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April 20, 2017

242969

Ms. Cynthia T. Brown
Chief, Section of Administration
Office of Proceedings
Surface Transportation Board
395 E Street, S.W.
Washington, DC 20423

ENTERED
Office of Proceedings
April 20, 2017
Part of
Public Record

Re: EP 558 (Sub-No. 20), *Railroad Cost of Capital—2016*

Dear Ms. Brown:

Pursuant to the decision served by the Board on February 28, 2017 in the above captioned proceeding, please find the attached Comments of the Association of American Railroads (AAR).

An electronic version of the same, in MS Word and PDF format, will be hand-delivered for the Board's convenience. The electronic files will also include AAR's underlying workpapers and spreadsheets, which will be made available upon request to other participants in the proceeding.

Respectfully submitted,

Timothy J. Strafford
Counsel for the Association of
American Railroads

**BEFORE THE
SURFACE TRANSPORTATION BOARD**

RAILROAD COST OF
CAPITAL — 2016

)
)
) EX PARTE NO. 558 (Sub- No. 20)
)

**COMMENTS OF THE ASSOCIATION OF AMERICAN RAILROADS
AND ITS MEMBER RAILROADS**

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April 20, 2017

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Verified Statements

Witness*	Subject
John T. Gray	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., V.S. Gray at _____

**BEFORE THE
SURFACE TRANSPORTATION BOARD**

RAILROAD COST OF
CAPITAL — 2016

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) STB Docket No. EP 558 (Sub-No. 20)
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**COMMENTS OF THE ASSOCIATION OF AMERICAN RAILROADS
AND ITS MEMBER RAILROADS**

By order served on February 28, 2017, the Surface Transportation Board (“Board”) instituted this proceeding to determine the railroad industry’s cost of capital for the year 2016. The Board noted that this determination will enable it to make the statutorily required annual individual railroad revenue adequacy determination for 2016. 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 – 2016*, EP 558 (Sub-No. 20) (STB served Feb. 28, 2017).

The railroads, through the Association of American Railroads (AAR), are submitting their calculation of: (1) the railroads’ 2016 cost of common equity capital; (2) the railroads’ 2016 current cost of preferred equity capital; (3) the railroads’ current 2016 cost of debt capital; and (4) the 2016 capital structure mix of the railroad industry on a market value basis.

The AAR’s calculations are discussed in the attached verified statement of John T. Gray, Senior Vice President, Policy and Economics of the AAR. Mr. Gray’s statement establishes the following:

1. The 2016 cost of common equity capital is 10.31 percent.

3. The 2016 cost of preferred equity capital is 3.64 percent.
3. The 2016 cost of debt capital is 3.43 percent.
4. The capital structure of the railroad industry is 21.09 percent debt, 0.00 percent preferred equity,¹ and 78.91 percent common equity.

From these data, Mr. Gray concludes that the overall railroad industry cost of capital for 2016 is 8.86 percent.²

I. Introduction

The sole purpose of this proceeding is to determine the railroad industry's cost of capital for 2016. 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'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). Those 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

¹ The weight for preferred equity is small enough that it rounds to 0.00.

² Gray V.S. at 2, 53.

company's stock is listed on either the New York or the American Stock Exchange³; and (5) the company has paid dividends throughout the year (2016).

This year there are four railroad corporations or holding companies in the sample meeting the Board's criteria: CSX Corporation, Kansas City Southern, Norfolk Southern Corporation, and Union Pacific Corporation. These railroad companies are the same four companies included in the 2015 sample.

II. The Cost of Common Equity Capital

In its February 28, 2017, order instituting this proceeding, the Board directed that the cost of capital components be calculated "using the methodology followed in Railroad Cost of Capital –2015." See *Railroad Cost of Capital – 2016*, EP 558 (Sub-No. 20), slip op. at 2 (STB served February 28, 2017). In *Railroad Cost of Capital –2015*, 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 *Railroad Cost of Capital – 2015*,

³ The Board noted that "[b]ecause CSX continues to trade on the NASDAQ, and we have available stock price data that can be used in the Board's computation of the rail industry's cost of capital, the Board will waive this fourth screening criterion for the 2016 cost of capital determination." See *Railroad Cost of Capital*, EP 558 (Sub-No. 20), slip op. at 2 (STB served Feb. 28, 2017).

