51731 SERVICE DATE – AUGUST 3, 2023
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SURFACE TRANSPORTATION BOARD

DECISION

Docket No. EP 558 (Sub-No. 26)

RAILROAD COST OF CAPITAL—2022

Digest:[1] The Board finds that the cost of capital for the railroad industry, which is calculated each year, was 10.58% for 2022. This figure represents the Board's Office of Economics' estimate of the average rate of return needed to persuade investors to provide capital to the freight rail industry.

Decided: August 2, 2023

One of the Board's regulatory responsibilities is to determine annually the railroad industry's cost of capital.[2] This determination is one component used in evaluating the adequacy of a railroad's revenue each year pursuant to 49 U.S.C. § 10704(a)(2) and (3). Standards for R.R. Revenue Adequacy, 364 I.C.C. 803 (1981), modified, 3 I.C.C.2d 261 (1986), aff'd sub nom. Consol. Rail Corp. v. United States, 855 F.2d 78 (3d Cir. 1988). The cost-of-capital finding may also be used in other regulatory proceedings, including (but not limited to) those involving the prescription of maximum reasonable rate levels, the proposed abandonment of rail lines, and the setting of compensation for use of another carrier's lines.

This proceeding was instituted by decision served on February 7, 2023, to update the railroad industry's cost of capital for 2022. In that decision, the Board solicited comments from interested parties on the following issues: (1) the railroads' 2022 current cost of debt capital, (2) the railroads' 2022 current cost of preferred equity capital (if any), (3) the railroads' 2022 cost of common equity capital, and (4) the 2022 capital structure mix of the railroad industry on a market value basis. The Board received comments from the Association of American Railroads (AAR) providing the information used to calculate the annual cost-of-capital determination, as established in Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital, EP 664 (Sub-No. 1) (STB served Jan. 28, 2009). AAR states that Kansas City Southern (KCS) was not included in the 2022 sample

[1] The digest constitutes no part of the decision of the Board but has been prepared for the convenience of the reader. It may not be cited to or relied upon as precedent. See Pol'y Statement on Plain Language Digs. in Decisions, EP 696 (STB served Sept. 2, 2010).

[2] The railroad cost of capital determined here is an aggregate measure. It is not intended to measure the desirability of any individual capital investment project.

because its stock is no longer listed on the New York Stock Exchange or NASDAQ and therefore did not meet the Board's criteria.[3] (AAR Opening, V.S. Gray 5.)

Western Coal Traffic League (WCTL) replied to AAR's submission stating that its review of AAR's filing and associated workpapers did not reveal any mathematical or associated data errors. (WCTL Reply 1.) Nevertheless, WCTL argues that the cost of capital is substantially overstated due to miscalculation of the cost of equity which stems from flaws in the Multi-Stage Discounted Cash Flow (MSDCF) model, and the implementation of the Capital Asset Pricing Model (CAPM). As in previous years, WCTL recommends the Board rely only on the Capital Asset Pricing Model (CAPM), but with a market-risk premium not exceeding six percent, to calculate the cost of equity portion of the cost of capital. (Id. at 3, 27-28.)

AAR responded to WCTL's reply, asserting that it followed the Board's instructions to use the methodology from Railroad Cost of Capital—2021, EP 558 (Sub-No. 25) (STB served Aug. 2, 2022), and noting that WCTL acknowledges that AAR's filing and associated workpapers did not contain mathematical or associated data errors. (AAR Rebuttal 1.) AAR asserts that WCTL's arguments are collateral attacks on the Board's cost-of-capital methodology and should therefore be rejected. (AAR Rebuttal 1-7.)

DISCUSSION AND CONCLUSIONS

WCTL's Reply

According to WCTL, AAR's 10.58% cost-of-capital figure for 2022 is "substantially overstated," as in previous years. (WCTL Reply 1, 4.) WCTL argues that MSDCF's instability (and resulting cost of equity instability) results from, among other things, the model's excessive sensitivity to changes in analyst growth rates and, in particular, the model's failure to adjust for stock buybacks. (Id. at 1-3, 14-22.) WCTL also challenges certain MSDCF data inputs and its sources used to calculate earnings per share growth rates. (Id. at 12-13.)

WCTL presents alternative cost-of-capital figures using a variety of alternative methods, but concludes that the 2022 cost-of-capital figure should not exceed 7.32%. (See id. at 4, 7-12.) WCTL also reiterates its critiques of the MSDCF and provides arguments in support of the CAPM-only approach and its calculation of the cost of equity. The Board, however, has rejected similar arguments WCTL has raised in the past. See, e.g., Pet. of the W. Coal Traffic League to Inst. a Rulemaking Proceeding to Abolish the Use of the Multi Stage Discounted Cash Flow Model in Determining the R.R. Indus.'s Cost of Equity Cap., EP 664 (Sub-No. 2), slip op. at 1-2 (STB served Sept. 28, 2018) (rejecting WCTL's arguments against the use of the MSDCF in the agency's estimation of the railroad industry's cost of capital); Pet. of the W. Coal Traffic League, EP 664 (Sub-No. 2), slip op. at 2, 5, 9, 11-13 (STB served Apr. 28, 2017) (rejecting WCTL's arguments supporting a CAPM-only approach and WCTL's position that the Board must incorporate a market-risk premium of five percent or lower); Pet. of the W. Coal Traffic League,

[3] See R.R. Cost of Cap.—1984, 1 I.C.C.2d 989, 1003-04 (1985); Revisions to the Cost-of-Cap. Composite R.R. Criteria, EP 664 (Sub-No. 3), slip op. at 3 (STB served Oct. 25, 2017).

