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BEFORE THE
SURFACE TRANSPORTATION BOARD

RAILROAD COST OF CAPITAL — 2023	)	STB Docket No. EP 558 (Sub-No. 27)

COMMENTS OF THE ASSOCIATION OF AMERICAN RAILROADS AND ITS MEMBER RAILROADS

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April 23, 2024

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VERIFIED STATEMENT

Witness*	Subject
Dr. Rand Ghayad	The railroads' market value capital structure, overall cost of capital, cost of common and preferred equity, and cost of all types of debt.

*Verified statements are referenced in these comments by witness name –
viz., Ghayad V.S. at _____

BEFORE THE
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RAILROAD COST OF CAPITAL — 2023	)))))	STB Docket No. EP 558 (Sub-No. 27)

COMMENTS OF THE ASSOCIATION OF AMERICAN RAILROADS
AND ITS MEMBER RAILROADS

By a decision served on February 20, 2024, the Surface Transportation Board ("STB" or "Board") instituted this proceeding to determine the railroad industry's cost of capital for the year 2023. The Board noted that this determination will enable it to make the required annual individual railroad revenue adequacy determination for 2023. 49 U.S.C. § 10701(d)(2), § 10704(a)(2). The Board noted further that the cost of capital determination may also be used in various other STB railroad proceedings. *See Railroad Cost of Capital – 2023*, EP 558 (Sub-No. 27) (STB served Feb. 20, 2024) ("*Cost of Capital – 2023*").

The railroads, through the Association of American Railroads ("AAR"), are submitting their calculation of: (1) the railroads' 2023 cost of common equity capital; (2) the railroads' 2023 current cost of preferred equity capital; (3) the railroads' current 2023 cost of debt capital; and (4) the 2023 capital structure mix of the railroad industry on a market value basis.

The AAR's calculations are discussed in the attached verified statement of Dr. Rand Ghayad, Senior Vice President, Policy and Economics of the AAR. Dr. Ghayad's statement establishes the following:

1. The 2023 cost of common equity capital is 10.94 percent.
2. The 2023 cost of preferred equity capital is 0.00 percent.
3. The 2023 cost of debt capital is 5.34 percent.
4. The capital structure of the railroad industry is 18.39 percent debt, 0.00 percent preferred equity,[1] and 81.61 percent common equity.

From these data, Dr. Ghayad concludes that the overall railroad industry cost of capital for 2023 is 9.87 percent.[2]

I. Introduction

The sole purpose of this proceeding is to determine the railroad industry's cost of capital for 2023. The cost of capital will be computed using the current cost of debt and equity and market value weights. *See Standards for Railroad Revenue Adequacy*, 3 I.C.C.2d 261 (1986), *aff'd sub nom., Consolidated Rail Corporation v. United States*, 855 F.2d 78 (3rd Cir. 1988). The Board has adopted a composite railroad approach to computing an industry-wide cost of capital. This approach relies upon data from a sample of railroads meeting criteria established by the Board and its predecessor, the Interstate Commerce Commission, in Ex Parte No. 458, *Railroad Cost of Capital — 1984,* 1 I.C.C.2d 989, 1003-04 (1985), and *Revisions to the Cost-of- Capital Composite Railroad Criteria*, EP 664 (Sub-No. 3) (STB served Oct. 25, 2017). Those

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[1] There is no preferred equity in 2023.

[2] Ghayad V.S. at 2.

criteria are: (1) the company is a Class I line-haul railroad; (2) if the Class I railroad is controlled by another company, the controlling company is primarily a railroad company (at least 50 percent of its total assets are devoted to railroad operations), and it is not already included in the study frame; (3) the company's bonds are rated at least BBB by Standard & Poor's and Baa by Moody's; (4) the company's stock is listed on either the New York Stock Exchange or the NASDAQ; and (5) the company has paid dividends throughout the year (2023).[3]

This year there are three railroad corporations or holding companies in the sample meeting the Board's criteria: CSX Corporation, Norfolk Southern Corporation, and Union Pacific Corporation. These are the same companies included in the 2022 sample.

II. The Cost of Common Equity Capital

In its February 20, 2024 order instituting this proceeding, the Board directed that the cost of capital components be calculated "using the methodology followed in Railroad Cost of Capital – 2022." *See Cost of Capital – 2023*, slip op. at 2. In *Railroad Cost of Capital – 2022*, the Board calculated the cost of equity component in its annual cost of capital proceeding using a simple average of the estimates produced by the Capital Asset Pricing Model ("CAPM") adopted in *Methodology to be Employed in Determining the Railroad Industry's Cost of Capital,* EP 664 (STB served Jan. 17, 2008) and the Morningstar/Ibbotson Multi-Stage Discounted Cash Flow Model ("MSDCF") adopted 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).[4] *See*

[3] Effective November 24, 2017, the Board modified the fourth screening criterion to require a company's stock to be listed on either the NYSE or NASDAQ.

[4] The Morningstar/Ibbotson MSDCF model adopted by the Board is a modified version that includes only the railroads that pass the screening criteria set forth in *Railroad Cost of Capital—1984*, 1 I.C.C.2d 989 (1985), for inclusion in the sample of railroads used for the annual cost of capital determination.

Railroad Cost of Capital – 2022, EP 558 (Sub-No. 25), slip op. at 7-11 (STB served Aug. 2, 2022).[5] Dr. Ghayad used a simple average of the CAPM and Morningstar/Ibbotson MSDCF models adopted by the Board in his calculation of the cost of common equity in this proceeding.

A. <u>The CAPM Methodology</u>

Under the CAPM methodology as applicable to the annual cost of capital proceeding, the cost of common equity is calculated by determining the return an investor would receive on a risk-free investment and by adding to the risk-free return a premium associated with the risk of railroad stocks. The premium is calculated by multiplying the market risk premium of the stock market as a whole by a factor, known as beta, that represents the non-diversifiable risk of holding railroad stocks. In formulaic terms, the CAPM can be expressed as:

K = RF + beta (MRP)

Where K = the firm's cost of equity,
RF = the risk-free rate,
MRP = the market's risk premium, and
beta = coefficient of systematic, non-diversifiable risk of the stock.

Dr. Ghayad's attached Verified Statement explains how the AAR calculated the cost of equity using the CAPM methodology. The risk-free rate was retrieved directly from the Federal Reserve Board website as approved by the Board in earlier proceedings, including the 2021 and 2022 cost of capital proceedings. *Railroad Cost of Capital – 2021,* EP 558 (Sub-No. 25), slip op.*See Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital,* EP 664 (Sub-No. 1), slip op. at 4 (STB served Jan. 28, 2009).

[5] The Board determined that using a simple average of CAPM and the commercially accepted Morningstar/Ibbotson multi-stage DCF model to calculate the cost of equity yields a more precise determination than relying on CAPM alone. As noted by the Board, "By using an average of the results produced by both models, we harness the strengths of both models while minimizing their respective weaknesses. The result should be a stable yet precise estimate of the cost of equity that we can use in future regulatory proceedings and to gauge the financial health of the railroad industry." *Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital*, EP 664 (Sub-No. 1), slip op. at 15 (STB served Jan. 28, 2009).

at 7. Since the 2006 cost of capital determination, the well-regarded and widely accepted Ibbotson Equity Risk Premium has been used for the market risk premium, as found in the *Ibbotson SBBI Valuation Yearbook* published by Morningstar.[6] Though that publication was discontinued after the 2013 edition, much of the same data could be found in the *Ibbotson SBBI Classic Yearbook.* Beginning in 2016, Morningstar stopped publishing its *Ibbotson SBBI Classic Yearbook.* For the 2015 cost of capital calculation, the AAR utilized the Duff & Phelps *2016 Valuation Handbook – Guide to Cost of Capital* as a source for the Ibbotson Equity Risk Premium (a.k.a. market risk premium), because this figure is calculated using the same sources and methodology as Ibbotson.[7] Ghayad V.S. at 31-32. For the 2016 calculation, the same source was used: the Duff & Phelps *2017 Valuation Handbook – Guide to Cost of Capital.* Though that publication was discontinued in hardcover form, the publication is available through the Duff & Phelps online *Cost of Capital Navigator*. For the 2023 calculation, the same source was used (the Duff & Phelps *Valuation Handbook – U.S. Guide to Cost of Capital*), but it was obtained through the online *Cost of Capital Navigator*. The calculation for beta was made using the S&P 500 Price Index and the same methodology approved by the Board in previous cost of capital proceedings, including the 2018, 2019, 2020, 2021, and 2022 cost of capital proceedings.

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[6] Ibbotson Associates is a wholly owned subsidiary of Morningstar, Inc. "SBBI" stands for "Stocks, Bonds, Bills, and Inflation."

[7] Duff and Phelps notes that this premium is "[c]alculated as the average annual return of the S&P 500 total return index minus the average annual return of the SBBI long-term (20-year) government bond income return series over the 1926-2016 time period. The long-horizon historical equity risk premium was previously published on the "back page" of the Morningstar/Ibbotson *SBBI Valuation Yearbook* (discontinued)."

The values determined by Dr. Ghayad for the elements of the CAPM methodology were 4.26 percent for the risk-free rate, 7.17 percent for the market risk premium, and 0.9858 for beta.

Based on the three-railroad composite described above and the procedures used by the STB in the last cost of capital proceeding, Dr. Ghayad estimates that under the CAPM methodology the cost of common equity capital for 2023 is 11.33 percent. Ghayad V.S. at 37-38.

B. The Morningstar/Ibbotson MSDCF Methodology

The Morningstar/Ibbotson MSDCF methodology, as adopted by the Board, calculates the cost of common equity capital as follows:

> The cost of equity in a DCF 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 investors will ultimately benefit from these cash flows through higher regular dividends, special dividends, stock buybacks, or stock price appreciation. The incorporation of these cash flows and the expected growth of earnings are the essential aspects of the multi-stage DCF we are adopting here.
>
> The Morningstar/Ibbotson 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
>
> $$CF = IBEI - CAPEX + DEP + DT.$$
>
> An average cash flow figure is used as the starting point of the analysis under the Morningstar/Ibbotson model. To find the average cash flow, the model uses the 5-year period leading up to the year being analyzed, and the total cash flows for that time period are divided by total sales, which determine the 5-year cash-flow-to-sales ratio. The ratio is then multiplied by the total sales for the year being analyzed to obtain the average cash flow estimate for that year. For the third (and final) stage of the Morningstar/Ibbotson multistage DCF model stage, Morningstar/Ibbotson uses two additional assumptions: that there is no depreciation or deferred taxes. Therefore, in the third stage, cash flows are based solely on income before extraordinary items.

> Growth of earnings is also calculated in three stages. In the first stage (years 1-5), the firm's annual earnings growth rate is assumed to be the median value of the qualifying railroad's 3- to 5-year growth estimates as determined by railroad industry analysts and published by Institutional Brokers Estimate System (IBES). In the second stage (years 6-10), the growth rate is the simple average of all growth rates in stage 1. In stage three (years 11 and onwards), the growth rate is the average 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 GDP and the long-run expected inflation rate.

Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital, EP 664 (Sub-No. 1), slip. op. at 5-6 (STB served Jan. 28, 2009).

The cost of common equity capital using the Morningstar/Ibbotson MSDCF model adopted by the Board is also calculated and explained in the attached Verified Statement of Dr. Ghayad. Consistent with the methodology approved by the Board in *Railroad Cost of Capital – 2008*, EP 558 (Sub-No. 12), slip op. at 9-10 (STB served Sept. 25, 2009), Dr. Ghayad's calculations used only IBES growth estimates (distributed by Refinitiv) available as of the end of 2023, and stock market values were based on shares outstanding and stock prices as of the last trading day of the last full week for 2023 – December 29, 2023 (Friday). Ghayad V.S. at 43-49.[8]

Dr. Ghayad calculates the cost of common equity capital for 2023, using STB's version of the Morningstar/Ibbotson MSDCF model, as 10.94 percent. Ghayad V.S. at 52.

[8] Consistent with the methodology approved by the Board in *Railroad Cost of Capital – 2017,* EP 558 (Sub-No. 21), slip op. at 11-12, Dr. Ghayad's calculations used data inputs in the cash flow formula as retrieved from the railroads' 2019-2023 10-K filings with the SEC (and used restated data where set forth in any subsequently filed 10-K filings with the SEC). *See* Ghayad V.S. at 40-42.

C. Conclusion as to the Cost of Common Equity Capital

Under the Board's methodology, the cost of common equity capital is the simple average of the results using the CAPM and Morningstar/Ibbotson MSDCF models. The simple average produces a cost of common equity capital of 10.94 percent for 2023. Ghayad V.S. at 51-52.

III. The Cost of Preferred Equity Capital

Preferred stock is a hybrid security which has some characteristics of debt and some characteristics of equity. Its cost depends on its specific features. The methodology used by the Board applies the following criteria:

(a) Where the preferred is not convertible into common stock, and where the corporation is not required to redeem the preferred at specific times, the cost of preferred equity is equal to its current dividend yield.

(b) Where the preferred is not convertible but is subject to mandatory redemption providing holders of the instrument with a premium, the cost is equal to the current dividend yield, plus the present value of the premium.

(c) Where the preferred is convertible at the option of the holder, and the market values of the preferred and common indicate that conversion is likely to occur or that the conversion right controls the price of the preferred, the preferred has the same cost as common equity.

From 2002 until 2012, no railroads in the composite had preferred stock outstanding. Beginning in 2013, one of the railroad companies comprising the railroad sample had preferred stock outstanding, and this continued through 2020. However, as was the case last year, one railroad company, Kansas City Southern, no longer meets the criteria for inclusion in the

sample, so there is no preferred stock in this year's calculation. The estimated cost of preferred equity is 0.00 percent for 2023. Ghayad V.S. at 52-53.

IV. The Cost of Debt

According to the Board's well-established methodology, the cost of debt includes costs for three categories (bonds, equipment trust certificates, conditional sales agreements) of debt instruments, plus flotation costs. *See, e.g., Railroad Cost of Capital – 1997,* EP 558 (Sub-No. 1), slip op. at 2-3 (STB served July 16, 1998); *Railroad Cost of Capital – 2021*, EP 558 (Sub-No. 25), slip op. at 4. To determine the cost of debt for bonds,[9] Dr. Ghayad has computed the average current bond yield for 135 bonds from the sample railroads for which data were available during 2023 according to the Board's well-established methodology. Under this approach, the bond yield is based on a sample representing 99 percent of the book value of the bonds issued by the railroads in the sample.[10] As the Board has recognized, equipment trust certificates ("ETCs") and conditional sales agreements ("CSAs") are not actively traded in secondary markets. Their costs were therefore estimated by comparing them to the yields on Treasury securities that are actively traded.[11] The composite current cost of debt is the market-weighted average cost of bonds, ETCs, and CSAs (if there were any), plus a small flotation

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[9] The term "bonds" is used to describe bonds, notes, debentures, and other similar types of debt.

[10] Bond data were retrieved from a Bloomberg database. Ghayad V.S. at 8-9.

[11] Ghayad V.S. at 16. No CSAs were modeled because none are outstanding.

cost.[12] Using the Board's established methodology, the railroads' 2023 cost of new debt is 5.34 percent. Ghayad V.S. at 24.

V. The 2023 Capital Structure of the Railroad Industry and the Overall Cost of Capital

Pursuant to the Board's February 20, 2024 decision, the market values of debt, preferred equity, and common equity were compiled to compute the 2023 capital structure of the railroad industry. The railroads' market value capital structure on a market value basis is 18.39 percent debt, 81.61 percent common equity capital, and 0.00 percent preferred equity capital. Ghayad V.S. at 53. Based upon this capital structure, the overall 2023 cost of capital is 9.87 percent. Ghayad V.S. at 54.

Conclusion

The Board should determine that the railroads' cost of capital for 2023 is 9.87 percent.

Respectfully submitted,

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April 23, 2024

[12] In this proceeding, the AAR calculated bond flotation costs by using data reported by the sample railroads to the Securities and Exchange Commission (SEC) regarding new debt offerings in 2023. This is the same methodology approved by the Board in *Railroad Cost of Capital –2022,* EP 558 (Sub-No. 26), slip op. at 6. Ghayad V.S. at 19-24.

CERTIFICATE OF SERVICE

I hereby certify that on this 23rd day of April 2024, I caused to be served by electronic mail a copy of the foregoing on the following:

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Amber L. McDonald

BEFORE THE

SURFACE TRANSPORTATION BOARD

EX PARTE NO. 558 (Sub-No. 27)

RAILROAD COST OF CAPITAL — 2023

VERIFIED STATEMENT

OF

DR. RAND GHAYAD

SENIOR VICE PRESIDENT — POLICY AND ECONOMICS

ASSOCIATION OF AMERICAN RAILROADS

April 23, 2024

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Verified Statement

of

Dr. Rand Ghayad

I. Introduction

My name is Dr. Rand Ghayad. I am the Chief Economist and Senior Vice President of Policy and Economics at the Association of American Railroads (AAR), headquartered at 425 Third Street, SW, Suite 1000, Washington, DC 20024. The AAR is the trade association of the Nation's major railroads, as well as the railroads of Canada and Mexico. The AAR's United States railroad members, which include all Class I railroads plus about 180 additional Class II and III freight railroads, account for approximately 98 percent of our Nation's total railroad freight operating revenue.

When appropriate, the AAR represents the railroad industry before government bodies, including economic regulatory proceedings before the Surface Transportation Board ("STB" or "Board"). In particular, the AAR has participated in all of the STB proceedings addressing revenue adequacy standards and the annual cost of capital determinations.

Aside from other responsibilities, I've provided economic analyses and consulting services to clients across diverse industries such as aviation, railroads, postal and shipping, addressing a wide range of policy and business matters. A summary of my qualifications and experience appears at the end of this statement.

In this submission, I am responding to the Board's decision of February 13, 2024 (served February 16), instituting a proceeding to determine the railroad industry's 2023 cost of capital — Ex Parte No. 558 (Sub-No. 27), *Railroad Cost of Capital — 2023* ("Ex Parte 558

Decision"). In my statement, I calculate the cost of debt for the railroad industry using the procedures accepted in previous STB proceedings. I also calculate the cost of common equity using a simple average of the estimates produced using the following methods: (1) the Capital Asset Pricing Model used by the Board in Ex Parte No. 558 (Sub-No. 26); and (2) the STB's version of the Morningstar/Ibbotson Multi-Stage Discounted Cash Flow Model as used by the Board in Ex Parte No. 558 (Sub-No. 26). In addition, I calculate a cost of preferred equity using the dividend yield method, as used in Ex Parte No. 558 (Sub-No. 26). Finally, I calculate the market value capital structure and the overall cost of capital using the procedures accepted in previous Cost of Capital proceedings. This statement presents the details for calculating the necessary components for the overall cost of capital: the market value capital structure, the cost of debt, the cost of common equity capital using the Capital Asset Pricing Model and the Multi-Stage Discounted Cash Flow Model, and, as applicable, the cost of preferred equity capital.

I conclude that the 2023 cost of capital for the railroad industry is 9.87 percent. This estimate is based on a current cost of debt of 5.34 percent, a cost of common equity capital of 10.89 percent; a cost of preferred equity of 0.00 percent; and market value weights for debt, common equity, and preferred equity of 18.39 percent, 81.61 percent, and 0.00 percent, respectively.

II. Determining the Cost of Capital

A. Defining the Cost of Capital

The cost of capital represents the *expected* return on investment that the providers of capital require to make them indifferent between investments with equivalent risk profiles. The cost of capital necessarily incorporates long-term investor expectations for a company's performance. Investment funds flow to companies where the expected returns, over the investors' investment horizons, are thought to at least equal the expected returns available from other investment opportunities, giving consideration to the relative (or commensurate) risk of investment. Similarly within a company, limited capital resources flow to projects where the expected returns are anticipated to be highest, giving consideration to the relative (or commensurate) risk, uncertainty and timing of investment. Because it is challenging to precisely ascertain these expectations of long-term investors, it is standard in the literature to estimate the parameters associated with the cost of capital using modern finance techniques. Such financial models are inherently imprecise, and the results provide only an estimate of an expected value of the cost of invested capital at a particular point in time. For some types of capital, such as traded bonds, investor expectations can be readily observed. For other types of capital, such as common equity, modeling is necessary. Using multiple models to estimate the cost of equity is crucial. Two widely employed methods for regulatory purposes include the Capital Asset Pricing Model (CAPM) and a Discounted Cash Flow (DCF) model.

B. The Composite Railroad Approach

The STB has adopted a composite railroad approach to computing an industry-wide cost of capital. This approach relies upon data from a sample of railroads meeting criteria established by the Board's predecessor, the Interstate Commerce Commission, in Ex Parte No. 458, *Railroad Cost of Capital — 1984,* 1 I.C.C. 2d 989, 1003–1004 (1985), and modified by the STB in Ex Parte No. 664 (Sub-No. 3) served October 25, 2017.

C. Selection of Railroads for Analysis

Under the criteria established by the Board for individual firm inclusion in the composite railroad sample, a company must meet certain criteria. (Ex Parte 558 Sub-No. 27 Decision) Those criteria are:

- The company is a Class I line-haul railroad.
- If the Class I railroad is controlled by another company, the controlling company is primarily a railroad company (at least 50 percent of its total assets are devoted to railroad operations), and it is not already included in the study frame.
- The company's bonds are rated at least BBB by Standard & Poor's and Baa by Moody's.
- The company's stock is listed on either the NYSE or the NASDAQ.
- The company has paid dividends throughout the year (2023).

Table 1 lists the AAR's evaluation of railroad companies that may meet the STB's criteria.

Table No. 1
Evaluation of Class I Railroads
Under Surface Transportation Board Selection Criteria
2023

Class I Railroad	Parent	Stock Symbol	Dividends Throughout 2023	Rail Assets Account For At Least 50% of Parent	Adequate Debt Rating	NYSE or NASDAQ
BNSF	Berkshire Hathaway	BRK-A	No	No	Yes	Yes
CSX	CSX Corporation	CSX	Yes	Yes	Yes	Yes
CNGT*	Canadian National Railway Co.	CNI	---	Non-U.S. company	---	
NS	Norfolk Southern Corporation	NSC	Yes	Yes	Yes	Yes
CPKC*	Canadian Pacific Kansas City	CP	---	Non-U.S. company	---	
UP	Union Pacific Corporation	UNP	Yes	Yes	Yes	Yes

* CNGT is Grand Trunk Corporation, and consists of almost all of the U.S. railroad operations of Canadian National Railway (a.k.a. CN). CPKC is KCS and Soo Line Corporation, and consists of the U.S. operations of Canadian Pacific Kansas City (CPKC). Following STB precedent, CN and CPKC were not included in the sample because both CN and CPKC are Canadian corporations – and the cost of capital proceeding is concerned with determining costs for U.S. railroads under STB jurisdiction.

This year there are three railroad corporations or holding companies in the sample meeting the Board's criteria: CSX Corporation, Norfolk Southern Corporation, and Union Pacific Corporation. Consistent with past proceedings, the two Canadian-owned railroads have been excluded from the sample.[1] Berkshire Hathaway, owner of BNSF Railway Company, did not pay dividends throughout 2023, and the railroad is less than 50% of the company's assets.[2] Based

[1] *See* STB Ex Parte No. 558, decided July 2, 1997, page 2, and verified statement of Craig F. Rockey on behalf of the Association of American Railroads in Ex Parte No. 558, submitted March 19, 1997, Table 1 on page 6. Accounting methods, differences in the treatment of taxes, and currency conversion could also be issues if foreign companies were added to the composite railroad. The railroad parents (CN and Canadian Pacific Kansas City) are still more Canadian than USA. Comparing operating revenues for 2022 as reported in the AAR's *Railroad Facts* book, 2023 edition: CNGT was 32 percent of CN, and KCS and SOO combined was 36 percent of Canadian Pacific Kansas City.

[2] The rail operations of BNSF Railway Company are the principal operating subsidiary of Burlington Northern Santa Fe, LLC – which is a subsidiary of Berkshire Hathaway, Inc. For 2023, BNSF accounted for 8.8 percent of Berkshire Hathaway assets. Among the many other diverse subsidiaries of Berkshire Hathaway are GEICO, Fruit of the Loom, Helzberg Diamonds and Dairy Queen. The company also owns pipelines, manufacturers, numerous automobile dealerships, real estate companies, and newspapers.

on data from Annual Report Form R-1 for 2023, the three-firm composite accounts for 61 percent of the operating revenues and 60 percent of the assets of all Class I railroads.

D. Types of Railroad Capital

The total capital of a firm may include various forms of debt and two types of equity; common stock and preferred stock. Each of these three sources of capital has different expected rates of return (reflecting different levels of perceived risk of the particular debt or equity instrument), and the overall cost of capital is calculated as the market value weighted average of the costs of common equity, preferred equity, and debt. Different approaches are used to estimate the costs of each of the types of capital. In this statement, 99 percent of the cost of debt is calculated using bonds and similar instruments (including notes and debentures). The remaining 1 percent – in the form of Equipment Trust Certificates – is calculated with a long-used model that permits comparison of market-determined yields for government debt, and the historical relationship between government debt and the type of railroad debt modeled.[3] No Conditional Sales Agreements were used to calculate the 2023 cost of debt because they have all been retired. The estimate of the cost of common equity is a simple average of the results from two estimation methods. One method is calculated using the backward-looking Capital Asset Pricing Model (CAPM) following the methodology prescribed by the Board and used in the 2022 Cost of Capital decision. The other method is calculated using the somewhat more forward-looking Multi-Stage Discounted Cash Flow model (MSDCF) methodology prescribed by the Board and also used in the 2022 Cost of Capital Decision. It is

[3] There are currently four Equipment Trust Certificates modeled.

the combined return on equity estimate—rather than the outcomes of any single model—that matters for evaluating the cost of equity in the railroad industry. The cost of preferred equity capital would have been calculated using a simple dividend yield method, as also used in the 2022 Cost of Capital Decision; however, none of the participating railroads have any preferred equity this year. Calculations for all three types of capital are based on data through 2023. The industry's overall cost of capital is computed as a weighted average of the three costs — debt, common equity, and preferred equity — based upon the market value for each type of capital.

III. Debt Capital in 2023

The current cost of debt is determined from the current market-determined yields on all debt outstanding. This approach is necessary, and in past Board Cost of Capital decisions has been accepted as appropriate, because of the reasons listed below.[4]

(1) There is a lack of sufficient new debt issues from which to develop a representative, and statistically reliable, current cost.

(2) The stated rate of interest/dividend payment to the investor is not always the same as the cost to the railroad. For example, when securities are issued, the total amount paid by investors is seldom received by the railroad. Administrative fees, such as compensation paid to investment bankers, reduce the proceeds to the railroad. The effect of this is to increase the cost of the securities to the railroad.

[4] *See* Ex Parte Nos. 415, 436, 452, 458, 464, 466, 473, 478, 486, 491, 506, 513, 518, 523, 523 (Sub-No. 1), 558, and 558 (Sub-No. 1) through (Sub-No. 26).

(3) The maturity mix and the type of instrument (equipment trust certificates, conditional sales agreements, long-term debt) of new security issues may be different from the average of existing securities. Because of the effect that length of maturity and type of security has on its current cost, the use of only new issues would not accurately measure the current cost.

(4) The quantity and quality of existing debt has an impact on the yield of new issues.

A. Bonds, Notes and Debentures

As in previous Cost of Capital determinations, calculations relating to the bond market value use market data for the composite railroad whenever possible, and calculations for the cost of bond debt rely entirely on market data.[5] Multiple sources for market data are available, and each source has its own criteria for including a financial instrument in its database. However, no market data will be available in any database for bonds that do not trade.[6] For 2023, yields and prices of the sample railroads' bonds, notes and debentures were obtained from Bloomberg.[7] This source is the same data source used since the 2011 cost of capital

[5] The terms "bonds" and "bonds, notes, and debentures" are used interchangeably herein.

[6] In some cases, a comparable bond method could be used, where yields for traded bonds could be used for non-traded bonds with similar qualities (maturity date and type of instrument), enabling the calculation of a probable market price. Another approach would be to construct a yield curve for a railroad. We have not recommended these approaches because the supply of bonds with market data is adequate.

[7] Bloomberg's product is called Bloomberg Professional, and it is available as a subscription service. https://www.bloomberg.com/professional/

determination. We were able to find data for 135 unique CUSIPs (bond identifiers).[8] The 135 bonds represent 99 percent of the book value of all railroad bonds belonging to the composite railroad. The bonds not included in the market value calculation are those that are either not in Bloomberg's database or were in the database but did not trade.

1. Market Value of Bonds, Notes, and Debentures

The average market value for traded bonds, notes, and debentures is calculated using the methodology employed in previous Cost of Capital proceedings. For each of the 135 bonds with market data in 2023, an average price is calculated based on the simple average of monthly prices. The prices represent what the investor is willing to pay for the bond given its coupon rate and maturity date. The market value is the average market price (stated as a price per hundred dollars of principal) times the amount of debt outstanding as of December 31, 2023.[9] Where market prices are not available (i.e., for instruments that did not trade or were not found in the Bloomberg database), the "face value" of the bond is assumed to be the price investors would pay. This assumption may slightly overstate the market value of some issues and understate the value of others, depending upon the relationship of the instruments' coupon rate and the current market rate. However, this possible variation is not likely to significantly affect the overall estimate of the cost of debt capital, since the differences are likely to be both small and offsetting – and, most importantly, since 99.1 percent of the book

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[8] A CUSIP number is a 9-character identification code used to identify a security. CUSIP is an abbreviation for Committee on Uniform Securities Identification Procedures.

[9] Securities that were newly issued during the year were prorated by the ratio of the number of months outstanding (rounded to the nearest half month) to the twelve-month year, as done in past proceedings.

value of bonds is priced at market. Table 2 summarizes the results of the market value calculations for 2023. The market value for bonds, notes, and debentures that traded is $54.21 billion, which is 98.9 percent of the total market value of $54.80 billion.

Table No. 2
Bonds, Notes and Debentures
Average Market Value

Railroad Co.	Traded Value ($000)	Non-Traded Value ($000)	Total Value ($000)	Weight Based on Traded
CSX	$15,280,930	$591,679	$15,872,609	28.19 %
NSC	$13,559,845	$0	13,559,845	25.01
UNP	$25,366,477	$0	25,366,477	46.80
Total	$54,207,251	$591,679	$54,798,930	100.00 %
Prior Year	$59,889,405	$591,679	$60,481,084	
Change	-9.5%	0.0%	-9.4%	

Although the number of bond offerings increased in 2023, the total market value for bonds is down 9.4 percent from the previous year. Among the causes of this decrease are existing debt offerings declining in market value, as average yields increase.

Appendix A lists details for each of the 135 bonds, notes, and debentures belonging to the composite railroad that have trading data available for 2023 in the Bloomberg database. As footnoted earlier, there are a few cases where a similar series of bonds has been assigned two CUSIPs because a privately-placed portion trades among qualified institutional buyers instead of through an exchange, as allowed under the Securities and Exchange Commission's Rule 144A. All instruments are summarized for each sample railroad in the front of the Appendix. Book values for non-traded debt are also listed.

2. Current Cost of Bonds, Notes, and Debentures

Table 3 summarizes the yield or cost of each railroad's debt (bonds, notes, and debentures), which, when weighted by the market value of the traded debt (as shown in Table 3), determines the sample composite cost of bonds, notes and debentures. The weighted average is 5.250 percent, which is 1.03 percentage points higher than 2022's figure of 4.220 percent.

Table No. 3
Bonds, Notes and Debentures
Weighted Current Cost

Railroad Co.	Weight		Current Cost	
CSX	28.19	%	5.268	%
NSC	25.01		5.451	
UNP	46.80		5.131	
Total	100.00	%	5.250	%

As noted earlier, the current cost for bonds, notes, and debentures is based on traded instruments issued by the sample railroads. Appendix A contains the average yield for each of the 135 securities that traded according to Bloomberg's database. The average yield for each security is a simple average of the twelve month-end yields. The traded portion of Appendix A (in the front section) summarizes the yield, or cost of each railroad's debt, which, when weighted by the market value of the traded debt, determines the sample composite cost of bonds, notes and debentures of 5.250 percent. The weights used in Table 3, as derived from the calculations in Table 2, are also based on the traded portion of bonds, notes and debentures listed in Appendix A.

B. Equipment Trust Certificates

Equipment Trust Certificates (ETCs) are debt obligations that are secured by the particular equipment which is acquired with the instrument's proceeds. In the event of default, creditors may repossess and resell or lease the equipment to pay off the debt obligations. This type of security has declined in popularity. In the 1990 cost of capital determination, ETCs accounted for 17.70 percent of the market value for the sum of bonds, ETCs, and conditional sales agreements.[10] For 2023, this percentage is 1.37 percent. Because entire ETCs are not actively traded in secondary markets, it is necessary to determine their cost by examining the return on other debt securities that are actively traded.

An ETC is generally serially issued. As such, each year during its life an equal amount (typically 1/15th) of the original amount must be retired. Consequently, an ETC may be thought of as a series of individual, annually-retiring bonds. In fact, when ETCs are issued, each of the maturities is sold independently from the others. A serially issued debt instrument provides an investor with the ability to purchase only those maturities of particular interest. To correctly compute the composite yield on a serially issued bond, the internal rate of return on the bond's principal and interest payments must be calculated.

To compare ETCs to other debt instruments, the yields to maturity (as detailed in Appendix B) for government bills, notes, and bonds having the same range of maturities as current ETCs were obtained from Federal Reserve data. The yield curve for these government

[10] See Table 1 in ICC Ex Parte No. 491, decided June 12, 1991. Conditional Sales Agreements accounted for an additional 2.46 percent of debt in the market value calculation.

securities (also in Appendix B) shows the relationship between the current costs, or yields to maturity, and maturity dates for government bonds (which, unlike ETCs, are actively traded in secondary markets).

These yield data have been adjusted by the Federal Reserve Board to reflect constant maturities, such that the data accurately reflect the 2023 relationships between yields and maturities. After determining the yields to maturity for government bonds of maturities similar to those of an ETC, those yields are adjusted to reflect the risk associated with the ETCs as compared to government bonds. This adjustment is the risk premium for railroad ETCs, which is the spread between ETCs and government securities.