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. 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).

EP 558 (Sub-No. 19), slip op. at 9-14 (STB served August 5, 2016).⁵ Mr. Gray 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. The CAPM Methodology

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:

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

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.

Mr. Gray'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 2015 cost of capital proceeding. *Railroad Cost of Capital – 2015*, EP 558 (Sub-No. 19), slip op. at 9. Since the 2006 cost of capital determination, the well-regarded and widely-accepted Ibbotson

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).

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), as this figure is calculated using the same sources and methodology as Ibbotson.⁷ Gray V.S. at 30. For the 2016 calculation, the same source was used: the Duff & Phelps *2017 Valuation Handbook – Guide to Cost of Capital*. 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 2015 cost of capital proceeding. Gray V.S. at 31-34.

The values determined by Mr. Gray for the elements of the CAPM methodology were 2.22 percent for the risk-free rate, 6.94 percent for the market risk premium, and 1.1467 for beta.

Based on the four-railroad composite described above and the procedures used by the STB in the last cost of capital proceeding, Mr. Gray estimates that under the CAPM methodology the cost of common equity capital for 2016 is 10.18 percent. Gray V.S. at 36.

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:

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 “Calculated 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 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 Mr. Gray. 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), Mr. Gray's

calculations used only IBES growth estimates available as of December 31, 2016, and stock market values were based on shares outstanding and stock prices as of the last trading day of the last full week for 2016 – December 30, 2016 (Friday). Gray V.S. at 41.⁸

Mr. Gray calculates the cost of common equity capital for 2016, using the STB's version of the Morningstar/Ibbotson MSDCF model, as 10.44 percent. Gray V.S. at 47.

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 10.31 percent. Gray V.S. at 47.

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.

⁸ Consistent with the methodology approved by the Board in *Railroad Cost of Capital – 2015*, EP 558 (Sub-No. 19), slip op. at 12-14, Mr. Gray's calculations used data inputs in the cash flow formula as retrieved from the railroads' 2012 - 2016 10-K filings with the SEC (and used restated data where set forth in any subsequently filed 10-K filings with the SEC). See Gray V.S. at 38.

- (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.

For the first time since 2002, one railroad in the composite had preferred stock outstanding at the end of 2013. This continues through 2016, and the estimated cost of preferred equity is 3.64 percent for 2016. Gray V.S. at 51.

IV. The Cost of Debt

The cost of debt can include costs for three categories (bonds, equipment trust certificates, conditional sales agreements) of debt instruments, plus flotation costs.⁹ To determine the cost of debt for bonds, Mr. Gray has computed the average current bond yield for 103 bonds from the sample railroads for which data were available during 2016. This methodology is identical to that used in the last 26 cost of capital proceedings. *Railroad Cost of Capital – 2015*, EP 558 (Sub-No. 19), slip op. at 5. Under this approach, the bond yield is based on a sample representing 98.5 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 This is the same methodology used by the Board in the last 28 proceedings. The composite current cost of debt is the market-weighted average cost of bonds, ETCs, and CSAs (if

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. Gray V.S. at 8.

¹¹ Gray V.S. at 11, 15. No CSAs were modeled because none are outstanding.

there were any), plus a small flotation cost.¹² Using the Board's established methodology, the railroads' 2016 cost of new debt is 3.43 percent. Gray V.S. at 23.

V. The 2016 Capital Structure of the Railroad Industry and the Overall Cost of Capital

Pursuant to the Board's February 28, 2017 decision, the market values of debt, preferred equity, and common equity were compiled to compute the 2016 capital structure of the railroad industry. The railroads' market value capital structure on a market value basis is 21.09 percent debt, 78.91 percent common equity capital, and 0.00 percent preferred equity capital. Gray V.S. at 53. Based upon this capital structure, the overall 2016 cost of capital is 8.86 percent. Gray V.S. at 53.