EP 664 (Sub-No. 2), slip op. at 11, 14, 17-18, 20 (STB served Oct. 31, 2016) (explaining that a methodology that uses multiple models is more robust than a methodology that utilizes only one model).

The Board has previously directed in past annual cost-of-capital proceedings that challenges to the Board's cost-of-capital methodology should be addressed in Docket No. EP 664 and not in the annual cost-of-capital proceeding. See R.R. Cost of Cap.—2016, EP 558 (Sub-No. 20), slip op. at 9 & n.15 (STB served Aug. 7, 2017). WCTL nevertheless argues, among other things, that the Board's methodology "manifest[s] [itself] differently depending on each year's data, and [that] errors and distortions should be documented and described as they emerge." (WCTL Reply 4.) WCTL therefore requests that its comments be construed as a petition for the Board to institute a rulemaking to the extent necessary to have its concerns addressed. (Id.) The Board reaffirms that this proceeding is not the proper forum by which a party may seek to institute a rulemaking for proposed changes to the Board's cost-of-capital methodology. As the Board has stated, "requests to [change our methodology] must be brought (*in the form of a petition for rulemaking*) in a 664 proceeding, not in the annual 558 proceeding, in which we calculate the cost of capital for a particular year." Methodology to Be Employed in Determining the R.R. Industry's Cost of Cap. (Cost-of-Cap. Methodology), EP 664, slip op. at 18 (STB served Jan. 17, 2008) (emphasis added).

The Board has stated that the mere existence of alternative methodologies does not mean the Board's methodology is flawed. See R.R. Cost of Cap.—2020, EP 558 (Sub-No. 24), slip op. at 3 (STB served Aug. 6, 2021); R.R. Cost of Cap.—2018, EP 558 (Sub-No. 22), slip op. at 2 (STB served Aug. 6, 2019), corrected (STB served Sept. 30, 2019). The Board has explicitly rejected many of WCTL's alternative proposals in the past. In any case, WCTL's alternative cost-of-capital figures are not properly before the Board here.

The Board will accept AAR's submission, which complies with the Board's established methodology. The Board also accepts AAR's determination not to include KCS in the 2022 sample because it did not meet the Board's criteria. See infra note 4.

2022 Cost-of-Capital Determination

AAR calculated the cost of capital for a "composite railroad" based on criteria developed in Railroad Cost of Capital—1984, 1 I.C.C.2d 989 (1985), and modified in Revisions to the Cost-of-Capital Composite Railroad Criteria, EP 664 (Sub-No. 3) (STB served Oct. 25, 2017).[4] According to AAR, the following three railroad holding companies meet these criteria: CSX Corporation (CSX), Norfolk Southern Corporation (NSC), and Union Pacific Corporation (UPC).

[4] The composite railroad includes those Class I carriers that (1) are listed on either the New York Stock Exchange (NYSE) or Nasdaq Stock Market (NASDAQ), (2) paid dividends throughout the year, (3) had rail assets greater than 50% of their total assets, and (4) had a debt rating of at least BBB (Standard & Poor's) and Baa (Moody's).

As discussed below, the Board's Office of Economics (OE) has examined the procedures used by AAR to calculate the following components for the railroad industry's 2022 cost of capital: (1) cost-of-debt capital, (2) cost of common equity capital, (3) cost of preferred equity capital, (4) capital structure, and (5) composite after-tax cost of capital. Based on that review, the Board estimates that the 2022 railroad cost of capital was 10.58%.

DEBT CAPITAL

AAR developed its 2022 current cost of debt using bond price data from Bloomberg Professional (Bloomberg), a subscription service used since Railroad Cost of Capital—2011, EP 558 (Sub-No. 15) (STB served Sept. 13, 2012). AAR's cost-of-debt figure is based on the market-value yields of the major forms of long-term debt instruments for the railroad holding companies used in the composite. These debt instruments include (1) bonds, notes, and debentures (bonds); (2) equipment trust certificates (ETCs); and (3) conditional sales agreements (CSAs). The yields of these debt instruments are weighted based on their market values.