In 2014, 2015, and 2016, a railroad issued new ETCs with interest rate spreads above government bonds of 76, 44, and 70 basis points, respectively. Since there were no new ETCs issued between 2017 and 2023, the 70 basis point spread is our most recent calculation, and I have used that difference for 2023. For comparisons, Table 4 lists historical spreads used since 2002 and the spread proposed for 2023.[11] Other than the spread for 2015, which appears to be an anomaly, the spread of 70 basis points is the lowest spread used in this century.

[11] The 70 basis point spread was calculated using the same method as that used for 2008, 2010, 2014, 2015, and 2016, and calculations were included in my work papers submitted with each of my verified statements.

Table No. 4
History of Premiums for
Equipment Trust Certificates (ETC)

Data Year	Proceeding	Basis Points
2002	Ex Parte No. 558 (Sub-No. 6)	114
2003	Ex Parte No. 558 (Sub-No. 7)	114
2004	Ex Parte No. 558 (Sub-No. 8)	114
2005	Ex Parte No. 558 (Sub-No. 9)	114
2006	Ex Parte No. 558 (Sub-No. 10)	114
2007	Ex Parte No. 558 (Sub-No. 11)	125
2008	Ex Parte No. 558 (Sub-No. 12)	125
2009	Ex Parte No. 558 (Sub-No. 13)	80
2010	Ex Parte No. 558 (Sub-No. 14)	80
2011	Ex Parte No. 558 (Sub-No. 15)	80
2012	Ex Parte No. 558 (Sub-No. 16)	80
2013	Ex Parte No. 558 (Sub-No. 17)	80
2014	Ex Parte No. 558 (Sub-No. 18)	76
2015	Ex Parte No. 558 (Sub-No. 19)	44
2016	Ex Parte No. 558 (Sub-No. 20)	70
2017	Ex Parte No. 558 (Sub-No. 21)	70
2018	Ex Parte No. 558 (Sub-No. 22)	70
2019	Ex Parte No. 558 (Sub-No. 23)	70
2020	Ex Parte No. 558 (Sub-No. 24)	70
2021	Ex Parte No. 558 (Sub-No. 25)	70
2022	Ex Parte No. 558 (Sub-No. 26)	70
2023	Proposed for EP 558 (Sub-No. 27)	70

Source for 2001-2023: STB Cost of Capital Decisions.

The methodology used to determine the cost of ETC debt is the same as the method employed and approved in previous proceedings. Risk-adjusted yields provide the basis to value each ETC. Using formulae suggested by *Standard Security Calculation Methods,* the market value of each maturity comprising an ETC is determined. In effect, these formulae make it possible to determine the price investors would pay in 2023 for the contractual interest payments and price appreciation for holding the instrument. It is the most accurate way to

compute the current cost of ETCs to the firm for the defined period. Computing the internal rate of return of the ETC prices and their associated cash flow streams establish the current cost for ETCs. The weighted-average cost for all modeled Equipment Trust Certificates (now 4) is shown in Table 5.[12]

Table No. 5
Summary of Equipment Trust Certificates Modeled for 2023
($000)

Railroad	Amount Outstanding Beg.	Ending	Average	Yield	Current Market Value	Current Interest Amount	No. ETC
CSX	$0	$0	$0	--	$0	$0	0
NS	0	0	0	--	0	0	0
UP	806,109	768,144	787,127	4.957%	747,612	37,061	4
Total	$806,109	$768,144	$787,127	4.957%	$747,612	$37,061	4

Weighing railroad yield (there was only one railroad) by its current market value for modeled ETCs results in a current cost of 4.957 percent. The average rate is higher than the 1.215

[12] The formulae used to value these bonds are standards of the security industry. They are:

For bonds with less than six months to maturity:

$$DP = \left[\frac{100 + C/2}{1 + DY/360}\right] - \left[C/2\ \frac{(180 - D)}{180}\right]$$

For bonds with six months or longer to maturity:

$$DP = \left[\frac{100}{(1 + Y/2)_{\text{EXP}}(N - 1 + D/180)}\right] + \left[\sum_{k=1}^{N} \frac{C/2}{(1 + Y/2)_{\text{EXP}}(K - 1 + D/180)}\right] - \left[C/2\frac{(180 - D)}{180}\right]$$

Where:
- DP = Dollar price of the bond
- C = Coupon rate as a percent per year
- D = Number of days from settlement date to coupon date
- Y = Yield to maturity as a decimal per year
- EXP = Raise the term on the left to the power indicated by the term on the right
- N = Whole number of coupons payable plus 1
- K = Compute for K, values 1 to N and sum the results

percent found for 2022. In this year's case, the premium used in the model is the same as last year – so the higher yield curve for 2023 reflects the higher interest rates on government securities. (See Appendix B). Appendix C lists each ETC, and includes a market value and a current yield for those modeled. (Union Pacific is the only railroad using ETCs currently.) Appendix C also lists ETCs that were not modeled (and those current, which are not used). There were no current ETCs this year. ETCs can fail to be modeled for two reasons: (1) the ETC instrument does not have all of the characteristics typical of an ETC; or (2) the ETC has a floating rate (instead of fixed) making its rate for a particular future year uncertain. There were no non-modeled ETCs this year. The market value of all modeled ETCs is $768.14 million.

C. Conditional Sales Agreements

Conditional Sales Agreements (CSAs) are another form of railroad financing that is treated by investors as debt securities, because their interest obligations are essentially the same as interest obligations on ETCs. Like ETCs, CSAs are not generally traded in secondary markets. Accordingly, as in prior proceedings, their current cost can be determined from current yields on government bonds in a similar manner to ETCs, using a 1997 relationship between CSAs and ETCs to determine the yield spread over government bonds. As in other recent years, no CSAs were outstanding in 2023 – so none were modeled and none were added to Miscellaneous Debt. No CSAs have been modeled since 2010, and none have been outstanding (non-modeled or current) since 2014. There is no appendix for CSAs.

D. All Other Debt

Capital leases and miscellaneous debt, which are normally relatively small amounts outstanding, are listed as All Other Debt. To comply with past decisions of the Board, non-modeled Equipment Trust Certificates and Conditional Sales Agreements would have been listed in this category had there been any this year. Capital leases are the largest portion of the All Other Debt category.

Capital leases are contracts between two parties and as such take many forms.[13] Since capital leases are not traded in the marketplace, their current cost is not directly observable. The lack of complete information with respect to leases necessitates that many assumptions be made to estimate their current cost and their values. For market value purposes, capital leases are included at book value. Given the large number of these leases and the significant differences among their terms, this is the only practical option available. Because the cost of capital calculation assigns this debt a cost based on traded or modeled securities (bonds, notes, debentures, ETCs and CSAs) that typically have a lower cost, the cost used for capital leases will be somewhat understated. The book value (assumed market value) of capital leases for 2023 is $174.0 million.

Miscellaneous debt, such as floating rate loans, demand deposits, premiums/discounts, and various instruments with extremely small amounts outstanding are also excluded from the current cost computations. However, miscellaneous debt is

[13] *See* generally 49 C.F.R. 1201, 2–20 for definitions.

valued at negative $1,248.38 million because in 2023 it consists mostly of discounts and unamortized debt issuance costs.

Capital leases and miscellaneous debt, when combined, net to negative $1,074.4 million and there were zero non-modeled ETCs. Therefore, All Other Debt as a percent of the total market value of debt of the composite railroad is negative 1.97 percent. Miscellaneous debt is lower than it was for 2022, and much of the decrease was caused by capital leases and discounts. More detail on Miscellaneous Debt can be found in the Debt Reconciliation portion of my work papers. This treatment of All Other Debt is the same approach used in the previous cost of capital proceeding.[14]

E. Market Value of Debt

Table 6 summarizes the total market value for each debt category. The total market value for traded and non-traded debt is $54,472 million.

Table No. 6
Market Value of Debt ($000)

Type of Debt	Market Value	Percent of Total	Percent of Subtotal
Bonds, Notes & Debentures	$54,798,930	100.60 %	98.65 %
Equipment Trust Certificates	747,612	1.37	1.35
Conditional Sales Agreements	0	0.00	0.00
Subtotal	55,546,542	101.97	100.00 %
All Other Debt*	-1,074,370	-1.97	
Total	$54,472,172	100.00 %	

* If any ETCs or CSAs are not modeled, they are included in All Other Debt.

[14] Non-modeled ETCs and/or CSAs would also have been included in the All Other category if there had been any.

Bonds, Notes, and Debentures (Bonds) account for 100.6 percent of the total market value. More details can be found in Appendix D. As can be computed from that appendix, 99 percent of the Bonds' market value is determined by the results of trading throughout the year, while the remaining portion is based upon the book value of non-traded bonds.

Current costs can be determined for three of the four debt categories ¾ Bonds, Equipment Trust Certificates, and Conditional Sales Agreements, had there been any. Therefore, in 2023, the weighted average cost of debt is based upon these three (of the four) debt categories (see subtotal column). The total market value of debt, used to determine the weight for debt in the overall cost of capital calculation, includes all four categories.

F. Flotation Costs for Debt Capital

The cost of issuing new debt generally has two portions. First, when new debt is issued by a negotiated offering or a competitive bid, the issuing firm pays a fee to the investment banking firm or firms handling the offer. These fees cover the banker's administrative costs in handling the sale and profits. Second, the issuer incurs expenses such as legal, accounting, and printing. Those types of expenses are quantified in the Securities and Exchange Commission's Form 424(b)(5) or 424(b)(2), as are the investment banker's fee and other details of new debt offerings. Flotation costs generally vary by type of security. For ETCs and CSAs, the fees are extremely small, but costs increase as the administrative burden and underwriting risk increase (i.e., in order of increasing cost ¾ ETCs and CSAs, bonds and notes, convertible bonds, and preferred stock and common stock). As discussed below, flotation costs directly reduce the gross proceeds available to the issuing firm.

An example helps to illustrate how flotation costs permanently increase the cost of debt capital to the railroad. If a railroad sells a 10-year bond with an annual coupon of 15 percent and investors are willing to pay $98 for each $100 in face value, the effective yield on the bond is 15.40 percent. Because the investment banker requires compensation (flotation costs) for his work, the railroad does not receive the full $98 from the investors. In addition, the railroad will have its own internal costs such as legal and accounting. If flotation costs reduce the net proceeds to say $96, the effective cost to the railroad over the life of the bond is 15.82 percent. Therefore, flotation costs have increased the cost of debt from 15.40 to 15.82, or by 42 basis points. Proper accounting treatment requires the $4 per $100 ($100 - $96) to be amortized on a straight line basis over the life of the bond. In addition, the Uniform System of Accounts requires the annual amortization to be charged directly to Account No. 548, Amortization of Discount on Funded Debt, a fixed charge item. This results in fixed charges for the year totaling $15.40 ($15.00 coupon payment + amortization of $0.20 discount + $0.20 flotation costs). It is important to note that these flotation costs are not recovered through operating costs but are fixed charges each year during the life of the bond. Also, it is evident that in order to reflect the total current cost of debt, flotation costs must be included.

Any firm requires the opportunity to cover flotation costs before it will have an incentive to make future capital expenditures. Before creditors will lend their funds, they must be assured that the railroad will have the opportunity to earn returns sufficient to cover all costs.

Using the same methodology used since 2008, I calculated 2023 flotation costs for bonds using publicly available data from electronic filings with the Securities and Exchange

Commission (SEC).[15] The filing types are "Prospectus Rule 424(b)(2)" and "Prospectus Rule 424(b)(5)". In addition to standard bond information such as coupon and maturity date, these filings also provide the price to investors, underwriter's fee, and railroad expenses excluding the underwriter's fee. I have calculated a yield based on the price to investors and a yield that also included flotation costs. The difference between the two yields is the flotation cost expressed in percentage points. For 2023, 8 new issues were reported in five filings, with some filings reporting multiple new issues. A simple average of the 8 flotation costs is 0.098 points, which is .034 higher than the figure used by the Board for 2022. As before, debt exchanges have not been included. Pages 1 and 2 of Appendix E contain a table with input data and calculations. Pages 3 and 4 of the same appendix contain, as an example, the pages from the SEC filing that were used as a source for one of the filings. The source filings for all of the new bond issues have been included in my work papers. I believe the 8 new railroad debt issues, which were issued by all three railroads, provide the best information to determine flotation costs for 2023, and I have therefore used 0.098 percentage points for the flotation costs for bonds.

Flotation costs for ETCs have much less significance compared to bonds simply because ETCs are less than 2 percent of the market value of the debt used to determine the current cost of debt. I have calculated flotation costs for ETCs using the same methodology used in the previous Cost of Capital decision, although it has some flaws. See the testimony for 2012 for a discussion of the incorrect assumption used with the current method. Because ETCs are such a

[15] The SEC's EDGAR (Electronic Data Gathering, Analysis, and Retrieval) system is available on the internet at the following address: https://www.sec.gov/edgar.shtml .

small portion of total debt, this flawed method for estimating flotation costs for ETCs does not affect the cost of debt, so I have not expended resources with an alternative method.

The Securities and Exchange Commission (SEC) conducted a study of flotation costs using railroad ETC data for the years 1951, 1952 and 1955.[16] In that study, the SEC determined that ETC flotation costs averaged 0.89 percent of gross proceeds. My calculation uses this old study, the flawed assumption about average railroad yields, and assumes the duration is 15 years. This methodology, suggested by a third party in 2008, was first approved by the Board in its cost of capital for 2007 decision served September 26, 2008.

Table 7 below calculates flotation costs for ETCs using the flotation percent of gross proceeds discussed above. No flotation costs have been calculated for CSAs, as none have been modeled.

Table No. 7
Flotation Costs for
Equipment Trust Certificates

Given	**ETC**
Flotation Costs as Pct of Gross Proceeds	0.890%
Avg. Railroad Yields (Table 5)	4.957%
Assumed Duration of New Instrument (Yrs)	15
Calculated	
Price After Flotation Costs	$99.11
Effective Yield Including Flotation Costs	5.043%
Difference Between Yields With and Without Floatation Costs =	
Flotation Cost as Percentage Points	**0.086%**

[16] *Cost of Flotation of Corporate Securities 1951-1955,* Securities and Exchange Commission, June 1957.

In this calculation, current average yields on railroad ETCs are assumed to be equal to the yield resulting from the price to investors for a new issue (a flawed assumption because the current yields and new issues are on *different places in the yield curve*). Coupons are assumed to be paid twice per year. The duration for new ETCs is assumed to be 15 years. Given the input data, effective yields can be calculated, and the difference between the yields excluding flotation costs and the yields including flotation costs are the flotation costs measured in percentage points. The results are flotation costs for ETCs of 0.086 percentage points – which is .008 percentage points higher than the value for 2022.

To compute the overall effect of flotation cost on debt, the market value weight of the debt outstanding is multiplied by the respective flotation cost. The weights for each type of debt are based on market values for debt (excluding All Other Debt), as found in the Percent of Subtotal column in Table 6. All Other Debt is excluded from the weight calculation, since a current cost of debt for that category has not been determined. As shown in Table 8, flotation costs increase the cost of debt by 0.098 percentage points.

Table No. 8
Flotation Costs For Debt

Type of Debt	Market Weight	Flotation Cost
Bonds, Notes & Debentures	98.65%	0.098%
Equipment Trust Certificates	1.35%	0.086%
Conditional Sales Agreements	0.00%	not calculated
Total	100.00%	0.098%

This flotation cost for 2022 is 0.034 percentage points higher than the number used by the Board in its 2022 Cost of Capital decision. Since bonds have a market weight of over 98

percent, flotation costs for total debt rounds to the same number as the flotation costs for bonds.

G. Conclusion as to the Cost of Debt Capital

To determine the overall composite current cost of debt, the current cost of each of three categories of debt (Bonds, ETCs and CSAs) is multiplied by its market value proportion. Market values are properly used in this connection, because they represent the amounts on which the current cost must be paid. Table 9 shows the results of this calculation.

Table No. 9
Composite Current Cost Of Debt

Type of Debt	Market Weight	Current Cost
Bonds, Notes & Debentures	98.65%	5.250%
Equipment Trust Certificates	1.35%	4.957%
Conditional Sales Agreements	0.00%	--
Subtotal	100.00%	5.246%
Flotation Costs		0.098%
Weighted Cost of Debt		5.344%
Weighted Cost of Debt (Rounded)		**5.34%**

The current weighted cost of debt before flotation costs is 5.246 percent. The addition of flotation costs results in a rounded cost of debt of 5.34 percent. This cost of debt is higher than the 2022 of 4.28 percent.[17] A summary for the 2023 calculation of the overall cost of debt

[17] The AAR's *Railroad Facts* book lists the cost of debt decided by the Board and its predecessor. The 2013 edition contains, on page 19, data from 1978 through 2012. The 2023 edition lists, on page 20, data from 1990 through 2022.

is provided in Appendix F. That appendix also has some historical costs of debt for comparisons.

IV Common Equity Capital In 2023

A. The Market Value of Common Equity Capital

The market value of common equity is based on stock prices and shares outstanding for 2023. Table 10 below summarizes the market value calculation. The Weight column, which is not used directly in our calculation, is provided as additional information.

Table No. 10
Average Market Value
For Common Equity in 2023

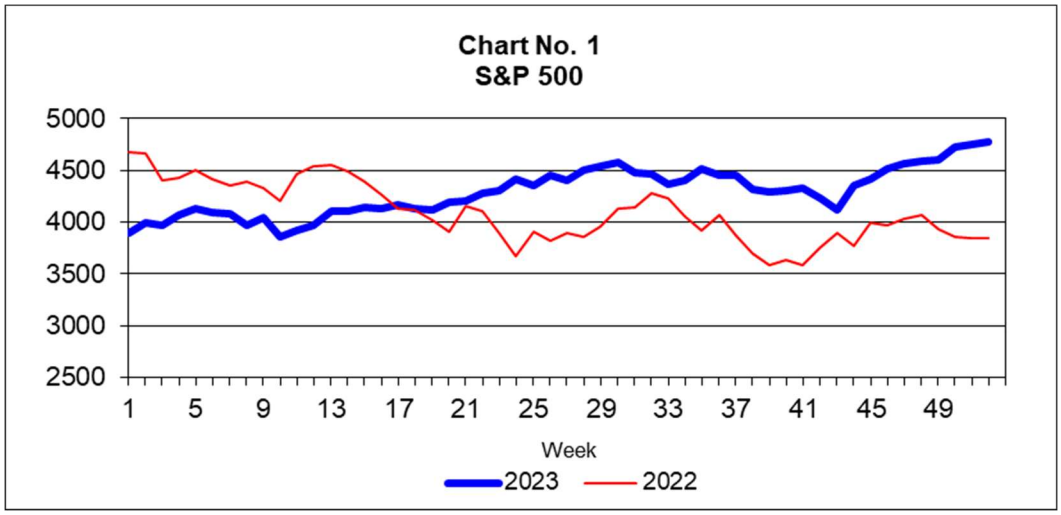
Railroad Co.	Value ($000)	Weight %
CSX	63,818,362.7	26.40
NSC	49,566,540.3	20.50
UNP	128,383,344.9	53.10
Total	$241,768,247.8	100.00 %
Prior Year	$270,192,632.0	
Change	-10.5%	

Details of the calculation are presented in Appendix G. Weekly market values were calculated for each railroad using shares outstanding data from railroad 10-Q and 10-K reports multiplied by stock prices at the close of each week in 2023.[18] Note that the week beginning on April 3 ends on Thursday April 6 because of the Good Friday holiday. Thus, any railroad shares outstanding change effective on April 7 would not happen until the following week because the

[18] The 10-Q and 10-K reports are filed with the US. Securities and Exchange Commission (SEC) and are available from railroad web sites or the SEC web site.

market was closed on April 7. Page 5 of Appendix G lists all full-day stock market holidays. Page 4 of the appendix lists the holiday that caused any week to not begin trading on a Monday or end trading on a Friday. Calculations for 2023 included 52 weeks. Week 1 began on Monday January 3, 2023, and is the first week after 2022's week 52 used in last year's calculation. The week beginning Tuesday December 26, 2023, qualifies as the final week for 2023. Thus, 2023 is a 52-week year for the purpose of calculating the market value of common equity.

The 52-week average market capitalization of the composite railroad (the three railroads that comprise the composite sample), listed in Table Number 10 and on page 4 of Appendix G, is $241.8 billion. This is a 10.5 percent decrease from last year's average.



As shown in Chart 1, the stock market in general, as represented by the Standard & Poor's 500, was higher in 2023 than it was in 2022. The S&P 500 finished the year 4.9 percent higher than it had been a year earlier. Starting week 17, the market rose higher than the previous year.

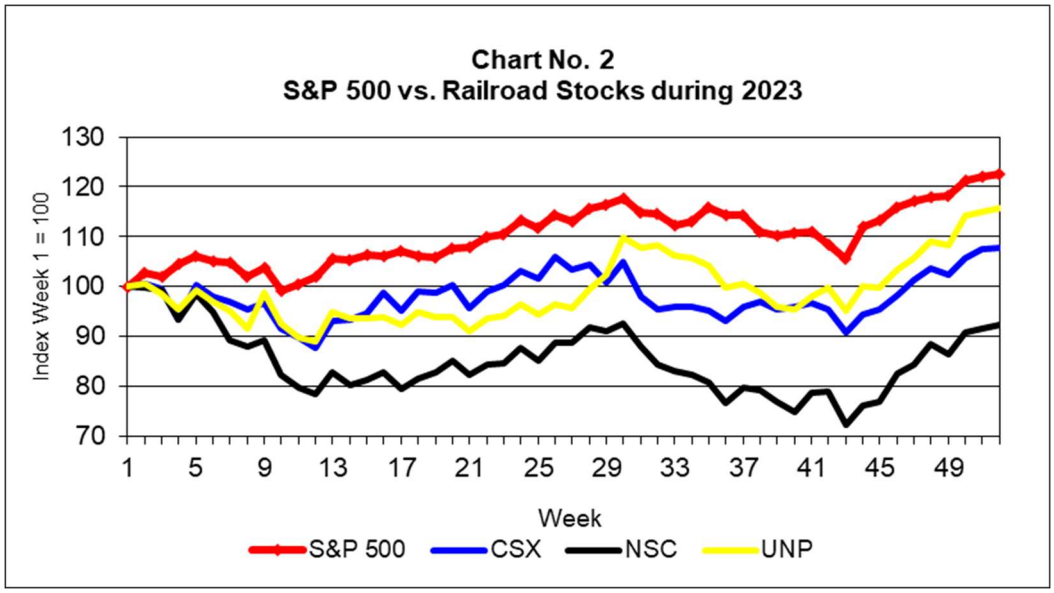


Chart 2 compares stock performance for 2023. The railroads started 2023 performing lower than the Standard & Poor's 500 index, but two of the three railroads ended the year higher than they were at the beginning of 2023. Stocks with betas of approximately 1.0 (see more on betas in section 3) move with the market, as illustrated in the chart (especially shown in the second half of the year).

B. The Capital Asset Pricing Model (CAPM)

The cost of equity is a measure of investor expectations, including the opportunity cost of investing in a share of a firm's stock; i.e., the expected rate of return that investors require on the market value (purchase price) of the stock in light of alternative investment opportunities of comparable risk. Because investor expectations are not directly observable, analysts have developed methods of inferring the cost of equity from available financial data. There are several methods available to estimate the cost of equity. Two of these methods, the Capital Asset Pricing Model (CAPM) and a Multi-Stage Discounted Cash Flow model (MSDCF) are used in this statement to compute an estimate for the cost of equity — in accordance with

STB Ex Parte No. 558 (Sub No. 27). The CAPM is discussed herein, and the MSDCF is discussed in the next section.

The CAPM relies on historical measurements of the risk and returns of assets in the market to forecast the likely future risk-return relationship governing the cost pf capital. The theory underlying the CAPM is that an investor seeks a risk-free return plus a premium that is dependent upon risk. Since all of the principal elements of the CAPM (the risk-free rate, the market risk premium, and the beta) are estimated using historical data and relationships computed from that data, the CAPM is essentially a backward look at how equity markets have historically regarded a particular firm or group of firms. The backward-looking nature of the CAPM means that it may not fully capture contemporaneous changes in the market or reflect the impact of current operational, financial, political or economic trends and events on market valuations or risk perceptions. The CAPM is also sensitive to changes in the risk-free rate, which is determined as of the estimation date. In formulaic terms, the cost of equity as estimated by the CAPM may be expressed as:

$$K = RF + \text{beta}\ (MRP)$$

Where K = the firm's cost of equity,
RF = the risk-free rate,
MRP = the market's risk premium, and
beta = the coefficient of systematic, non-diversifiable risk of the stock.

Therefore, each firm's cost of equity above the risk-free rate depends on the market risk premium adjusted for the non-diversifiable risk of its common stock, with the adjustment factor represented in the model as beta. The risk-free rate (RF) is typically represented by the rate of a U.S. Government (Treasury) instrument. As the risk-free rate enters the CAPM linearly, the

impact of a change in the risk-free rate is one-for-one. Moreover, fluctuations in the risk-free rate might primarily reflect shifts in monetary policy rather than variations in the cost of capital for private firms. Consequently, during periods of significant financial uncertainty, the model may yield biased outcomes. The market risk premium (MRP) is the expected future difference between returns for the overall stock market and risk-free returns. That expected difference is typically estimated using historical differences. Beta is the coefficient of systematic, non-diversifiable risk of the stock, which depends on its volatility and its correlation with the overall stock market. The beta for the overall stock market is 1.0. Firms with higher risk will have a beta above 1.0, while firms with lower risk will have a beta below 1.0. As with the market risk premium, betas are also typically estimated using historical relationships. The methodology used for the CAPM calculation — including details for using certain inputs — follows the methodology prescribed and used by the STB in the 2022 Cost of Capital decision.[19]

1. Risk-Free Rate (RF)

In all decisions regarding the CAPM, the Board has specified a risk-free rate based on an average yield to maturity for a 20-year U.S. Treasury Bond. The average yield-to-maturities for U.S. Treasury Bonds are available from the Federal Reserve web site, and I have again utilized this resource to retrieve data for 2023.[20] A copy of the "download" from the Federal Reserve web site is included in my work papers. Table 11 lists a 10-year history of this bond. As the

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[19] *Railroad Cost of Capital – 2022,* EP 558 (Sub-No. 26) (STB served August 3, 2023).

[20] Federal Reserve's new web site is https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15. For Data set, choose Selected Interest Rates. For Instrument, select U.S. government securities/Treasury constant maturities/Nominal. For Maturity, select 20-year. For Frequency, select Annual.

table shows, the average rate for 20-Year U.S. Treasury Bonds in 2023 is an increase from the previous year. Appendix H lists all of the annual 20-Year U.S. Treasury Bond rates available since 1980. The 20-year rate for 2020 was the lowest rate during that period, and 2021 is the second-lowest.[21]

Table No. 11
20-Year U.S. Treasury Bonds 2014 - 2023

Year	Average Annual Rate
2014	3.07 %
2015	2.55
2016	2.22
2017	2.65
2018	3.02
2019	2.40
2020	1.35
2021	1.98
2022	3.30
2023	4.26

Source: Federal Reserve

Using the average yield to maturity in 2023 for a 20-year U.S. Treasury Bond, as directed in STB Ex Parte No. 558 (Sub No. 27), the CAPM's risk-free rate is 4.26 percent.

[21] The Federal Reserve Board has two series for 20-Year Treasury Bonds. The first data set is from 1962 through 1986. The second set has data from 1993 to current. Rates from the two data sets are listed in my work papers. There are no data for 1987 through 1992.

2. Market Risk Premium (MRP)

In previous decisions, the STB has required that the market risk premium (a.k.a. equity risk premium) calculation begin with year 1926, which is a standard approach. The Standard & Poor's 500 Index is to be used as the representative of the market — also a standard approach. The STB's decision also stated that the "data are also available from a variety of commercial vendors, including Ibbotson."

In the 2006 through 2012 Cost of Capital determinations, the well-regarded and widely-accepted Ibbotson Equity Risk Premium was used. The premium was listed in the *Ibbotson SBBI Valuation Yearbook* published by Morningstar.[22] This premium is the long-horizon equity risk premium, using the S&P 500 and data beginning with 1926. Although Morningstar discontinued its *Ibbotson SBBI Valuation Yearbook,* it published the same long-horizon equity risk premium in the *Ibbotson SBBI Classic Yearbook.* This source was used for 2013 and 2014 equity risk premiums.

In 2015 and 2016, yet another source of data was needed, as Morningstar decided to discontinue its *Ibbotson SBBI Classic Yearbook.* The valuation and financial advisory firm Duff & Phelps maintains many of the same series formerly published by Ibbotson, and their *Valuation Handbook-U.S. Guide to Cost of Capital* included a page that listed the long-horizon expected equity risk premium.[23] The Duff & Phelps *Valuation Handbook-U.S. Guide to Cost of Capital* was

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[22] Ibbotson Associates is a wholly-owned subsidiary of Morningstar, Inc. "SBBI" stands for "Stocks, Bonds, Bills, and Inflation.

[23] The Duff & Phelps *2017 Valuation Handbook – Guide to Cost of Capital* was published by John Wiley & Sons. The handbook listed the premium on page 36 of chapter 3 (and page 14 of chapter 5). The last

the source used to obtain the 2015 and 2016 equity risk premiums. In 2018, however, Duff & Phelps decided to discontinue the publication of that book in hardcover form, which would have been used as the source for the 2017 equity risk premium. Although the physical book is no longer be published, Duff & Phelps has developed an online tool called the *Cost of Capital Navigator*, and the data that would have been published in the *Valuation Handbook-U.S. Guide to Cost of Capital* are available in the online *Cost of Capital Navigator*.[24] The *Cost of Capital Navigator* contains the "Long-horizon expected equity risk premium (historical)", which is calculated using "large company stock total returns minus long-term government bond income returns", beginning 1926. This premium is calculated using the same method as that used by Ibbotson to calculate the market risk premiums used in previous cost of capital determinations. For 2023, the online Duff & Phelps *Cost of Capital Navigator* shows this premium as 7.17 percent (note that Duff & Phelps is now a Kroll company). There was no change from the figure used by the Board for 2022. (Page 1 of my Appendix H shows Equity Risk Premiums since 1980, and page 2 shows a screen shot of the on-line source for the 2023 equity risk premium.) Thus, I used 7.17 percent as the rate for the CAPM's market risk premium.

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sentence of Footnote 5-16 (on page 14 of Chapter 5) in the Handbook says "The long-horizon historical equity risk premium was previously published on the "back page" of the Morningstar/Ibbotson SBBI Valuation Yearbook (discontinued)."

[24] The References section of the online *Cost of Capital Navigator* contains the same data, in the same chapter format, that would have been published in the *Valuation Handbook – U.S. Guide to Cost of Capital*. It is essentially an online book, instead of a hardcover book.

3. Beta

The STB Ex Parte No. 664 decision requires parties to calculate the 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) + E

Where:

R	= merger and dividend-adjusted stock returns for the portfolio of railroads;[25]
SRRF	= short-run risk-free rate represented by 3-mo. U.S. Treasury Bills;
alpha	= constant term;
beta	= coefficient of systematic, non-diversifiable risk;
RM	= return for the market, represented by the S&P 500; and
E	= random error term.

In its Railroad Cost of Capital – 2006 decision, the STB clarified its beta calculation methodology. The STB noted that "[t]he proper way to arrive at the weekly portfolio change is to calculate the weekly stock percentage change for each firm, weighted by that firm's share of the industry as a whole." The STB also determined that the Standard & Poor's 500 Price Index, which is publicly available, should be used as a proxy for the Standard & Poor's 500 Total Return Index, unless the Total Return Index is made available to the public.

Using the STB instructions, the value for beta can be solved for by using a linear regression. The railroad portfolio return less the short-term risk free rate is the dependent variable, while the market return less the risk free rate is the independent variable. The

[25] Railroads must meet the screening criteria set forth in *Railroad Cost of Capital – 1984* and modified recently by the Board in Revisions to the *Cost-of-Capital Composite Railroad Criteria*.

regression's random error term is unknown, the intercept is the alpha, and the coefficient for the explanatory variable is the beta.

The raw regression data set used in the AAR calculation has normally been derived from publicly available data from web sites on the internet (for further information, see the work papers). Due to Yahoo data quality concerns in the prior years, we used Bloomberg stock price data for 2023.

As instructed, I have used weekly stock price data for the prior five years. The raw data consists of weekly observations from the last week of 2018 (Week 0) through the last week of 2023 (Week 261). Bloomberg identifies each week in the data set by the last trading day of the week (typically Friday), which means that the stock price data and the identification of the week are the same.[26] Week 1 in the regression data set is the week ending Friday, January 4, 2019 (or beginning Monday December 31, 2018).[27] This week meets the Board's criterion to qualify as week 1 because it is the first week to contain 3 or more trading days in 2019. The last week of 2023, Week 261, began on Tuesday, December 26. Week 0 began in 2018 on Monday December 24, and it is *not* directly used in our regression for beta. The purpose of having a Week 0 is to be able to calculate the return for Week 1 and to have a weight for the beginning

[26] In some cases, stock did not trade on Friday. For example, trading during Week 223 ended Thursday, April 6, 2023, because Friday, April 7, 2023, was the Good Friday holiday. There are also cases where the first trading day of the week was not Monday because of a holiday. For example, Week 212 began on Tuesday, January 17, because of the Martin Luther King Day holiday on January 16.

[27] Following the Board's clarification in Ex Parte No. 558 (Sub-No. 12), the week beginning December 31, 2018, is the first week in the relevant year that contains 3 or more trading days. The previous week had no trading days in 2019.

(instead of the end) of Week 1. This enables a Week 1 return to be included in the regression data set as clarified by the Board on page 7 of its 2008 cost of capital decision.[28]

Three categories of data are necessary for the raw regression data set. First, weekly stock prices for CSX, NSC, and UNP are acquired.[29] The price index values for Standard & Poor's 500 Price Index were also downloaded. Stock prices adjusted for dividends and splits are used to calculate the regression's dependent variable, while prices that are only adjusted for splits are used for weighting.[30]

The second category of data is shares outstanding. Stock shares outstanding, and an effective date, were gathered from each railroad's 10-Q and 10-K reports. The shares outstanding data were adjusted for stock splits, if necessary. For each railroad, a shares outstanding value is assigned to each week based upon the latest available 10-Q or 10-K submissions by that railroad to the Securities and Exchange Commission.[31] In some cases, the last trading day of a week was actually a Thursday (Good Friday is always a holiday for the U.S. stock markets), and this can affect the shares outstanding used. All of the days stocks traded, and stock market holidays, are listed in my work papers.