Conclusion

The Board should determine that the railroads' cost of capital for 2016 is 8.86 percent.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'K. D. Kirmayer', with a stylized flourish at the end.

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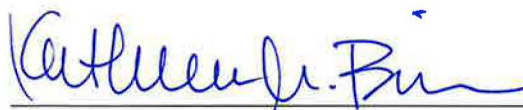
April 20, 2017

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 2016. This is the same methodology approved by the Board in *Railroad Cost of Capital –2015*, EP 558 (Sub-No. 19), slip op. at 7. Gray V.S. at 18-22.

CERTIFICATE OF SERVICE

I hereby certify that on this 20th day of April, 2017, I caused to be served by first class mail, postage prepaid, a copy of the forgoing on the following:

Robert D. Rosenberg
Slover & Loftus
1224 Seventeenth St, NW
Washington, DC 20036-3003



Kathleen M. Birch ✓

BEFORE THE
SURFACE TRANSPORTATION BOARD

EX PARTE NO. 558 (Sub-No. 20)
RAILROAD COST OF CAPITAL — 2016

VERIFIED STATEMENT
OF
JOHN T. GRAY
SENIOR VICE PRESIDENT — POLICY AND ECONOMICS
ASSOCIATION OF AMERICAN RAILROADS

April 20, 2017

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**Verified Statement
of
John T. Gray**

I. Introduction

My name is John T. Gray. I am Senior Vice President – Policy and Economics of the Association of American Railroads (AAR), with offices 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 of the Class I railroads plus about 150 additional Class II and III freight railroads, account for approximately 97 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 have conducted or directed a wide range of analyses and projects addressing regulatory, legislative and internal issues relevant to railroads. Furthermore, I have testified before federal regulatory agencies, and have been an expert witness for a railroad. 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 27, 2017 (served February 28), instituting a proceeding to determine the railroad industry’s 2016

cost of capital — Ex Parte No. 558 (Sub-No. 20), *Railroad Cost of Capital — 2016* ("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. 19); 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. 19). In addition, I calculate a cost of preferred equity using the dividend yield method, as used in Ex Parte No. 558 (Sub-No. 19). 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 calculation: 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 the cost of preferred equity capital.

I conclude that the 2016 cost of capital for the railroad industry is 8.86 percent. This estimate is based on a current cost of debt of 3.43 percent, a cost of common equity capital of 10.31 percent; a cost of preferred equity of 3.64 percent; and market value weights for debt, common equity, and preferred equity of 21.09 percent, 78.91 percent, and 0.00 percent, respectively.

II. Determining the Cost of Capital

A. Defining the Cost of Capital

The cost of capital for a firm is the minimum rate of return on investment that the providers of capital require as a condition for making an investment in the firm. In essence, it is the threshold rate of return on investment that makes investment in the firm attractive. 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. Methods used to estimate the cost of capital therefore attempt to measure investor expectations. Such models of future behavior are inherently uncertain, and cost of capital computations 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.

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).

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. 20 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 has paid dividends throughout the year (2016).

Table 1 (below) 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
2016

Class I Railroad	Parent	Stock Symbol	Dividends Throughout 2016	Rail Assets Account For At Least 50% of Parent	Adequate Debt Rating
BNSF	Berkshire Hathaway	BRK.A	No	No	Yes
CSX	CSX Corporation	CSX	Yes	Yes	Yes
CNGT*	Canadian National Railway Co.	CNI	--- Non-U.S. company	---	---
KCS	Kansas City Southern	KSU	Yes	Yes	Yes
NS	Norfolk Southern Corporation	NSC	Yes	Yes	Yes
CPSL*	Canadian Pacific Railway Ltd.	CP	--- Non-U.S. company	---	---
UP	Union Pacific Corporation	UNP	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). CPSL is Soo Line Corporation, and consists of the U.S. operations of Canadian Pacific (CP). Following STB precedent, CN and Canadian Pacific were not included in the sample because both CN and Canadian Pacific are Canadian corporations – and the cost of capital proceeding is concerned with determining costs for U.S. railroads under STB jurisdiction.