Cost of Bonds, Notes, and Debentures (Bonds)

AAR used data from Bloomberg for the current cost of bonds, based on monthly prices and yields during 2022, for all issues (a total of 132) that were publicly traded during the year. (AAR Opening, V.S. Gray 10-11.) To develop the current (in 2022) market value of bonds, AAR used these traded bonds and additional bonds that were outstanding but not publicly traded during 2022. Following the procedure in effect since 1988, AAR based the market value on monthly prices for all traded bonds and the face or par value ($1,000) for all bonds not traded during the year. AAR computed the total market value of all outstanding bonds to be $60.5 billion ($59.9 billion traded and $0.59 billion non-traded). (Id., V.S. Gray 10.) Based on the yields for the traded bonds, AAR calculated the weighted average 2022 yield for all bonds to be 4.220%. (Id., V.S. Gray 11.) OE examined AAR's bond price and yield data and determined that AAR's computations are correct. The calculations and data for all bonds are shown in **Tables 1** and **2** of the Appendix.

Cost of Equipment Trust Certificates (ETCs)

ETCs are not actively traded on secondary markets. Therefore, their costs must be estimated by comparing them to the yields of other debt securities that are actively traded. Following the practice in previous cost-of-capital proceedings, AAR used government securities with maturities similar to these ETCs as surrogates for developing yields. After calculating the

2022 yields for these government securities, AAR added basis points[5] to these yields to compensate for the additional risks associated with the ETCs.

There were four ETCs outstanding during 2022 for UPC. (AAR Opening, V.S. Gray 15.) Using the yield spreads, AAR calculated the weighted average cost of ETCs to be 3.742%[6] and their market value to be $806.97 million for 2022. (Id., V.S. Gray 12-16, App. C.)

OE has examined AAR's ETC calculations and, based on that review, the Board accepts the cost and market value of the ETCs using AAR's data. **Table 3** in the Appendix shows a summary of the ETC computations.

Cost of Conditional Sales Agreements (CSAs)

CSAs normally represent no more than a small fraction (less than 1%) of total railroad debt. This year, no CSAs were used to calculate the 2022 cost of debt because no CSAs are outstanding.[7] (AAR Opening, V.S. Gray 16.)

Capitalized Leases and Miscellaneous Debt

As in previous cost-of-capital determinations, AAR excluded the cost of capitalized leases and miscellaneous debt in its computation of the overall current cost of debt because these costs are not directly observable in the open market. (AAR Opening, V.S. Gray 17.) Also, in keeping with past practice, AAR included the book value of capitalized leases and miscellaneous debt in the overall market value of debt, which is used to determine the railroads' capital structure mix. AAR calculated the book value (assumed market value) for the capitalized leases and miscellaneous debt to be ($840.6) million for 2022.[8] (Id., V.S. Gray 17.) OE has examined AAR's calculations for the market value for capitalized leases and miscellaneous debt, and, based on that review, the Board accepts the market value using AAR's data. **Table 5** in the Appendix shows the calculations for capitalized leases and miscellaneous debt to be ($840.6) million.

Total Market Value of Debt

AAR calculated the total market value for all debt during 2022 to be $60.4 billion. (AAR Opening, V.S. Gray 18-19.) OE has examined AAR's calculations and, based on that review, the

[5] A basis point equals 1/100th of a percentage point.

[6] This percentage is higher than the 2021 figure of 1.692%. See R.R. Cost of Cap.—2020, EP 558 (Sub-No. 25), slip op. at 5 (STB served Aug. 2, 2022).

[7] No CSAs have been modeled since 2010, and none have been outstanding since 2014. (AAR Opening, V.S. Gray 18-19.)

[8] This figure consists of $242.4 million of capitalized leases and ($1,083.0) million of miscellaneous debt. (Id., App. D; see also id., V.S. Gray 17-18.) **Table 5** in the Appendix shows these figures.

Board accepts the total market value for all debt using AAR's data. **Table 6** in the Appendix shows a breakdown of the market value of debt.

Flotation Costs of Debt

AAR calculated flotation costs for bonds, notes, and debentures by first calculating a yield on a new issue that included flotation costs, and then deducting a yield that did not include flotation costs. The difference between the two yields is the flotation costs expressed in percentage points. For 2022, 13 new issues were reported in five filings, with some filings reporting multiple new issues. (AAR Opening, V.S. Gray 21.) A simple average of the eight flotation cost figures is 0.064%. (Id.) AAR calculated the 2022 flotation costs for bonds using publicly available data from electronic filings with the Securities and Exchange Commission (SEC). For the calculation of ETC flotation costs, AAR used a historical SEC study composed of railroad ETC data for the years 1951, 1952, and 1955. (Id., V.S. Gray 22 (citing SEC, Cost of Flotation of Corp. Sec. 1951-1955 (1957)).) AAR asserts that, in that study, the SEC determined that ETC flotation costs average 0.89% of gross proceeds. (AAR Opening, V.S. Gray 22.) Using 0.89% for ETCs, and assuming that coupons are paid twice per year and that the duration for new ETCs is 15 years, yields flotation costs of 0.078%. (Id., V.S. Gray 23.)

