>
$RF$	=	3-month U. S. Treasury bond rate;
$RM$	=	return on the S&P 500; and
$\varepsilon$	=	random error term.

In the 2006 cost-of-capital proceeding, parties will be instructed to submit the information, calculations, and supporting workpapers needed to estimate the cost of equity under this approach.

### iii. Range of Estimates

The railroads argue that, given the limitations of any approach to derive the cost of equity, we should consider a range of estimates and adopt a point somewhere within the middle to upper portion of that range.<sup>30</sup> This argument appears premised on the supposition that the public harm from underestimating the cost of capital is greater than the public harm from overestimating the cost of capital. The railroads point to the increasing demand for rail transportation and the importance of meeting that demand with sufficient capital investment.<sup>31</sup> Shippers object to this proposal.<sup>32</sup>

We will not knowingly select an approach that would systematically overstate the cost of equity for the same reasons we would not select an approach that would systematically understate the cost of equity: neither outcome reflects a proper balancing of railroads' needs to achieve adequate revenues and shippers' interests in not paying unreasonable rates, and it would contravene the statute's directive that we base our regulatory policies on accurate cost data. See 49 U.S.C. 10101(13) (directing the Board to "ensure the availability of accurate cost information in regulatory proceedings"). Moreover, the carriers have not offered any principled way to select a cost of equity in the upper end of a range in a non-arbitrary fashion. Finally, we do not agree

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<sup>29</sup> The criteria are that the carrier (1) had rail assets greater than 50% of its total assets; (2) had a debt rating of at least BBB (Standard & Poor's) and Baa (Moody's); (3) is listed on either the New York or American Stock Exchange; and (4) paid dividends throughout the year. A Class I railroad is one having annual carrier operating revenues of at least \$250 million in 1991 dollars. 49 CFR 1201.1-1.

<sup>30</sup> See, e.g., AAR Open. at 13-15.

<sup>31</sup> See, e.g., UP Open., V.S. Knight at 6-11.

<sup>32</sup> See, e.g., WCTL Reply at 22-25; NITL Reply at 4-6;

that the public harm from underestimating the cost of capital is greater than the public harm from overestimating it. Permitting a carrier to earn excessive profits would harm the public and the nation's entire economy because customers would ultimately pay higher prices for goods sold as the transportation rates are passed along. Consumers would therefore be expected to reduce their consumption of a wide variety of goods, to a greater or lesser extent, based on higher shippers' prices. Accordingly, we will not deliberately bias our cost-of-capital determination in the carriers' favor.

Nor do we believe that it would be appropriate to consider a range of CAPM estimates, and select a figure in the middle. That approach would invite parties to debate, each year, the suitable comparison group of commercial vendors to whom we should compare our result. Rather, we believe the better approach is to select a reasonable CAPM methodology to apply, which will provide a transparent and stable method to estimate this amorphous component of the cost of capital. As we stated recently, "[p]redictability in regulation is an important goal. It serves the public good by permitting carriers to conform their conduct to a set of rules and assisting captive shippers in judging whether a particular rate could be challenged as unreasonably high."<sup>33</sup> Predictability is particularly important with regard to the cost of capital, as this calculation reflects the return the Board will permit carriers to earn on their capital investments and will therefore influence their investment decisions.

## II. Multi-Stage DCF Model

In the NPRM, we considered using a multi-stage DCF model to estimate the cost of equity. A multi-stage DCF can be adapted in any number of ways: stages can be made longer or shorter; more stages can be added; and growth rates could be phased down from the initial rate to the long-term rate over any number of years.<sup>34</sup> However, the parties did not present a workable multi-stage DCF in response to our ANPRM. Accordingly, we ultimately proposed to use just CAPM instead.

The railroad community opposes our decision not to use a multi-stage DCF model. Yet they failed to submit a multi-stage DCF model for us to analyze, criticized WCTL's DCF model and the DCF model we used in the NPRM to illustrate the approach, and largely ignored the DCF model submitted by Professor Mohanram.<sup>35</sup> At our December 2007 hearing, AAR counsel

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<sup>33</sup> Major Issues in Rail Rate Cases, STB Ex Parte No. 657 (Sub-No. 1), slip op. at 46 (STB served Oct. 30, 2006), pet. for review docketed, No. 06-1374, et al. (D.C. Cir. filed Nov. 13, 2006) (Major Issues).