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[28] EP 558 (Sub-No. 12), (STB served Sept. 25, 2009).

[29] CSX Corporation has a stock symbol of CSX, Norfolk Southern Corporation is NSC, and Union Pacific Corporation is UNP.

[30] The dividend-adjusted values may differ for a given week if the data are downloaded at different times during the year, especially if dividends have been paid during the interim time. The difference typically affects the fourth digit after the decimal of the beta calculations. The current data sets were downloaded March 13, 2024, and the range of data was from 12/20/2018 through 1/10/2024.

[31] Shares outstanding are updated using the first Friday on (provided the stock traded that day), or after, the effective date listed in the 10-Q and 10-K reports – since Friday's (or the end of the week) stock price is used.

The final category of raw data is the rate for 3-Month U.S. Treasury Bills. These securities are also known as 13-Week Treasury Bills or 90-Day Treasury Bills. The Treasury Bill rates are acquired from the Federal Reserve web site, and the "download" is included in my work papers.

SAS statistical software was used to prepare the regression data set from the raw data.[32] The weekly stock percentage change for each railroad was calculated and weighted by that railroad's share of the industry as a whole to create a composite railroad return.[33] Weekly returns are also calculated for the Standard & Poor's 500 Price Index (the proxy for the market as a whole). Each week's three-month Treasury Bill rate, which is the measure employed for the short-run risk-free rate, is restated from an annual to a weekly rate to make it comparable to the weekly returns. The method used to convert from an annual rate to a weekly rate accounts for compounding. The weekly Treasury Bill rates are then deducted from the composite railroad portfolio returns and market returns as was done in the previous cost of capital submissions. The resulting regression data set has 261 observations (weeks 1 through 261), since week 0 of the raw data set was used only to calculate a weighted return for week 1.

The SAS General Linear Model procedure (Proc GLM) was used to calculate the regression, with composite railroad returns less the short-run risk-free rate as the dependent variable and the market returns less the short-run risk-free rate as the independent variable. As a check against our beta calculations, a spreadsheet has also been utilized to calculate the

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[32] SAS Institute Inc., Cary, NC.

[33] Since the weight needs to be the weight at the beginning of the week instead of the end of the week, data from the end of the previous period are used to represent the beginning of the current period.

beta using a linear regression, and the results matched the SAS calculation. As specified by the STB decisions, the regression includes an intercept. Appendix I contains a summary of the regression using SAS. The beta is the estimate of the parameter shown on the bottom of the Appendix page. The entire SAS printout and a spreadsheet version are included in my work papers. The regression using the Bloomberg data resulted in a beta estimate of 0.985784073 using a spreadsheet, and 0.9857840733 using SAS – both round to .9858.[34]

The 2023 beta is lower than the beta for 2022 (0.9946) and is the lowest since 2009. We have evaluated our beta calculation by comparing it to previous years and expectations. The value of .9858 for beta is used as an input to the CAPM.

4. Cost of Common Equity Using the CAPM

A review of the Capital Asset Pricing Model (CAPM) is as follows:

K = RF + beta (MRP)

Where K = the cost of equity for the portfolio of railroads,
RF = the risk-free rate,
MRP = the market's risk premium, and
beta = coefficient of systematic, non-diversifiable risk.

Our CAPM used the methodology endorsed by the STB in the previous cost of capital determination, Ex Parte No. 558 (Sub-No. 26). Table 12 is a summary of our CAPM cost of

[34] Differences between the SAS regression and the spreadsheet regression were probably caused by the number of digits after the decimal allowed in the data sets by the two software packages.

common equity calculation, which resulted in an average 2023 cost of equity estimate for the composite railroad of 11.33 percent. This is an increase from 2022's 10.43 percent.

Table No. 12
Cost of Common Equity
Using STB's Capital Asset Pricing Model

Inputs to Model	**2023**	**2022**	
Risk-Free Rate	4.26 %	3.30 %	Table No. 11
Market Risk Premium	7.17	7.17	Appendix H
Beta	0.9858	0.9946	Appendix I
Calculation			
Risk-Free Rate	4.26	3.30	Given
Plus: Beta Adj. Risk Premium	7.07	7.13	Beta x MRP
CAPM Cost of Equity	11.33 %	10.43 %	RF Rate + Prem.

C. The Multi-Stage Discounted Cash Flow Model

As stated earlier, there are several methods available to estimate the cost of equity. The Multi-Stage Discounted Cash Flow Model (MSDCF) is another model available. Using this model, the cost of equity is the discount rate that equates a firm's market value to the present value of the expected stream of free cash flow that is potentially available for distribution to equity investors. The multiple stage portion of the model accounts for the assumption that the firm will not experience a constant growth rate throughout its life. The MSDCF uses company-specific growth rates in stage 1 and long-term GDP growth in stage 3, because in the long-term growth is expected to normalize to that of the economy. These features of the model make the MSDCF somewhat more forward looking in that it relies on the expectations of the equities markets as to the firm's future performance although its accounting treatment of cash flows

remains grounded in historic relationships. Nonetheless, its theoretical basis contrasts dramatically with the historic view of the CAPM, and brings investor perceptions of the firm's future into the process of estimating its cost of equity. Investor perceptions of a firm's future opportunities and potential difficulties will inevitably have a substantial impact on the level of risk that investor associates with a firm. That risk level is, in turn, a major determinate of the rate of return that will be required to encourage acquisition or retention of an equity position in the company. Thus, estimations of the cost of equity using MSDCF more closely align with section 16 of the Surface Transportation Board Reauthorization Act of 2015, which directed the agency to consider current and future conditions when evaluating railroad revenue adequacy, a key function of the STB's cost of capital calculation.

The STB, in Ex Parte No. 664 (Sub No. 1), adopted the Morningstar/Ibbotson MSDCF model to use for estimating the cost of common equity capital.[35] This model assumes that investor cash flows do not all have to be in the form of dividends. Instead, investors benefit from regular dividends, special dividends, stock buybacks, or stock price appreciation.[36] Major

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[35] The Morningstar/Ibbotson MSDCF model adopted by the Board in Ex Parte No. 664 (Sub-No.1) is a modified version that includes only the railroads that pass the screening criteria set forth in Railroad Cost of Capital – 1984, 1 I.C.C. 2d 989 (1985), for inclusion in the sample of railroads used for the annual cost of capital determination. See Ex Parte No. 664 (Sub-No.1), *Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital,* served January 28, 2009.

[36] One interested party believes that stock repurchases (buybacks) bias the MSDCF *upwardly*. However, stock repurchases have the opposite effect – they bias the MSDCF *downward*. The MSDCF does not fully reflect the reality that distributions to shareholders (buybacks) mean cash flows to investors are shifted forward in time, and earlier cash flows should raise cost of equity estimates since the present value of a dollar received today is always (unless we have deflation) greater than the present value of that same dollar received at some future date. Since the model cannot account for this shift forward in cash flows, it is likely to understate the cost of equity. See September 5, 2014, verified statement of Dr. Bente Villadsen on behalf of Association of American Railroads in Ex Parte No. 664 (Sub-No.2)

inputs to the model include cash flows, expected growth rates, and market values. An equation for this model can be found in Appendix J. A firm's present value as determined by the market is therefore equal to the sum of the present value of three sets of future cash flows. This is the same formula that appeared in the Appendix to the Board's decision in Ex Parte No. 664 (Sub No.1) served August 11, 2008, and it is the same formula found in the AAR's submissions for the 2008 through 2022 cost of capital.

1. Cash Flows

The Morningstar/Ibbotson MSDCF model defines cash flows for the first two stages, as income before extraordinary items minus capital expenditures plus depreciation and deferred taxes. Income before extraordinary items (IBEI) is derived by deducting extraordinary items from net income. Thus, the model's formula for cash flows is as follows:

$$CF = (NI - EI) - CAPEX + DEP + DT$$

Where CF = cash flow,
NI = net income,
EI = extraordinary items,
CAPEX = capital expenditures,
DEP = depreciation, and
DT = deferred taxes.

The Morningstar/Ibbotson MSDCF model utilizes five-year moving averages for each railroad leading up to the year being analyzed. The years used in this case are 2019 through 2023. Data are copied from the Consolidated Cash Flow and Income Statement of each railroad's annual 10-K report, and any changes to prior years have been incorporated. The 10-K reports, which are filed with the Securities and Exchange Commission, are usually available

each year around February. In addition to the data points listed above, sales (a.k.a. revenue) is used as part of a smoothing (or averaging) process. Table 13 illustrates the Morningstar/Ibbotson process to calculate an average cash flow. Revenue, Net Income, and Extraordinary Items are sourced from the Income Statement. Depreciation, Deferred Taxes, and Capital Expenditures are sourced from the Statement of Cash Flows.

Table No. 13
Example Cash Flow Calculations for CSX in 2023
($ in millions)

	2019	2020	2021	2022	2023	Total
Net Income	$3,331	$2,765	$3,781	$4,166	$3,715	$17,758
Less Extraord. Items	0	0	0	0	0	0
Inc. Bef. Extraord. Items (+)	$3,331	$2,765	$3,781	$4,166	$3,715	$17,758
Capital Expenditures (-)	$1,657	$1,626	$1,791	$2,133	$2,281	$9,488
Depreciation (+)	1,349	1,383	1,420	1,500	1,611	7,263
Deferred Taxes (+)	273	180	167	117	140	877
Cash Flow	$3,296	$2,702	$3,577	$3,650	$3,185	$16,410
Revenue (a.k.a. "Sales")	$11,937	$10,583	$12,522	$14,853	$14,657	$64,552

Ratio of Cash Flow to Sales (Smoothed Ibbotson-style) = ($16,410 / $64,552) =	0.25421
Initial Cash Flow in 2023 (Smoothed Ibbotson-style) = (0.25421 x $14,657) =	**$3,726.01**
Ratio of IBEI to Sales (Smoothed Ibbotson-style) = ($17,758 / $64,552) =	0.27510
Terminal Cash Flow input (Smoothed Ibbotson-style) = (0.27510 x $14,657) =	**$4,032.08**

After the financial data are collected, they are combined (Total column in the example) into a five-year cash flow for the purpose of averaging or smoothing. The average cash flow for 2023, which is the initial cash flow in the model, is calculated by multiplying revenue for 2023 times the five-year average ratio of cash flow to revenue. In our example here, the model's input for the initial cash flow is $3,726.01 million. The ratio of cash flow to sales is calculated by dividing the five year total cash flow by the five year total revenue.

The model's terminal cash flow value is based on the assumptions that in the third stage of the model, capital expenditures will consist of just maintenance capital (no growth capital), so that capital expenditures and depreciation are equal. Moreover, since deferred taxes are associated with capital expenditures, this amount is anticipated to diminish as capital expenditures coverage towards maintenance levels in the long-term. Consequently, the adjustment to earnings before taxes (depreciation minus capital expenditures plus deferred taxes) will gradually approach zero over the long term. The remaining part of the equation for the model's terminal cash flow is income before extraordinary items (IBEI), which we calculate by subtracting extraordinary items from net income. In our Table 13 example, the model's input for the terminal cash flow is $4,032.08 million. The model's terminal cash flow input is calculated by multiplying revenue for 2023 times the five-year average ratio of income before extraordinary items to revenue. The ratio of income before extraordinary items to sales is calculated by dividing the five-year income before extraordinary items by the five-year total revenue.

All cash flow calculations herein have been calculated using the same procedure used by the STB for the previous cost of capital determination. Appendix K contains the cash flow calculations for all three railroads. The pages from the 2023 10-K reports that were used as data sources for cash flows are included in my work papers. Data for prior years (2019-2022) used in this year's calculation are unchanged from last year's submission[37] – unless restated/revised data were found in the 2023 10-K statements.

[37] Excepting where necessary to remove Kansas City Southern from prior year computations.

2. Growth Rates

The first stage of the Morningstar/Ibbotson MSDCF model applies to a period that is one to five years in the future. The current year (2023) is considered to be year 0. In each year of the first stage, a firm's annual earnings growth rate is assumed to be the median value of the firm's three- to five-year growth estimates that are made by railroad industry analysts after the release of the year-end financial statements. However, in Ex Parte No. 558 (Sub No. 12), the STB clarified their interpretation of the Morningstar/Ibbotson MSDCF model by specifying use of data in effect at the end of the current year as the date for growth rates, stock prices, and stock shares outstanding.[38] (Clearly, the Board's interpretation does not anticipate the use of growth estimates based on the release of audited year-end financial statements.) In Ex Parte No. 558 (Sub No. 16), the STB made another clarification in their interpretation of the Morningstar/Ibbotson MSDCF model by specifying the *last full week of the year* as the point from which stock prices should be used. Therefore, we have utilized growth rate projections that were in effect at the end of 2023, and stock prices as of December 29, 2023 – the prices at the end of the last full week for 2023.[39] Each growth rate projection was reviewed by the brokerage firm's analyst during 2023, and the stock prices were retrieved from Yahoo! Finance.

For many years, analyst growth rate estimates were collected, and distributed, by the Institutional Brokers Estimate System (a.k.a. IBES or I/B/E/S). In recent years, the IBES growth rates have been distributed by Thomson Financial (now called Refinitiv) through its Eikon

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[38] *Railroad Cost of Capital – 2008*, EP 558 (Sub-No. 12) (STB served Sept. 25, 2009).

[39] Friday, December 29, 2023 was the last trading day for the week.

service.[40] Although the term "IBES" is rarely used by Thomson, many users of the data still refer to these growth rates as "IBES" growth rates. Thomson Financial has also distributed medians of the IBES growth rate estimates on a historical basis through its Thomson ONE Banker service. The median estimates provided through the Thomson ONE Banker service did not always reflect the full set of growth rate estimates. Therefore, I have utilized all estimates available from the Refinitiv/Thomson Reuters Eikon service, and determined medians based on that data. These growth rates are described in the Thomson Financial Glossary as the expected annual increase in operating earnings over a company's next full business cycle. A worktable and the source data are included in Appendix L. Table 14 lists the median growth rate estimates.

Table No. 14
2023 Thomson Median Growth Rate Estimates

Company	Stock Symbol	Growth Rate
CSX Corporation	CSX	5.89 %
Norfolk Southern Corporation	NSC	2.80
Union Pacific Corporation	UNP	6.36
Simple Average		5.02

Thus, the median growth rate estimates have been retrieved using the same procedure and source used by the AAR last year. Each individual railroad's median growth rate is used in the first stage of the Morningstar/Ibbotson MSDCF model.

The second stage of the Morningstar/Ibbotson MSDCF model applies to a period six to ten years in the future. This is *not a transition stage* where the growth rate should be

[40] In October 2018, we were notified that the Financial and Risk business of Thomson Reuters is now called Refinitiv.

smoothed between the first and third stages. Morningstar's model assumes "that over a middle horizon, growth of any particular company will lie more in line with the industry as a whole".[41] In other words, other companies "catch" their industry growth leaders, or the leaders fall back to the rate of the slower growth railroads. Therefore, in this stage, the cash flows at the end of year five are assumed to grow at the simple (not weighted) average of the individual firm medians used in the first stage. Any attempt to change the second stage to a transition stage is corrupting the intent of the model.

In Table 14, the average of the median growth rates is 5.02 percent, which is a decrease from 2022 (10.28 percent). For all railroads in the Morningstar/Ibbotson MSDCF model, a second stage growth rate of 5.02 percent is used.[42]

The third stage of the MSDCF model begins 11 years in the future and continues in perpetuity. Starting in year 11, the firm's growth rate is assumed to be the long-run nominal growth rate of the aggregate U.S. economy, which can be thought of as a combination of expected inflation plus the real growth rate in Gross Domestic Product (GDP). Until the 2013 Cost of Capital determination, the long-run nominal growth rate was supplied by Morningstar/Ibbotson in its *Ibbotson SBBI Valuation Yearbook*. In September 2013, customers subscribing to the *Ibbotson SBBI Valuation Yearbook* were notified that the publication was being discontinued. The *Ibbotson® SBBI® Classic Yearbook* (Classic Yearbook) was expanded and contained some of the data needed for the Stage 3 calculation, but it was discontinued

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[41] *Ibbotson SBBI 2013 Valuation Yearbook*, page 51.

[42] The model used an average rounded to 2 digits after the decimal.

after two years. Therefore, beginning with the 2013 determination, and then more so beginning with the 2015 determination, I have continued the original Ibbotson methodology by using data available from the Federal Reserve and Bureau of Economic Analysis. Work and data sources for this third stage of the MSDCF model are shown in Appendix M.

As summarized on page 1 of Appendix M, the long-run expected nominal growth rate of the U.S. economy (Stage 3 growth rate of the MSDCF) is the long-term expected growth rate for real GDP plus the long-term expected inflation rate. The real GDP growth rate is simply a historical compound growth rate calculated from Bureau of Economic Analysis data beginning in 1929, and it is illustrated on pages 2 through 4 of Appendix M. This procedure has been used, and accepted, since the 2013 Cost of Capital determination, and it is the same method used by Morningstar for 2008 through 2012. Page 2 of Appendix M has a replication of the Morningstar long-term real GDP growth rate calculation for 2009 through 2012, and AAR has continued this calculation (now using 2012 dollars) up to the latest year. Pages 3 and 4 of the same Appendix show data sources used on page 2. The calculation for 2023 is 3.17 percent – which is nearly identical to 2022.

The second piece of our Stage 3 calculation, expected inflation, is calculated by subtracting Inflation Indexed 20-Year Treasury Bond rates from Long-Term Government Yields (which are not inflation indexed). Work for this second piece of Stage 3 is shown on page 5 of Appendix M. Using data from the Ibbotson and the Federal Reserve, I have replicated the 2009 through 2012 Ibbotson calculations for expected long-term inflation. Beginning with the 2013 Cost of Capital determination, Ibbotson did not release a rate for Inflation-Indexed 20-Year

Bonds. However, I have been able to replicate their source,[43] and Long-Term Government yields were available from Morningstar's Ibbotson SBBI Classic yearbook. This methodology to determine expected inflation was accepted every year since the 2013 cost of capital determination.

Beginning with the 2015 Cost of Capital determination, the SBBI long-term government yields are no longer available since Morningstar no longer publishes its *Ibbotson SBBI Classic Yearbook*. In lieu of the SBBI number used for part of the calculation (that is no longer available), I have used 20-Year U.S. Treasury Bond yields at the end of the year, which are very close to the numbers used by Ibbotson.[44] This addition to the methodology was accepted in the 2015 through 2022 cost of capital determinations, and has been used again for 2023. Comparing yields for long-term government bonds to inflation indexed bonds, I calculate an expected long-term inflation rate of 2.36 percent.

Page 1 of Appendix M summarizes my calculations shown on pages 2 through 5 (with source data) of the same Appendix. Because expected real growth in output is usually very stable, changes in the Stage 3 growth rate are usually determined by changes in inflation expectations. For comparison purposes, page 6 of Appendix M shows Stage 3 rates since 2008, including the two components: the expected real growth in output (as measured by Gross Domestic Product) and expected inflation. The Stage 3 rate for 2023 is 5.53 percent (3.17 +

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[43] See Appendix M, page 5, columns (d) and (e) for a comparison of Inflation Indexed 20-Year Treasury Bonds from the SBBI compared to 20-Year Treasury Bonds at the end of the year from the Federal Reserve web site.

[44] See Appendix M, page 5, columns (b) and (c) for a comparison of Long-Term Government Yields from the SBBI compared to 20-Year Treasury Bonds at the end of the year from the Federal Reserve web site.

2.36 as also shown on page 1 of Appendix M), which is lower than the 5.68 used for 2022. Although real growth is relatively the same as the previous year, expected inflation is slightly down, and this caused the decrease in the Stage 3 Growth rate calculated for 2023. This is the same method I used for the previous year.

3. Market Values

The final inputs to the Morningstar/Ibbotson MSDCF model are the stock market values for the common equity of each railroad. The market values serve two purposes. First, a firm's market value is a necessary part of the MSDCF model. As stated earlier, each railroad's cost of equity in the MSDCF model is determined by solving for the discount rate that equates a firm's *market value* to the present value of the expected stream of free cash flow that is potentially available for distribution to equity investors.

Market values are also used to determine weights for combining the model's cost of equity for each individual railroad into the composite railroad mandated by the Board. Thus, Table 15 below calculates the market value for each railroad, and it uses the market values to calculate weights. Prices and shares outstanding are for common stock. Although weights are shown at three digits after the decimal, they have been left at full float for calculation purposes – and so they will total to exactly 100 percent.

Table No. 15
Equity Market Value on December 29, 2023

Company	Stock Price	Shares Outstanding	Market Value ($mil)	Weight
CSX	$34.67	1,976,131,035	68,512.5	25.217 %
NSC	$236.38	226,136,334	53,454.1	19.674
UNP	$245.62	609,597,495	149,729.3	55.109
Total		2,811,864,864	$271,695.9	100.000 %

As directed by the Board, I have used stock prices (from Yahoo! Finance) for December 29, 2023, the last trading day of the week that qualifies as the last week of 2023 for cost of capital purposes. I have also used the shares outstanding for that day from the 2023 Q3 10-Q reports (the latest information available prior to December 29, 2023) filed with the Securities and Exchange Commission. Market value is simply each firm's stock price multiplied by its shares outstanding, and weights are based on the market values. Appendix N contains the stock price pages as retrieved from Yahoo! Finance, and it also contains the 10-Q pages used for shares outstanding.[45]

4. Cost of Common Equity Using the MSDCF Model

The equation found in Appendix J provides the mathematical formula that is used to generate the three-stage DCF cost of equity estimates for each railroad. The left side of this equation is the market value of the firm in year 0. The right side of the equation is the discounted value of the cash flows from the three stages of the firm's expected future growth.

[45] Although we found some errors in dividend-adjusted stock prices downloaded from Yahoo! Finance when examining the data set to be used for the CAPM's beta calculation in prior years, no problems were found with regular stock prices.

Essentially, this equation is solved for each firm by simply testing discount rates (cost of equity) in an effort to find one that causes the sum of the present values of the cash flows for the three stages to be equal to the market value at year 0. An iterative process can be used to narrow down the possible solutions to the ultimate answer, or Microsoft Excel's Solver function can be used to automate the process.[46]

Applying the methods described above, I have calculated a cost of common equity for each of the three railroads specified using a spreadsheet like the one utilized in the 2022 filing. Using an initial cash flow, an input for calculating the terminal cash flow, growth rates for each of the three stages, and a market value effective December 29, 2023, I have solved for the discount rate (cost of equity) that causes the sum of the present values of cash flows for each stage to equal the firm's market value.[47] The spreadsheet used for the calculations is displayed in Appendix O.

The resulting costs of common equity for each railroad, using the Board's MSDCF, are shown in Table 16. In the same table, I have also calculated an MSDCF cost of common equity (using weights from Table 15 and the individual railroad cost of equities) for the composite railroad, which is the current cost of equity for this model.

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[46] A commonly used Excel user's manual describes the Solver function as follows: "Solver is an Excel add-in that goes several steps further than goal seeking. It uses the same basic trial-and-error approach (known to scientific types as an iterative approach), but it's dramatically more intelligent than goal seeking." See Matthew McDonald, Excel: *The Missing Manual*, O'Reilly Media, 2005, p. 519.

[47] As noted in Appendix K, cash flow data for 2017 utilizes the Board's adjustments to net income and deferred taxes that remove the impact of the Tax Cuts and Jobs Act.

Table No. 16
Cost of Equity Using STB's Ibbotson MSDCF

Company	Weight	Cost of Equity	Weighted Calculation
CSX	25.217%	11.53 %	2.91
NSC	19.674%	9.90	1.95
UNP	55.109%	10.13	5.58
Total	100.000%		
Weighted Current Cost of Equity			**10.44 %**

Thus, the MSDCF produces a cost of common equity of 10.44 percent for 2023 – a decrease from the 13.54 percent used by the Board for 2022 (2020 was the lowest ever calculated since the MSDCF began being used in 2008).

D. Conclusion as to the Cost of Common Equity Capital

In the STB's Ex Parte No. 558 (Sub-No. 27) decision served February 20, 2024, the Board specified that comments "should focus … using the methodology followed in *Railroad Cost of Capital – 2022",* which means that a simple average of the estimates produced by the CAPM adopted in STB Ex Parte No. 664 and the Morningstar/Ibbotson Multi-Stage DCF Model specified in STB Ex Parte 664 (Sub No. 1) should be used. Table 17 contains the cost of common equity estimated by each model, and a simple average of the estimates. [48] Once again, it should be noted that each cost of equity model has its strengths and weaknesses, and this illustrates

[48] Although the CAPM is currently favored by groups that want a low cost of equity calculation, that has not always been true. In the 1981 Cost of Capital determination, Ex Parte No. 415 decided June 11, 1982, the Interstate Commerce Commission noted that "In general, the various shipper groups dislike the use of the CAPM methodology for determining the railroads' cost of equity capital."

the Board's wisdom in using more than one model to estimate the cost of common equity.[49]

The cost of common equity for 2023 is 10.89 percent, which is slightly below the 11.99 percent decided for 2022.

Table No. 17
Cost of Common Equity Capital

Model		
Capital Asset Pricing Model	11.33 %	From Table No. 12
Multi-Stage Discounted Cash Flow	10.44	From Table No. 16
Cost of Common Equity	10.89 %	Average

V. Preferred Equity Capital in 2023

There were no preferred stock shares outstanding for the composite railroad sample from 2002 through 2012. Beginning 2013, one of the railroad companies comprising the railroad composite sample had preferred stock outstanding, and this continued through 2020. However, that one railroad company no longer meets the criteria for inclusion in the sample, so there is no preferred stock in this year's calculation.

[49] Utility companies also believe multiple cost of equity models are appropriate, as noted in STB Ex Parte 664 (Sub-No. 2) testimony on behalf of the Association of American Railroads entered July 23, 2015.

Table No. 18
Average Market Value
For Preferred Equity in 2023

Railroad Co.	Value ($000)	Weight %
CSX	$0.0	0.00
NSC	0.0	0.00
UNP	0.0	0.00
Total	$0.0	0.00 %
Prior Year	$0.0	

VI. The Overall Cost of Capital In 2023

A. Determination of Market Value Weights

With more detail shown in Tables 6, 10, and 18, the average market value of debt, common equity, and preferred equity are $54.5 billion, $241.8 billion, and $0.0, respectively. More market value detail are provided in Appendixes D and G. The figure for the market value of debt includes market values of bonds, notes, debentures, equipment trust certificates, and conditional sales agreements (if there had been any). Other debt and capitalized leases are included at their book value, because market values are difficult to determine (in some instances book values correspond to market values) and because these other instruments are a minimal portion of all railroad debt.

Based on the market value calculations, the capital structure for 2023 has weights for debt, common equity, and preferred equity of 18.39 percent, 81.61 percent, and 0.00 percent, respectively. Table 19 contains the weights computation and a comparison to the previous year.

Table No. 19
Capital Structure and Weights

		2023		2022	
	Source Table	Market Value (mil)	Capital Structure Weight	Market Value (mil)	Capital Structure Weight
Debt	6	$54,472.2	18.39 %	$60,447.5	18.29 %
Common Equity	10	241,768.2	81.61	270,091.0	81.71
Preferred Equity	18	0.0	0.00	0.0	0.00
Total		$296,240.4	100.00 %	$330,538.4	100.00 %

The market value for debt and common equity decreased from the prior year, while the market value for preferred equity remained at zero. Weights remained similar to their values for 2022. Debt increased 0.10 percentage points from 2022, while common equity decreased by that amount, and preferred remains at zero.

B. The Overall Cost of Capital

Multiplying the cost of debt, the cost of common equity capital, and the cost of preferred equity capital, by their respective market value proportions, results in a 2023 overall cost of capital of 9.87 percent, as shown in Table 20. This is lower than the cost of capital decision of 10.58 percent for 2022. The decrease was primarily driven by a lowered projected annual earnings growth rate, which reduced the current cost of common equity.

Table No. 20
Weighted Current Cost of Capital for 2023

	Source Table	Capital Structure Weight	Current Cost
Debt	11	18.39 %	5.34 %
Common Equity	18	81.61	10.89
Preferred Equity	20	0.00	0.00
Total		100.000 %	
Weighted Current Cost of Capital			**9.87 %**

VII. Qualifications of Dr. Rand Ghayad

My name is Dr. Rand Ghayad and I am the Chief Economist and Senior Vice President of Policy and Economics at the Association of American Railroads (AAR), headquartered at 425 Third Street SW, Suite 1000, Washington, DC 20024. In my role, I oversee the collection, analysis, and presentation of economic and operational data pertaining to railroads and their broader economic landscape. A key aspect of my responsibilities involves conducting and supervising economic, financial, statistical, and cost studies that inform strategic decision-making within the rail industry.

Prior to joining the AAR, I served as the Head of Economics and Global Labor Markets at LinkedIn Corporation. In this role, I spearheaded thought leadership initiatives and conducted pioneering research on labor market dynamics, exploring the implications of current and emerging trends on the future of work and workers. My professional journey also includes senior positions at global institutions such as the International Monetary Fund (IMF) and the Brattle Group.

During my tenure at the IMF, I provided expert advice to member countries on a wide range of international economic policy and stabilization matters. I conducted innovative research in macroeconomics and finance, offering strategic insights and policy recommendations to both fragile and emerging market economies.

At the Brattle Group, I assisted corporations, regulators, and government agencies, including the U.S. Department of Justice and the Internal Revenue Service, in developing economic and financial testimony for various finance and tax litigation cases. Additionally, I

provided economic analyses and consulting services to clients across diverse industries such as aviation, railroads, postal and shipping, addressing a wide range of policy and business matters.

I began my career as a scholar with the Federal Reserve Bank of Boston and have also worked as an economic consultant at both the Brookings Institution and the International Labor Organization, where I published on economic growth, inequality, and tax policy. Currently, I serve as a Global Fellow at the Woodrow Wilson Center of Scholars and have been an adjunct faculty member at Harvard University since 2014. I hold a Ph.D. in Economics from Northeastern University, along with dual Master's degrees in Financial Economics and Multinational Commerce from Boston University.

VERIFICATION

I, Rand Ghayad, declare under penalty of perjury under the laws of the United States that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this statement.

Executed on this 23rd day of April, 2024.

Rand Ghayad, Ph.D.