To compute the overall effect of the flotation cost on debt, the market value weight of the outstanding debt is multiplied by the respective flotation cost. The weight for each type of debt is based on market values for debt, excluding all other debt,[9] for which a current cost of debt has not been determined.[10] AAR calculated that the flotation costs of debt increase the cost of debt by 0.064 percentage points. (Id., V.S. Gray 23.)

OE has reviewed AAR's calculations concerning flotation costs and has determined that AAR's computation is correct. Based on OE's analysis, the Board finds that the cost factors developed for the various components of debt are reasonable.[11] **Table 7** in the Appendix shows these calculations.

Overall Current Cost of Debt

AAR concluded that the railroads' weighted cost of debt for 2022 was 4.28%.[12] (AAR Opening, V.S. Gray 24-25.) OE has verified that the percentage put forth by AAR is correct.

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[9] All other debt represents capitalized leases, miscellaneous debt, non-modeled ETCs, and non-modeled CSAs. There were no non-modeled ETCs or non-modeled CSAs in 2022. (AAR Opening, V.S. Gray 16-18.)

[10] Current costs can be determined for three of the four debt categories—bonds, ETCs, and CSAs. Usually, the weighted average cost of debt is based upon these three (of the four) debt categories, but in this instance only bonds and ETCs are present. (Id., V.S. Gray 19.)

[11] AAR calculated the 2022 flotation costs for bonds using publicly available data from electronic filings with the SEC. (Id., V.S. Gray 21.)

[12] This percentage is higher than the 2021 figure of 2.63%. See R.R. Cost of Cap.—2021, EP 558 (Sub-No. 25), slip op. at 6.

Table 8 in the Appendix shows the overall current cost of debt.

COMMON EQUITY CAPITAL

The cost of common equity capital is estimated by calculating the simple average of estimates produced by a Capital Asset Pricing Model (CAPM) and the Morningstar/Ibbotson Multi-Stage Discounted Cash Flow Model (MSDCF).

CAPM

Under CAPM, the cost of equity is equal to RF + β × RP, where RF is the risk-free rate, RP is the market-risk premium, and β (or beta) is the measure of systematic, non-diversifiable risk. In order to calculate the RF, the railroads were asked to provide the average yield to maturity in 2022 for a 20-year U.S. Treasury Bond. Similarly, the railroads were asked to provide an estimate for the RP based on returns experienced by the S&P 500 since 1926. Finally, the railroads were asked to calculate beta using a portfolio of weekly, merger-adjusted railroad stock returns for the prior five years in the following equation:

$$R - SRRF = \alpha + \beta(RM - SRRF) + \varepsilon, \text{ where}$$

α	=	constant term;
R	=	merger-adjusted stock returns for the portfolio of railroads that meet the screening criteria set forth in Railroad Cost of Capital—1984, 1 I.C.C.2d at 1003-04;
SRRF	=	the short-run risk-free rate, which we will proxy using the 3-month U.S. Treasury bond rate;
RM	=	return on the S&P 500; and
ε	=	random error term.

RF – The Risk-Free Rate

To establish the risk-free rate, AAR relies on the Federal Reserve website to retrieve the average yield to maturity for a 20-year U.S. Treasury Bond. Using the average yield to maturity in 2022 for a 20-year U.S. Treasury Bond, consistent with Railroad Cost of Capital—2006, EP 558 (Sub-No. 10) (STB served Aug. 15, 2008), AAR calculated the 2022 risk-free rate to be 3.30%. (AAR Opening, V.S. Gray 29.) OE has examined AAR's data and the data from the Federal Reserve's website and has determined that AAR's computation is correct.

RP – The Market-Risk Premium

Using the approach from Cost-of-Capital Methodology, EP 664, slip op. at 7-9, AAR submitted data reflecting a market-risk premium of 7.17%. The Ibbotson SBBI Classic Yearbook, published by Morningstar, which was previously used as the source of the market-risk premium for 2013 and 2014, has been discontinued. AAR replaced the former source with the Duff & Phelps' Valuation Handbook—U.S. Guide to Cost of Capital, as the source of the market-risk premium for 2015 and 2016. However, in 2018, Duff & Phelps discontinued the

publication of that book in hardcover form and replaced it with an online tool called the Cost of Capital Navigator.[13] According to AAR, the Cost of Capital Navigator uses the same method as that used by Ibbotson and provides the same data reflecting the market-risk premium. (AAR Opening, V.S. Gray 29-31.)

OE has verified that use of the 1926 base year, as used by the Cost of Capital Navigator, is a reasonable method of calculating the market-risk premium, (see AAR Opening, App. H), and has also determined that AAR's computation of the market-risk premium is correct.