<sup>34</sup> See, e.g., Shannon P. Pratt, Cost of Capital: Estimation & Applications at 114 (2nd ed. 2002).

<sup>35</sup> See Mohanram Open Comments at 34 (recommending the Board estimate the cost of equity using an Ohlson-Juettner model instead of CAPM). Railroad witnesses did recommend that we consider using the multi-stage DCF model published by Morningstar/Ibbotson. But when pressed about the details of that approach at our hearing, AAR's witness recommended that our staff meet with that company to explore the assumptions underlying that model.

(continued)

argued that the record was too bare to support the adoption of any multi-stage DCF model.<sup>36</sup> And one of its finance experts emphatically stated that he could not endorse any of the multi-stage DCF models that are on this record.<sup>37</sup>

U.S. DOT has suggested that, because both CAPM and DCF have different strengths and weaknesses, using an average of the two approaches might provide a superior estimate.<sup>38</sup> U.S. DOT observed that there is no single cost-of-equity method that applies to all economic conditions – no silver bullet – such that the choice of any particular method or set of assumptions may not be reasonable for long. U.S. DOT therefore urged that Board to consider using the cost-of-equity estimate produced by both CAPM and DCF models, at least for an interim period, to reduce the risk of error.<sup>39</sup> WCTL did not oppose the idea that we incorporate a multi-stage DCF as a check on the CAPM result and offered a multi-stage DCF model for consideration.<sup>40</sup>

There may be merit to the idea of using both models to estimate the cost of equity. While CAPM is a widely accepted tool for estimating the cost of equity, it has certain strengths and weaknesses, and it may be complemented by a DCF model. In theory, both approaches seek to estimate the true cost of equity for a firm, and if applied correctly, should produce the same expected result.<sup>41</sup> The two approaches simply take different paths towards the same objective. Therefore, by taking an average of the results from the two approaches, we might be able to obtain a more reliable, less volatile, and ultimately superior estimate than by relying on either model standing alone.<sup>42</sup>

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December Hearing Tr. at 94 (“you might want to meet with the people from Ibbotson because it’s their model, not mine”).

<sup>36</sup> December Hearing Tr. at 215.

<sup>37</sup> December Hearing Tr. at 88 (referring to the DCF model in the NPRM and proposed by WCTL).

<sup>38</sup> See U.S. DOT Reply at 2.

<sup>39</sup> December Hearing Tr. at 20-21.

<sup>40</sup> See WCTL Reply, V.S. Crowley/Fapp at 24-27.

<sup>41</sup> See U.S. DOT Reply at 9 (noting consensus among major shipper and carrier representatives that, properly implemented, different models should yield cost of capital results within a narrow range).

<sup>42</sup> As the FRB testified, “academic studies had demonstrated that using multiple models will improve estimation techniques when each model provides new information . . . .” January Hearing Tr. at 18. See generally David F. Hendry and Michael P. Clements, Pooling of Forecasts, VII *Econometrics Journal* 1 (2004); J.M. Bates and C.W.J. Granger, The Combination of Forecasts in Eric Ghysels, Norman R. Swanson, and Mark W. Watson, eds., Essays in Econometrics: Collected Papers of Clive W.J. Granger. Vol. I: Spectral Analysis, Seasonality, Nonlinearity, Methodology, and Forecasting at 391-410 (Cambridge Univ. Press, 2001); Spyros Makridakis and Robert L. Winkler, Averages of Forecasts: Some Empirical Results, XXIX *Management Science* 987 (Sept. 1983).

Both the Ohlson-Juettner model and Morningstar/Ibbotson multi-stage DCF model show some promise. Those models reflect a more current approach that looks beyond just the dividend payments to examine either the cash flow of the company or total shareholder distributions.<sup>43</sup> For example, stock repurchases represent a significant corporate financing activity, and as has been pointed out by the AAR, are ignored in our 1981 DCF Model and WCTL's proposed three-stage DCF model.