Appendix A
Bonds, Notes and Debentures

Summaries

CSX Corporation **A-2**

Norfolk Southern Corporation **A-5**

Union Pacific Corporation **A-8**

Individual Bonds, Notes, and Debentures

CSX Corporation **A-11**

Norfolk Southern Corporation **A-43**

Union Pacific Corporation **A-83**

CSX Corporation
12/31/2023

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Traded						
1	Notes	CSX Corp.	1	126408HD8	3.350%	11/1/2025	$600,000	$600,000	96.434	$578,605	5.090%	$29,451
2	Notes	CSX Corp.	2	126408HE6	2.600%	11/1/2026	$700,000	$700,000	93.149	$652,040	4.930%	$32,146
3	Notes	CSX Corp.	3	126408BP7	7.250%	5/1/2027	$83,312	$83,312	105.858	$88,192	5.580%	$4,921
4	Notes	CSX Corp.	4	126408BM4	7.950%	5/1/2027	$64,266	$64,266	109.453	$70,341	5.270%	$3,707
5	Notes	CSX Corp.	5	126408HH9	3.250%	6/1/2027	$850,000	$850,000	94.524	$803,452	4.880%	$39,208
6	Notes	CSX Corp.	6	12641LBU6	6.800%	12/1/2028	$200,000	$200,000	108.037	$216,074	5.110%	$11,041
7	Notes	CSX Corp.	7	126408HJ5	3.800%	3/1/2028	$800,000	$800,000	95.981	$767,845	4.820%	$37,010
8	Notes	CSX Corp.	8	126408HM8	4.250%	3/15/2029	$950,000	$950,000	97.137	$922,802	4.870%	$44,940
9	Notes	CSX Corp.	9	126408HQ9	2.400%	2/15/2030	$400,000	$400,000	86.047	$344,190	4.960%	$17,072
10	Notes	CSX Corp.	10	126408HU0	4.100%	11/15/2032	$950,000	$950,000	94.088	$893,831	4.930%	$44,066
11	Notes (New)	CSX Corp.	11	126408HW6	5.200%	11/15/2033	$600,000	$200,000	98.682	$197,363	5.420%	$10,697
12	Notes	CSX Corp.	12	126408GH0	6.000%	10/1/2036	$400,000	$400,000	105.875	$423,500	5.420%	$22,954
13	Notes	CSX Corp.	13	126408GK3	6.150%	5/1/2037	$700,000	$700,000	107.537	$752,758	5.410%	$40,724
14	Notes	CSX Corp.	14	126408GP2	7.450%	4/1/2038	$79,226	$79,226	115.161	$91,238	5.990%	$5,465
15	Notes	CSX Corp.	15	126408GS6	6.220%	4/30/2040	$660,000	$660,000	107.965	$712,571	5.540%	$39,476
16	Notes	CSX Corp.	16	126408GU1	5.500%	4/15/2041	$550,000	$550,000	100.424	$552,331	5.510%	$30,433
17	Notes	CSX Corp.	17	126408GW7	4.750%	5/30/2042	$600,000	$600,000	91.758	$550,548	5.500%	$30,280
18	Notes	CSX Corp.	18	126408GX5	4.400%	3/1/2043	$300,000	$300,000	87.147	$261,440	5.530%	$14,458
19	Notes	CSXT - Conrail	19	126410LL1	7.875%	5/15/2043	$99,989	$99,989	119.896	$119,883	6.230%	$7,469
20	Notes	CSX Corp.	20	126408GY3	4.100%	3/15/2044	$800,000	$800,000	84.431	$675,445	5.400%	$36,474
21	Notes	CSX Corp.	21	126408HF3	3.800%	11/1/2046	$800,000	$800,000	79.197	$633,574	5.420%	$34,340
22	Notes	CSX Corp.	22	126408HK2	4.300%	3/1/2048	$850,000	$850,000	85.360	$725,558	5.440%	$39,470
23	Notes	CSX Corp.	23	126408HN6	4.750%	11/15/2048	$650,000	$650,000	90.736	$589,786	5.480%	$32,320
24	Notes	CSX Corp.	24	126408HP1	4.500%	3/15/2049	$400,000	$400,000	87.882	$351,526	5.420%	$19,053
25	Notes	CSX Corp.	25	126408HR7	3.350%	9/15/2049	$600,000	$600,000	72.246	$433,473	5.380%	$23,321
26	Notes	CSX Corp.	26	126408HS5	3.800%	4/15/2050	$500,000	$500,000	78.272	$391,359	5.390%	$21,094
27	Notes	CSX Corp.	27	126408HC0	3.950%	5/1/2050	$600,000	$600,000	80.557	$483,342	5.370%	$25,955
28	Notes	CSX Corp.	28	126408HT3	2.500%	5/15/2051	$500,000	$500,000	61.879	$309,394	5.120%	$15,841
29	Notes	CSX Corp.	29	126408HV8	4.500%	11/15/2052	$900,000	**$487,500**	87.989	$428,946	5.350%	$22,949
30	Notes	CSX Corp.	30	126408HA4	4.500%	8/1/2054	$450,000	$450,000	86.740	$390,329	5.440%	$21,234
31	Notes	CSX Corp.	31	126408HG1	4.250%	11/1/2066	$700,000	$700,000	80.755	$565,287	5.440%	$30,752
32	Notes	CSX Corp.	32	126408HL0	4.650%	3/1/2068	$350,000	$350,000	86.831	$303,909	5.500%	$16,715
33												
34												
35												
37												
38												
39												
40												
41												
42												
43												
44												
45												
46												
47												
48												
49												
50												
Total							**$17,686,793**	**$16,874,293**		**$15,280,930**	**5.268%**	**$805,037**

CSX Corporation
12/31/2023

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
					Trading Data Not Available or Did Not Trade							
1	Notes	CSX Corp.			1.310%	12/17/2050	73,304	73,304	100.000	$73,304		
2	Conrail Tax Note	CSXT			1.310%	12/17/2050	368,375	368,375	100.000	$368,375		
3	Notes	CSX Corp.			4.650%	3/1/2068	150,000	150,000	100.000	$150,000		
4												
5												
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11												
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14												
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21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
Total							**$591,679**	**$591,679**		**$591,679**		

CSX Corporation
12/31/2023

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Matures in 2024						
1	Notes	CSX Corp		126408HB2	3.400%	8/1/2024	$550,000					
2												
3												
4												
5												
6												
7												
8												
9												
10												
Total							**$550,000**					

	Grand Totals		
Total Traded and Trading Data Not Available	**$18,278,472**	**$17,465,972**	**$15,872,609**
Grand Total (for reconciliation to carrier data only)	**$18,828,472**		

From CSX:

Corporate Notes	$18,360,108
Convertible Debt	0
CSXT Notes	468,364
Secured Equipment Notes	0
Other Notes	0
Total	**$18,828,472**

Norfolk Southern Corporation

12/31/2023

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Traded						
1	Notes	Senior	33	655844AW8	5.590%	5/17/2025	$251,172	$251,172	100.584	$252,640	5.330%	$13,466
2	Notes	Senior	34	655844CA4	3.650%	8/1/2025	$300,000	$300,000	97.001	$291,002	5.270%	$15,336
3	Notes	Senior	35	655844BS6	2.900%	6/15/2026	$600,000	$600,000	94.511	$567,068	5.000%	$28,353
4	Conrail Notes	CR NSC 2027	36	655844AJ7	7.800%	5/15/2027	$319,135	$319,135	110.160	$351,558	4.900%	$17,226
5	Notes	Senior	37	655844BT4	3.150%	6/1/2027	$300,000	$300,000	93.906	$281,718	5.020%	$14,142
6	Notes	Senior	38	655844BZ0	3.800%	8/1/2028	$600,000	$600,000	95.241	$571,446	4.910%	$28,058
7	Notes	Senior	39	655844AX6	5.640%	5/17/2029	$210,316	$210,316	101.826	$214,156	5.300%	$11,350
8	Notes	Senior	40	655844CE6	2.550%	11/1/2029	$400,000	$400,000	86.774	$347,098	5.080%	$17,633
9	Notes (New)	Senior	41	655844CR7	5.050%	8/1/2030	$600,000	**$250,000**	98.446	$246,115	5.350%	$13,167
10	Notes	Senior	42	655844AQ1	7.250%	2/15/2031	$284,028	$284,028	111.001	$315,274	5.520%	$17,403
11	Notes	Senior	43	655844CK2	2.300%	5/15/2031	$500,000	$500,000	82.996	$414,979	4.990%	$20,707
12	Notes	Senior	44	655844CM8	3.000%	3/15/2032	$600,000	**$525,000**	86.074	$451,886	5.040%	$22,775
13	Notes (New)	Senior	45	655844CQ9	4.450%	3/1/2033	$500,000	$500,000	95.499	$477,497	5.100%	$24,352
14	Notes (New)	Senior	46	655844CT3	5.550%	3/15/2034	$400,000	**$66,667**	104.064	$69,376	5.070%	$3,517
15	Conrail Notes	CR NSC 2037	47	655844AF5	7.050%	5/1/2037	$171,750	$171,750	110.311	$189,460	6.020%	$11,405
16	Notes	Senior	48	655844BH0	4.837%	10/1/2041	$595,504	$595,504	91.952	$547,579	5.590%	$30,610
17	Notes	Senior 144A	49	655844BE7	4.837%	10/1/2041	$0	$0	91.886	$0	5.590%	$0
18	Notes	Senior	50	655844BM9	3.950%	10/1/2042	$600,000	$600,000	82.030	$492,182	5.510%	$27,119
19	Debenture	Southern Railway	51	655855FB5	7.875%	5/15/2043	$138,085	$138,085	118.346	$163,418	6.360%	$10,393
20	Notes	Senior	52	655844BN7	4.800%	8/15/2043	$291,829	$291,829	87.035	$253,995	6.000%	$15,240
21	Notes	Senior	53	655844BQ0	4.450%	6/15/2045	$500,000	$500,000	85.856	$429,280	5.630%	$24,168
22	Notes	Senior	54	655844BR8	4.650%	1/15/2046	$600,000	$600,000	88.233	$529,396	5.610%	$29,699
23	Notes	Senior	55	655844BX5	3.942%	11/1/2047	$749,997	$749,997	79.773	$598,292	5.500%	$32,906
24	Notes	Senior	56	655844BY3	4.150%	2/28/2048	$700,000	$700,000	82.441	$577,084	5.490%	$31,682
25	Notes	Senior	57	655844CC0	4.100%	5/15/2049	$400,000	$400,000	81.454	$325,817	5.500%	$17,920
26	Notes	Senior	58	655844CD8	3.400%	11/1/2049	$400,000	$400,000	71.755	$287,018	5.480%	$15,729
27	Notes	Senior	59	655844CF3	3.050%	5/15/2050	$800,000	$800,000	67.290	$538,319	5.410%	$29,123
28	Notes	Senior	60	655844CL0	2.900%	8/25/2051	$600,000	**$50,000**	64.496	$32,248	5.410%	$1,745
29	Notes	Senior	61	655844BV9	4.050%	8/15/2052	$749,994	$749,994	80.471	$603,527	5.430%	$32,772
30	Notes	Senior	62	655844CN6	3.700%	3/15/2053	$400,000	$350,000	75.041	$262,645	5.440%	$14,288
31	Notes	Senior	63	655844CP1	4.550%	6/1/2053	$750,000	$750,000	87.287	$654,649	5.450%	$35,678
32	Notes (New)	Senior	64	655844CS5	5.350%	8/1/2054	$1,000,000	**$416,667**	94.965	$395,688	5.740%	$22,713
33	Notes	Senior	65	655844CH9	3.155%	5/15/2055	$799,996	$799,996	66.529	$532,232	5.450%	$29,007
34	Notes	Senior 144A	66	655844CG1	3.155%	5/15/2055	$1	$1	66.227	$1	5.440%	$0
35	Notes (New)	Senior	67	655844CU0	5.950%	3/15/2064	$600,000	**$100,000**	107.584	$107,584	5.520%	$5,939
36	Notes	CR NSC 2097	68	655844AK4	7.900%	5/15/2097	$196,302	$196,302	124.962	$245,302	6.420%	$15,748
37	Notes	Senior 2105	69	655844AV0	6.000%	3/15/2105	$157,780	$157,780	93.015	$146,759	6.640%	$9,745
38	Notes	Senior	70	655844BD9	6.000%	5/23/2111	$79,726	$79,726	96.713	$77,106	6.310%	$4,865
39	Notes	Senior	71	655844CB2	5.100%	8/1/2118	$350,521	$350,521	85.223	$298,724	6.110%	$18,252
40	Notes	Senior	72	655844CJ5	4.100%	5/15/2121	$600,000	$600,000	69.955	$419,732	5.940%	$24,932
41												
42												
43												
44												
45												
46												
47												
Total							**$18,096,136**	**$15,654,469**		**$13,559,845**	**5.451%**	**$739,164**

Norfolk Southern Corporation

12/31/2023

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
	Trading Data Not Available or Did Not Trade											
1												
2												
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29												
30												
Total							$0	$0		$0		

Norfolk Southern Corporation

12/31/2023

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Matures in 2024						
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
Total							**$0**					

	Grand Totals			
Total Traded and Trading Data Not Available	**$18,096,136**	**$15,654,469**		**$13,559,845**
Grand Total (for reconciliation to carrier data only)	**$18,096,136**			

From NSC:

Income Debentures	$138,085
Medium Term Notes & Conrail Notes	17,958,051
Other Debt (Poca Dev)	
Total	**$18,096,136**

Union Pacific Corporation
12/31/2023

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Traded						
1	Notes	UP Corp.	73	907818DY1	3.250%	1/15/2025	$349,550	$349,550	97.469	$340,704	5.140%	$17,512
2	Notes	UP Corp.	74	907818ES3	3.750%	7/15/2025	$499,073	$499,073	97.768	$487,933	5.000%	$24,397
3	Notes	UP Corp.	75	907818ED6	3.250%	8/15/2025	$499,709	$499,709	96.815	$483,795	4.940%	$23,899
4	Notes (New)	UP Corp.	76	907818GE2	4.750%	2/21/2026	$497,859	**$456,371**	99.894	$455,887	4.830%	$22,019
5	Notes	UP Corp.	77	907818EH7	2.750%	3/1/2026	$649,113	$649,113	95.008	$616,710	4.860%	$29,972
6	Notes	UP Corp.	78	907818FJ2	2.150%	2/5/2027	$498,061	$498,061	91.731	$456,878	4.760%	$21,747
7	Notes	UP Corp.	79	907818EP9	3.000%	4/15/2027	$496,021	$496,021	94.308	$467,787	4.730%	$22,126
8	Debentures	UP Corp.	80	907818BY3	7.125%	2/1/2028	$160,966	**$175,599**	108.048	$189,732	5.160%	$9,790
9	Notes	UP Corp.	81	907818EY0	3.950%	9/10/2028	$1,049,341	$1,049,341	97.028	$1,018,150	4.650%	$47,344
10	Debentures	UP Corp.	82	907818CF3	6.625%	2/1/2029	$389,916	**$425,362**	109.464	$465,618	4.720%	$21,977
11	Notes	UP Corp.	83	907818FB9	3.700%	3/1/2029	$770,902	$770,902	95.481	$736,067	4.670%	$34,374
12	Notes	UP Corp.	84	907818FH6	2.400%	2/5/2030	$744,355	$744,355	86.654	$645,015	4.830%	$31,154
13	Notes	UP Corp.	85	907818FU7	2.375%	5/20/2031	$997,707	$997,707	84.393	$841,995	4.830%	$40,668
14	Notes	UP Corp.	86	907818FX1	2.800%	2/14/2032	$1,237,286	$1,237,286	85.881	$1,062,590	4.860%	$51,642
15	Notes	UP Corp.	87	907818GB8	4.500%	1/20/2033	$890,842	**$296,947**	97.622	$289,885	4.850%	$14,059
16	Debentures	UP Corp.	88	907818CS5	5.375%	6/1/2033	$143,104	$143,104	100.822	$144,281	5.340%	$7,705
17	Debentures	UP Corp.	89	907818CU0	6.250%	5/1/2034	$152,390	$152,390	106.929	$162,949	5.430%	$8,848
18	Notes	UP Corp.	90	907818EB0	3.375%	2/1/2035	$446,289	$446,289	85.396	$381,111	5.140%	$19,589
19	Notes (Exchange)	UP Corp.	91	907818FQ6	2.891%	4/6/2036	$610,125	$610,125	80.019	$488,216	5.080%	$24,801
20	Notes (Exchange)	UP Corp. 144A	92	907818FP8	2.891%	4/6/2036	$1,716	$1,716	79.912	$1,371	5.100%	$70
21	Debentures	UP Corp.	93	907818CX4	6.150%	5/1/2037	$89,902	$89,902	106.287	$95,554	5.580%	$5,332
22	Notes	UP Corp.	94	907818EQ7	3.600%	9/15/2037	$495,825	$495,825	85.018	$421,539	5.130%	$21,625
23	Notes	UP Corp.	95	907818EV6	4.375%	9/10/2038	$231,167	$231,167	90.038	$208,139	5.410%	$11,260
24	Notes	UP Corp.	96	907818FD5	3.550%	8/15/2039	$494,589	$494,589	82.630	$408,679	5.200%	$21,251
25	Notes	UP Corp. 144A	97	907818DE5	5.780%	7/15/2040	$10	$10	99.638	$10	5.890%	$1
26	Notes	UP Corp.	98	907818DF2	5.780%	7/15/2040	$64,831	**$70,725**	102.208	$72,286	5.660%	$4,091
27	Notes	UP Corp.	99	907818FT0	3.200%	5/20/2041	$991,727	$991,727	77.554	$769,119	5.180%	$39,840
28	Notes	UP Corp.	100	907818DJ4	4.750%	9/15/2041	$212,714	$212,714	91.456	$194,540	5.610%	$10,914
29	Notes	UP Corp.	101	907818FY9	3.375%	2/14/2042	$495,123	**$453,862**	79.175	$359,347	5.170%	$18,578
30	Notes	UP Corp.	102	907818DL9	4.300%	6/15/2042	$204,411	$204,411	85.804	$175,392	5.570%	$9,769
31	Notes	UP Corp.	103	907818DP0	4.250%	4/15/2043	$183,677	$183,677	83.207	$152,833	5.740%	$8,773
32	Notes	UP Corp.	104	907818DU9	4.750%	12/15/2043	$182,804	$182,804	89.598	$163,789	5.670%	$9,287
33	Notes	UP Corp.	105	907818DT2	4.821%	2/1/2044	$130,775	$130,775	89.958	$117,643	5.740%	$6,753
34	Notes	UP Corp. 144A	106	907818DS4	4.821%	2/1/2044	$1	$1	89.512	$1	5.810%	$0
35	Notes	UP Corp.	107	907818DX3	4.850%	6/15/2044	$83,354	$83,354	86.001	$71,686	6.120%	$4,387
36	Notes	UP Corp.	108	907818DZ8	4.150%	1/15/2045	$229,141	$229,141	82.387	$188,783	5.620%	$10,610
37	Notes	UP Corp.	109	907818EF1	4.050%	11/15/2045	$396,048	$396,048	82.800	$327,929	5.420%	$17,774
38	Notes	UP Corp.	110	907818EJ3	4.050%	3/1/2046	$515,958	$515,958	82.553	$425,941	5.430%	$23,129
39	Notes	UP Corp.	111	907818EK0	3.350%	8/15/2046	$296,493	$296,493	72.929	$216,230	5.470%	$11,828
40	Notes	UP Corp.	112	907818EN4	4.000%	4/15/2047	$489,819	$489,819	82.408	$403,649	5.360%	$21,636
41	Notes	UP Corp.	113	907818EW4	4.500%	9/10/2048	$386,086	$386,086	88.172	$340,421	5.400%	$18,383
42	Notes	UP Corp.	114	907818FC7	4.300%	3/1/2049	$627,129	$627,129	86.231	$540,778	5.330%	$28,823
43	Notes	UP Corp.	115	907818FK9	3.250%	2/5/2050	$1,695,943	$1,695,943	73.092	$1,239,597	5.180%	$64,211
44	Notes	UP Corp.	116	907818EM6	3.799%	10/1/2051	$715,652	$715,652	80.155	$573,631	5.190%	$29,771
45	Notes	UP Corp.	117	907818FW3	2.950%	3/10/2052	$841,418	$841,418	67.740	$569,974	5.150%	$29,354
46	Notes	UP Corp.	118	907818GC6	4.950%	9/9/2052	$590,095	$590,095	97.502	$575,356	5.150%	$29,631
47	Notes	UP Corp.	119	907818FZ6	3.500%	2/14/2053	$1,234,758	**$1,131,862**	75.657	$856,327	5.140%	$44,015
48	Notes (New)	UP Corp.	120	907818GF9	4.950%	5/15/2053	$494,126	**$452,949**	96.617	$437,625	5.210%	$22,800
49	Notes	UP Corp.	121	907818EC8	3.875%	2/1/2055	$444,334	$444,334	79.065	$351,314	5.300%	$18,620
50	Notes	UP Corp.	122	907818EX2	4.800%	9/10/2058	$25,788	$25,788	86.349	$22,267	5.780%	$1,287
51	Notes	UP Corp.	123	907818FE3	3.950%	8/15/2059	$491,420	$491,420	78.847	$387,472	5.310%	$20,575
52	Notes	UP Corp.	124	907818FG8	3.839%	3/20/2060	$1,419,466	$1,419,466	77.383	$1,098,425	5.280%	$57,997
53	Notes	UP Corp. 144A	125	907818FF0	3.839%	3/20/2060	$184	$184	77.468	$143	5.290%	$8
54	Notes	UP Corp.	126	907818FV5	3.550%	5/20/2061	$640,416	$640,416	72.235	$462,606	5.300%	$24,518
55	Notes (Exchange)	UP Corp.	127	907818FN3	2.973%	9/16/2062	$716,465	$716,465	63.354	$453,912	5.210%	$23,649
56	Notes (Exchange)	UP Corp. 144A	128	907818FM5	2.973%	9/16/2062	$3,004	$3,004	63.231	$1,899	5.230%	$99
57	Notes	UP Corp.	129	907818GD4	5.150%	1/20/2063	$393,126	**$131,042**	97.280	$127,478	5.370%	$6,846

Union Pacific Corporation
12/31/2023

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
58	Notes	UP Corp.	130	907818EG9	4.375%	11/15/2065	$169,458	$169,458	79.227	$134,257	5.740%	$7,706
59	Notes	UP Corp.	131	907818ER5	4.100%	9/15/2067	$494,515	$494,515	79.967	$395,450	5.330%	$21,077
60	Notes	UP Corp.	132	907818FL7	3.750%	2/5/2070	$742,314	$742,314	73.646	$546,684	5.340%	$29,193
61	Notes (Exchange)	UP Corp.	133	907818FS2	3.799%	4/6/2071	$817,752	$817,752	74.410	$608,489	5.320%	$32,372
62	Notes (Exchange)	UP Corp. 144A	134	907818FR4	3.799%	4/6/2071	$7,274	**$21,822**	74.422	$16,240	5.290%	$859
63	Notes (New)	UP Corp.	135	907818GA0	3.850%	2/14/2072	$493,553	**$1,480,659**	75.397	$1,116,370	5.310%	$59,279
64												
65												
66												
Total							**$30,316,969**	**$30,291,796**		**$25,366,477**	**5.131%**	**$1,301,606**
							Trading Data Not Available or Did Not Trade					
1												
2												
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30												
Total							**$0**	**$0**		**$0**		

Union Pacific Corporation
12/31/2023

	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding ($000) Year-End	Amt. Outstanding ($000) Used	Average Price	Market Value ($ 000)	Average Yield	Interest Cost ($ 000)
						Matures in 2024						
1	Notes	UP Corp.			3.646%	2/15/2024	$437,150					
2	Notes	UP Corp.			3.150%	3/1/2024	$499,854					
3	Notes	UP Corp.			3.750%	3/15/2024	$399,821					
4												
5												
6												
7												
8												
9												
10												
Total							**$1,336,825**					

Grand Totals			
Total Traded and Trading Data Not Available	**$30,316,969**	**$30,291,796**	**$25,366,477**
Grand Total (for reconciliation to carrier data only)	**$31,653,794**		

From UNP:

Corporate Debentures, Notes, Floating Rate Loans, and Commercial Paper	$31,653,794
Removal of Floating Rate Loans & Commercial Paper	0
UP RR Debt Securities Outstanding	-633
Removal of unamortized SOR Fees	633
Removal of Sale of Receivables	0
Total	**$31,653,794**

CSX Corporation

1

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HD8
Coupon Rate:	3.350%
Maturity Date:	11/1/2025
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	96.993	4.56 %
February	95.353	5.27
March	97.229	4.53
April	97.279	4.55
May	96.619	4.90
June	95.739	5.37
July	96.448	5.08
August	96.181	5.29
September	95.711	5.62
October	95.542	5.80
November	96.586	5.29
December	97.530	4.81
Average	96.434	5.09 %

Source: Bloomberg

CSX Corporation

2

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HE6
Coupon Rate:	2.600%
Maturity Date:	11/1/2026
Amount Outstanding ($ 000)	$700,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	93.739	4.46 %
February	91.655	5.16
March	94.074	4.44
April	94.589	4.31
May	93.492	4.72
June	92.374	5.16
July	92.908	5.03
August	92.570	5.22
September	91.870	5.53
October	91.479	5.76
November	93.750	4.96
December	95.282	4.42
Average	93.149	4.93 %

Source: Bloomberg

CSX Corporation

3

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408BP7
Coupon Rate:	7.250%
Maturity Date:	5/1/2027
Amount Outstanding ($ 000)	$83,312
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	107.901	5.22 %
February	105.187	5.89
March	107.452	5.26
April	107.802	5.13
May	106.752	5.37
June	105.363	5.72
July	106.094	5.48
August	105.025	5.76
September	103.897	6.08
October	102.913	6.37
November	105.126	5.63
December	106.783	5.07
Average	105.858	5.58 %

Source: Bloomberg

CSX Corporation

4

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408BM4
Coupon Rate:	7.950%
Maturity Date:	5/1/2027
Amount Outstanding ($ 000)	$64,266
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	112.713	4.69 %
February	109.812	5.37
March	112.076	4.74
April	112.355	4.62
May	110.973	4.92
June	109.454	5.27
July	110.145	5.03
August	107.239	5.81
September	106.031	6.14
October	105.056	6.40
November	107.981	5.43
December	109.603	4.86
Average	109.453	5.27 %

Source: Bloomberg

CSX Corporation

5

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HH9
Coupon Rate:	3.250%
Maturity Date:	6/1/2027
Amount Outstanding ($ 000)	$850,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	95.691	4.38 %
February	93.160	5.08
March	95.677	4.42
April	95.884	4.38
May	95.089	4.63
June	94.247	4.94
July	94.565	4.87
August	94.168	5.06
September	92.872	5.51
October	92.040	5.79
November	94.369	5.07
December	96.523	4.40
Average	94.524	4.88 %

Source: Bloomberg

CSX Corporation

6

Type:	Notes
Description:	CSX Corp.
CUSIP:	12641LBU6
Coupon Rate:	6.800%
Maturity Date:	12/1/2028
Amount Outstanding ($ 000)	$200,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	111.427	4.57 %
February	107.970	5.20
March	109.540	4.88
April	110.611	4.65
May	108.419	5.06
June	107.202	5.28
July	107.112	5.28
August	107.302	5.22
September	106.012	5.48
October	104.356	5.83
November	107.310	5.15
December	109.181	4.72
Average	108.037	5.11 %

Source: Bloomberg

CSX Corporation

7

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HJ5
Coupon Rate:	3.800%
Maturity Date:	3/1/2028
Amount Outstanding ($ 000)	$800,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.602	4.36 %
February	94.753	5.02
March	97.772	4.33
April	98.198	4.24
May	96.478	4.66
June	95.317	4.97
July	95.709	4.89
August	95.250	5.02
September	93.761	5.44
October	92.963	5.68
November	95.830	4.93
December	98.134	4.32
Average	95.981	4.82 %

Source: Bloomberg

CSX Corporation

8

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HM8
Coupon Rate:	4.250%
Maturity Date:	3/15/2029
Amount Outstanding ($ 000)	$950,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	99.016	4.46 %
February	94.748	5.30
March	98.939	4.48
April	99.372	4.40
May	98.235	4.63
June	96.745	4.94
July	97.600	4.77
August	96.418	5.02
September	94.434	5.47
October	93.109	5.79
November	97.084	4.90
December	99.944	4.29
Average	97.137	4.87 %

Source: Bloomberg

$350,000
600,000
$950,000

same CUSIP

CSX Corporation

9

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HQ9
Coupon Rate:	2.400%
Maturity Date:	2/15/2030
Amount Outstanding ($ 000)	$400,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	87.793	4.47 %
February	84.255	5.15
March	87.639	4.55
April	88.003	4.50
May	87.169	4.68
June	86.144	4.91
July	86.442	4.88
August	85.647	5.07
September	83.392	5.56
October	81.525	6.00
November	85.835	5.13
December	88.725	4.56
Average	86.047	4.96 %

Source: Bloomberg

CSX Corporation

10

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HU0
Coupon Rate:	4.100%
Maturity Date:	11/15/2032
Amount Outstanding ($ 000)	$950,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.015	4.50 %
February	92.065	5.17
March	96.465	4.58
April	96.997	4.51
May	95.219	4.75
June	94.556	4.85
July	94.637	4.84
August	94.077	4.93
September	90.001	5.53
October	87.494	5.92
November	93.219	5.07
December	97.305	4.49
Average	94.088	4.93 %

Source: Bloomberg

CSX Corporation

11

Type:	Notes (New)
Description:	CSX Corp.
CUSIP:	126408HW6
Coupon Rate:	5.200%
Maturity Date:	11/15/2033
Amount Outstanding ($ 000)	$600,000
Months Outstanding	4.0

End of Month in 2023	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	Not Traded	-
September	96.800	5.67
October	93.756	6.08
November	99.780	5.26
December	104.390	4.67
Average	98.682	5.42 %

Source: Bloomberg

CSX Corporation

12

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GH0
Coupon Rate:	6.000%
Maturity Date:	10/1/2036
Amount Outstanding ($ 000)	$400,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	109.660	5.06 %
February	104.074	5.61
March	108.930	5.12
April	108.953	5.11
May	107.053	5.30
June	105.885	5.41
July	105.445	5.46
August	104.816	5.52
September	101.431	5.88
October	98.677	6.19
November	105.296	5.46
December	110.280	4.93
Average	105.875	5.42 %

Source: Bloomberg

CSX Corporation

13

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GK3
Coupon Rate:	6.150%
Maturity Date:	5/1/2037
Amount Outstanding ($ 000)	$700,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	111.502	5.05 %
February	105.342	5.64
March	110.291	5.15
April	110.748	5.11
May	109.255	5.25
June	107.874	5.38
July	108.032	5.36
August	106.675	5.49
September	102.679	5.90
October	99.512	6.22
November	106.665	5.46
December	111.868	4.96
Average	107.537	5.41 %

Source: Bloomberg

CSX Corporation

14

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GP2
Coupon Rate:	7.450%
Maturity Date:	4/1/2038
Amount Outstanding ($ 000)	$79,226
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	121.541	5.43 %
February	115.424	5.96
March	120.297	5.52
April	121.174	5.44
May	118.503	5.67
June	118.531	5.66
July	119.831	5.54
August	111.234	6.34
September	106.675	6.80
October	102.940	7.19
November	109.971	6.45
December	115.813	5.88
Average	115.161	5.99 %

Source: Bloomberg

CSX Corporation

15

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GS6
Coupon Rate:	6.220%
Maturity Date:	4/30/2040
Amount Outstanding ($ 000)	$660,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	113.758	5.06 %
February	106.892	5.63
March	111.072	5.27
April	111.281	5.25
May	108.869	5.45
June	108.555	5.48
July	108.081	5.51
August	106.962	5.61
September	102.107	6.06
October	98.390	6.42
November	106.352	5.66
December	113.265	5.06
Average	107.965	5.54 %

Source: Bloomberg

CSX Corporation

16

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GU1
Coupon Rate:	5.500%
Maturity Date:	4/15/2041
Amount Outstanding ($ 000)	$550,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	106.371	5.00 %
February	100.237	5.51
March	103.827	5.21
April	103.652	5.22
May	101.281	5.42
June	101.271	5.42
July	101.336	5.42
August	99.860	5.55
September	94.077	6.09
October	90.406	6.46
November	98.243	5.69
December	104.524	5.14
Average	100.424	5.51 %

Source: Bloomberg

$300,000
250,000
$550,000

same CUSIP

CSX Corporation

17

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GW7
Coupon Rate:	4.750%
Maturity Date:	5/30/2042
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.015	5.02 %
February	91.119	5.53
March	95.083	5.18
April	95.441	5.15
May	93.227	5.35
June	92.500	5.42
July	92.990	5.37
August	90.394	5.61
September	85.567	6.08
October	82.010	6.45
November	89.833	5.67
December	95.916	5.12
Average	91.758	5.50 %

Source: Bloomberg

CSX Corporation

18

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GX5
Coupon Rate:	4.400%
Maturity Date:	3/1/2043
Amount Outstanding ($ 000)	$300,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	92.470	5.03 %
February	86.281	5.58
March	90.181	5.23
April	90.683	5.19
May	88.460	5.39
June	88.172	5.42
July	87.719	5.46
August	86.156	5.61
September	80.954	6.12
October	77.628	6.47
November	85.260	5.70
December	91.797	5.11
Average	87.147	5.53 %

Source: Bloomberg

CSX Corporation

19

Type:	Notes
Description:	CSXT - Conrail
CUSIP:	126410LL1
Coupon Rate:	7.875%
Maturity Date:	5/15/2043
Amount Outstanding ($ 000)	$99,989
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	127.073	5.67 %
February	121.603	6.08
March	124.188	5.86
April	124.427	5.85
May	118.481	6.32
June	121.454	6.12
July	119.200	6.31
August	115.816	6.53
September	110.065	7.02
October	103.489	7.58
November	123.158	5.95
December	129.796	5.42
Average	119.896	6.23 %

Source: Bloomberg

CSX Corporation

20

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408GY3
Coupon Rate:	4.100%
Maturity Date:	3/15/2044
Amount Outstanding ($ 000)	$800,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	89.428	4.94 %
February	83.721	5.43
March	87.968	5.07
April	88.643	5.01
May	86.534	5.20
June	85.926	5.25
July	85.288	5.31
August	83.376	5.49
September	78.303	5.98
October	74.390	6.39
November	81.554	5.67
December	88.036	5.08
Average	84.431	5.40 %

Source: Bloomberg

CSX Corporation

21

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HF3
Coupon Rate:	3.800%
Maturity Date:	11/1/2046
Amount Outstanding ($ 000)	$800,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	84.106	4.97 %
February	78.411	5.46
March	82.089	5.15
April	82.502	5.11
May	81.235	5.22
June	80.660	5.28
July	80.356	5.31
August	78.348	5.49
September	73.075	5.99
October	68.913	6.43
November	77.127	5.61
December	83.539	5.05
Average	79.197	5.42 %

Source: Bloomberg

CSX Corporation

22

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HK2
Coupon Rate:	4.300%
Maturity Date:	3/1/2048
Amount Outstanding ($ 000)	$850,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	91.108	4.96 %
February	84.864	5.44
March	88.983	5.13
April	89.095	5.12
May	85.720	5.39
June	87.036	5.28
July	87.202	5.27
August	84.435	5.50
September	78.958	5.99
October	74.602	6.41
November	82.819	5.64
December	89.495	5.10
Average	85.360	5.44 %

Source: Bloomberg

CSX Corporation

23

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HN6
Coupon Rate:	4.750%
Maturity Date:	11/15/2048
Amount Outstanding ($ 000)	$650,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	96.903	5.00 %
February	90.051	5.52
March	94.144	5.20
April	94.309	5.19
May	91.954	5.37
June	92.616	5.32
July	92.203	5.35
August	89.958	5.53
September	83.991	6.03
October	79.454	6.45
November	87.760	5.71
December	95.493	5.11
Average	90.736	5.48 %

Source: Bloomberg

CSX Corporation

24

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HP1
Coupon Rate:	4.500%
Maturity Date:	3/15/2049
Amount Outstanding ($ 000)	$400,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	93.075	5.00 %
February	87.982	5.39
March	91.446	5.12
April	91.667	5.11
May	90.015	5.23
June	90.108	5.23
July	89.025	5.31
August	86.784	5.49
September	81.512	5.94
October	76.676	6.39
November	84.302	5.70
December	91.986	5.09
Average	87.882	5.42 %

Source: Bloomberg

CSX Corporation

25

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HR7
Coupon Rate:	3.350%
Maturity Date:	9/15/2049
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	77.258	4.92 %
February	71.584	5.40
March	76.038	5.02
April	75.743	5.05
May	73.183	5.27
June	73.966	5.21
July	73.242	5.28
August	71.513	5.43
September	66.220	5.94
October	62.228	6.37
November	70.025	5.58
December	75.946	5.06
Average	72.246	5.38 %

Source: Bloomberg

CSX Corporation

26

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HS5
Coupon Rate:	3.800%
Maturity Date:	4/15/2050
Amount Outstanding ($ 000)	$500,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	83.097	4.98 %
February	77.211	5.45
March	81.756	5.09
April	81.724	5.09
May	79.439	5.28
June	79.546	5.27
July	80.108	5.23
August	77.887	5.41
September	72.611	5.89
October	67.926	6.35
November	75.678	5.61
December	82.279	5.06
Average	78.272	5.39 %

Source: Bloomberg

CSX Corporation

27

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HC0
Coupon Rate:	3.950%
Maturity Date:	5/1/2050
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	85.590	4.95 %
February	79.908	5.40
March	84.374	5.04
April	83.494	5.11
May	81.540	5.27
June	82.621	5.19
July	81.467	5.28
August	80.215	5.38
September	74.536	5.88
October	70.049	6.32
November	78.038	5.58
December	84.852	5.02
Average	80.557	5.37 %

Source: Bloomberg

CSX Corporation

28

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HT3
Coupon Rate:	2.500%
Maturity Date:	5/15/2051
Amount Outstanding ($ 000)	$500,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	66.625	4.66 %
February	61.495	5.12
March	65.579	4.76
April	65.455	4.77
May	63.473	4.95
June	63.593	4.94
July	62.414	5.06
August	60.828	5.21
September	56.056	5.70
October	52.103	6.15
November	59.302	5.37
December	65.622	4.79
Average	61.879	5.12 %

Source: Bloomberg

CSX Corporation

29

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HV8
Coupon Rate:	4.500%
Maturity Date:	11/15/2052
Amount Outstanding ($ 000)	$900,000
Months Outstanding	6.5

End of Month in 2023	Price	Yield
January	92.680	4.99 %
February	86.417	5.44
March	91.632	5.07
April	92.051	5.04
May	89.760	5.20
June	90.199	5.17
July	89.079	5.25
August	87.129	5.40
September	81.458	5.85
October	76.314	6.30
November	85.904	5.49
December	93.243	4.96
Average	87.989	5.35 %

Source: Bloomberg

CSX Corporation

30

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HA4
Coupon Rate:	4.500%
Maturity Date:	8/1/2054
Amount Outstanding ($ 000)	$450,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	91.843	5.06 %
February	85.318	5.52
March	89.520	5.22
April	89.764	5.20
May	87.248	5.38
June	88.821	5.27
July	89.108	5.25
August	85.883	5.49
September	79.977	5.96
October	75.735	6.33
November	84.981	5.56
December	92.679	5.01
Average	86.740	5.44 %

Source: Bloomberg

CSX Corporation

31

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HG1
Coupon Rate:	4.250%
Maturity Date:	11/1/2066
Amount Outstanding ($ 000)	$700,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	86.302	5.05 %
February	79.671	5.50
March	83.113	5.26
April	84.137	5.19
May	82.477	5.30
June	83.347	5.25
July	81.736	5.36
August	80.473	5.45
September	74.760	5.88
October	69.039	6.38
November	78.140	5.62
December	85.869	5.08
Average	80.755	5.44 %

Source: Bloomberg

CSX Corporation

32

Type:	Notes
Description:	CSX Corp.
CUSIP:	126408HL0
Coupon Rate:	4.650%
Maturity Date:	3/1/2068
Amount Outstanding ($ 000)	$350,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	91.866	5.16 %
February	84.907	5.61
March	89.783	5.29
April	89.861	5.28
May	88.690	5.36
June	89.582	5.30
July	90.050	5.27
August	86.493	5.51
September	80.256	5.96
October	74.261	6.45
November	84.036	5.68
December	92.190	5.13
Average	86.831	5.50 %

Source: Bloomberg

Norfolk Southern Corp.