Note: the NYSE/AMEX requirement was waived by the Board in its decision served February 28, 2017.

This year there are four railroad corporations or holding companies in the sample meeting the Board's criteria: CSX Corporation, Kansas City Southern, Norfolk Southern Corporation, and Union Pacific Corporation. These are the same railroad companies included in the 2015 sample. 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 2016, and the railroad is less than 50% of the company's assets.² Based on data from Annual Report Form R-1 for 2016, the four-firm composite accounts for 64 percent of the operating revenues and 59 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, 97 percent of the cost of debt is calculated using bonds and similar instruments (including notes and debentures). The

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) are still more Canadian than USA. Comparing operating revenues for 2015 as reported in the AAR's *Railroad Facts* book, 2016 edition: CNGT was 33 percent of CN, and SOO was 31 percent of Canadian Pacific.

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. At the end of 2016, BNSF accounted for 13.5 percent of Berkshire Hathaway's total assets. Among the many other subsidiaries of Berkshire Hathaway are GEICO, Fruit of the Loom, Helzberg Diamonds and Dairy Queen. The company also owns numerous automobile dealerships, real estate companies, and newspapers.

remaining 3 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 2016 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 in the 2015 Cost of Capital decision. The other method is calculated using the somewhat more forward looking Multi-Stage Discounted Cash Flow model methodology prescribed by the Board in the 2015 Cost of Capital Decision. The cost of preferred equity capital has been calculated using a simple dividend yield method, as used in the 2015 Cost of Capital Decision. Calculations for all three types of capital are based on data through 2016. 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 2016

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

³ There are currently five Equipment Trust Certificates modeled.

⁴ See Ex Parte Nos. 415, 436, 452, 458, 464, 466, 473, 478, 486, 491, 506, 513, 518, 523, 523 (Sub-No. 1), 588, and 588 (Sub-No. 1) through (Sub-No. 19).

- (1) There is a lack of sufficient new 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.
- (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 2016, yields and prices of the sample railroads' bonds, notes

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

and debentures were obtained from Bloomberg.⁷ This source is the same data source used since the 2011 cost of capital determination. We were able to find data for 103 unique CUSIPs (bond identifiers).⁸ The 103 bonds represent 98.5 percent of the book value of all railroad bonds belonging to the composite railroad.⁹ The bonds not included 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 103 traded CUSIPs in 2016, 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, 2016.¹⁰ 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

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/>

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 In some cases, similar series of bonds have been assigned two CUSIPs because a privately-placed portion trades *among* qualified institutional buyers instead of *through an exchange*. This can happen in a bond exchange offer where not all of the "old" bonds have been redeemed for the new version.

¹⁰ 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.

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 98.5 percent of the book value of bonds is priced at market. Table 2 summarizes the results of the market value calculations for 2016. The market value for bonds, notes, and debentures that traded is \$34.46 billion, which is 98 percent of the total market value of \$34.99 billion.¹¹

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	\$10,241,181	\$254,338	\$10,495,519	29.72 %
KSU	\$1,132,975	\$184,019	1,316,994	3.29
NSC	\$10,947,983	\$84,902	11,032,885	31.77
UNP	\$12,135,928	\$6,810	12,142,738	35.22
Total	\$34,458,067	\$530,069	\$34,988,136	100.00 %
Prior Year	\$32,141,035	\$552,886	\$32,693,921	
Change	7.2%	-4.1%	7.0%	

Total market value for bonds is up 7.0 percent from the previous year. Among the causes of this increase are new debt offerings outpacing retirements, as year-end book values of bonds are higher for three of the four railroads.

Appendix A lists details for each of 103 unique CUSIPs for bonds, notes, and debentures belonging to the composite railroad – and having trading data available for 2016 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

¹¹ The market value and book value percentages for traded bonds were very close, but not exactly the same.

among qualified institutional buyers instead of through an exchange, as allowed under the Securities and Exchange Commission’s Rule 144A. There are two cases where a portion of a single series of bonds was issued at two different times. In one of those cases, a portion was issued in 2015, while the second portion was issued in 2016. Each of the two series of notes has been split into two pieces (a and b) to make it easier to follow the Surface Transportation Board’s procedure of prorating new debt. 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 3.392 percent, which is a little lower than 2015’s figure of 3.508 percent.