Calculating Beta

Cost-of-Capital Methodology, EP 664, slip op. at 11, requires parties to calculate CAPM's beta using a portfolio of weekly, merger-adjusted stock returns for the prior five years in the following equation: $R - SRRF = \alpha + \beta(RM - SRRF) + \varepsilon$. Applying the modified approach for assigning the new shares outstanding,[14] as described in Railroad Cost of Capital—2010, EP 558 (Sub-No. 14), slip op. at 6 (STB served Oct. 3, 2011), AAR's calculations estimate that the value of beta is 0.9946.[15] (AAR Opening, V.S. Gray 36.)

Based on OE's verification and calculation of the value of beta, the Board accepts AAR's calculated estimate that the value of beta is 0.9946.

Cost of Common Equity Capital using CAPM

Using the modified approach for assigning the new shares outstanding, the Board calculates the cost of equity as $RF + (\beta \times RP)$, or $3.30\% + (0.9946 \times 7.17\%)$, which equals 10.43%. **Tables 9** and **10** in the Appendix show the calculations of the cost of common equity using CAPM. (See also AAR Opening, V.S. Gray 37.)

To calculate the 2022 market value of common equity for each railroad, AAR calculated each railroad's weekly market value using data on shares outstanding from railroad 10-Q and 10-K reports filed with the SEC, multiplied by stock prices at the close of each week in 2022. (Id., V.S. Gray 25-26.) AAR calculated the combined 52-week average market value of the railroads to be $270.1 billion. (Id., V.S. Gray 26.) It appears, however, that AAR used incorrect

[13] AAR notes that Duff & Phelps is now a Kroll Company. (AAR Opening, V.S. Gray 31.)

[14] For the purposes of determining the number of shares outstanding, new shares outstanding are assigned to the first Friday on or after the effective date listed in the carriers' 10-Q and 10-K reports.

[15] Bloomberg equity prices adjusted for dividends and splits were used in place of Yahoo Finance's adjusted prices in the calculation of the carrier-specific returns, which are needed to calculate an industry beta. AAR states that due to "Yahoo data quality concerns in the prior years, [it] used Bloomberg stock price data for 2022." (AAR Opening, V.S. Gray 33.) AAR uses the SAS General Linear Model procedure to compute regression data. The Board uses a standard Excel regression method.

figures for UPC's shares outstanding for the first two weeks of July 2022 and October 2022. UPC's 10-Q report filed on July 21, 2022, shows that there were 628,025,156 shares outstanding on July 1, 2022, and July 8, 2022 (higher than the 624,478,594 reflected in AAR's analysis), and UPC's 10-Q report filed on October 20, 2022, shows 624,478,156 shares outstanding on September 30, 2022, and October 7, 2022 (higher than the 614,800,800 reflected in AAR's analysis). Using the correct figures, OE determines that the combined 52-week average market value of the railroads is $270.2 billion. This error does not affect the composite railroad industry cost of capital found in this decision.

MSDCF

The cost of equity in a discounted cash flow model is the discount rate that equates a firm's market value to the present value of the stream of cash flows that could affect investors. These cash flows are not presumed to be paid out to investors; instead, it is assumed that investors will ultimately benefit from these cash flows through higher regular dividends, special dividends, stock buybacks, or stock price appreciation. Incorporation of these cash flows and the expected growth of earnings are the essential elements of the Morningstar/Ibbotson MSDCF model.

Cash Flow

The Morningstar/Ibbotson MSDCF model defines cash flows (CF) for the first two stages as income before extraordinary items (IBEI), minus capital expenditures (CAPEX), plus depreciation (DEP) and deferred taxes (DT), or

$$CF = IBEI – CAPEX + DEP + DT.$$

As noted above, the third-stage cash flow is based on two assumptions: depreciation equals capital expenditures, and deferred taxes are zero. That is, cash flow in the third stage of the model is based only on IBEI.

To obtain an average cash-flow-to-sales ratio, AAR divided the total cash flow in the 2018-2022 periods by the total sales over the same periods. (AAR Opening, V.S. Gray 39-40.) To obtain the 2022 average cash flow, the cash-flow-to-sales ratio is multiplied by the sales revenue from 2022. (Id., V.S. Gray 40.) The 2022 average cash flow figure is then used as the starting point of the Morningstar/Ibbotson MSDCF model. (Id.) The initial value of IBEI is determined through the same averaging process for the cash flows in stages one and two. (Id., V.S. Gray, App. J.) According to AAR, the data inputs in the cash flow formula were retrieved from the railroads' 2018-2022 10-K filings. (Id., V.S. Gray 39.)

Growth Rates

Growth of earnings is also calculated in three stages. These three growth-rate stages are what make the Morningstar/Ibbotson model a "multi-stage" model. In the first stage (years one through five), the firm's annual earnings growth rate is assumed to be the median value of the qualifying railroad's three- to five-year growth estimates, as determined by railroad industry

analysts and published by the Institutional Brokers Estimate System (I/B/E/S). In the second stage (years six through 10), the growth rate is the average of all growth rates in stage one. In the third stage (years 11 and onwards), the growth rate is the long-run nominal growth rate of the U.S. economy. This long-run nominal growth rate is estimated by using the historical growth in real Gross Domestic Product (GDP) plus the long-run expected inflation rate.