33

Type:	Notes
Description:	Senior
CUSIP:	655844AW8
Coupon Rate:	5.590%
Maturity Date:	5/17/2025
Amount Outstanding ($ 000)	$251,172
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	101.982	4.71 %
February	99.906	5.68
March	101.492	4.88
April	101.743	4.73
May	100.780	5.22
June	100.246	5.50
July	100.511	5.33
August	100.018	5.63
September	99.578	5.92
October	99.641	5.91
November	100.323	5.42
December	100.793	5.05
Average	100.584	5.33 %

Source: Bloomberg

Norfolk Southern Corp.

34

Type:	Notes
Description:	Senior
CUSIP:	655844CA4
Coupon Rate:	3.650%
Maturity Date:	8/1/2025
Amount Outstanding ($ 000)	$300,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.641	4.69 %
February	96.032	5.45
March	97.459	4.84
April	97.558	4.83
May	97.067	5.12
June	96.314	5.58
July	96.808	5.38
August	96.764	5.49
September	96.496	5.72
October	96.470	5.83
November	97.334	5.37
December	98.065	4.96
Average	97.001	5.27 %

Source: Bloomberg

Norfolk Southern Corp.

35

Type:	Notes
Description:	Senior
CUSIP:	655844BS6
Coupon Rate:	2.900%
Maturity Date:	6/15/2026
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	94.980	4.55 %
February	92.877	5.32
March	95.176	4.57
April	95.645	4.44
May	94.754	4.81
June	94.155	5.09
July	94.393	5.05
August	94.257	5.17
September	93.721	5.46
October	93.364	5.69
November	94.769	5.16
December	96.045	4.66
Average	94.511	5.00 %

Source: Bloomberg

Norfolk Southern Corp.

36

Type:	Conrail Notes
Description:	CR NSC 2027
CUSIP:	655844AJ7
Coupon Rate:	7.800%
Maturity Date:	5/15/2027
Amount Outstanding ($ 000)	$319,135
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	112.774	4.52 %
February	109.482	5.29
March	111.496	4.73
April	112.238	4.49
May	111.147	4.71
June	110.265	4.89
July	109.844	4.95
August	109.328	5.04
September	108.474	5.23
October	107.368	5.51
November	109.256	4.89
December	110.243	4.52
Average	110.160	4.90 %

Source: Bloomberg

Norfolk Southern Corp.

37

Type:	Notes
Description:	Senior
CUSIP:	655844BT4
Coupon Rate:	3.150%
Maturity Date:	6/1/2027
Amount Outstanding ($ 000)	$300,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	95.036	4.54 %
February	92.035	5.38
March	94.696	4.67
April	95.107	4.58
May	94.602	4.75
June	93.647	5.07
July	93.708	5.08
August	93.451	5.20
September	92.486	5.55
October	91.832	5.81
November	94.286	5.06
December	95.984	4.54
Average	93.906	5.02 %

Source: Bloomberg

Norfolk Southern Corp.

38

Type:	Notes
Description:	Senior
CUSIP:	655844BZ0
Coupon Rate:	3.800%
Maturity Date:	8/1/2028
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.747	4.29 %
February	93.440	5.23
March	96.358	4.60
April	97.399	4.38
May	96.224	4.65
June	94.485	5.07
July	94.886	4.99
August	94.565	5.09
September	93.147	5.45
October	91.689	5.85
November	95.337	4.95
December	97.614	4.40
Average	95.241	4.91 %

Source: Bloomberg

Norfolk Southern Corp.

39

Type:	Notes
Description:	Senior
CUSIP:	655844AX6
Coupon Rate:	5.640%
Maturity Date:	5/17/2029
Amount Outstanding ($ 000)	$210,316
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	103.932	4.93 %
February	99.902	5.68
March	103.638	4.97
April	104.061	4.88
May	102.487	5.17
June	101.263	5.41
July	101.044	5.45
August	100.557	5.55
September	98.706	5.94
October	99.062	5.86
November	102.885	5.05
December	104.373	4.73
Average	101.826	5.30 %

Source: Bloomberg

Norfolk Southern Corp.

40

Type:	Notes
Description:	Senior
CUSIP:	655844CE6
Coupon Rate:	2.550%
Maturity Date:	11/1/2029
Amount Outstanding ($ 000)	$400,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	88.168	4.64 %
February	84.606	5.36
March	88.165	4.68
April	89.085	4.54
May	87.504	4.87
June	86.311	5.15
July	87.075	5.02
August	86.259	5.22
September	84.463	5.64
October	82.829	6.04
November	86.721	5.22
December	90.107	4.53
Average	86.774	5.08 %

Source: Bloomberg

Norfolk Southern Corp.

41

Type:	Notes (New)
Description:	Senior
CUSIP:	655844CR7
Coupon Rate:	5.050%
Maturity Date:	8/1/2030
Amount Outstanding ($ 000)	$600,000
Months Outstanding	5.0

End of Month in 2023	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	99.008	5.24
September	96.461	5.70
October	94.407	6.09
November	99.792	5.11
December	102.562	4.61
Average	98.446	5.35 %

Source: Bloomberg

Norfolk Southern Corp.

42

Type:	Notes
Description:	Senior
CUSIP:	655844AQ1
Coupon Rate:	7.250%
Maturity Date:	2/15/2031
Amount Outstanding ($ 000)	$284,028
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	114.785	5.04 %
February	110.602	5.62
March	114.322	5.07
April	114.521	5.02
May	112.782	5.26
June	110.942	5.52
July	110.416	5.58
August	109.597	5.70
September	106.576	6.17
October	104.324	6.54
November	109.785	5.62
December	113.362	5.04
Average	111.001	5.52 %

Source: Bloomberg

Norfolk Southern Corp.

43

Type:	Notes
Description:	Senior
CUSIP:	655844CK2
Coupon Rate:	2.300%
Maturity Date:	5/15/2031
Amount Outstanding ($ 000)	$500,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	85.417	4.45 %
February	80.871	5.23
March	84.422	4.66
April	85.120	4.56
May	83.318	4.87
June	82.856	4.98
July	83.243	4.95
August	82.661	5.08
September	80.391	5.52
October	78.157	5.97
November	82.984	5.11
December	86.509	4.49
Average	82.996	4.99 %

Source: Bloomberg

Prospectus supplement dated May 3, 2021
Interest accrues from May 12, 2021

Norfolk Southern Corp.

44

Type:	Notes
Description:	Senior
CUSIP:	655844CM8
Coupon Rate:	3.000%
Maturity Date:	3/15/2032
Amount Outstanding ($ 000)	$600,000
Months Outstanding	10.5

End of Month in 2023	Price	Yield
January	89.115	4.49 %
February	84.349	5.21
March	88.346	4.62
April	88.819	4.58
May	86.818	4.88
June	85.962	5.04
July	86.222	5.02
August	85.459	5.16
September	82.499	5.66
October	80.223	6.08
November	85.579	5.19
December	89.492	4.57
Average	86.074	5.04 %

Source: Bloomberg

Norfolk Southern Corp.

45

Type:	Notes (New)
Description:	Senior
CUSIP:	655844CQ9
Coupon Rate:	4.450%
Maturity Date:	3/1/2033
Amount Outstanding ($ 000)	$500,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	99.407	4.58 %
February	93.697	5.33
March	97.557	4.81
April	98.836	4.64
May	96.323	4.97
June	95.553	5.08
July	95.704	5.06
August	94.876	5.18
September	91.579	5.65
October	88.702	6.08
November	94.616	5.22
December	99.142	4.60
Average	95.499	5.10 %

Source: Bloomberg

Norfolk Southern Corp.

46

Type:	Notes (New)
Description:	Senior
CUSIP:	655844CT3
Coupon Rate:	5.550%
Maturity Date:	3/15/2034
Amount Outstanding ($ 000)	$400,000
Months Outstanding	2.0

End of Month in 2023	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	Not Traded	-
September	Not Traded	-
October	Not Traded	-
November	101.597	5.37
December	106.530	4.76
Average	104.064	5.07 %

Source: Bloomberg

Norfolk Southern Corp.

47

Type:	Conrail Notes
Description:	CR NSC 2037
CUSIP:	655844AF5
Coupon Rate:	7.050%
Maturity Date:	5/1/2037
Amount Outstanding ($ 000)	$171,750
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	113.917	5.68 %
February	110.146	6.03
March	114.589	5.60
April	115.042	5.55
May	112.038	5.84
June	111.510	5.88
July	110.655	5.96
August	108.383	6.19
September	103.949	6.66
October	100.309	7.07
November	107.090	6.32
December	116.108	5.40
Average	110.311	6.02 %

Source: Bloomberg

Norfolk Southern Corp.

48

Type:	Notes
Description:	Senior
CUSIP:	655844BH0
Coupon Rate:	4.837%
Maturity Date:	10/1/2041
Amount Outstanding ($ 000)	$595,504
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.626	5.06 %
February	91.456	5.61
March	94.361	5.35
April	95.076	5.28
May	91.842	5.58
June	92.836	5.49
July	92.706	5.50
August	91.191	5.65
September	86.494	6.11
October	82.208	6.56
November	90.529	5.72
December	97.101	5.11
Average	91.952	5.59 %

Source: Bloomberg

Prospectus supplement dated May 3, 2021
Interest accrues from May 12, 2021

Norfolk Southern Corp.

49

Type:	Notes
Description:	Senior 144A
CUSIP:	655844BE7
Coupon Rate:	4.837%
Maturity Date:	10/1/2041
Amount Outstanding ($ 000)	$0
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.455	5.07 %
February	91.611	5.60
March	94.496	5.35
April	94.604	5.33
May	91.881	5.58
June	92.604	5.50
July	92.684	5.50
August	91.083	5.65
September	86.490	6.10
October	82.458	6.52
November	90.337	5.72
December	96.923	5.13
Average	91.886	5.59 %

Source: Bloomberg

Prospectus supplement dated August 16, 2021
Interest accrues from August 25, 2021

Norfolk Southern Corp.

50

Type:	Notes
Description:	Senior
CUSIP:	655844BM9
Coupon Rate:	3.950%
Maturity Date:	10/1/2042
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	87.552	4.97 %
February	81.571	5.52
March	85.491	5.16
April	86.174	5.10
May	82.672	5.43
June	82.500	5.45
July	81.577	5.54
August	80.792	5.63
September	76.668	6.06
October	72.825	6.48
November	80.288	5.69
December	86.254	5.12
Average	82.030	5.51 %

Source: Bloomberg

Norfolk Southern Corp.

51

Type:	Debenture
Description:	Southern Railway
CUSIP:	655855FB5
Coupon Rate:	7.875%
Maturity Date:	5/15/2043
Amount Outstanding ($ 000)	$138,085
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	125.714	5.76 %
February	116.679	6.46
March	121.080	6.12
April	122.583	6.03
May	118.940	6.29
June	120.059	6.21
July	120.055	6.21
August	118.538	6.41
September	112.064	6.87
October	106.835	7.32
November	115.889	6.51
December	121.714	6.09
Average	118.346	6.36 %

Source: Bloomberg

Norfolk Southern Corp.

52

Type:	Notes
Description:	Senior
CUSIP:	655844BN7
Coupon Rate:	4.800%
Maturity Date:	8/15/2043
Amount Outstanding ($ 000)	$291,829
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	92.478	5.48 %
February	87.257	5.95
March	89.374	5.76
April	90.912	5.62
May	87.657	5.92
June	87.561	5.93
July	88.229	5.87
August	86.645	6.02
September	81.309	6.56
October	76.842	7.05
November	84.771	6.21
December	91.390	5.60
Average	87.035	6.00 %

Source: Bloomberg

Norfolk Southern Corp.

53

Type:	Notes
Description:	Senior
CUSIP:	655844BQ0
Coupon Rate:	4.450%
Maturity Date:	6/15/2045
Amount Outstanding ($ 000)	$500,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	91.670	5.12 %
February	85.175	5.67
March	88.608	5.37
April	89.710	5.28
May	86.363	5.57
June	87.283	5.49
July	86.641	5.55
August	84.642	5.73
September	79.907	6.18
October	75.505	6.63
November	84.144	5.78
December	90.624	5.22
Average	85.856	5.63 %

Source: Bloomberg

Norfolk Southern Corp.

54

Type:	Notes
Description:	Senior
CUSIP:	655844BR8
Coupon Rate:	4.650%
Maturity Date:	1/15/2046
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	93.963	5.12 %
February	87.904	5.62
March	91.022	5.36
April	92.027	5.28
May	88.783	5.55
June	89.609	5.48
July	88.638	5.56
August	87.409	5.67
September	82.424	6.13
October	77.454	6.62
November	86.045	5.80
December	93.513	5.17
Average	88.233	5.61 %

Source: Bloomberg

Norfolk Southern Corp.

55

Type:	Notes
Description:	Senior
CUSIP:	655844BX5
Coupon Rate:	3.942%
Maturity Date:	11/1/2047
Amount Outstanding ($ 000)	$749,997
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	85.774	4.97 %
February	78.767	5.56
March	82.419	5.25
April	82.955	5.21
May	79.812	5.48
June	81.177	5.36
July	81.146	5.37
August	79.313	5.52
September	74.581	5.97
October	69.498	6.49
November	77.315	5.72
December	84.514	5.10
Average	79.773	5.50 %

Source: Bloomberg

Norfolk Southern Corp.

56

Type:	Notes
Description:	Senior
CUSIP:	655844BY3
Coupon Rate:	4.150%
Maturity Date:	2/28/2048
Amount Outstanding ($ 000)	$700,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	88.155	5.01 %
February	81.535	5.54
March	85.022	5.26
April	85.335	5.23
May	82.206	5.49
June	84.420	5.31
July	84.300	5.32
August	82.435	5.48
September	76.831	5.99
October	71.610	6.51
November	80.173	5.69
December	87.264	5.09
Average	82.441	5.49 %

Source: Bloomberg

Norfolk Southern Corp.

57

Type:	Notes
Description:	Senior
CUSIP:	655844CC0
Coupon Rate:	4.100%
Maturity Date:	5/15/2049
Amount Outstanding ($ 000)	$400,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	86.424	5.07 %
February	80.838	5.52
March	83.693	5.29
April	84.408	5.23
May	81.097	5.51
June	83.658	5.30
July	82.954	5.36
August	81.409	5.49
September	76.370	5.93
October	71.133	6.45
November	79.020	5.70
December	86.446	5.09
Average	81.454	5.50 %

Source: Bloomberg

Norfolk Southern Corp.

58

Type:	Notes
Description:	Senior
CUSIP:	655844CD8
Coupon Rate:	3.400%
Maturity Date:	11/1/2049
Amount Outstanding ($ 000)	$400,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	77.126	4.99 %
February	70.879	5.53
March	73.961	5.26
April	74.569	5.21
May	71.264	5.50
June	73.849	5.28
July	73.184	5.34
August	71.205	5.52
September	66.496	5.98
October	61.865	6.48
November	69.954	5.65
December	76.703	5.05
Average	71.755	5.48 %

Source: Bloomberg

Norfolk Southern Corp.

59

Type:	Notes
Description:	Senior
CUSIP:	655844CF3
Coupon Rate:	3.050%
Maturity Date:	5/15/2050
Amount Outstanding ($ 000)	$800,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	72.467	4.91 %
February	66.504	5.44
March	69.587	5.18
April	70.427	5.11
May	67.237	5.40
June	69.152	5.23
July	68.512	5.28
August	66.693	5.47
September	62.151	5.92
October	57.731	6.40
November	65.169	5.61
December	71.849	5.00
Average	67.290	5.41 %

Source: Bloomberg

Norfolk Southern Corp.

60

Type:	Notes
Description:	Senior
CUSIP:	655844CL0
Coupon Rate:	2.900%
Maturity Date:	8/25/2051
Amount Outstanding ($ 000)	$600,000
Months Outstanding	1.0

End of Month in 2023	Price	Yield
January	69.971	4.89 %
February	63.891	5.43
March	66.623	5.18
April	67.020	5.15
May	64.366	5.40
June	66.083	5.24
July	65.652	5.29
August	63.789	5.47
September	59.524	5.90
October	55.397	6.36
November	62.643	5.59
December	68.991	5.01
Average	64.496	5.41 %

Source: Bloomberg

Norfolk Southern Corp.

61

Type:	Notes
Description:	Senior
CUSIP:	655844BV9
Coupon Rate:	4.050%
Maturity Date:	8/15/2052
Amount Outstanding ($ 000)	$749,994
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	86.599	4.94 %
February	79.244	5.51
March	83.452	5.18
April	84.416	5.11
May	81.005	5.37
June	82.623	5.24
July	81.871	5.30
August	79.548	5.49
September	74.396	5.94
October	69.172	6.44
November	77.858	5.64
December	85.467	5.04
Average	80.471	5.43 %

Source: Bloomberg

Norfolk Southern Corp.

62

Type:	Notes
Description:	Senior
CUSIP:	655844CN6
Coupon Rate:	3.700%
Maturity Date:	3/15/2053
Amount Outstanding ($ 000)	$400,000
Months Outstanding	10.5

End of Month in 2023	Price	Yield
January	80.823	4.96 %
February	73.724	5.53
March	77.354	5.22
April	77.953	5.17
May	75.404	5.40
June	77.354	5.24
July	76.964	5.27
August	74.681	5.46
September	69.360	5.94
October	64.429	6.43
November	72.428	5.67
December	80.022	5.04
Average	75.041	5.44 %

Source: Bloomberg

Norfolk Southern Corp.

63

Type:	Notes
Description:	Senior
CUSIP:	655844CP1
Coupon Rate:	4.550%
Maturity Date:	6/1/2053
Amount Outstanding ($ 000)	$750,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	93.531	4.98 %
February	85.971	5.53
March	90.524	5.19
April	90.916	5.17
May	87.516	5.41
June	90.037	5.23
July	89.037	5.30
August	86.591	5.49
September	80.865	5.95
October	75.206	6.45
November	84.521	5.65
December	92.723	5.05
Average	87.287	5.45 %

Source: Bloomberg

Note: These are Rule 144-A notes, which trade among qualified institutional buyers and have their own CUSIP. The exchange-traded notes similar to these are on the proceeding page.

63	Exchange traded	$750,000
64	Rule 144-A	**0**
		$750,000

This note has 3 CUSIPs, but one of them has no trading data available, and 595,504 is the amount submitted by NS

Norfolk Southern Corp.

64

Type:	Notes (New)
Description:	Senior
CUSIP:	655844CS5
Coupon Rate:	5.350%
Maturity Date:	8/1/2054
Amount Outstanding ($ 000)	$1,000,000
Months Outstanding	5.0

End of Month in 2023	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	97.225	5.56
September	91.580	5.97
October	85.131	6.49
November	95.915	5.65
December	104.975	5.05
Average	94.965	5.74 %

Source: Bloomberg

Norfolk Southern Corp.

65

Type:	Notes
Description:	Senior
CUSIP:	655844CH9
Coupon Rate:	3.155%
Maturity Date:	5/15/2055
Amount Outstanding ($ 000)	$799,996
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	71.962	4.93 %
February	65.364	5.49
March	68.998	5.24
April	69.114	5.23
May	66.556	5.45
June	68.524	5.29
July	67.835	5.35
August	66.089	5.44
September	61.415	5.88
October	56.608	6.40
November	64.653	5.64
December	71.234	5.07
Average	66.529	5.45 %

Source: Bloomberg

Note: This is the exchange-traded portion of these notes. The Rule 144-A notes similar to these have a different CUSIP, and are shown on the next page.

65	Exchange traded	**$799,996**
66	Rule 144-A	1
		$799,997

Norfolk Southern Corp.

66

Type:	Notes
Description:	Senior 144A
CUSIP:	655844CG1
Coupon Rate:	3.155%
Maturity Date:	5/15/2055
Amount Outstanding ($ 000)	$1
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	71.605	4.96 %
February	65.135	5.51
March	68.341	5.23
April	68.810	5.19
May	66.278	5.41
June	68.214	5.25
July	67.416	5.32
August	65.370	5.50
September	61.604	5.86
October	56.866	6.37
November	64.004	5.64
December	71.075	5.03
Average	66.227	5.44 %

Source: Bloomberg

Note: These are Rule 144-A notes, which trade among qualified institutional buyers and have their own CUSIP. The exchange-traded notes similar to these are on the proceeding page.

65	Exchange traded	$799,996
66	Rule 144-A	1
		$799,997

Norfolk Southern Corp.

67

Type:	Notes (New)
Description:	Senior
CUSIP:	655844CU0
Coupon Rate:	5.950%
Maturity Date:	3/15/2064
Amount Outstanding ($ 000)	$600,000
Months Outstanding	2.0

End of Month in 2023	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	Not Traded	-
September	Not Traded	-
October	Not Traded	-
November	102.662	5.80
December	112.506	5.23
Average	107.584	5.52 %

Source: Bloomberg

Norfolk Southern Corp.

68

Type:	Notes
Description:	CR NSC 2097
CUSIP:	655844AK4
Coupon Rate:	7.900%
Maturity Date:	5/15/2097
Amount Outstanding ($ 000)	$196,302
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	132.637	6.02 %
February	123.958	6.44
March	130.483	6.12
April	130.369	6.12
May	123.115	6.48
June	125.761	6.35
July	124.152	6.43
August	121.674	6.56
September	112.796	7.08
October	107.972	7.39
November	124.020	6.44
December	142.603	5.59
Average	124.962	6.42 %

Source: Bloomberg

Norfolk Southern Corp.

69

Type:	Notes
Description:	Senior 2105
CUSIP:	655844AV0
Coupon Rate:	6.000%
Maturity Date:	3/15/2105
Amount Outstanding ($ 000)	$157,780
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	99.352	6.19 %
February	92.984	6.61
March	97.655	6.29
April	97.378	6.31
May	93.271	6.58
June	94.964	6.47
July	93.748	6.55
August	91.732	6.69
September	83.838	7.30
October	78.848	7.76
November	87.065	7.04
December	105.343	5.83
Average	93.015	6.64 %

Source: Bloomberg

Norfolk Southern Corp.

70

Type:	Notes
Description:	Senior
CUSIP:	655844BD9
Coupon Rate:	6.000%
Maturity Date:	5/23/2111
Amount Outstanding ($ 000)	$79,726
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	102.856	5.91 %
February	95.982	6.34
March	101.734	5.98
April	101.563	5.99
May	96.898	6.28
June	98.089	6.20
July	96.773	6.28
August	94.648	6.42
September	88.192	6.89
October	83.719	7.25
November	93.690	6.49
December	106.415	5.72
Average	96.713	6.31 %

Source: Bloomberg

Norfolk Southern Corp.

71

Type:	Notes
Description:	Senior
CUSIP:	655844CB2
Coupon Rate:	5.100%
Maturity Date:	8/1/2118
Amount Outstanding ($ 000)	$350,521
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	91.391	5.68 %
February	84.821	6.12
March	88.725	5.85
April	87.976	5.90
May	84.552	6.14
June	86.647	5.99
July	86.699	5.99
August	84.310	6.15
September	78.496	6.60
October	73.895	7.00
November	83.785	6.19
December	91.377	5.68
Average	85.223	6.11 %

Source: Bloomberg

Norfolk Southern Corp.

72

Type:	Notes
Description:	Senior
CUSIP:	655844CJ5
Coupon Rate:	4.100%
Maturity Date:	5/15/2121
Amount Outstanding ($ 000)	$600,000
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	75.485	5.48 %
February	68.032	6.07
March	71.989	5.76
April	71.717	5.78
May	68.498	6.05
June	70.743	5.86
July	71.858	5.77
August	70.443	5.87
September	65.346	6.33
October	60.285	6.86
November	69.022	6.00
December	76.045	5.45
Average	69.955	5.94 %

Source: Bloomberg

Union Pacific Corp.

73

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DY1
Coupon Rate:	3.250%
Maturity Date:	1/15/2025
Amount Outstanding ($ 000)	$349,550
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.662	4.57 %
February	96.616	5.23
March	98.114	4.42
April	97.953	4.57
May	97.327	5.04
June	96.972	5.40
July	97.252	5.30
August	97.238	5.44
September	97.086	5.69
October	97.301	5.66
November	97.874	5.30
December	98.236	5.08
Average	97.469	5.14 %

Source: Bloomberg

Union Pacific Corp.

74

Type:	Notes
Description:	UP Corp.
CUSIP:	907818ES3
Coupon Rate:	3.750%
Maturity Date:	7/15/2025
Amount Outstanding ($ 000)	$499,073
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	98.327	4.50 %
February	97.171	5.05
March	98.679	4.39
April	98.630	4.43
May	98.014	4.77
June	97.226	5.24
July	97.331	5.25
August	97.253	5.35
September	96.910	5.63
October	97.216	5.51
November	97.948	5.11
December	98.509	4.81
Average	97.768	5.00 %

Source: Bloomberg

Union Pacific Corp.

75

Type:	Notes
Description:	UP Corp.
CUSIP:	907818ED6
Coupon Rate:	3.250%
Maturity Date:	8/15/2025
Amount Outstanding ($ 000)	$499,709
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.275	4.44 %
February	95.697	5.17
March	97.321	4.49
April	97.514	4.43
May	97.328	4.57
June	96.256	5.17
July	96.547	5.10
August	96.394	5.26
September	96.112	5.50
October	96.390	5.43
November	97.123	5.07
December	97.827	4.69
Average	96.815	4.94 %

Source: Bloomberg

Union Pacific Corp.

76

Type:	Notes (New)
Description:	UP Corp.
CUSIP:	907818GE2
Coupon Rate:	4.750%
Maturity Date:	2/21/2026
Amount Outstanding ($ 000)	$497,859
Months Outstanding	11.0

End of Month in 2023	Price	Yield
January	Not Traded	- %
February	99.461	4.97
March	101.202	4.32
April	101.138	4.33
May	100.430	4.60
June	99.386	5.02
July	99.631	4.92
August	99.505	4.99
September	98.797	5.32
October	98.769	5.36
November	99.818	4.87
December	100.696	4.44
Average	99.894	4.83 %

Source: Bloomberg

Union Pacific Corp.

77

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EH7
Coupon Rate:	2.750%
Maturity Date:	3/1/2026
Amount Outstanding ($ 000)	$649,113
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	95.534	4.34 %
February	93.680	5.08
March	95.986	4.27
April	95.971	4.30
May	95.436	4.56
June	94.636	4.97
July	94.624	5.03
August	94.661	5.09
September	93.994	5.48
October	94.060	5.54
November	95.164	5.09
December	96.351	4.58
Average	95.008	4.86 %

Source: Bloomberg

Union Pacific Corp.

78

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FJ2
Coupon Rate:	2.150%
Maturity Date:	2/5/2027
Amount Outstanding ($ 000)	$498,061
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	92.092	4.37 %
February	90.362	4.93
March	92.740	4.27
April	93.089	4.20
May	92.318	4.49
June	91.352	4.83
July	91.410	4.87
August	91.403	4.94
September	90.356	5.37
October	90.111	5.53
November	91.976	4.94
December	93.567	4.42
Average	91.731	4.76 %

Source: Bloomberg

Union Pacific Corp.

79

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EP9
Coupon Rate:	3.000%
Maturity Date:	4/15/2027
Amount Outstanding ($ 000)	$496,021
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	95.471	4.22 %
February	92.907	4.95
March	95.587	4.23
April	95.874	4.17
May	95.019	4.45
June	94.054	4.77
July	94.131	4.78
August	93.783	4.94
September	92.798	5.30
October	91.949	5.63
November	94.303	4.89
December	95.818	4.42
Average	94.308	4.73 %

Source: Bloomberg

Union Pacific Corp.

80

Type:	Debentures
Description:	UP Corp.
CUSIP:	907818BY3
Coupon Rate:	7.125%
Maturity Date:	2/1/2028
Amount Outstanding ($ 000)	$160,966
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	108.644	5.19 %
February	106.395	5.67
March	109.749	4.88
April	109.761	4.85
May	108.460	5.11
June	106.842	5.46
July	106.783	5.46
August	107.447	5.26
September	105.736	5.66
October	106.365	5.47
November	109.247	4.70
December	111.152	4.17
Average	108.048	5.16 %

Source: Bloomberg

Union Pacific Corp.

81

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EY0
Coupon Rate:	3.950%
Maturity Date:	9/10/2028
Amount Outstanding ($ 000)	$1,049,341
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	98.373	4.30 %
February	95.525	4.91
March	98.962	4.19
April	99.097	4.16
May	97.742	4.46
June	96.838	4.69
July	96.804	4.71
August	96.331	4.82
September	94.493	5.26
October	93.856	5.44
November	96.975	4.69
December	99.335	4.15
Average	97.028	4.65 %

Source: Bloomberg

Union Pacific Corp.

82

Type:	Debentures
Description:	UP Corp.
CUSIP:	907818CF3
Coupon Rate:	6.625%
Maturity Date:	2/1/2029
Amount Outstanding ($ 000)	$389,916
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	111.066	4.55 %
February	108.421	5.01
March	111.788	4.35
April	111.928	4.31
May	111.153	4.43
June	109.410	4.73
July	109.017	4.79
August	108.655	4.84
September	106.662	5.23
October	105.849	5.38
November	108.892	4.71
December	110.724	4.30
Average	109.464	4.72 %

Source: Bloomberg

Union Pacific Corp.

83

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FB9
Coupon Rate:	3.700%
Maturity Date:	3/1/2029
Amount Outstanding ($ 000)	$770,902
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.048	4.30 %
February	93.488	5.00
March	97.195	4.28
April	97.646	4.20
May	96.569	4.42
June	95.480	4.66
July	95.675	4.63
August	94.713	4.85
September	92.941	5.25
October	92.032	5.48
November	95.238	4.78
December	97.751	4.23
Average	95.481	4.67 %

Source: Bloomberg

Union Pacific Corp.

84

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FH6
Coupon Rate:	2.400%
Maturity Date:	2/5/2030
Amount Outstanding ($ 000)	$744,355
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	87.911	4.44 %
February	85.040	5.00
March	88.452	4.39
April	88.824	4.34
May	87.528	4.62
June	86.812	4.79
July	86.570	4.86
August	86.191	4.96
September	84.072	5.42
October	82.576	5.77
November	86.478	4.99
December	89.397	4.42
Average	86.654	4.83 %

Source: Bloomberg

Union Pacific Corp.

85

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FU7
Coupon Rate:	2.375%
Maturity Date:	5/20/2031
Amount Outstanding ($ 000)	$997,707
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	86.619	4.33 %
February	82.790	4.97
March	86.553	4.38
April	87.058	4.31
May	85.223	4.64
June	84.634	4.77
July	84.641	4.78
August	83.938	4.93
September	81.328	5.42
October	79.039	5.88
November	83.709	5.04
December	87.184	4.46
Average	84.393	4.83 %

Source: Bloomberg

Union Pacific Corp.

86

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FX1
Coupon Rate:	2.800%
Maturity Date:	2/14/2032
Amount Outstanding ($ 000)	$1,237,286
Months Outstanding	11.0

End of Month in 2023	Price	Yield
January	88.400	4.39 %
February	84.332	5.01
March	88.140	4.45
April	88.441	4.42
May	86.662	4.70
June	85.992	4.82
July	86.119	4.82
August	85.534	4.93
September	82.891	5.38
October	80.313	5.85
November	85.005	5.08
December	88.740	4.49
Average	85.881	4.86 %

Source: Bloomberg

Union Pacific Corp.

87

Type:	Notes
Description:	UP Corp.
CUSIP:	907818GB8
Coupon Rate:	4.500%
Maturity Date:	1/20/2033
Amount Outstanding ($ 000)	$890,842
Months Outstanding	4.0

End of Month in 2023	Price	Yield
January	100.873	4.41 %
February	96.021	5.03
March	100.421	4.47
April	100.768	4.42
May	98.676	4.69
June	98.155	4.76
July	97.792	4.81
August	96.874	4.94
September	93.551	5.41
October	91.162	5.77
November	96.353	5.02
December	100.813	4.41
Average	97.622	4.85 %

Source: Bloomberg

Union Pacific Corp.