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

Railroad Co.	Weight	Current Cost
CSX	29.72 %	3.700 %
KSU	3.29	3.588
NSC	31.77	3.499
UNP	35.22	3.019
Total	100.00 %	3.392 %

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 103 unique CUSIP 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 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 3.392 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 17.7 percent of the market value for the sum of bonds, ETCs, and conditional sales agreements.¹² For 2016, this percentage is 3.0 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

¹² See verified statement of David F. Miller on behalf of the Association of American Railroads in Ex Parte No. 491, submitted February 15, 1991, Appendix I.

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 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 2016 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 2007, 2009, 2014, and 2015, a railroad issued new ETCs with interest rate spreads above government bonds of 125, 80, 76 and 44 basis points, respectively. In 2016, another new ETC was issued by a railroad, and its interest rate spread was calculated to be 70 basis points – higher than 2015, but much closer to the 2014 spread. For comparisons, Table 4 lists historical spreads used since 2000 and the spread proposed for 2016.¹³

¹³ The 70 basis point spread was calculated using the same method as that used for 2008, 2014 and 2015, and calculations are 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
2000	Ex Parte No. 558 (Sub-No. 4)	171
2001	Ex Parte No. 558 (Sub-No. 5)	114
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	Proposed for EP 558 (Sub-No. 20)	70

Comparing the proposed 2016 premium to earlier years, the 2016 premium is significantly more consistent with patterns observed since 2009, while the 2015 premium appears to be an anomaly. Therefore, we have used the 70 basis point spread herein as the interest rate spread (the risk premium) above government bonds.

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 2016 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 5) is shown in Table 5.¹⁴

Table No. 5
Summary of Equipment Trust Certificates Modeled for 2016
(\$000)

Railroad	Amount Outstanding			Yield	Current Market Value	Current Interest Amount	No. ETC
	Beg.	Ending	Average				
CSX	\$0	\$0	\$0	--	\$0	\$0	0
KCS	0	0	0	--	0	0	0
NS	0	0	0	--	0	0	0
UP	1,106,527	1,061,098	1,083,813	2.494%	1,068,200	26,638	5
Total	\$1,106,527	\$1,061,098	\$1,083,813	2.494%	\$1,068,200	\$26,638	5

¹⁴The 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

Weighing each railroad's yield (there was only one railroad) by its current market value for modeled ETCs results in a current cost of 2.494 percent. The average rate is slightly lower than the 2.535 percent found for 2015. In this year's case, the lower (for year 4 and later) yield curve for 2016 is not entirely offset by the higher premium. (See Appendix B).

A summary of each railroad's modeled ETCs can be found in Appendix C, which includes a market value and a current yield. (Union Pacific is the only railroad using ETCs currently.) The large difference in yields for the first ETC compared to the other four (Appendix C, page 7) is caused by the big difference in their series of maturity dates – they have a different set of places on an upward sloping yield curve. Appendix C also lists ETCs that were not modeled (and those current, which are not used). 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. The market value of all modeled ETCs is \$1.07 billion. Following STB procedure, the new ETC has been prorated on page 7 of Appendix C by the ratio of the number of months outstanding (rounded to the nearest half month) to the twelve-month year. There were no non-modeled ETCs this year.

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

N = Whole number of coupons payable plus 13
K = Compute for K, values 1 to N and sum the results

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. However, no CSAs were outstanding in 2016 – so none were modeled and none were added to Miscellaneous Debt. There is no appendix for CSAs.

D. All Other Debt

Capital leases and miscellaneous debt such as commercial paper, demand deposits, and other instruments with 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 account for most of the All Other Debt category.

Capital leases are contracts between two parties and as such take many forms.¹⁵ 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.

¹⁵ See generally 49 C.F.R. 1201, 2–20 for definitions.