AAR calculated the first- and second-stage growth rates according to the I/B/E/S data, which was retrieved from Refinitiv (formerly Thomson ONE Investment Management). (AAR Opening, V.S. Gray 42-43.) The third-stage growth rate of 5.68% was calculated by using the sum of the figures for long-run expected growth in real output, 3.16%,[16] and long-run expected inflation, 2.52%. (Id., V.S. Gray 45-47.)[17] OE has reviewed the evidence provided by AAR and determined that the growth rates are correct and consistent with the Board's approved methodology. Accordingly, they will be used in the Board's determination of the cost of equity for 2022.

Market Values for MSDCF

The final inputs to the Morningstar/Ibbotson MSDCF model are the stock market values for the equity of each railroad. To calculate these values, AAR used stock prices from Yahoo Finance for December 30, 2022, and shares outstanding from the 2022 Q3 10-Q reports filed with the SEC. (AAR Opening, V.S. Gray 48.)

[16] The real GDP growth rate is a compound growth rate calculated from the Bureau of Economic Analysis (BEA) data beginning in 1929. BEA rebased the real GDP from 2005 dollars to 2009 dollars. Beginning in 2019, BEA began using 2012 dollars. (AAR Opening, App. M.) AAR calculated the growth rate using GDP in 2012 dollars. (Id., V.S. Gray 45.)

[17] According to AAR, until the 2013 cost-of-capital determination, the long-run nominal growth rate used was that provided by Morningstar/Ibbotson in its Ibbotson SBBI Valuation Yearbook. (AAR Opening, V.S. Gray 44.) AAR states that this publication has been discontinued. However, for several years, another valuation reference book, the Ibbotson SBBI Classic Yearbook, was expanded to contain many of the statistics found in the Valuation Yearbook. (Id.) Using data from the Ibbotson SBBI Classic Yearbook, the Federal Reserve, and the BEA, AAR states that it replicated the Ibbotson calculations for real growth rates and long-term inflation for the 2013 and 2014 cost-of-capital determinations. (Id., V.S. Gray 44-45.) Beginning with the 2015 cost-of-capital determination, AAR states the SBBI long-term government yields, an input into the long-run nominal growth rate, were no longer available because Morningstar discontinued publication of the Ibbotson SBBI Classic Yearbook. (Id., V.S. Gray 46.) To replace the SBBI long-term government yields, AAR uses the 20-year U.S. Treasury Bond yields, which it contends are very close to the SBBI long-term government yields used by Ibbotson. (Id.) This methodology was accepted in the 2015 through 2021 cost-of-capital determinations and has been used again for 2022. (Id.) Appendix M in AAR's opening statement contains the calculations for the stage three growth rate. (Id., App. M.) OE has reviewed AAR's approach and finds it to be reasonable.

OE has reviewed AAR's evidence and found it to be accurate. Based on that review, the Board finds that the market values used in the 2022 estimate of the cost of equity using the Morningstar/Ibbotson MSDCF are correct.

Cost of Common Equity Capital Using MSDCF

AAR estimates an MSDCF cost of equity of 13.54%. (AAR Opening, V.S. Gray 50.) Based on the verified inputs discussed above, the Board adopts 13.54% as the MSDCF cost of equity. This estimate will be averaged with the cost of equity derived from the CAPM approach. **Table 11** shows the MSDCF inputs and the cost of equity calculation.

Cost of Common Equity

Based on the evidence provided and the recalculated MSDCF, the Board concludes that the railroad cost of equity in 2022 was 11.99%. This figure is based on an estimate of the cost of equity using a CAPM of 10.43% and an MSDCF estimate of 13.54%. (AAR Opening, V.S. Gray 51 & id., Table 17.) **Table 12** shows the costs of common equity for each model and the average of the two models.

PREFERRED EQUITY

Preferred equity has some of the characteristics of both debt and equity. Essentially, preferred stock issues are like common stocks in that they have no maturity dates and represent ownership in the company (usually with no voting rights attached). They are similar to debt in that they usually have fixed dividend payments (akin to interest payments).

AAR stated that KCS, the only railroad company with preferred stock outstanding beginning in 2013 through 2020, no longer meets the criteria for inclusion in the sample, so there is no preferred stock in this year's calculation. Therefore, AAR computed the market value of preferred equity during 2022 to be $0. (AAR Opening, V.S. Gray 51, Table 18.) AAR computed the cost of preferred equity to be 0%. (Id., V.S. Gray 53.)

OE has determined that AAR's computations are correct. Based on that review, **Table 13** shows the calculations of the cost of preferred equity.

CAPITAL STRUCTURE MIX

The Board will apply the same inputs used in the market value for the CAPM model to the capital structure.