88

Type:	Debentures
Description:	UP Corp.
CUSIP:	907818CS5
Coupon Rate:	5.375%
Maturity Date:	6/1/2033
Amount Outstanding ($ 000)	$143,104
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	102.974	5.07 %
February	98.331	5.65
March	103.532	4.99
April	105.221	4.78
May	102.777	5.08
June	101.499	5.24
July	100.691	5.35
August	101.175	5.28
September	96.533	5.91
October	95.139	6.11
November	99.147	5.55
December	102.848	5.05
Average	100.822	5.34 %

Source: Bloomberg

Union Pacific Corp.

89

Type:	Debentures
Description:	UP Corp.
CUSIP:	907818CU0
Coupon Rate:	6.250%
Maturity Date:	5/1/2034
Amount Outstanding ($ 000)	$152,390
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	109.981	5.10 %
February	105.396	5.62
March	110.920	4.98
April	111.114	4.96
May	108.854	5.21
June	106.177	5.51
July	106.407	5.48
August	105.687	5.56
September	102.050	6.01
October	99.458	6.35
November	106.174	5.49
December	110.927	4.92
Average	106.929	5.43 %

Source: Bloomberg

Union Pacific Corp.

90

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EB0
Coupon Rate:	3.375%
Maturity Date:	2/1/2035
Amount Outstanding ($ 000)	$446,289
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	89.223	4.61 %
February	84.299	5.22
March	88.069	4.76
April	88.397	4.73
May	86.439	4.98
June	85.391	5.12
July	85.397	5.13
August	84.391	5.27
September	81.582	5.65
October	78.966	6.03
November	84.082	5.34
December	88.512	4.78
Average	85.396	5.14 %

Source: Bloomberg

Union Pacific Corp.

91

Type:	Notes (Exchange)
Description:	UP Corp.
CUSIP:	907818FQ6
Coupon Rate:	2.891%
Maturity Date:	4/6/2036
Amount Outstanding ($ 000)	$610,125
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	83.415	4.61 %
February	78.631	5.19
March	82.905	4.69
April	83.423	4.64
May	80.739	4.97
June	79.390	5.14
July	79.623	5.11
August	79.104	5.19
September	76.162	5.58
October	73.274	5.99
November	79.215	5.21
December	84.348	4.61
Average	80.019	5.08 %

Source: Bloomberg

Exchange Offer, 424B3, Prospectus Dated September 3, 2021
Note: This is the Exchange traded portion of the notes, the 144A portion is shown on the prior page

91	$610,125
92	1716
	$611,841

Union Pacific Corp.

92

Type:	Notes (Exchange)
Description:	UP Corp. 144A
CUSIP:	907818FP8
Coupon Rate:	2.891%
Maturity Date:	4/6/2036
Amount Outstanding ($ 000)	$1,716
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	83.307	4.63 %
February	79.068	5.13
March	82.712	4.71
April	83.127	4.67
May	80.540	4.99
June	79.260	5.16
July	79.574	5.13
August	78.939	5.22
September	76.015	5.61
October	73.150	6.02
November	79.074	5.24
December	84.176	4.63
Average	79.912	5.10 %

Source: Bloomberg

Exchange Offer, 424B3, Prospectus Dated September 3, 2021,
interest accrues from April 6, 2021

Note: These are Rule 144-A notes, which trade among qualified institutional buyers.

92	$1,716
91	610125
	$611,841

Union Pacific Corp.

93

Type:	Debentures
Description:	UP Corp.
CUSIP:	907818CX4
Coupon Rate:	6.150%
Maturity Date:	5/1/2037
Amount Outstanding ($ 000)	$89,902
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	111.190	5.11 %
February	106.063	5.60
March	112.130	5.01
April	112.283	5.00
May	109.539	5.25
June	105.837	5.61
July	104.872	5.71
August	103.972	5.80
September	99.896	6.23
October	96.638	6.60
November	103.722	5.82
December	109.302	5.25
Average	106.287	5.58 %

Source: Bloomberg

Union Pacific Corp.

94

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EQ7
Coupon Rate:	3.600%
Maturity Date:	9/15/2037
Amount Outstanding ($ 000)	$495,825
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	88.792	4.69 %
February	84.174	5.18
March	88.397	4.73
April	88.593	4.72
May	86.008	5.00
June	85.198	5.10
July	85.176	5.11
August	83.597	5.29
September	80.273	5.68
October	77.300	6.06
November	83.333	5.34
December	89.371	4.68
Average	85.018	5.13 %

Source: Bloomberg

Union Pacific Corp.

95

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EV6
Coupon Rate:	4.375%
Maturity Date:	9/10/2038
Amount Outstanding ($ 000)	$231,167
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	95.171	4.88 %
February	90.353	5.35
March	92.905	5.10
April	93.774	5.02
May	91.788	5.22
June	90.470	5.35
July	90.148	5.39
August	87.820	5.64
September	84.742	5.99
October	81.812	6.33
November	87.973	5.64
December	93.503	5.06
Average	90.038	5.41 %

Source: Bloomberg

Union Pacific Corp.

96

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FD5
Coupon Rate:	3.550%
Maturity Date:	8/15/2039
Amount Outstanding ($ 000)	$494,589
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	87.761	4.64 %
February	82.020	5.21
March	85.776	4.85
April	86.118	4.82
May	83.279	5.11
June	83.498	5.09
July	83.419	5.11
August	81.122	5.35
September	77.832	5.72
October	73.873	6.19
November	80.434	5.45
December	86.429	4.83
Average	82.630	5.20 %

Source: Bloomberg

Union Pacific Corp.

97

Type:	Notes
Description:	UP Corp. 144A
CUSIP:	907818DE5
Coupon Rate:	5.780%
Maturity Date:	7/15/2040
Amount Outstanding ($ 000)	$10
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	105.948	5.32 %
February	100.405	5.80
March	101.780	5.68
April	102.809	5.59
May	101.310	5.72
June	100.879	5.75
July	99.696	5.86
August	97.219	6.09
September	92.835	6.56
October	89.883	6.85
November	99.153	5.91
December	103.740	5.49
Average	99.638	5.89 %

Source: Bloomberg

Note: These are Rule 144-A notes, which trade among qualified institutional buyers.

97	$10
98	64831
	$64,841

Union Pacific Corp.

98

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DF2
Coupon Rate:	5.780%
Maturity Date:	7/15/2040
Amount Outstanding ($ 000)	$64,831
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	105.749	5.34 %
February	100.440	5.81
March	106.720	5.26
April	106.990	5.23
May	104.050	5.49
June	103.219	5.56
July	101.855	5.68
August	100.780	5.78
September	96.390	6.20
October	92.747	6.57
November	100.562	5.80
December	106.991	5.22
Average	102.208	5.66 %

Source: Bloomberg

Note: This is the exchange-traded portion of these notes. The Rule 144-A notes similar to these have a different CUSIP, and are shown on the next page.

98	$64,831
97	10
	$64,841

Union Pacific Corp.

99

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FT0
Coupon Rate:	3.200%
Maturity Date:	5/20/2041
Amount Outstanding ($ 000)	$991,727
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	83.051	4.60 %
February	77.002	5.18
March	81.109	4.80
April	81.070	4.81
May	77.912	5.12
June	78.345	5.07
July	78.460	5.07
August	76.438	5.29
September	72.626	5.71
October	68.491	6.19
November	75.188	5.45
December	80.950	4.86
Average	77.554	5.18 %

Source: Bloomberg

Prospectus supplement dated May 17, 2021
Interest accrues from May 20, 2021

Union Pacific Corp.

100

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DJ4
Coupon Rate:	4.750%
Maturity Date:	9/15/2041
Amount Outstanding ($ 000)	$212,714
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	97.480	5.05 %
February	92.122	5.52
March	98.010	5.01
April	98.126	5.00
May	95.218	5.25
June	91.755	5.56
July	90.652	5.67
August	89.380	5.79
September	84.104	6.32
October	80.391	6.73
November	86.897	6.04
December	93.341	5.43
Average	91.456	5.61 %

Source: Bloomberg

Union Pacific Corp.

101

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FY9
Coupon Rate:	3.375%
Maturity Date:	2/14/2042
Amount Outstanding ($ 000)	$495,123
Months Outstanding	11.0

End of Month in 2023	Price	Yield
January	84.703	4.62 %
February	78.450	5.21
March	82.896	4.79
April	83.206	4.77
May	79.770	5.09
June	79.873	5.08
July	79.900	5.09
August	77.932	5.28
September	74.452	5.66
October	70.239	6.13
November	76.522	5.45
December	82.160	4.90
Average	79.175	5.17 %

Source: Bloomberg

Union Pacific Corp.

102

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DL9
Coupon Rate:	4.300%
Maturity Date:	6/15/2042
Amount Outstanding ($ 000)	$204,411
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	89.813	5.17 %
February	84.930	5.62
March	90.663	5.10
April	90.665	5.10
May	87.872	5.35
June	87.257	5.41
July	86.357	5.50
August	84.937	5.64
September	80.224	6.12
October	75.691	6.61
November	83.080	5.83
December	88.155	5.35
Average	85.804	5.57 %

Source: Bloomberg

Union Pacific Corp.

103

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DP0
Coupon Rate:	4.250%
Maturity Date:	4/15/2043
Amount Outstanding ($ 000)	$183,677
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	87.150	5.34 %
February	82.136	5.81
March	87.796	5.29
April	87.694	5.30
May	84.731	5.58
June	84.374	5.61
July	83.146	5.73
August	82.109	5.84
September	78.033	6.26
October	74.353	6.66
November	80.824	5.98
December	86.139	5.47
Average	83.207	5.74 %

Source: Bloomberg

Union Pacific Corp.

104

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DU9
Coupon Rate:	4.750%
Maturity Date:	12/15/2043
Amount Outstanding ($ 000)	$182,804
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	95.458	5.15 %
February	89.965	5.61
March	96.090	5.10
April	93.482	5.31
May	90.521	5.57
June	89.937	5.62
July	89.331	5.68
August	88.234	5.78
September	83.936	6.19
October	79.404	6.66
November	86.280	5.97
December	92.542	5.41
Average	89.598	5.67 %

Source: Bloomberg

Union Pacific Corp.

105

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DT2
Coupon Rate:	4.821%
Maturity Date:	2/1/2044
Amount Outstanding ($ 000)	$130,775
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	98.056	5.04 %
February	90.251	5.69
March	94.129	5.36
April	94.203	5.35
May	91.112	5.62
June	90.846	5.64
July	89.643	5.75
August	88.715	5.84
September	84.030	6.28
October	79.535	6.75
November	86.493	6.05
December	92.484	5.51
Average	89.958	5.74 %

Source: Bloomberg

Note: This is the exchange-traded portion of these notes. The Rule 144-A notes similar to these have a different CUSIP, and are shown on the next page.

105	$130,775
106	1
	$130,776

Union Pacific Corp.

106

Type:	Notes
Description:	UP Corp. 144A
CUSIP:	907818DS4
Coupon Rate:	4.821%
Maturity Date:	2/1/2044
Amount Outstanding ($ 000)	$1
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	95.917	5.20 %
February	90.383	5.71
March	93.841	5.40
April	93.873	5.42
May	91.424	5.67
June	90.768	5.67
July	89.580	5.76
August	87.598	5.96
September	82.646	6.43
October	79.196	6.80
November	86.195	6.13
December	92.719	5.53
Average	89.512	5.81 %

Source: Bloomberg

Note: These are Rule 144-A notes, which trade among qualified institutional buyers.

106	$1
105	130775
	$130,776

Union Pacific Corp.

107

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DX3
Coupon Rate:	4.850%
Maturity Date:	6/15/2044
Amount Outstanding ($ 000)	$83,354
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	90.244	5.71 %
February	85.371	6.15
March	91.073	5.64
April	91.054	5.65
May	88.345	5.89
June	87.489	5.97
July	85.911	6.12
August	85.124	6.19
September	80.149	6.69
October	75.794	7.17
November	82.790	6.43
December	88.670	5.87
Average	86.001	6.12 %

Source: Bloomberg

Union Pacific Corp.

108

Type:	Notes
Description:	UP Corp.
CUSIP:	907818DZ8
Coupon Rate:	4.150%
Maturity Date:	1/15/2045
Amount Outstanding ($ 000)	$229,141
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	88.166	5.09 %
February	83.563	5.49
March	86.833	5.20
April	87.339	5.16
May	84.512	5.41
June	82.379	5.61
July	82.007	5.64
August	79.621	5.87
September	76.683	6.17
October	72.848	6.57
November	79.130	5.93
December	85.565	5.34
Average	82.387	5.62 %

Source: Bloomberg

Union Pacific Corp.

109

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EF1
Coupon Rate:	4.050%
Maturity Date:	11/15/2045
Amount Outstanding ($ 000)	$396,048
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	88.516	4.91 %
February	82.782	5.39
March	87.103	5.03
April	87.061	5.04
May	84.122	5.29
June	84.644	5.25
July	83.414	5.35
August	81.374	5.54
September	77.134	5.94
October	72.268	6.44
November	79.318	5.74
December	85.867	5.16
Average	82.800	5.42 %

Source: Bloomberg

Union Pacific Corp.

110

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EJ3
Coupon Rate:	4.050%
Maturity Date:	3/1/2046
Amount Outstanding ($ 000)	$515,958
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	87.838	4.96 %
February	82.705	5.39
March	85.796	5.13
April	86.256	5.09
May	84.047	5.28
June	83.684	5.31
July	82.849	5.39
August	81.402	5.52
September	77.586	5.88
October	72.535	6.39
November	79.721	5.68
December	86.222	5.11
Average	82.553	5.43 %

Source: Bloomberg

Union Pacific Corp.

111

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EK0
Coupon Rate:	3.350%
Maturity Date:	8/15/2046
Amount Outstanding ($ 000)	$296,493
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	78.287	4.95 %
February	72.878	5.44
March	76.606	5.10
April	77.296	5.05
May	73.990	5.35
June	74.484	5.31
July	73.925	5.36
August	71.603	5.59
September	67.249	6.03
October	63.158	6.49
November	69.710	5.79
December	75.963	5.20
Average	72.929	5.47 %

Source: Bloomberg

Union Pacific Corp.

112

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EN4
Coupon Rate:	4.000%
Maturity Date:	4/15/2047
Amount Outstanding ($ 000)	$489,819
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	87.652	4.90 %
February	81.792	5.38
March	87.059	4.95
April	86.690	4.98
May	82.906	5.30
June	84.332	5.18
July	83.815	5.22
August	81.214	5.45
September	77.359	5.80
October	71.863	6.35
November	79.168	5.64
December	85.043	5.13
Average	82.408	5.36 %

Source: Bloomberg

Union Pacific Corp.

113

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EW4
Coupon Rate:	4.500%
Maturity Date:	9/10/2048
Amount Outstanding ($ 000)	$386,086
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	93.433	4.98 %
February	87.694	5.42
March	91.023	5.16
April	91.640	5.11
May	88.031	5.39
June	89.944	5.24
July	89.634	5.27
August	87.612	5.43
September	83.697	5.76
October	77.944	6.28
November	85.132	5.64
December	92.284	5.07
Average	88.172	5.40 %

Source: Bloomberg

Union Pacific Corp.

114

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FC7
Coupon Rate:	4.300%
Maturity Date:	3/1/2049
Amount Outstanding ($ 000)	$627,129
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	91.726	4.89 %
February	85.876	5.34
March	89.828	5.03
April	90.340	5.00
May	86.524	5.29
June	87.998	5.18
July	87.404	5.22
August	85.825	5.35
September	81.434	5.72
October	75.556	6.26
November	82.874	5.60
December	89.385	5.08
Average	86.231	5.33 %

Source: Bloomberg

Union Pacific Corp.

115

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FK9
Coupon Rate:	3.250%
Maturity Date:	2/5/2050
Amount Outstanding ($ 000)	$1,695,943
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	78.009	4.72 %
February	71.992	5.21
March	76.471	4.84
April	76.716	4.82
May	73.475	5.10
June	74.593	5.04
July	74.577	5.04
August	72.098	5.29
September	68.227	5.64
October	63.217	6.15
November	70.807	5.41
December	76.921	4.89
Average	73.092	5.18 %

Source: Bloomberg

Union Pacific Corp.

116

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EM6
Coupon Rate:	3.799%
Maturity Date:	10/1/2051
Amount Outstanding ($ 000)	$715,652
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	85.274	4.78 %
February	79.212	5.24
March	83.996	4.88
April	84.040	4.87
May	80.788	5.10
June	82.057	5.03
July	81.519	5.07
August	79.005	5.25
September	74.541	5.65
October	69.452	6.12
November	77.584	5.39
December	84.392	4.84
Average	80.155	5.19 %

Source: Bloomberg

Union Pacific Corp.

117

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FW3
Coupon Rate:	2.950%
Maturity Date:	3/10/2052
Amount Outstanding ($ 000)	$841,418
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	72.589	4.70 %
February	67.289	5.15
March	71.451	4.80
April	71.076	4.83
May	68.048	5.11
June	69.436	4.99
July	68.920	5.02
August	66.744	5.22
September	62.058	5.68
October	58.085	6.10
November	65.723	5.34
December	71.457	4.84
Average	67.740	5.15 %

Source: Bloomberg

Prospectus supplement dated September 7, 2021
Interest accrues from September 10, 2021

Union Pacific Corp.

118

Type:	Notes
Description:	UP Corp.
CUSIP:	907818GC6
Coupon Rate:	4.950%
Maturity Date:	9/9/2052
Amount Outstanding ($ 000)	$590,095
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	102.884	4.79 %
February	96.132	5.23
March	101.652	4.86
April	102.329	4.82
May	98.152	5.09
June	99.299	5.02
July	99.378	5.01
August	96.897	5.19
September	91.426	5.58
October	84.884	6.10
November	94.366	5.35
December	102.628	4.81
Average	97.502	5.15 %

Source: Bloomberg

Union Pacific Corp.

119

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FZ6
Coupon Rate:	3.500%
Maturity Date:	2/14/2053
Amount Outstanding ($ 000)	$1,234,758
Months Outstanding	11.0

End of Month in 2023	Price	Yield
January	81.202	4.69 %
February	74.608	5.20
March	79.558	4.81
April	79.647	4.81
May	76.126	5.08
June	77.321	4.99
July	76.882	5.03
August	74.395	5.23
September	70.276	5.59
October	64.959	6.09
November	73.084	5.35
December	79.820	4.81
Average	75.657	5.14 %

Source: Bloomberg

CSX Corporation

120

Type:	Notes (New)
Description:	UP Corp.
CUSIP:	907818GF9
Coupon Rate:	4.950%
Maturity Date:	5/15/2053
Amount Outstanding ($ 000)	$494,126
Months Outstanding	11.0

End of Month in 2023	Price	Yield
January	Not Traded	- %
February	95.487	5.27
March	101.640	4.86
April	101.338	4.88
May	97.314	5.14
June	99.376	5.01
July	99.117	5.03
August	96.232	5.22
September	90.868	5.62
October	84.811	6.08
November	94.088	5.38
December	102.515	4.82
Average	96.617	5.21 %

Source: Bloomberg

Union Pacific Corp.

121

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EC8
Coupon Rate:	3.875%
Maturity Date:	2/1/2055
Amount Outstanding ($ 000)	$444,334
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	85.716	4.79 %
February	78.325	5.33
March	82.498	5.02
April	82.913	4.99
May	80.200	5.19
June	81.167	5.12
July	80.306	5.19
August	78.073	5.36
September	73.460	5.74
October	67.943	6.25
November	75.863	5.54
December	82.319	5.04
Average	79.065	5.30 %

Source: Bloomberg

Union Pacific Corp.

122

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EX2
Coupon Rate:	4.800%
Maturity Date:	9/10/2058
Amount Outstanding ($ 000)	$25,788
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	89.981	5.51 %
February	83.716	5.97
March	90.899	5.45
April	91.283	5.42
May	87.929	5.65
June	89.360	5.54
July	88.615	5.60
August	85.671	5.81
September	79.583	6.30
October	74.888	6.72
November	83.507	5.98
December	90.750	5.45
Average	86.349	5.78 %

Source: Bloomberg

Union Pacific Corp.

123

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FE3
Coupon Rate:	3.950%
Maturity Date:	8/15/2059
Amount Outstanding ($ 000)	$491,420
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	84.645	4.88 %
February	77.967	5.36
March	82.358	5.04
April	82.719	5.02
May	79.691	5.23
June	81.544	5.10
July	80.616	5.17
August	77.899	5.37
September	73.159	5.75
October	67.619	6.25
November	75.483	5.56
December	82.468	5.04
Average	78.847	5.31 %

Source: Bloomberg

Union Pacific Corp.

124

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FG8
Coupon Rate:	3.839%
Maturity Date:	3/20/2060
Amount Outstanding ($ 000)	$1,419,466
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	83.228	4.85 %
February	76.001	5.36
March	80.932	5.01
April	81.438	4.97
May	77.734	5.23
June	79.543	5.10
July	79.425	5.11
August	76.920	5.30
September	70.293	5.85
October	66.236	6.21
November	74.817	5.46
December	82.029	4.93
Average	77.383	5.28 %

Source: Bloomberg

Note: This is the exchange-traded portion of these notes. The Rule 144-A notes similar to these have a different CUSIP, and are shown on the next page.

124	$1,419,466
125	184
	$1,419,650

Union Pacific Corp.

125

Type:	Notes
Description:	UP Corp. 144A
CUSIP:	907818FF0
Coupon Rate:	3.839%
Maturity Date:	3/20/2060
Amount Outstanding ($ 000)	$184
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	83.333	4.85 %
February	77.522	5.26
March	81.240	4.99
April	81.285	4.99
May	77.723	5.25
June	79.365	5.13
July	79.166	5.14
August	76.950	5.31
September	70.379	5.84
October	66.151	6.23
November	74.654	5.49
December	81.848	4.96
Average	77.468	5.29 %

Source: Bloomberg

Note: These are Rule 144-A notes, which trade among qualified institutional buyers.

125	$184
124	1419466
	$1,419,650

Union Pacific Corp.

126

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FV5
Coupon Rate:	3.550%
Maturity Date:	5/20/2061
Amount Outstanding ($ 000)	$640,416
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	78.275	4.83 %
February	71.498	5.33
March	76.237	4.97
April	76.495	4.96
May	72.327	5.27
June	74.085	5.14
July	73.903	5.15
August	71.195	5.36
September	66.934	5.72
October	61.221	6.27
November	69.001	5.55
December	75.651	5.03
Average	72.235	5.30 %

Source: Bloomberg

Prospectus supplement dated May 17, 2021
Interest accrues from May 20, 2021

Union Pacific Corp.

127

Type:	Notes (Exchange)
Description:	UP Corp.
CUSIP:	907818FN3
Coupon Rate:	2.973%
Maturity Date:	9/16/2062
Amount Outstanding ($ 000)	$716,465
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	69.258	4.72 %
February	62.526	5.24
March	66.836	4.89
April	66.679	4.91
May	63.487	5.17
June	65.477	5.01
July	64.978	5.06
August	61.854	5.33
September	57.902	5.70
October	52.923	6.22
November	60.702	5.44
December	67.631	4.85
Average	63.354	5.21 %

Source: Bloomberg

Exchange Offer, 424B3, Prospectus Dated May 5, 2021,

Note: This is the Exchange traded portion of the notes, the 144A portion is shown on the next page

127	$716,465
128	3004
	$719,469

Union Pacific Corp.

128

Type:	Notes (Exchange)
Description:	UP Corp. 144A
CUSIP:	907818FM5
Coupon Rate:	2.973%
Maturity Date:	9/16/2062
Amount Outstanding ($ 000)	$3,004
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	68.889	4.75 %
February	63.202	5.20
March	66.534	4.93
April	66.783	4.91
May	62.686	5.25
June	65.123	5.05
July	64.818	5.07
August	62.046	5.31
September	57.388	5.75
October	52.905	6.22
November	60.436	5.46
December	67.960	4.84
Average	63.231	5.23 %

Source: Bloomberg

Note: These are Rule 144-A notes, which trade among qualified institutional buyers.

128	$3,004
127	716465
	$719,469

Union Pacific Corp.

129

Type:	Notes
Description:	UP Corp.
CUSIP:	907818GD4
Coupon Rate:	5.150%
Maturity Date:	1/20/2063
Amount Outstanding ($ 000)	$393,126
Months Outstanding	4.0

End of Month in 2023	Price	Yield
January	103.536	4.98 %
February	96.022	5.43
March	101.334	5.11
April	102.130	5.05
May	98.748	5.26
June	100.192	5.17
July	100.138	5.18
August	96.103	5.42
September	90.258	5.81
October	83.195	6.35
November	93.218	5.61
December	102.485	5.04
Average	97.280	5.37 %

Source: Bloomberg

Note: These are Medium Term Notes, referred to as Series B.

Union Pacific Corp.

130

Type:	Notes
Description:	UP Corp.
CUSIP:	907818EG9
Coupon Rate:	4.375%
Maturity Date:	11/15/2065
Amount Outstanding ($ 000)	$169,458
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	84.378	5.35 %
February	78.066	5.81
March	82.963	5.45
April	82.844	5.46
May	79.848	5.67
June	80.428	5.63
July	78.906	5.75
August	78.190	5.80
September	75.466	6.02
October	69.639	6.54
November	76.525	5.94
December	83.476	5.42
Average	79.227	5.74 %

Source: Bloomberg

Union Pacific Corp.

131

Type:	Notes
Description:	UP Corp.
CUSIP:	907818ER5
Coupon Rate:	4.100%
Maturity Date:	9/15/2067
Amount Outstanding ($ 000)	$494,515
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	85.379	4.95 %
February	78.173	5.44
March	83.527	5.07
April	84.129	5.03
May	81.235	5.22
June	83.334	5.07
July	82.292	5.14
August	79.384	5.35
September	74.038	5.76
October	68.008	6.28
November	76.343	5.58
December	83.765	5.06
Average	79.967	5.33 %

Source: Bloomberg

Union Pacific Corp.

132

Type:	Notes
Description:	UP Corp.
CUSIP:	907818FL7
Coupon Rate:	3.750%
Maturity Date:	2/5/2070
Amount Outstanding ($ 000)	$742,314
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	78.720	4.96 %
February	72.325	5.42
March	76.537	5.11
April	76.806	5.09
May	74.281	5.27
June	76.131	5.14
July	75.506	5.17
August	73.123	5.36
September	68.460	5.73
October	62.777	6.25
November	70.917	5.53
December	78.169	5.00
Average	73.646	5.34 %

Source: Bloomberg

Union Pacific Corp.

133

Type:	Notes (Exchange)
Description:	UP Corp.
CUSIP:	907818FS2
Coupon Rate:	3.799%
Maturity Date:	4/6/2071
Amount Outstanding ($ 000)	$817,752
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	79.617	4.94 %
February	72.742	5.43
March	78.017	5.05
April	78.300	5.03
May	75.562	5.21
June	76.841	5.12
July	76.086	5.17
August	73.603	5.35
September	68.331	5.79
October	62.712	6.30
November	71.835	5.50
December	79.274	4.96
Average	74.410	5.32 %

Source: Bloomberg

Exchange Offer, 424B3, Prospectus Dated September 3, 2021,

Note: This is the Exchange traded portion of the notes, the 144A portion is shown on the next page

133	$817,752
134	7274
	$825,026

Union Pacific Corp.

134

Type:	Notes (Exchange)
Description:	UP Corp. 144A
CUSIP:	907818FR4
Coupon Rate:	3.799%
Maturity Date:	4/6/2071
Amount Outstanding ($ 000)	$7,274
Months Outstanding	12.0

End of Month in 2023	Price	Yield
January	80.646	4.84 %
February	74.566	5.26
March	78.419	4.99
April	78.398	4.99
May	74.817	5.24
June	76.694	5.11
July	74.533	5.26
August	73.799	5.32
September	68.042	5.78
October	62.730	6.27
November	71.363	5.51
December	79.052	4.95
Average	74.422	5.29 %

Source: Bloomberg

Note: These are Rule 144-A notes, which trade among qualified institutional buyers.

134	$7,274
133	817752
	$825,026

Union Pacific Corp.

135

Type:	Notes (New)
Description:	UP Corp.
CUSIP:	907818GA0
Coupon Rate:	3.850%
Maturity Date:	2/14/2072
Amount Outstanding ($ 000)	$493,553
Months Outstanding	12.0

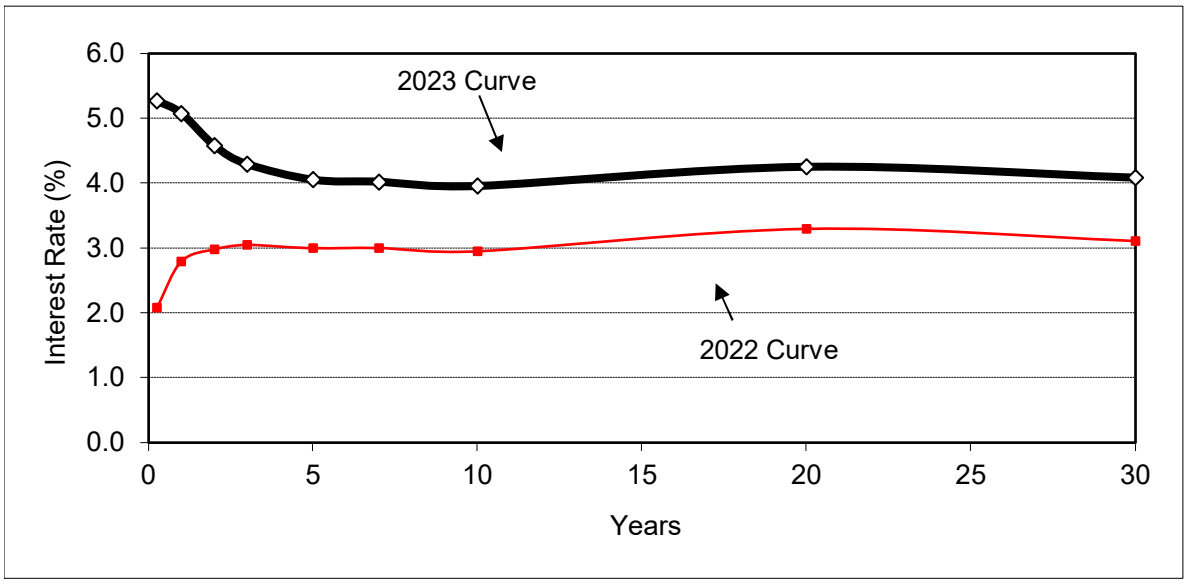
End of Month in 2023	Price	Yield
January	80.661	4.93 %
February	74.557	5.35
March	79.542	5.00
April	79.904	4.98
May	76.178	5.23
June	77.642	5.13
July	76.806	5.19
August	74.710	5.34
September	69.299	5.77
October	63.692	6.27
November	71.836	5.56
December	79.935	4.98
Average	75.397	5.31 %

Source: Bloomberg

Interest Rates on Selected Government Instruments

Yield in Percent Per Annum, Constant Maturity Rates for 2023

	3 Mo.	1 Yr	2 Yr	3 Yr	5 Yr	7 Yr	10 Yr	20 Yr	30 Yr
January	4.69	4.69	4.21	3.91	3.64	3.59	3.53	3.81	3.66
February	4.79	4.93	4.53	4.23	3.94	3.86	3.75	3.95	3.80
March	4.86	4.68	4.30	4.09	3.82	3.77	3.66	3.94	3.77
April	5.07	4.68	4.02	3.76	3.54	3.50	3.46	3.80	3.68
May	5.31	4.91	4.13	3.82	3.59	3.58	3.57	3.96	3.86
June	5.42	5.24	4.64	4.27	3.95	3.85	3.75	4.04	3.87
July	5.49	5.37	4.83	4.47	4.14	4.03	3.90	4.15	3.96
August	5.56	5.37	4.90	4.59	4.31	4.26	4.17	4.46	4.28
September	5.56	5.44	5.02	4.74	4.49	4.46	4.38	4.65	4.47
October	5.60	5.42	5.07	4.89	4.77	4.82	4.80	5.13	4.95
November	5.52	5.28	4.88	4.64	4.49	4.53	4.50	4.84	4.66
December	5.44	4.96	4.46	4.19	4.00	4.04	4.02	4.32	4.14
Average	**5.28**	**5.08**	**4.58**	**4.30**	**4.06**	**4.02**	**3.96**	**4.25**	**4.09**



Source: Federal Reserve statistical release H.15, Treasury Constant Maturities, Nominal

Equipment Trust Certificates for CSX

Modeled ETCs

	ETC ID	Maturity	Balance For 2023 ($000) Beg.	Ending	Avg O/S	Current Valuation Interest Rate	Valuation Factor	Current Market Value	Interest
1.	[None]				--			--	--
2.					--			--	--
3.					--			--	--
4.					--			--	--
5.					--			--	--
6.					--			--	--
7.					--			--	--
8.					--			--	--
9.					--			--	--
10.					--			--	--
11.					--			--	--
12.					--			--	--
13.					--			--	--
14.					--			--	--
15.					--			--	--
	Total		$0	$0	$0	--		**$0**	$0

Non-Modeled ETCs

	ETC ID	Maturity	Balance For 2023 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Equipment Trust Certificates for CSX (continued)

Entire ETC Current – Not Used for Cost or Market Value

	ETC ID	Maturity	Balance 2023 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Grand Totals (for reconciliation to carrier data)

	Balance For 2023 ($000) Beg.	Ending
Total Modeled	$0	$0
Total Non-Modeled	0	0
Sub Total	0	0
Total All Current	0	0
Grand Total	$0	$0
From CSX:		
Total ETCs		$0
Difference		$0

Equipment Trust Certificates for NS

Modeled ETCs

	ETC ID	Maturity	Balance For 2023 ($000) Beg.	Ending	Avg O/S	Current Valuation Interest Rate	Valuation Factor	Current Market Value	Interest
1.	[None]				--			--	--
2.					--			--	--
3.					--			--	--
4.					--			--	--
5.					--			--	--
6.					--			--	--
7.					--			--	--
8.					--			--	--
9.					--			--	--
10.					--			--	--
11.					--			--	--
12.					--			--	--
13.					--			--	--
14.					--			--	--
15.					--			--	--
	Total		$0	$0	$0	--		**$0**	$0

Non-Modeled ETCs

	ETC ID	Maturity	Balance For 2023 ($000) Beg.	Ending
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Equipment Trust Certificates for NS (continued)

Entire ETC Current – Not Used for Cost or Market Value

	ETC ID	Maturity	Balance 2023 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Grand Totals (for reconciliation to carrier data)

	Balance For 2023 ($000) Beg.	Ending
Total Modeled	$0	$0
Total Non-Modeled	0	0
Sub Total	0	0
Total All Current	0	0
Grand Total	$0	$0
From NS:		
Total ETCs		$0
Difference		$0

Equipment Trust Certificates for UP

Modeled ETCs

	ETC ID	Maturity	Balance For 2023 ($000) Beg.	Ending	Avg O/S	Current Valuation Interest Rate	Valuation Factor	Current Market Value	Interest
1.	ETC UPC Series J	1/2/2031	24,027	21,458	22,743	4.785%	1.06200	24,152	1,156
2.	ETC UPC Series A	5/14/2026	361,478	344,608	353,043	5.038%	0.95983	338,863	17,071
3.	ETC UPC Series 2015 A	5/12/2027	301,714	288,296	295,005	4.922%	0.94104	277,611	13,665
4.	ETC UPC Series 2016 A	11/9/2029	118,890	113,782	116,336	4.832%	0.91963	106,986	5,170
5.					--			--	--
6.					--			--	--
7.					--			--	--
8.					--			--	--
9.					--			--	--
10.					--			--	--
11.					--			--	--
12.					--			--	--
13.					--			--	--
14.					--			--	--
15.					--			--	--
	Total		$806,109	$768,144	$787,127	**4.957%**		**$747,612**	$37,061

Non-Modeled ETCs

	ETC ID	Maturity	Balance For 2023 ($000) Beg.	Ending
1.	[None]			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Equipment Trust Certificates for UP (continued)

Entire ETC Current – Not Used for Cost or Market Value

	ETC ID	Maturity	Balance 2023 ($000) Beg.	Ending
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
	Total		$0	$0

Grand Totals (for reconciliation to carrier data)

	Balance For 2023 ($000) Ending
Total Modeled	$768,144
Total Non-Modeled	0
Sub Total	768,144
Total All Current	0
Grand Total	$768,144
From UP:	
Total ETCs	$768,143
Difference	$1

2023 Market Value of Debt ($000)

Type of Debt	Market Value: Traded or Modeled	Market Value: Non-Traded or Non-Modeled	Market Value: Total	Percent of: Subtotal	Percent of: Total
Bonds, Notes & Debentures	$54,207,251	$591,679	$54,798,930	98.65%	100.60%
Equipment Trust Certificates	747,612		747,612	1.35%	1.37%
Conditional Sales Agreements	0		0	0.00%	0.00%
Sub Total	$54,954,863	$591,679	$55,546,542	100.00%	101.97%
All Other — Capital Leases		$174,012	$174,012	-16.20%	0.32%
All Other — Misc. Debt		-1,248,382	-1,248,382	116.20%	-2.29%
All Other — Non-Modeled ETC		0	0	0.00%	0.00%
All Other — Non-Modeled CSA		0	0	0.00%	0.00%
Sub Total			-$1,074,370	100.00%	-1.97%
Total Market Value			**$54,472,172**		100.00%

General Notes:

Bonds, Notes, and Debentures from Appendix A. Securities that did not trade were assigned a market value equal to their book value. The traded portion accounts for 98.92 percent of the total market value for this category.