But those models are laden with key underlying assumptions that have not been vetted or—in the case of the Morningstar/ Ibbotson model—explained to our satisfaction. Nor has any party submitted evidence showing how these two models (or indeed, any multi-stage DCF model) would compare against CAPM, so that we could analyze whether a combination of the two approaches could lead to a more reliable and less volatile cost-of-equity estimate. Accordingly, we agree with AAR that the current record does not allow us to decide upon a particular DCF model at this point.

We will not, however, delay this proceeding for potentially another year in search of a suitable multi-stage DCF to possibly use in conjunction with CAPM. We must release our 2006 cost-of-capital decision soon, as it is needed for a wide variety of ongoing agency business. We must, therefore, proceed with the best approach available to us now, and cannot await the development of a potentially superior approach that the record is too bare to support at this time.<sup>44</sup> We advised the parties in the NPRM that we could not find a suitable multi-stage DCF approach to use, which was why we proposed to rely solely on CAPM. It was therefore incumbent on parties advocating the use of a multi-stage DCF model to propose an alternative for our consideration and provide sufficient details so that the approach could be subjected to full public scrutiny. The parties declined to provide us with such an alternative.

Accordingly, we will use the CAPM described above to determine the cost of equity for 2006. We will, however, continue to explore in a separate sub-proceeding the possibility of using an average of CAPM and a reasonable multi-stage DCF model. A notice of that proceeding will be issued shortly, where parties will be invited to submit a detailed proposal of suitable multi-stage DCF models we might consider using, together with the data needed to compare the results from those models with the CAPM model adopted here. If, however, parties again fail to provide and defend a suitable multi-stage DCF model, we will promptly discontinue that proceeding.

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<sup>43</sup> We reject the model submitted by WCTL because it is a pure dividend model, which ignores other forms of shareholder distributions, such as stock buybacks. We are persuaded that a pure dividend DCF model may seriously understate the cost of equity by understating the value (to the investor) of holding the stock in question.

<sup>44</sup> See Railroad Cost of Capital – 2005.

### III. Ancillary Suggestions

Several ancillary suggestions have been made by the parties in response to our NPRM. These include (1) a proposal by WCTL that we permit parties to argue for different weighting of the railroads' cost of debt and cost of equity; (2) a general request from several parties that we consider using a replacement-cost approach in our revenue-adequacy determination; and (3) a request by KCS that we not use the average cost of capital of the four major U.S. Class I carriers for KCS's cost of capital. We discuss each in turn below.

#### i. Debt/Equity Ratios and Operating Leases

In the NPRM, we addressed and rejected WCTL's suggestions that we adjust the debt portion of capital to reflect the capitalization of operating leases or that we replace the current-year debt-to-equity ratio with a multi-year average. See NPRM at 8-9. We concluded it would be improper to first calculate the costs of debt and equity using the real debt-to-equity ratios and then attempt to weight those costs with a multi-year average. We observed that the proper treatment of operating leases is a controversial subject, and we rely on Generally Accepted Accounting Principles (GAAP) to distinguish between the types of leases. See 49 U.S.C. 11161 (instructing the Board to conform its accounting principles to GAAP to the maximum extent practicable). We concluded that it would be improper to treat every operating lease as debt, particularly very short-term leases, and WCTL had offered no intelligible way to distinguish between the various types of operating leases if we were to depart from GAAP.

WCTL has nonetheless renewed its requests.<sup>45</sup> Because its requests fall outside the scope of this rulemaking, we will treat its comments as a renewed request to institute a separate rulemaking to address this subject, which we will deny. WCTL has failed to address our concerns with changing the weighting of the cost of debt and cost of equity, or to depart from GAAP in the treatment of operating leases. It has offered no intelligible way to distinguish between various types of operating leases. Nor has it acknowledged or addressed how we could rationally re-weight the costs of debt and equity, which are themselves a function of the actual debt-equity ratios of the carriers.