OE has determined that the average market values of debt, common equity, and preferred equity are $60.448 billion, $270.193 billion, and $0 respectively. The percentage share of debt increased from 17.71% in 2021 to 18.28% in 2022. The percentage share of common equity decreased from 82.29% in 2021 to 81.72% in 2022. Based on that review, **Table 14** in the Appendix shows the calculations of the average market value of common equity and relative weights for each railroad. **Table 15** in the Appendix shows the 2022 capital structure mix.

COMPOSITE COST OF CAPITAL

Based on the evidence furnished in the record and the MSDCF, the 2022 composite after-tax cost of capital for the railroad industry, as set forth in **Table 16** in the Appendix, was 10.58%. The procedure used to develop the composite cost of capital is consistent with the Statement of Principle established by the Railroad Accounting Principles Board: "Cost of capital shall be a weighted average computed using proportions of debt and equity as determined by their market values and current market rates." R.R. Accounting Principles Bd., Final Report, Vol. 1 (1987). The 2022 cost of capital was 0.21 percentage points higher than the 2021 cost of capital (10.37%). See R.R. Cost of Cap.—2021, EP 558 (Sub-No. 25), slip op. at 12.

CONCLUSIONS

The Board finds that for 2022:

1. The cost of railroad long-term debt was 4.28%.

2. The cost of common equity was 11.99%.

3. The cost of preferred equity was 0%.

4. The capital structure mix of the railroads was 18.28% long-term debt, 81.72% common equity, and 0.00% preferred equity.

5. The composite railroad industry cost of capital was 10.58%.

It is ordered:

1. This decision is effective on September 2, 2023.

2. This proceeding is discontinued.

By the Board, Board Members Fuchs, Hedlund, Oberman, Primus, and Schultz.

APPENDIX

Table 1
2022 Traded & Non-traded Bonds

Railroad	Traded vs. Non-traded	Number	Market Value ($000)	% Market Value to All Bonds
CSX	Traded[1]	32	$16,679,113	96.57%
	Non-traded	3	591,679	3.43%
	Total	35	17,270,792	100.00%
NSC	Traded[2]	36	14,382,099	100.00%
	Non-traded	0	0	0.00%
	Total	36	14,382,099	100.00%
UPC	Traded[3]	64	28,828,193	100.00%
	Non-traded	0	0	0.00%
	Total	64	28,828,193	100.00%
Composite	Traded	132	59,889,405	99.02%
	Non-traded	3	591,679	0.98%
	Total	135	$60,481,084	100.00%

[1] Includes 2 bonds issued during 2022, prorated based on the date of issue.

[2] Includes 3 bonds issued during 2022, prorated based on the date of issue.

[3] Includes 7 bonds issued during 2022, prorated based on the date of issue.

Table 2
2022 Bonds, Notes, & Debentures

Railroad	Number of Traded Issues	Market Value Traded Issues ($000)	Current Cost	Weighted Cost
CSX	32	$16,679,113	4.273%	1.190%
NSC	36	14,382,099	4.319%	1.037%
UPC	64	$28,828,193	4.140%	1.993%

Table 3
2022 Equipment Trust Certificates

Railroad	Number of Issues	Market Value ($000)	Yield %	Weighted Yield ($000)
CSX	0	$0	0.00%	$0
NSC	0	0	0.00%	0
UPC	4	806,974	3.742%	30,195
Composite	**4**	**$806,974**	**3.742%**	**$30,195**

Table 4
2022 Conditional Sales Agreements

Railroad	Number of Issues	Market Value ($000)	Current Cost	Weighted Cost
Composite	**0**	**$0**		**0.00%**

Table 5
2022 Capitalized Leases & Miscellaneous Debt

Railroad	Capitalized Leases ($000)	Miscellaneous Debt[1] ($000)	Total Other Debt ($000)
CSX	$18,435	($351,872)	($333,437)
NSC	13,014	(830,102)	(817,088)
UPC	210,962	98,959	309,921
Composite	**$242,411**	**($1,083,015)**	**($840,604)**

[1] Miscellaneous debt includes unamortized debt discount.

Table 6
2022 Market Value of Debt

Type of Debt	Market Value of Debt ($000)	Percentage of Total Market Value (Excluding Other Debt)
Bonds, Notes, & Debentures	$60,481,084	98.68%
ETCs	806,974	1.32%
CSAs	0	0.00%
Subtotal	61,288,058	100.00%
Capitalized Leases/Miscellaneous Debt	(840,604)	NA
Total Market Value of Debt	**$60,447,454**	**NA**

Table 7
2022 Flotation Cost for Debt

Type of Debt	Market Weight (Excludes Other Debt)	Flotation Cost	Weighted Average Flotation Cost
Bonds, Notes, & Debentures	98.683%	0.064%	0.063%
ETCs	1.317%	0.078%	0.001%
CSAs	0.000%	0.000%	0.000%
Total	**100.000%**		**0.064%**