Equipment Trust Certificates from Appendix C.

All Conditional Sales Agreements have been retired.

Capital Leases and Miscellaneous Debt listed in work papers.

The capital leases and miscellaneous debt portion of the All Other debt category was assigned a market value equal to its book value, and totals to -$1,074,370 thousand. The non-modeled ETCs and CSAs are typically also assigned a market value equal to their book value, but there were none for this year. The All Other category totals to -$1,074,370 thousand, or -2.0 percent of total debt.

If negative numbers appear in Miscellaneous Debt, they typically are related to debt premiums and discounts.

2023 Flotation Costs for Bonds

	CSX Sr Notes	NSC Sr Notes	NSC Sr Notes	NSC Sr Notes	NSC Sr Notes	NSC Sr Notes
From 424(b)	**9/5/2023**	**1/26/2023**	**7/31/2023**	**7/31/2023**	**11/20/2023**	**11/20/2023**
Face Amount	$600,000,000	$500,000,000	$600,000,000	$1,000,000,000	$400,000,000	$600,000,000
Coupon Rate	5.200%	4.450%	5.050%	5.350%	5.550%	5.950%
Maturity Date	11/15/2033	3/1/2033	8/1/2030	8/1/2054	3/15/2034	3/15/2064
Frequency of Coupon Payment	2	2	2	2	2	2
Interest Accrual Date	9/7/2023	2/2/2023	8/2/2023	8/2/2023	11/22/2023	11/22/2023
Price To Investors	99.811	99.65	99.796	99.416	99.985	99.721
Proceeds from Sale (before expenses)	$598,866,000	$498,250,000	$598,776,000	$994,160,000	$399,940,000	$598,326,000
Underwriter Fee as % of Gross Proceeds	0.650%	0.650%	0.625%	0.875%	0.650%	0.875%
Underwriter's Fee	$3,900,000	$3,250,000	$3,750,000	$8,750,000	$2,600,000	$5,250,000
Railroad Expenses Excluding Fee	$350,000.00	$1,000,000.00	$1,035,000.00	$1,725,000.00	$740,000.00	$1,110,000.00
Page in 424(b) for Expenses	S-22	S-21	S-16	S-16	S-16	S-16
Calculated						
Yield Based on Price to Investors	5.223%	4.493%	5.085%	5.389%	5.551%	5.968%
Issue Price Per $100 Less Flotation	$99.10	$98.80	$99.00	$98.37	$99.15	$98.66
Yield on New Issue Including Flotation	5.314%	4.600%	5.223%	5.460%	5.659%	6.038%
Flotation Costs (Diff. in Pct Pts)	**0.091%**	**0.107%**	**0.138%**	**0.071%**	**0.108%**	**0.071%**
Avg. Flotation Cost (Pct. Points)	**0.098%**					
(includes costs on page 2)						
Previous Year's Average	0.064%					

Source: SEC 424(b)(5) or 424(b)(2) filings.

In cases where multiple series of notes were issued with one set of expenses (excluding underwriting fee), the expenses are allocated by the face amount of the notes involved.

2023 Flotation Costs for Bonds

	UNP Sr Notes	UNP Sr Notes
From 424(b)	**2/13/2023**	**2/13/2023**
Face Amount	$500,000,000	$500,000,000
Coupon Rate	4.750%	4.950%
Maturity Date	2/21/2026	5/15/2053
Frequency of Coupon Payment	2	2
Interest Accrual Date	2/21/2023	2/21/2023
Price To Investors	99.930	99.855
Proceeds from Sale (before expenses)	$499,650,000	$499,275,000
Underwriter Fee as % of Gross Proceeds	0.350%	0.875%
Underwriter's Fee	$1,750,000	$4,375,000
Railroad Expenses Excluding Fee	$225,000.00	$225,000.00
Page in 424(b) for Expenses	S-12	S-12
Calculated		
Yield Based on Price to Investors	4.775%	4.959%
Issue Price Per $100 Less Flotation	$99.54	$98.94
Yield on New Issue Including Flotation	4.919%	5.018%
Flotation Costs (Diff. in Pct Pts)	**0.143%**	**0.060%**

Source: SEC 424(b)(5) or 424(b)(2) filings.

Example of Source for Bond Flotation Costs

Filed Pursuant to Rule 424(b)(2)
Registration No. 333-262788

Prospectus Supplement
(To Prospectus dated February 16, 2022)

CSX

$600,000,000 5.200% Notes due 2033

CSX Corporation is offering $600,000,000 aggregate principal amount of 5.200% Notes due 2033 (the "Notes").

The Notes will mature on November 15, 2033. Interest is payable on the Notes on May 15 and November 15 of each year, commencing on May 15, 2024. Interest on the Notes will accrue from September 7, 2023. We may, at our option, redeem the Notes, in whole or in part, at any time at the applicable redemption price set forth under the caption "Description of Notes—Optional Redemption."

The Notes will be unsecured senior obligations of CSX and will rank equally with all of CSX's other unsecured senior indebtedness.

The Notes will be represented by one or more permanent global Notes in definitive, fully registered form without interest coupons, registered in the name of a nominee for The Depository Trust Company. The Notes will be issued in denominations of $2,000 and integral multiples of $1,000 in excess thereof.

Investing in these Notes involves risks. See risks described as risk factors in Item 1A of our Annual Report on Form 10-K for the fiscal year ended December 31, 2022, as they may be amended, updated and modified periodically in our reports filed with the Securities and Exchange Commission (the "SEC").

Neither the SEC nor any state securities commission has approved or disapproved of these securities or determined if this prospectus supplement or the accompanying prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

	Price to Public(1)	Underwriting Discount	Proceeds to Us(1)
Per Note	99.811%	0.650%	99.161%
Total	$598,866,000	$3,900,000	$594,966,000

(1) Plus accrued interest from September 7, 2023 to the settlement date, if settlement occurs after that date.

CSX will not make application to list the Notes on any securities exchange or to include them in any automated quotation system.

We expect that delivery of the Notes will be made to investors on or about September 7, 2023, through the book-entry system of The Depository Trust Company for the accounts of its participants, including Euroclear Bank S.A./N.V., as operator of the Euroclear system, and Clearstream Banking, *société anonyme*.

Joint Book-Running Managers

Barclays **BofA Securities** **Citigroup** **Morgan Stanley**

Senior Co-Managers

J.P. Morgan **Mizuho** **UBS Investment Bank**

Co-Managers

PNC Capital Markets LLC **Siebert Williams Shank**

September 5, 2023

Example of Source for Bond Flotation Costs

the Notes to be purchased by the underwriters in the offering, which creates a syndicate short position. Syndicate covering transactions involve purchases of the Notes in the open market after the distribution has been completed, in order to cover syndicate short positions. Stabilizing transactions consist of certain bids or purchases of the Notes made for the purpose of preventing or retarding a decline in the market price of such Notes while the offering is in progress.

The representatives, on behalf of the underwriters, may also impose a penalty bid. Penalty bids permit the underwriters to reclaim a selling concession from a syndicate member when the representatives, in covering syndicate short positions or making stabilizing purchases, repurchase Notes originally sold by that syndicate member.

Any of these activities may have the effect of preventing or retarding a decline in the market price of the Notes. They may also cause the price of the Notes to be higher than the price that otherwise would exist in the open market in the absence of these transactions. The underwriters may conduct these transactions in the over-the-counter market or otherwise. If the underwriters commence any of these transactions, they may discontinue them at any time.

We estimate that our total expenses (excluding the underwriting discount) for this offering will be approximately $350,000.

Certain of the underwriters and their affiliates have in the past provided, are currently providing and may in the future from time to time provide investment banking and other financing, trading, banking, research, transfer agent and trustee services to us or our subsidiaries, for which they have in the past received, and may currently or in the future receive, customary fees and expenses.

Certain of the underwriters or their affiliates engage in commercial lending activities with us and are lenders under our bank credit facilities.

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act, or to contribute to payments the underwriters may be required to make because of any of those liabilities.

European Economic Area

This prospectus supplement has been prepared on the basis that any offer of Notes in any Member State of the European Economic Area ("EEA") will be made pursuant to an exemption under the Prospectus Regulation from the requirement to publish a prospectus for offers of Notes. Accordingly any person making or intending to make an offer in that Relevant Member State of Notes which are the subject of the offering contemplated in this prospectus supplement may only do so to legal entities which are qualified investors as defined in the Prospectus Regulation, provided that no such offer of Notes shall require us or any of the underwriters to publish a prospectus pursuant to Article 3 of the Prospectus Regulation or supplement a prospectus pursuant to Article 23 of the Prospectus Regulation in relation to such offer.

Neither we nor the underwriters have authorized, nor do we or they authorize, the making of any offer of Notes to any legal entity which is not a qualified investor as defined in the Prospectus Regulation. Neither we nor the underwriters have authorized, nor do they authorize, the making of any offer of Notes through any financial intermediary, other than offers made by the underwriters or their representatives, which constitute the final placement of the Notes contemplated in this prospectus supplement.

For the purpose of the above provisions, the expression "Prospectus Regulation" means Regulation (EU) 2017/1129 (as amended).

2023 Current Cost of Debt

Type of Debt	Cost Reference	Appendix D Weight	Current Cost	Weighted Cost
Type of Instrument				
Bonds, Notes & Debentures	App. A & Table 3	98.65%	5.250%	5.179%
Equipment Trust Certificates	App. C & Table 5	1.35%	4.957%	0.067%
Conditional Sales Agreements	Railroad Data	0.00%	--	--
Total Without Floatation Costs		100.00%		5.246%
Floatation Costs				
Bonds, Notes & Debentures	App. F & Table 8	98.65%	0.098%	0.097%
Equipment Trust Certificates	Tables 7 and 8	1.35%	0.086%	0.001%
Conditional Sales Agreements	Table 8	0.00%	not calculated	--
Total Floatation Costs		100.00%		0.098%
Weighted Cost of Debt				5.344%
Weighted Cost of Debt (rounded)				**5.34%**

Historical Weighted Cost of Debt (for comparison purposes only)

Item	Year	Reference	Weighted Cost
Previous Year	2022	EP 558 (Sub-No. 26) Served August 2, 2023	4.28%
Highest	1982	EP 436 Decided July 22, 1983	14.0%
Lowest	2020	EP 558 (Sub-No. 24) Served August 6, 2021	2.54%

Market Value for Common Equity

CSX Data from Bloomberg 3-13-2024

Bloomberg's stock prices had already been adjusted for the split, but the shares outstanding need to also be adjusted, done below.

End of Wk. Date	End of Wk Close	Shares Outstanding	Capitalization ($000)
Friday, January 6, 2023	32.20	2,102,408,729	67,697,561
Friday, January 13, 2023	32.42	2,102,408,729	68,160,091
Friday, January 20, 2023	32.01	2,102,408,729	67,298,103
Friday, January 27, 2023	30.08	2,102,408,729	63,240,455
Friday, February 3, 2023	32.27	2,062,605,434	66,560,277
Friday, February 10, 2023	31.57	2,062,605,434	65,116,454
Friday, February 17, 2023	31.21	2,062,605,434	64,373,916
Friday, February 24, 2023	30.75	2,062,605,434	63,425,117
Friday, March 3, 2023	31.15	2,062,605,434	64,250,159
Friday, March 10, 2023	29.49	2,062,605,434	60,826,234
Friday, March 17, 2023	28.91	2,062,605,434	59,629,923
Friday, March 24, 2023	28.25	2,062,605,434	58,268,604
Friday, March 31, 2023	29.94	2,033,054,922	60,869,664
Thursday, April 6, 2023	30.02	2,033,054,922	61,032,309
Friday, April 14, 2023	30.46	2,033,054,922	61,926,853
Friday, April 21, 2023	31.82	2,033,054,922	64,691,808
Friday, April 28, 2023	30.64	2,033,054,922	62,292,803
Friday, May 5, 2023	31.86	2,033,054,922	64,773,130
Friday, May 12, 2023	31.82	2,033,054,922	64,691,808
Friday, May 19, 2023	32.31	2,033,054,922	65,688,005
Friday, May 26, 2023	30.81	2,033,054,922	62,638,422
Friday, June 2, 2023	31.92	2,033,054,922	64,895,113
Friday, June 9, 2023	32.31	2,033,054,922	65,688,005
Friday, June 16, 2023	33.21	2,033,054,922	67,517,754
Friday, June 23, 2023	32.74	2,033,054,922	66,562,218
Friday, June 30, 2023	34.10	2,006,330,057	68,415,855
Friday, July 7, 2023	33.30	2,006,330,057	66,810,791
Friday, July 14, 2023	33.63	2,006,330,057	67,472,880
Friday, July 21, 2023	32.46	2,006,330,057	65,125,474
Friday, July 28, 2023	33.80	2,006,330,057	67,813,956
Friday, August 4, 2023	31.52	2,006,330,057	63,239,523
Friday, August 11, 2023	30.75	2,006,330,057	61,694,649
Friday, August 18, 2023	30.87	2,006,330,057	61,935,409
Friday, August 25, 2023	30.91	2,006,330,057	62,015,662
Friday, September 1, 2023	30.63	2,006,330,057	61,453,890
Friday, September 8, 2023	29.95	2,006,330,057	60,089,585
Friday, September 15, 2023	30.85	2,006,330,057	61,895,282
Friday, September 22, 2023	31.20	2,006,330,057	62,597,498
Friday, September 29, 2023	30.75	2,006,330,057	61,694,649
Friday, October 6, 2023	30.91	1,976,131,035	61,082,210
Friday, October 13, 2023	31.14	1,976,131,035	61,536,720
Friday, October 20, 2023	30.76	1,976,131,035	60,785,791
Friday, October 27, 2023	29.24	1,976,131,035	57,782,071
Friday, November 3, 2023	30.40	1,976,131,035	60,074,383
Friday, November 10, 2023	30.70	1,976,131,035	60,667,223
Friday, November 17, 2023	31.62	1,976,131,035	62,485,263
Friday, November 24, 2023	32.64	1,976,131,035	64,500,917
Friday, December 1, 2023	33.40	1,976,131,035	66,002,777
Friday, December 8, 2023	32.96	1,976,131,035	65,133,279
Friday, December 15, 2023	34.00	1,976,131,035	67,188,455
Friday, December 22, 2023	34.63	1,976,131,035	68,433,418
Friday, December 29, 2023	34.67	1,976,131,035	68,512,463

Note: Capitalization calulated using close of week price multiplied by the number of shares outstanding.

Market Value for Common Equity

NSC Data from Bloomberg 3-13-2024

End of Wk. Date	End of Wk Close	Shares Outstanding	Capitalization ($000)
Friday, January 6, 2023	255.79	231,514,213	59,219,021
Friday, January 13, 2023	255.13	231,514,213	59,066,221
Friday, January 20, 2023	253.66	231,514,213	58,725,895
Friday, January 27, 2023	238.81	231,514,213	55,287,909
Friday, February 3, 2023	252.12	227,782,202	57,428,449
Friday, February 10, 2023	242.61	227,782,202	55,262,240
Friday, February 17, 2023	228.15	227,782,202	51,968,509
Friday, February 24, 2023	224.77	227,782,202	51,198,606
Friday, March 3, 2023	228.39	227,782,202	52,023,177
Friday, March 10, 2023	210.45	227,782,202	47,936,764
Friday, March 17, 2023	203.90	227,782,202	46,444,791
Friday, March 24, 2023	200.26	227,782,202	45,615,664
Friday, March 31, 2023	212.00	227,639,602	48,259,596
Thursday, April 6, 2023	205.41	227,639,602	46,759,451
Friday, April 14, 2023	207.59	227,639,602	47,255,705
Friday, April 21, 2023	211.61	227,639,602	48,170,816
Friday, April 28, 2023	203.03	227,639,602	46,217,668
Friday, May 5, 2023	208.72	227,639,602	47,512,938
Friday, May 12, 2023	211.91	227,639,602	48,239,108
Friday, May 19, 2023	217.74	227,639,602	49,566,247
Friday, May 26, 2023	210.57	227,639,602	47,934,071
Friday, June 2, 2023	215.87	227,639,602	49,140,561
Friday, June 9, 2023	216.18	227,639,602	49,211,129
Friday, June 16, 2023	224.14	227,639,602	51,023,140
Friday, June 23, 2023	218.00	227,639,602	49,625,433
Friday, June 30, 2023	226.76	227,015,277	51,477,984
Friday, July 7, 2023	226.72	227,015,277	51,468,904
Friday, July 14, 2023	234.78	227,015,277	53,298,647
Friday, July 21, 2023	233.01	227,015,277	52,896,830
Friday, July 28, 2023	236.66	227,015,277	53,725,435
Friday, August 4, 2023	224.64	227,015,277	50,996,712
Friday, August 11, 2023	215.91	227,015,277	49,014,868
Friday, August 18, 2023	212.11	227,015,277	48,152,210
Friday, August 25, 2023	210.65	227,015,277	47,820,768
Friday, September 1, 2023	206.38	227,015,277	46,851,413
Friday, September 8, 2023	195.64	227,015,277	44,413,269
Friday, September 15, 2023	204.03	227,015,277	46,317,927
Friday, September 22, 2023	202.50	227,015,277	45,970,594
Friday, September 29, 2023	196.93	227,015,277	44,706,118
Friday, October 6, 2023	191.51	226,136,334	43,307,369
Friday, October 13, 2023	200.94	226,136,334	45,439,835
Friday, October 20, 2023	201.70	226,136,334	45,611,699
Friday, October 27, 2023	184.53	226,136,334	41,728,938
Friday, November 3, 2023	194.56	226,136,334	43,997,085
Friday, November 10, 2023	196.88	226,136,334	44,521,721
Friday, November 17, 2023	211.04	226,136,334	47,723,812
Friday, November 24, 2023	215.86	226,136,334	48,813,789
Friday, December 1, 2023	226.47	226,136,334	51,213,096
Friday, December 8, 2023	221.00	226,136,334	49,976,130
Friday, December 15, 2023	232.27	226,136,334	52,524,686
Friday, December 22, 2023	234.12	226,136,334	52,943,039
Friday, December 29, 2023	236.38	226,136,334	53,454,107

Note: Capitalization calulated using close of week price multiplied by the number of shares outstanding.

Market Value for Common Equity

UNP Data from Bloomberg 3-13-2024

End of Wk. Date	End of Wk Close	Shares Outstanding	Capitalization ($000)
Friday, January 6, 2023	212.01	614,800,800	130,343,918
Friday, January 13, 2023	213.23	614,800,800	131,093,975
Friday, January 20, 2023	208.66	614,800,800	128,284,335
Friday, January 27, 2023	202.39	614,800,800	124,429,534
Friday, February 3, 2023	210.29	611,872,981	128,670,769
Friday, February 10, 2023	205.50	611,872,981	125,739,898
Friday, February 17, 2023	201.59	611,872,981	123,347,474
Friday, February 24, 2023	194.02	611,872,981	118,715,596
Friday, March 3, 2023	209.36	611,872,981	128,101,727
Friday, March 10, 2023	196.06	611,872,981	119,963,817
Friday, March 17, 2023	190.01	611,872,981	116,261,985
Friday, March 24, 2023	188.51	611,872,981	115,344,176
Friday, March 31, 2023	201.26	611,872,981	123,145,556
Thursday, April 6, 2023	198.64	611,872,981	121,542,449
Friday, April 14, 2023	198.53	609,695,454	121,042,838
Friday, April 21, 2023	198.85	609,695,454	121,237,941
Friday, April 28, 2023	195.70	609,695,454	119,317,400
Friday, May 5, 2023	201.23	609,695,454	122,689,016
Friday, May 12, 2023	198.99	609,695,454	121,323,298
Friday, May 19, 2023	198.97	609,695,454	121,311,104
Friday, May 26, 2023	193.10	609,695,454	117,732,192
Friday, June 2, 2023	198.66	609,695,454	121,122,099
Friday, June 9, 2023	199.67	609,695,454	121,737,891
Friday, June 16, 2023	204.67	609,695,454	124,786,369
Friday, June 23, 2023	199.89	609,695,454	121,872,024
Friday, June 30, 2023	204.62	609,695,454	124,755,884
Friday, July 7, 2023	202.82	609,695,454	123,658,432
Friday, July 14, 2023	210.99	609,695,454	128,639,644
Friday, July 21, 2023	216.78	609,456,215	132,117,918
Friday, July 28, 2023	232.77	609,456,215	141,863,123
Friday, August 4, 2023	228.53	609,456,215	139,279,029
Friday, August 11, 2023	229.49	609,456,215	139,864,107
Friday, August 18, 2023	225.26	609,456,215	137,286,107
Friday, August 25, 2023	224.18	609,456,215	136,627,894
Friday, September 1, 2023	221.03	609,456,215	134,708,107
Friday, September 8, 2023	211.80	609,456,215	129,082,826
Friday, September 15, 2023	213.32	609,456,215	130,009,200
Friday, September 22, 2023	209.24	609,456,215	127,522,618
Friday, September 29, 2023	203.63	609,456,215	124,103,569
Friday, October 6, 2023	202.46	609,456,215	123,390,505
Friday, October 13, 2023	207.75	609,597,495	126,643,880
Friday, October 20, 2023	211.34	609,597,495	128,832,335
Friday, October 27, 2023	201.72	609,597,495	122,968,007
Friday, November 3, 2023	212.13	609,597,495	129,313,917
Friday, November 10, 2023	211.49	609,597,495	128,923,774
Friday, November 17, 2023	219.21	609,597,495	133,629,867
Friday, November 24, 2023	224.28	609,597,495	136,720,526
Friday, December 1, 2023	231.37	609,597,495	141,042,572
Friday, December 8, 2023	229.77	609,597,495	140,067,216
Friday, December 15, 2023	241.98	609,597,495	147,510,402
Friday, December 22, 2023	243.58	609,597,495	148,485,758
Friday, December 29, 2023	245.62	609,597,495	149,729,337

Note: Capitalization calulated using close of week price multiplied by the number of shares outstanding.

Market Value for Common Equity

Total Market Value for CSX, NSC, and UNP combined

Based on close price on last trading day of week and shares outstanding from 10-K and 10-Q.

	Days For Week (actual trading days)		Capitalization	
	Beginning	End	($000)	Holiday (M or F)
1.	Tuesday, January 3, 2023	Friday, January 6, 2023	$257,260,499	New Year's Day
2.	Monday, January 9, 2023	Friday, January 13, 2023	$258,320,287	
3.	Tuesday, January 17, 2023	Friday, January 20, 2023	$254,308,334	Martin Luther King Day
4.	Monday, January 23, 2023	Friday, January 27, 2023	$242,957,898	
5.	Monday, January 30, 2023	Friday, February 3, 2023	$252,659,495	
6.	Monday, February 6, 2023	Friday, February 10, 2023	$246,118,591	
7.	Monday, February 13, 2023	Friday, February 17, 2023	$239,689,899	
8.	Tuesday, February 21, 2023	Friday, February 24, 2023	$233,339,318	Washington's Birthday
9.	Monday, February 27, 2023	Friday, March 3, 2023	$244,375,064	
10.	Monday, March 6, 2023	Friday, March 10, 2023	$228,726,815	
11.	Monday, March 13, 2023	Friday, March 17, 2023	$222,336,699	
12.	Monday, March 20, 2023	Friday, March 24, 2023	$219,228,443	
13.	Monday, March 27, 2023	Friday, March 31, 2023	$232,274,816	
14.	Monday, April 3, 2023	Thursday, April 6, 2023	$229,334,208	Good Friday
15.	Monday, April 10, 2023	Friday, April 14, 2023	$230,225,396	
16.	Monday, April 17, 2023	Friday, April 21, 2023	$234,100,565	
17.	Monday, April 24, 2023	Friday, April 28, 2023	$227,827,872	
18.	Monday, May 1, 2023	Friday, May 5, 2023	$234,975,084	
19.	Monday, May 8, 2023	Friday, May 12, 2023	$234,254,214	
20.	Monday, May 15, 2023	Friday, May 19, 2023	$236,565,356	
21.	Monday, May 22, 2023	Friday, May 26, 2023	$228,304,685	
22.	Tuesday, May 30, 2023	Friday, June 2, 2023	$235,157,773	Memorial Day
23.	Monday, June 5, 2023	Friday, June 9, 2023	$236,637,025	
24.	Monday, June 12, 2023	Friday, June 16, 2023	$243,327,263	
25.	Monday, June 19, 2023	Friday, June 23, 2023	$238,059,676	
26.	Monday, June 26, 2023	Friday, June 30, 2023	$244,649,723	
27.	Monday, July 3, 2023	Friday, July 7, 2023	$241,938,126	
28.	Monday, July 10, 2023	Friday, July 14, 2023	$249,411,170	
29.	Monday, July 17, 2023	Friday, July 21, 2023	$250,140,222	
30.	Monday, July 24, 2023	Friday, July 28, 2023	$263,402,515	
31.	Monday, July 31, 2023	Friday, August 4, 2023	$253,515,264	
32.	Monday, August 7, 2023	Friday, August 11, 2023	$250,573,624	
33.	Monday, August 14, 2023	Friday, August 18, 2023	$247,373,726	
34.	Monday, August 21, 2023	Friday, August 25, 2023	$246,464,324	
35.	Monday, August 28, 2023	Friday, September 1, 2023	$243,013,410	
36.	Tuesday, September 5, 2023	Friday, September 8, 2023	$233,585,680	Labor Day
37.	Monday, September 11, 2023	Friday, September 15, 2023	$238,222,409	
38.	Monday, September 18, 2023	Friday, September 22, 2023	$236,090,710	
39.	Monday, September 25, 2023	Friday, September 29, 2023	$230,504,337	
40.	Monday, October 2, 2023	Friday, October 6, 2023	$227,780,085	
41.	Monday, October 9, 2023	Friday, October 13, 2023	$233,620,435	
42.	Monday, October 16, 2023	Friday, October 20, 2023	$235,229,824	
43.	Monday, October 23, 2023	Friday, October 27, 2023	$222,479,016	
44.	Monday, October 30, 2023	Friday, November 3, 2023	$233,385,385	
45.	Monday, November 6, 2023	Friday, November 10, 2023	$234,112,718	
46.	Monday, November 13, 2023	Friday, November 17, 2023	$243,838,942	
47.	Monday, November 20, 2023	Friday, November 24, 2023	$250,035,232	
48.	Monday, November 27, 2023	Friday, December 1, 2023	$258,258,445	
49.	Monday, December 4, 2023	Friday, December 8, 2023	$255,176,625	
50.	Monday, December 11, 2023	Friday, December 15, 2023	$267,223,543	
51.	Monday, December 18, 2023	Friday, December 22, 2023	$269,862,214	
52.	Tuesday, December 26, 2023	Friday, December 29, 2023	$271,695,906	Christmas Day
		Average	**$241,768,247.83**	

Market Value for Common Equity

List of U.S. Stock Market Full-Day Holidays in 2023

	Day	Holiday
1.	Monday, January 2, 2023	New Year's Day
2.	Monday, January 16, 2023	Martin Luther King Jr. Day
3.	Monday, February 20, 2023	Washington's Birthday
4.	Friday, April 7, 2023	Good Friday
5.	Monday, May 29, 2023	Memorial Day
6.	Tuesday, July 4, 2023	Independence Day
7.	Monday, September 4, 2023	Labor Day
8.	Thursday, November 23, 2023	Thanksgiving Day
9.	Monday, December 25, 2023	Christmas Day

Historical Risk Free Rates and Market Risk Premiums

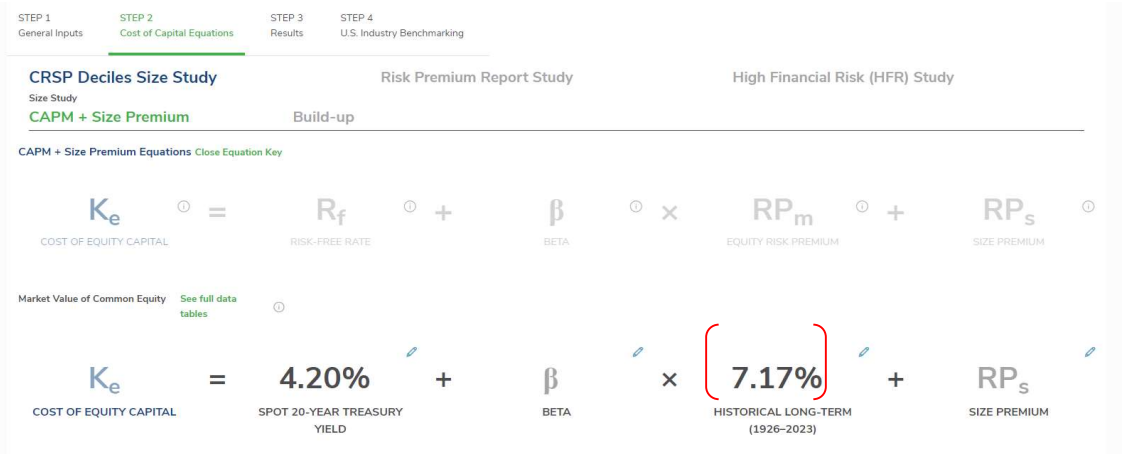
The Surface Transportation Board (STB) has used a Capital Asset Pricing Model (CAPM) as part of its cost of capital determination since 2006. Two major components of the STB's CAPM are the Risk-Free Rate, which is based on 20-Year U.S. Government Bonds, and the Market Risk Premium (a.k.a. Equity Risk Premium), as calculated by Ibbotson Associates using data beginning in 1926. The table below lists the rates used by the STB (since 2006), the rate for the current year, and earlier rates that would have been used as part of the current STB specifications.

Year	Risk-Free Rate	Market Risk Premium
1980	11.36 %	7.60 %
1981	13.72	7.20
1982	12.92	7.20
1983	11.34	7.30
1984	12.49	7.10
1985	10.97	7.30
1986	7.84	7.40
1987	n.a.	7.20
1988	n.a.	7.20
1989	n.a.	7.50
1990	n.a.	7.20
1991	n.a.	7.40
1992	n.a.	7.30
1993	6.29	7.20
1994	7.49	7.00
1995	6.95	7.40
1996	6.83	7.50
1997	6.69	7.80
1998	5.72	8.00
1999	6.20	8.10
2000	6.23	7.80
2001	5.63	7.40
2002	5.43	7.00
2003	4.96	7.20
2004	5.04	7.20
2005	4.64	7.10
2006	5.00	7.13
2007	4.91	7.05
2008	4.36	6.47
2009	4.11	6.67
2010	4.03	6.72
2011	3.62	6.62
2012	2.54	6.70
2013	3.12	6.96
2014	3.07	7.00
2015	2.55	6.90
2016	2.22	6.94
2017	2.65	7.07
2018	3.02	6.91
2019	2.40	7.15
2020	1.35	7.25
2021	1.98	7.46
2022	3.30	7.17
2023	4.26	7.17

Sources: Federal Reserve Board for U.S. government 20-year bonds (Risk-Free Rate) and Morningstar's *Ibbotson SBBI Valuation Yearbook* Table A-1 for Market Risk Premiums through 2012. Morningstar's *Ibbotson SBBI Classic Yearbook* is the source for premiums beginning 2013. The Duff & Phelps *Valuation Handbook Guide to Cost of Capital* is the source for premiums in 2015 and 2016. Values for 2017-2023 are from the Duff & Phelps online Cost of Capital Navigator, which is now owned by Kroll. 2006 through 2020 match decisions by the STB. The U.S. Government did not issue 20-Year bonds in 1987 through 1992.