Moreover, our acceptance of the actual capital structure of the railroads does not conflict with our statutory directives, as WCTL claims. For regulatory costing purposes, we use an industry-average cost of capital, which reflects an averaging of the capital structures of the industry. We use this average in part to create the incentive for railroads with sub-optimal capital structure (or other management concerns that might affect their cost of capital) to be more efficient. If their capital structures are inefficient, their costs of capital may be higher than the industry average. By using an industry average cost of capital that is lower than their actual individual costs of capital, we build into our approach some incentives for carriers to improve their capital structure without requiring this agency to second-guess the debt structure of the carriers. We believe this is a better approach, particularly as the market for corporate control will also discipline a carrier that permits its capital structure to become significantly inefficient.

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<sup>45</sup> See WCTL Open. at 10-12.

Finally, we reject WCTL's contention that carriers have any real incentive to game their capital structure by increasing debt-equity ratios to influence our regulatory costing model.<sup>46</sup> We have only a limited role in the economic regulation of the carriers, because the vast majority of railroad traffic is beyond our rate review authority. As such, we find it implausible that a railroad's management would deliberately lower the debt-equity ratio in some ill-defined attempt to manipulate our regulatory costing model. To the extent that reducing the debt-equity ratio to an inefficient level might raise the carrier's overall cost of capital, the regulatory benefits would pale in comparison to the loss of profits and competitiveness that a particular carrier would experience both in the market for capital and in the market for transportation.

## ii. Replacement Costs

In the NPRM, we also rejected the suggestion by the railroad industry that we expand the scope of this rulemaking to reexamine how the cost-of-capital determination is applied in the Board's annual revenue-adequacy determinations. See NPRM at 9. Specifically, the railroads advocate using a replacement-cost analysis. As the ICC explained, "[w]hile current cost accounting is theoretically preferable to original cost valuation, it cannot be practically implemented in a manner that we can be confident would produce accurate and reliable results."<sup>47</sup> Although the railroads and other parties continue to lobby for a shift to a replacement-cost approach, this change is outside the scope of this rulemaking. Moreover, the railroads have failed to address any of the practical concerns that led our predecessor to reject this approach, or address how we could calculate the real (rather than nominal) cost of capital needed for a replacement-cost (rather than book-value) approach. See NPRM at 9. Until we receive a firm proposal that addresses these issues, we will not initiate a rulemaking to reexamine this issue.

CSXT argues that we cannot investigate the narrow issue of how best to estimate the cost of capital of the railroad industry without simultaneously launching a broader reexamination of whether book value or replacement cost should be used to conduct our revenue-adequacy determinations.<sup>48</sup> CSXT offered no legal support for its position, and it failed to offer any detailed proposal for our consideration. While the cost of capital is used in the revenue-adequacy determination, it is also used in a wide variety of other significant regulatory functions. Parties have provided no legal authority for the principle that an agency must reexamine every aspect of its regulatory functions before taking action to improve the precision of one input into them. Such a requirement would provide an easy avenue for parties to delay an unfavorable change and largely paralyze our ability to effect needed change.

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<sup>46</sup> See WCTL Open. at 12.

<sup>47</sup> Standards for Railroad Revenue Adequacy, 3 I.C.C.2d at 277.

<sup>48</sup> See CSXT Open. at 4.

### iii. Industry-Average Cost of Capital

In the NPRM, we stated that we would continue our established practice of calculating an industry-wide cost of capital to be used for all railroads. NPRM at 10. Under that practice, we use the cost of capital for the four largest Class I carriers to estimate the cost of capital for the rail industry.

KCS objects to this practice, arguing that its cost of capital is higher than the cost of capital of the four largest Class I railroads.<sup>49</sup> It argues that the disparity is attributable to fundamental differences between the capital markets available to investment-grade railroads and those available to non-investment-grade railroads such as KCS. KCS argues that non-investment-grade markets can be more volatile and demand higher premiums. KCS maintains that applying the industry-average cost of capital to it would not reflect its true cost of capital and would provide a competitive advantage to its Class I competitors.