Table 8
2022 Current Cost of Debt

Type of Debt	Percentage of Total Market Value (Excludes Other Debt)	Debt Cost	Weighted Debt Cost (Excludes Other Debt)
Bonds, Notes, & Debentures	98.683%	4.220%	4.164%
ETCs	1.317%	3.742%	0.049%
CSAs	0.000%	0.000%	0.000%
Subtotal	100.000%		4.214%
Flotation Cost			0.064%
Weighted Cost of Debt			**4.278%**

Table 9
2022 Summary Output

Regression Statistics					
Multiple R	0.773261				
R Square	0.597933				
Adjusted R Square	0.596381				
Standard Error	0.023375				
Observations	261				
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.210462	0.210462	385.171345	3.64813E-53
Residual	259	0.141520	0.000546		
Total	260	0.351982			
	Coefficients	Standard Error	t Stat	P-value	
Intercept	0.001073	0.001449	0.740460	0.459692	
X-Variable	0.994581	0.050677	19.625783	3.64813E-53	

Table 10
2022 CAPM Cost of Common Equity

Risk-Free Rate (RF)	3.30%	
RF+(Beta x Market Risk Premium)	3.3% + (0.9946 x 7.17%)	10.43%
Cost of Equity		**10.43%**

Table 11
2022 Cost of Equity Using STB's MSDCF
($ in millions)

Company	CSX		NSC		UNP	
Initial Cash Flow	$3,919		$2,598		$6,090	
Input for Terminal C.F.	$4,147		$3,089		$6,908	
Stage One Growth	11.84%		9.40%		9.60%	
Stage Two Growth	10.28%		10.28%		10.28%	
Stage Three Growth*	5.68%		5.68%		5.68%	
Year	Value on 12/31 of Each Year	Present Value	Value on 12/31 of Each Year	Present Value	Value on 12/31 of Each Year	Present Value
1	$4,384	$3,807	$2,843	$2,519	$6,674	$5,905
2	4,903	3,698	3,110	2,442	7,315	5,726
3	5,483	3,591	3,402	2,368	8,017	5,552
4	6,132	3,488	3,722	2,296	8,787	5,383
5	6,858	3,388	4,072	2,226	9,630	5,220
6	7,563	3,245	4,491	2,175	10,620	5,093
7	8,341	3,108	4,952	2,126	11,712	4,969
8	9,198	2,976	5,461	2,077	12,916	4,848
9	10,144	2,851	6,023	2,030	14,244	4,730
10	11,187	2,730	6,642	1,984	15,708	4,615
Terminal	$132,141	$32,250	$116,505	$34,806	$256,182	$75,266
Sum of Present Value	$65,133		$57,050		$127,307	
Market Value	$65,133		$57,050		$127,307	
COE	15.15%		12.84%		13.03%	
Weighted COE	3.95%		2.94%		6.65%	
Industry COE	13.54%					

Table 12
2022 Cost of Common Equity Capital

Model	
Capital Asset Pricing Model	10.43%
Multi-Stage Discounted Cash Flow	13.54%
Cost of Common Equity	**11.99%**

Table 13
2022 Cost & Market Value of Preferred Stock

Railroad	**Dividend**	**Value Per Share**	**Div. Yield %**	**Shares (000)**	**Market Value ($000)**	**Market Weight**	**Weighted Yield**
CSX	$0.00	$0.00	0.00%	0	$0	0.00%	0.00%
NSC	0.00	0.00	0.00%	0	0	0.00%	0.00%
UPC	0.00	0.00	0.00%	0	0	0.00%	0.00%
Composite					**$0**	**0.00%**	**0.00%**

Table 14
2022 Average Market Value for Common Equity

Railroad	**Average Market ($000)**	**Average Market Weight**
CSX	$69,423,445	25.69%
NSC	58,913,410	21.80%
UPC	141,855,777	52.50%
COMPOSITE	**$270,192,632**	**100.00%**

Table 15
2022 Capital Structure Mix

Railroad	Type of Capital	Market Value ($000)	Weight
CSX	Debt	$16,937,355	19.61%
	Equity	69,423,445	80.39%
	P. Equity	0	0.00%
NSC	Debt	13,565,011	18.72%
	Equity	58,913,410	81.28%
	P. Equity	0	0.00%
UPC	Debt	29,945,089	17.43%
	Equity	141,855,777	82.57%
	P. Equity	0	0.00%
Composite Weight	Debt	60,447,454	18.28%
	Equity	270,192,632	81.72%
	P. Equity	0	0.00%
	Total	$330,640,086	100.00%

Table 16
2022 Cost-of-Capital Computation

Type of Capital	Cost	Weight	Weighted Average
Long-Term Debt	4.28%	18.28%	0.78%
Common Equity	11.99%	81.72%	9.80%
Preferred Equity	0.00%	0.00%	0.00%
Composite Cost of Capital		**100.00%**	**10.58%**