Historical Risk Free Rates and Market Risk Premiums

The Surface Transportation Board (STB) has always used a **long-term** equity risk premium (a.k.a. market risk premium) for its Capital Asset Pricing Model, and Kroll (previously Duff & Phelps) has been the source used in recent years. Kroll calculates this premium using the same method as the earlier source used by the STB, Morningstar/Ibbotson as found in its Ibbotson *SBBI Valuation Yearbook*. The screenshot shown below is from the 2024 *Cost of Capital Navigator by Kroll*.The latest long-term equity risk premium, as shown below, is **7.17 percent**. The years used for this calculation are 1926 through 2023.



AAR Regression for 2023 Beta

AAR Regression for 2023 Beta

STB-Style 5-Year Beta using SP 500 Price Index, Weighted RR Returns, 90-Day T-Bill as RF

CSX, NSC, and UNP

The GLM Procedure

Dependent Variable: ZRR

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	0.0001883702	0.00151432	0.12	0.9011
ZSP5	0.9857840733	0.05483418	17.98	<.0001

Cost of Common Equity using the Multi-Stage Discounted Cash Flow Model

The cost of equity for each firm (r_i) in the Surface Transportation Board's interpretation of the Morningstar/Ibbotson three-stage DCF model is the solution to the following equation:[1]

$$\mathrm{MV}_{i0} = \sum_{t=1}^{5} \frac{\mathrm{CF}_{i0}(1+g_{i1})^t}{(1+r_i)^t} + \sum_{t=6}^{10} \frac{\mathrm{CF}_{i5}(1+g_{i2})}{(1+r_i)^t} + \frac{\left(\dfrac{\mathrm{IBEI}_{i10}(1+g_{i3})}{r_i - g_{i3}}\right)}{(1+r_i)^{10}},$$

where

MV_{i0} = market value of equity for firm i in year 0 (i.e., the year for which the cost of equity is being estimated);

CF_{it} = average cash flow for firm i at the end of year t;

g_{ij} = earnings growth rate for firm i in stage j (j = 1, 2, or 3);

r_i = the cost of equity for firm i; and

$\mathrm{IBEI}_{10} = \mathrm{IBEI}_0(1+g_1)^5(1+g_2)^5$.

Note that IBEI_0 is determined by the same process as CF_0 (See Table 13 in text).

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[1] *Cost of Capital Yearbook*, 2008, Morningstar, Inc., p. 24.

Cash Flow Calculation

CSX, Corp.	1	2	3	4	5	Total
	2019	2020	2021	2022	2023	
($ in millions)						
Revenue	11,937	10,583	12,522	14,853	14,657	64,552
Net Income	3,331	2,765	3,781	4,166	3,715	17,758
Extraordinary Items	0	0	0	0	0	0
Depreciation	1,349	1,383	1,420	1,500	1,611	7,263
Deferred Taxes	273	180	167	117	140	877
Capital Expenditures	1,657	1,626	1,791	2,133	2,281	9,488
Cash Flow	3,296	2,702	3,577	3,650	3,185	16,410
Cash Flow / Revenue	0.27612	0.25532	0.28566	0.24574	0.21730	0.25421
NIBEI / Revenue	0.27905	0.26127	0.30195	0.28048	0.25346	0.27510

Ibbotson Smoothed Cash Flow = $14,657 x 0.25421 = $3,726.01
Ibbotson Smoothed Net Income BEI = $14,657 x 0.27510 = $4,032.08

Cash Flow Calculation

Norfolk Southern	1	2	3	4	5	Total
	2019	2020	2021	2022	2023	
($ in millions)						
Revenue	11,296	9,789	11,142	12,745	12,156	57,128
Net Income	2,722	2,013	3,005	3,270	1,827	12,837
Extraordinary Items	0	0	0	0	0	0
Depreciation	1,139	1,154	1,181	1,221	1,298	5,993
Deferred Taxes	330	142	184	83	-49	690
Capital Expenditures	2,019	1,494	1,470	1,948	2,349	9,280
Cash Flow	2,172	1,815	2,900	2,626	727	10,240
Cash Flow / Revenue	0.19228	0.18541	0.26028	0.20604	0.05981	0.17925
NIBEI / Revenue	0.24097	0.20564	0.26970	0.25657	0.15030	0.22471

Ibbotson Smoothed Cash Flow = $12,156 x 0.17925 = $2,178.92
Ibbotson Smoothed Net Income BEI = $12,156 x 0.22471 = $2,731.53

Cash Flow Calculation

Union Pacific Corp.	1	2	3	4	5	Total
	2019	2020	2021	2022	2023	
($ in millions)						
Revenue	21,708	19,533	21,804	24,875	24,119	112,039
Net Income	5,919	5,349	6,523	6,998	6,379	31,168
Extraordinary Items	0	0	0	0	0	0
Depreciation	2,216	2,210	2,208	2,246	2,318	11,198
Deferred Taxes	566	340	154	262	117	1,439
Capital Expenditures	3,453	2,927	2,936	3,620	3,606	16,542
Cash Flow	5,248	4,972	5,949	5,886	5,208	27,263
Cash Flow / Revenue	0.24175	0.25454	0.27284	0.23662	0.21593	0.24333
NIBEI / Revenue	0.27266	0.27384	0.29917	0.28133	0.26448	0.27819

Ibbotson Smoothed Cash Flow = $24,119 x 0.24333 = $5,868.99
Ibbotson Smoothed Net Income BEI = $24,119 x 0.27819 = $6,709.64

2023 Median Growth Rates for MSDCF

	Analyst Growth Rates from IBES December 31								
Company	**Rate 1**	**Rate 2**	**Rate 3**	**Rate 4**	**Rate 5**	**Rate 6**	**Rate 7**	**Rate 8**	**Median**
CSX	5.60	5.89	8.70	--	--	--	--	--	**5.89**
NSC	1.80	3.28	2.80	--	--	--	--	--	**2.80**
UNP	5.22	7.50	--	--	--	--	--	--	**6.36**

Simple Average of Medians = 5.02 percent.

2023 Median Growth Rates for MSDCF
CSX

Detail Estimates - Period Summary

Enter RIC : CSX.O **CSX Corp**

Measure : Earnings Per Share

Period : Long Term Growth

Currency: USD *(in millions except for per share items)*

	Ests	Mean	High	Low
Earnings Per Share	3	6.73	8.70	5.60
Filtered/Preliminary Mean**	1	5.60	5.60	5.60
30 Day Ago Mean	3	6.59	8.70	4.66

	12/2022\	3/2023\	6/2023\	9/2023\	12/2022A
Reported	0.47	0.48	0.49	0.42	1.92
Surprise Mean	0.45	0.43	0.40	0.43	1.88
Surprise (%)	1.13	12.38	-0.73	-1.28	1.91

* Only selected brokers below are included in the filtered mean

Check / Uncheck	Contributor	Analyst	Current Estimate	Current Estimate Date	Previous Estimate	Previous Estimate Date	Review Date
✓	Permission Denied 32	Permission Denie	5.60 ↓	Dec 15, 23	6.40	Oct 20, 23	Dec 15, 23
	Permission Denied 392	Permission Denie	5.89 ↑	Dec 14, 23	4.66	Oct 20, 23	Dec 14, 23
	Permission Denied 398136	Permission Denie	8.70 ↑	Oct 19, 23	8.60	Sep 21, 23	Oct 19, 23

2023 Median Growth Rates for MSDCF
NSC

Detail Estimates - Period Summary

Enter RIC : NSC **Norfolk Southern Corp**

Measure : Earnings Per Share

Period : Long Term Growth

Currency: USD *(in millions except for per share items)*

	Ests	Mean	High	Low
Earnings Per Share	3	2.63	3.28	1.80
Filtered/Preliminary Mean**:	1	1.80	1.80	1.80
30 Day Ago Mean	3	2.69	3.27	2.00

	12/2022A	3/2023A	6/2023A	9/2023A	12/2022A
Reported	3.42	3.32	2.95	2.65	13.88
Surprise Mean	3.44	3.12	3.11	2.69	13.86
Surprise (%)	-0.57	6.27	-5.26	-1.34	0.12

* Only selected brokers below are included in the filtered mean

Check / Uncheck	Contributor	Analyst	Current Estimate	Current Estimate Date	Previous Estimate	Previous Estimate Date	Review Date
✓	Permission Denied 32	Permission Denie	1.80 ↓	Dec 08, 23	2.00	Dec 01, 23	Dec 08, 23
	Permission Denied 392	Permission Denie	3.28 ↓	Dec 15, 23	8.00	Oct 08, 88	Dec 31, 23
	Permission Denied 398136	Permission Denie	2.80 ↓	Oct 25, 23	4.30	Jul 27, 23	Oct 25, 23

2023 Median Growth Rates for MSDCF
UNP

Detail Estimates - Period Summary

Enter RIC : UNP **Union Pacific Corp**

Measure : Earnings Per Share

Period : Long Term Growth

Currency: USD *(in millions except for per share items)*

	Ests	Mean	High	Low
Earnings Per Share	2	6.36	7.50	5.22
Filtered/Preliminary Mean**:	1	5.22	5.22	5.22
30 Day Ago Mean	2	6.17	7.50	4.84

	12/2022\	3/2023\	6/2023\	9/2023\	12/2022A
Reported	2.67	2.67	2.54	2.51	11.33
Surprise Mean	2.78	2.53	2.75	2.44	11.44
Surprise (%)	-3.79	3.39	-7.69	2.92	-1.00

* Only selected brokers below are included in the filtered mean

Check / Uncheck	Contributor	Analyst	Current Estimate	Current Estimate Date	Previous Estimate	Previous Estimate Date	Review Date
✓	Permission Denied 392	Permission Denied	5.22 ↑	Dec 14, 23	4.84	Oct 20, 23	Dec 14, 23
	Permission Denied 398136	Permission Denied	7.50 ↓	Oct 04, 23	7.90	Apr 20, 23	Oct 19, 23

Stage 3 Growth Rate for MS-DCF
Summary

The Surface Transportation Board's Multi-Stage Discounted Cash Flow model for estimating the cost of common equity uses 3 stages of growth. The third stage is the long-run nominal growth rate of the U.S. economy, and it is estimated by adding the long-term expected growth in output (represented by the historical growth rate for U.S. Real Gross Domestic Product since 1929) to the long-run expected U.S. inflation rate.

Long Term Expected Growth in Output			3.17 %
Historical Growth Rate for Real GDP, 1929-2023		(page 2)	
Long Term Expected Inflation Rate			2.36
Rate for Long-Term U.S. Government Bonds	4.20	(page 5)	
Rate for 20-year U.S. Inflation-Indexed Bonds	1.84	(page 5)	
	2.36		
Stage 3 Growth Rate (real growth + inflation)			**5.53 %**

The purpose of this appendix is to replicate Morningstar's Stage 3 Growth Rate used by the Surface Transportation Board in its version of the Multi-Stage Discounted Cash Flow model used to estimate the cost of common equity for the railroad industry.

Morningstar's Ibbotson SBBI Valuation Yearbook has annually been used as a source for the Stage 3 growth rate of the Surface Transportation Board's Multi-Stage Discounted Cash Flow (MSDCF) model. On September 19, 2013, Morningstar customers were notified that the *SBBI Valuation Yearbook* was being discontinued, but much of the same data could be found in a different publication -- the *Ibbotson SBBI Classic Yearbook*.

Customer Service said **"We won't be publishing the long-term growth rate anymore, however it's pretty simple to calculate using data that will be in the Classic Yearbook and publicly available data."** They also said "Essentially, you would take the long-term government yield as of December (which would be included in the Classic Yearbook) and subtract the Treasury Real Yield for 20 year bonds as of the same date. This value is called the inflation estimate." "From there, you need the GDP growth rate, which you can calculate from the Current-dollar and "real" GDP link in the BEA website. Using the GDP in billions of chained 2005 dollars column, calculate an annual growth rate. One thing, however, is that we've always used GDP chained to 2005 dollars and it looks like they've since changed it to be chained to 2009 dollars. This may cause a slight change in the historical growth rates."

Beginning in 2016, Morningstar stopped publishing its Ibbotson SBBI Classic Yearbook. Calculations on page 5 of this appendix use 20-Year U.S. Treasury Bonds in lieu of the Ibbotson Long-Term Government Yields.

Stage 3 Growth Rate for MS-DCF
Long-Term Expected Growth in Output

AAR Replicates Morningstar

Year	(a) GDP in billions of chained 2005 dollars	(b) Years of Growth	(c) AAR Calc. Growth Rate	(d) SBBI Text Growth Rate
1929	976.1			
2009	12,757.9	80	3.27%	3.3%
2010	13,063.0	81	3.25%	3.3%
2011	13,299.1	82	3.24%	3.24%
2012	13,591.1	83	3.22%	3.22%

The Bureau of Economic Analysis rebased Real GDP from 2005 dollars to 2009 dollars, and may have revised recent year data. Therefore, GDP data in 2005 $ were not available for 2013. Beginning in 2024, BEA began using 2017 dollars.

(a) Real GDP in 2005 $ - 2009-2012 are from the Economic Report of the President 2013, Table B-11
1929 is from BEA table dated August 2011
(b) Year minus 1929 = number of years of growth from 1929 to year
(c) Compound growth rate from 1929 to year
(d) Ibbotson SBBI Valuation Yearbook, chapter 4. For 2012 data, 2013 edition, page 52.

AAR Calculates Growth Rate using GDP in 2017 dollars

Year	(e) GDP in billions of chained 2017 dollars	(f) Years of Growth	(g) AAR Calc. Growth Rate	(h) AAR Calc. Growth Rate using 2009 $
1929	1,191.1			
2015	18,799.6	86	3.26%	3.25%
2016	19,141.7	87	3.24%	3.22%
2017	19,612.1	88	3.23%	3.21%
2018	20,193.9	89	3.23%	
2019	20,692.1	90	3.22%	
2020	20,234.1	91	3.16%	
2021	21,407.7	92	3.19%	
2022	21,822.0	93	3.18%	
2023	22,374.3	**94**	**3.17%**	

(e) Real GDP in 2017 $ downloaded from BEA 2/28/2024.
(f) Year - 1929 = number of years of growth from 1929 to year
(g) Compound growth rate from 1929 to year
(h) Previous years' calculations used 2012 $, which have now been discontinued. This column's purpose is only for comparison purposes.

Stage 3 Growth Rate for MS-DCF
Data Sources for Real GDP in 2005 $

186 GDP and Other Major NIPA Series August 2011

Table 2A. Real Gross Domestic Product—Continues

[Billions of chained (2005) dollars; quarterly estimates are seasonally adjusted at annual rates]

Year and quarter	Gross domestic product	Personal consumption expenditures	Gross private domestic investment	Exports and imports of goods and services		Government consumption expenditures and gross investment	Residual	Final sales of domestic product	Gross domestic purchases	Final sales to domestic purchasers	Gross national product	Percent change from preceding period				
				Exports	Imports							Gross domestic product	Final sales of domestic product	Gross domestic purchases	Final sales to domestic purchasers	Gross national product
1929	976.1	736.3	101.4	37.9	49.1	146.5	3.1	986.8	994.1	1,005.2	984.6	...	...	...	...	...
1930	892.0	696.8	67.6	31.3	42.7	161.4	−22.4	919.2	911.1	939.2	900.0	−8.6	−6.8	−8.4	−6.6	−8.6
1931	834.2	674.9	42.5	26.1	37.2	168.2	−40.3	865.2	853.9	885.9	840.7	−6.5	−5.9	−6.3	−5.7	−6.6
1932	725.2	614.4	12.8	20.4	30.9	162.6	−54.1	766.6	743.9	786.5	730.5	−13.1	−11.4	−12.9	−11.2	−13.1
1933	715.8	600.8	18.9	20.5	32.2	157.2	−49.4	743.2	735.1	763.4	720.3	−1.3	−3.1	−1.2	−2.9	−1.4
1934	793.7	643.7	34.1	22.8	32.9	177.3	−51.3	814.0	812.7	833.7	797.7	10.9	9.5	10.6	9.2	10.7
1935	864.2	683.0	63.1	24.1	43.1	182.2	−45.1	864.5	892.2	892.7	868.9	8.9	6.2	9.8	7.1	8.9
1936	977.0	752.5	80.9	25.3	42.6	212.6	−51.7	978.9	1,006.1	1,008.1	981.1	13.1	13.2	12.8	12.9	12.9
1937	1,027.1	780.4	101.1	31.9	47.9	203.6	−42.0	1,019.8	1,052.9	1,045.5	1,032.5	5.1	4.2	4.7	3.7	5.2
1938	991.8	767.8	66.8	31.5	37.3	219.3	−56.3	1,005.2	1,007.3	1,021.0	997.4	−3.4	−1.4	−4.3	−2.3	−3.4
1939	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.4	8.1	7.4	8.1

Table B–2. Real gross domestic product, 1964–2012

[Billions of chained (2005) dollars, except as noted; quarterly data at seasonally adjusted annual rates]

Year or quarter	Gross domestic product	Personal consumption expenditures			Gross private domestic investment				
						Fixed investment			
							Nonresidential		
		Total	Goods	Services	Total	Total	Total	Structures	Equipment and software
1964	3,389.4	2,107.5	...	...	382.1	...	...	...	...
1965	3,607.0	2,240.8	...	...	435.7	...	...	...	...
1966	3,842.1	2,367.9	...	...	474.1	...	...	...	...
1967	3,939.2	2,438.8	...	...	452.4	...	...	...	...
1968	4,129.9	2,579.6	...	...	478.7	...	...	...	...
1969	4,258.2	2,676.2	...	...	506.6	...	...	...	...
1970	4,266.3	2,738.9	...	...	473.4	...	...	...	...
1971	4,409.5	2,843.3	...	...	527.3	...	...	...	...
1972	4,643.8	3,018.1	...	...	589.8	...	...	...	...
1973	4,912.8	3,167.7	...	...	658.9	...	...	...	...
1974	4,885.7	3,141.4	...	...	610.3	...	...	...	...
1975	4,875.4	3,212.6	...	...	502.2	...	...	...	...
1976	5,136.9	3,391.5	...	...	603.7	...	...	...	...
1977	5,373.1	3,534.3	...	...	694.9	...	...	...	...
1978	5,672.8	3,690.1	...	...	778.7	...	...	...	...
1979	5,850.1	3,777.8	...	...	803.5	...	...	...	...
1980	5,834.0	3,764.5	...	...	715.2	...	...	...	...
1981	5,982.1	3,821.6	...	...	779.6	...	...	...	...
1982	5,865.9	3,874.9	...	...	670.3	...	...	...	...
1983	6,130.9	4,096.4	...	...	732.8	...	...	...	...
1984	6,571.5	4,313.6	...	...	948.7	...	...	...	...
1985	6,843.4	4,538.3	...	...	939.8	...	...	...	...
1986	7,080.5	4,722.4	...	...	933.5	...	...	...	...
1987	7,307.0	4,868.0	...	...	962.2	...	...	...	...
1988	7,607.4	5,064.3	...	...	984.9	...	...	...	...
1989	7,879.2	5,207.5	...	...	1,024.4	...	...	...	...
1990	8,027.1	5,313.7	...	...	989.9	...	...	...	...
1991	8,008.3	5,321.7	...	...	909.4	...	...	...	...
1992	8,280.0	5,503.2	...	...	983.1	...	...	...	...
1993	8,516.2	5,698.6	...	...	1,070.9	...	...	...	...
1994	8,863.1	5,916.2	...	...	1,216.4	...	...	...	...
1995	9,086.0	6,076.2	1,896.0	4,208.5	1,254.3	1,231.2	787.9	342.0	489.4
1996	9,425.8	6,288.3	1,980.9	4,331.7	1,365.3	1,341.6	861.5	361.4	541.4
1997	9,845.9	6,520.4	2,075.3	4,465.3	1,535.2	1,465.4	965.5	387.9	615.9
1998	10,274.7	6,862.3	2,215.5	4,662.1	1,688.9	1,624.4	1,081.4	407.7	705.2
1999	10,770.7	7,237.6	2,392.0	4,853.1	1,837.6	1,775.5	1,194.3	408.2	805.0
2000	11,216.4	7,604.6	2,518.2	5,093.6	1,963.1	1,906.8	1,311.3	440.0	889.2
2001	11,337.5	7,810.3	2,597.3	5,219.1	1,825.2	1,870.7	1,274.8	433.3	860.6
2002	11,543.1	8,018.3	2,702.9	5,318.5	1,800.4	1,791.5	1,173.7	356.6	824.2
2003	11,836.4	8,244.5	2,827.2	5,418.2	1,870.1	1,854.7	1,189.6	343.0	850.0
2004	12,246.9	8,515.8	2,953.3	5,582.7	2,058.2	1,992.5	1,263.0	346.7	917.3
2005	12,623.0	8,803.5	3,076.7	5,726.8	2,172.3	2,122.3	1,347.3	351.8	995.6
2006	12,958.5	9,054.5	3,178.9	5,875.6	2,231.8	2,172.7	1,455.5	384.0	1,071.1
2007	13,206.4	9,262.9	3,273.5	5,990.2	2,159.5	2,130.6	1,550.0	438.2	1,106.8
2008	13,161.9	9,211.7	3,192.9	6,017.0	1,939.8	1,978.6	1,537.6	466.4	1,059.4
2009	12,757.9	9,032.6	3,098.2	5,930.6	1,458.1	1,602.2	1,259.8	368.1	885.2
2010	13,063.0	9,196.2	3,209.1	5,987.6	1,658.0	1,598.7	1,268.5	310.6	963.9
2011	13,299.1	9,428.8	3,331.0	6,101.5	1,744.0	1,704.5	1,378.2	319.2	1,070.0
2012 p	13,591.1	9,604.9	3,433.0	6,178.0	1,911.0	1,850.1	1,484.9	351.3	1,143.5

"Survey of Current Business", August 2011, U.S. Bureau of Economic Analysis

"Economic Report of the President", March 2013

Stage 3 Growth Rate for MS-DCF
Data Sources for Real GDP in 2017 $

Current-Dollar and "Real" Gross Domestic Product 28-Feb-

Annual			Quarterly (Seasonally adjusted annual rates)		
	GDP in billions of current dollars	GDP in billions of chained 2017 dollars		GDP in billions of current dollars	GDP in billions of chained 2017 dollars
1929	104.6	1,191.1	1947Q1	243.2	2,182.7
1930	92.2	1,089.8	1947Q2	246.0	2,176.9
1931	77.4	1,020.0	1947Q3	249.6	2,172.4
1932	59.5	888.4	1947Q4	259.7	2,206.5
2016	18,804.9	19,141.7	1968Q4	968.0	5,202.2
2017	19,612.1	19,612.1	1969Q1	993.3	5,283.6
2018	20,656.5	20,193.9	1969Q2	1,009.0	5,299.6
2019	21,521.4	20,692.1	1969Q3	1,030.0	5,334.6
2020	21,323.0	20,234.1	1969Q4	1,038.1	5,308.6
2021	23,594.0	21,407.7	1970Q1	1,051.2	5,300.7
2022	25,744.1	21,822.0	1970Q2	1,067.4	5,308.2
2023	27,357.8	22,374.3	1970Q3	1,086.1	5,357.1

Download for Bureau of Economic Analysis web site. Middle years and some quarters omitted to enable data to fit on this page. Use the 2017 dollars column (annual), circled values.

Stage 3 Growth Rate for MS-DCF
Long-Term Inflation Rate

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
	Long-Term Gov. Yields			Inflation Indexed		Long Term	
	From SBBI		T-Bonds	20-Yr T-Bonds		Inflation Rate	
Year	Text	Appendix	20-Yr	SBBI Text	Daily	SBBI Text	AAR Calc
2010	4.1	4.14	4.13	1.6	1.59	2.6	2.55 %
2011	2.48	2.48	2.57	0.53	0.53	1.95	1.95
2012	2.41	2.41	2.54	0.15	0.15	2.26	2.26
2013	n/a	3.67	3.72	n/a	1.36	n/a	2.31
2014	n/a	2.40	2.47	n/a	0.68	n/a	1.72
2015	n/a	n/a	2.67	n/a	1.07	n/a	1.60
2016	n/a	n/a	2.79	n/a	0.82	n/a	1.97
2017	n/a	n/a	2.58	n/a	0.61	n/a	1.97
2018	n/a	n/a	2.87	n/a	1.09	n/a	1.78
2019	n/a	n/a	2.25	n/a	0.39	n/a	1.86
2020	n/a	n/a	1.45	n/a	-0.61	n/a	2.06
2021	n/a	n/a	1.94	n/a	-0.63	n/a	2.57
2022	n/a	n/a	4.14	n/a	1.62	n/a	2.52
2023	n/a	n/a	4.20	n/a	1.84	n/a	2.36

n/a = no longer available

Sources:

(a) Ibbotson SBBI Valuation Yearbook, chapter 4. For 2012 data, 2013 edition, page 52.

(b) SBBI Appendix B, Table B-9 (Long-Term Government Bonds), December
Beginning in 2014, data from Ibbotson® SBBI® Classic Yearbook (Classic Yearbook).
2013 is from Table 2-2 of the Classic Yearbook, on page 42. The 2013 and 2014 numbers are also found in the Ibbotson SBBI Market Report with data as of December, in Table 3 on page 9.

(c) Treasury Constant Maturities, Nominal, 20-Year, Business Day, last day of year
https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15 (See workpapers)

(d) Ibbotson SBBI Valuation Yearbook, chapter 4. For 2012 data, 2013 edition, page 52.

(e) Treasury Constant Maturities, Inflation Indexed, 20-Year, Business Day,
last (business) day of year
https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15 (See workpapers)

(f) Ibbotson SBBI Valuation Yearbook, chapter 4. For 2012 data, 2013 edition, page 52.

(g) Column (b) less column (e) except for 2015 to 2022, which is column (c) less column (e)

Market Value Data for MSDCF
Stock Price for CSX - End of 2023

NasdaqGS - Nasdaq Real Time Price • USD

CSX Corporation (CSX)

Follow

36.87 -0.48 (-1.29%)

As of 2:55 PM EDT. Market Open.

Dec 27, 2023 - Jan 04, 2024 | Historical Prices | Daily

Currency in USD

Date	Open	High	Low	Close	Adj Close
Jan 3, 2024	34.64	34.92	34.52	34.66	34.55
Jan 2, 2024	34.64	34.98	34.45	34.62	34.51
Dec 29, 2023	34.69	34.78	34.55	34.67	34.56
Dec 28, 2023	34.72	34.82	34.60	34.74	34.63
Dec 27, 2023	34.77	34.89	34.57	34.65	34.54

Retrieved March 25, 2024.
Link to web page: http://finance.yahoo.com/quote/CSX/history

Market Value Data for MSDCF
Stock Price for NSC - End of 2023

NYSE - Nasdaq Real Time Price • USD

Norfolk Southern Corporation (NSC)

☆ Follow

247.65 -6.46 (-2.54%)

As of 2:59 PM EDT. Market Open.

Dec 27, 2023 - Jan 04, 2024 | Historical Prices | Daily

Currency in USD

Date	Open	High	Low	Close	Adj Close
Jan 3, 2024	235.58	235.58	231.99	232.97	231.63
Jan 2, 2024	235.57	238.24	234.24	235.66	234.31
Dec 29, 2023	236.50	237.23	235.17	236.38	235.02
Dec 28, 2023	235.96	236.95	235.41	236.53	235.17
Dec 27, 2023	235.18	236.65	234.70	235.53	234.18

Retrieved March 25, 2024.
Link to web page: http://finance.yahoo.com/quote/NSC/history

Market Value Data for MSDCF
Stock Price for UNP - End of 2023

NYSE - Nasdaq Real Time Price • USD

Union Pacific Corporation (UNP)

Follow

243.51 -1.46 (-0.60%)

As of 3:02 PM EDT. Market Open.

Dec 27, 2023 - Jan 04, 2024 | Historical Prices | Daily

Currency in USD

Date	Open	High	Low	Close	Adj Close
Jan 3, 2024	242.80	243.96	240.98	241.70	240.46
Jan 2, 2024	244.98	245.99	242.75	243.43	242.18
Dec 29, 2023	245.99	246.54	244.73	245.62	244.36
Dec 28, 2023	246.04	246.99	245.20	246.02	244.76
Dec 27, 2023	244.65	246.70	244.31	245.81	244.55

Retrieved March 25, 2024.
Link to web page: http://finance.yahoo.com/quote/UNP/history

Market Value Data for MSDCF
Shares Outstanding for CSX - End of 2023

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-Q

(☒) QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended September 30, 2023

OR

(☐) TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

Commission File Number 1-8022

CSX

CSX CORPORATION

(Exact name of registrant as specified in its charter)

Virginia					62-1051971	
(State or other jurisdiction of incorporation or organization)					*(I.R.S. Employer Identification No.)*	
500 Water Street	15th Floor	Jacksonville	FL	32202	904	359-3200
(Address of principal executive offices)				*(Zip Code)*	*(Telephone number, including area code)*	

No Change

(Former name, former address and former fiscal year, if changed since last report.)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of exchange on which registered
Common Stock, $1 Par Value	CSX	Nasdaq Global Select Market

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes (X) No ( )

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preced 12 months (or for such shorter period that the registrant was required to submit such files).

Yes (X) No ( )

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company (as defined in Exchange Act Rule 12b-2).

Large Accelerated Filer (X) Accelerated Filer ( ) Non-accelerated Filer ( ) Smaller Reporting Company (☐) Emerging growth company (☐)

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Sect 13(a) of the Exchange Act. ( )

Indicate by a check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes (☐) No (X)

There were 1,976,131,035 shares of common stock outstanding on September 30, 2023 (the latest practicable date that is closest to the filing date).

Market Value Data for MSDCF
Shares Outstanding for NSC - End of 2023

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-Q

☒ QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the quarterly period ended **September 30, 2023**

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from _____ to _____

Commission File Number: 1-8339

NORFOLK SOUTHERN CORPORATION
(Exact name of registrant as specified in its charter)

Virginia (State or other jurisdiction of incorporation or organization)

52-1188014 (I.R.S. Employer Identification No.)

650 West Peachtree Street NW
Atlanta, Georgia (Address of principal executive offices)

30308-1925 (Zip Code)

(855) 667-3655
(Registrant's telephone number, including area code)

No change
(Former name, former address and former fiscal year, if changed since last report)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol	Name of each exchange on which registered
Norfolk Southern Corporation Common Stock (Par Value $1.00)	**NSC**	**New York Stock Exchange**

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.
Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date.

Class	Outstanding at September 30, 2023
Common Stock ($1.00 par value per share)	226,136,334 (excluding 20,320,777 shares held by the registrant's consolidated subsidiaries)

Market Value Data for MSDCF
Shares Outstanding for UNP - End of 2023

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-Q

(Mark One)

☒ QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended September 30, 2023

OR

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

Commission File Number 1-6075

UNION PACIFIC CORPORATION
(Exact name of registrant as specified in its charter)

Utah (State or other jurisdiction of incorporation or organization)	13-2626465 (I.R.S. Employer Identification No.)
1400 Douglas Street, Omaha, Nebraska (Address of principal executive offices)	68179 (Zip Code)

(402) 544-5000
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each Class	Trading Symbol	Name of each exchange on which registered
Common Stock (Par Value $2.50 per share)	UNP	New York Stock Exchange

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for s shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

☒ Yes ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) du the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

☒ Yes ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definit of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer	☒	Accelerated Filer	☐	Non-Accelerated Filer	☐
Smaller Reporting Company	☐	Emerging Growth Company	☐		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting stand provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

☐ Yes ☒

As of October 13, 2023, there were 609,597,495 shares of the Registrant's Common Stock outstanding.

2023 Cost of Equity Using STB's MSDCF

Company	CSX		NSC		UNP	
Year	2023		2023		2023	
Inputs						
Initial Cash Flow	$3,726.01		$2,178.92		$5,868.99	
Input for Terminal C.F.	$4,032.08		$2,731.53		$6,709.64	
Stage One Growth	5.890%		2.800%		6.360%	
Stage Two Growth	5.020%		5.020%		5.020%	
Stage Three Growth*	5.530%		5.530%		5.530%	
Year	Val. 12/31	Pres Val.	Val. 12/31	Pres Val.	Val. 12/31	Pres Val.
1	$3,945	$3,538	$2,240	$2,038	$6,242	$5,668
2	4,178	3,359	2,303	1,907	6,639	5,474
3	4,424	3,189	2,367	1,783	7,062	5,286
4	4,685	3,027	2,433	1,668	7,511	5,105
5	4,960	2,874	2,502	1,561	7,988	4,930
6	5,209	2,706	2,627	1,491	8,389	4,701
7	5,471	2,548	2,759	1,425	8,810	4,483
8	5,746	2,400	2,897	1,362	9,253	4,275
9	6,034	2,260	3,043	1,301	9,717	4,076
10	6,337	2,128	3,196	1,244	10,205	3,887
Terminal	120,578	40,484	96,807	37,674	267,404	101,846
Sum of Pres. Values		$68,512.46		$53,454.11		$149,729.34
Market Value (input)		$68,512.46		$53,454.11		$149,729.34
Cost of Equity	**11.53%**		**9.90%**		**10.13%**	
Prev. Yr. Cost of Equity	15.15%		12.84%		13.03%	

Preferred Stock

There is no preferred stock for any participating railroads

Cost of Preferred Equity Capital

Step 1: Calculate Average Stock Price and Annual Dividend

	Stock Price			
	High	**Low**	**Avg.**	**Dividend**
Q1			$0.000	
Q2			$0.000	
Q3			$0.000	
Q4			$0.000	
Year			**$0.000**	**$0.00**

Step 2: Calculate Cost of Preferred Equity Capital Using Dividend Yield method

	Annual Dividend	**Average Price**	**Yield**
	$0.00	$0.000	#DIV/0!
Cost of Preferred Equity			**#DIV/0!**
Previous Year Cost of Preferred Equity			0.00%

Market Value of Preferred Equity

Outstanding Shares	**Average Price**	**Market Value**
	$0.000	**$0**