This generic issue of the use of an industry-average cost of capital was examined by the Railroad Accounting Principles Board (RAPB).<sup>50</sup> The RAPB—an independent agency created by Congress to develop regulatory principles to help guide the ICC—concluded that it is appropriate to use an industry-wide cost of capital, as inclusion of the lower capital costs of stronger railroads would provide an incentive to individual railroads to be managed more efficiently. The RAPB also concluded that an average figure is more reliable than individual figures, given the margin of error associated with railroad estimates. RAPB recommended that we consider using the individual railroad's cost-of-capital figure only where the railroad is faced with economic circumstances beyond its control, which would result in capital structure and financing costs materially different from those of the stronger railroads.

KCS has not made the requisite showing that economic circumstances beyond its control have resulted in a higher cost of capital for it than for the other Class I carriers. KCS submitted testimony from a consultant that its 2007 cost of equity was 11.3% and its weighted average cost of capital 9%.<sup>51</sup> These figures are not appreciably different from the cost of equity and cost of capital for the other Class I carriers. Moreover, using the industry average provides a useful way to provide the incentive for an individual railroad to be managed more efficiently. Without compelling evidence that KCS's cost of capital is substantially above the industry average for

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<sup>49</sup> See KCS Open. at 5-8.

<sup>50</sup> See Railroad Accounting Principles Board - Final Report, Vol. 2 at 37 (Sept. 1987). The RAPB was established by Congress to evaluate issues associated with rail costing and to propose principles to govern the estimation of such costs. See former 49 U.S.C. 11161-11163 (1995). Pursuant to the statute, our predecessor agency gave great weight to the recommendations of the RAPB. See former 49 U.S.C. 11163 (1995); Railroad Cost Recovery Procedures – Productivity Adjustment, 5 I.C.C.2d 434, 440 (1989). While that provision is no longer in our governing statute, we continue to accord great weight to the recommendations of the RAPB. See, e.g., Major Issues at 61.

<sup>51</sup> KCS Open., V.S. Walsh, Att. A.

reasons beyond its control, it is appropriate for us to continue to follow our longstanding practice and the recommendation of the RAPB by applying the industry-average cost of capital to all regulated carriers, including KCS.

#### **IV. Future Proceedings: STB Ex Parte No. 664 & STB Ex Parte No. 558**

While the CAPM approach has become the industry norm to estimate the cost of equity, best practices can change and evolve over time. Therefore, we are not foreclosing the possibility that we may need to modify the CAPM assumptions in future cost-of-capital proceedings. We will entertain petitions for a rulemaking to revise the CAPM standard adopted here to keep our cost-of-capital calculation abreast with current finance practices.

Recent experience has shown that the most useful way for the agency to review such petitions – while also completing our annual cost-of-capital determination in a timely fashion – is to maintain separate proceedings: one (STB Ex Parte No. 558 sub-numbered proceedings “558 proceedings”) for the annual estimate and another (STB Ex Parte No. 664 sub-numbered proceedings “664 proceedings”) for petitioners to advocate changes to the cost-of-capital model. Use of 664 proceedings will enable all stakeholders to have a meaningful opportunity to comment on any proposed changes to the CAPM methodology we are adopting here. In contrast, the annual 558 proceedings are best suited to a mechanical application of the standards adopted here, rather than to debate about changes in the standards, which can lead to protracted litigation that will delay the release of a cost-of-capital figure needed for a wide variety of regulatory functions. While in the past we have entertained challenges to the agency’s model in the 558 proceedings, we will no longer do so. As such, future requests to change the assumptions that form the elements of our CAPM model must be brought (in the form of a petition for rulemaking) in a 664 proceeding, not in the annual 558 proceedings, in which we calculate the cost of capital for a particular year.

Pursuant to 5 U.S.C. 605(b), the Board certifies that the proposed action will not have a significant economic effect on a substantial number of small entities within the meaning of the Regulatory Flexibility Act.

This action will not significantly affect either the quality of the human environment or the conservation of energy resources.

By the Board, Chairman Nottingham, Vice Chairman Mulvey, and Commissioner Buttrey.

Anne K. Quinlan  
Acting Secretary