Miscellaneous debt, such as commercial paper, demand deposits, and various instruments with extremely small amounts outstanding are also excluded from the current cost computations. The book value (assumed market value) of capital leases and miscellaneous debt is \$451.4 million; as a percent of the total market value of debt of the composite railroad, it is 1.2 percent. Miscellaneous debt is lower than for 2015, and much of the decrease is related to one railroad's 2015 obligation concerning the sale of receivables, which was zero in 2016. (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.¹⁶

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 \$36,507.7 million. Bonds, Notes, and Debentures (Bonds) account for 96 percent of the total market value. As can be computed from Appendix D, 98 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.

¹⁶ Non-modeled ETCs and/or CSAs would also have been included in the All Other category if there had been any.

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

Type of Debt	Market Value	Percent of	
		Total	Subtotal
Bonds, Notes & Debentures	\$34,988,136	95.84 %	97.04 %
Equipment Trust Certificates	1,068,200	2.93	2.96
Conditional Sales Agreements	0	0.00	0.00
Subtotal	36,056,336	98.76	100.00 %
All Other Debt*	451,375	1.24	
Total	\$36,507,712	100.00 %	

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

Current costs can be determined for three of the four debt categories — Bonds, Equipment Trust Certificates, and Conditional Sales Agreements, had there been any. Therefore, in 2016, 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. The market value of debt, including traded and non-traded debt, is described in more detail in Appendix D.

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 — 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 2016 flotation costs for bonds using publicly available data from electronic filings with the Securities and Exchange Commission (SEC).¹⁷ 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 2016, 10 new issues were reported in five filings, with some filings reporting multiple new issues. (In one case, portions of the same series of bonds were issued at two different times. In another case, a series of bonds was first issued in 2015, and a second portion of the same series was issued in 2016.) A simple average of the 10 flotation costs is 0.067 points, which is slightly lower than the figure used by the Board for 2015 – although not substantially different. As before, debt exchanges have not been included. Page 1 of Appendix E contains a table with input data and calculations. Pages 2 and 3 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 10 new railroad debt issues, which were issued by four different railroads, provide the best

¹⁷ 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> .

information to determine flotation costs for 2016, and I have therefore used 0.067 percentage points for the flotation costs for bonds.

The Securities and Exchange Commission (SEC) conducted a study of flotation costs using railroad ETC data for the years 1951, 1952 and 1955.¹⁸ In that study, the SEC determined that ETC flotation costs averaged 0.89 percent of gross proceeds.

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 my testimony for 2012 for a discussion of the incorrect assumption used with the current method. Because ETCs are such a 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. 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.

¹⁸ *Cost of Flotation of Corporate Securities 1951-1955*, Securities and Exchange Commission, June 1957.

Table No. 7
Flotation Costs for
Equipment Trust Certificates

<i>Given</i>	ETC
Flotation Costs as Pct of Gross Proceeds	0.890%
Avg. Railroad Yields (Table 5)	2.494%
Assumed Duration of New Instrument (Yrs)	15
<i>Calculated</i>	
Price After Flotation Costs	\$99.11
Effective Yield Including Flotation Costs	2.566%
Difference Between Yields With and Without Flotation Costs =	
Flotation Cost as Percentage Points	0.072%

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 0.072 percentage points – which rounds to the same value as that for 2015.

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 0.067 percentage points.

Table No. 8
Flotation Costs For Debt

Type of Debt	Market Weight	Flotation Cost
Bonds, Notes & Debentures	97.04%	0.067%
Equipment Trust Certificates	2.96%	0.072%
Conditional Sales Agreements	0.00%	not calculated
Total	100.00%	0.067%

This flotation cost for 2016 is lower than the Board's 0.071 percentage points calculated in its 2015 Cost of Capital decision. Since bonds have a market weight of over 97 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	97.04%	3.392%
Equipment Trust Certificates	2.96%	2.494%
Conditional Sales Agreements	0.00%	--
Subtotal	100.00%	3.366%
Flotation Costs		0.067%
Weighted Cost of Debt		3.433%
Weighted Cost of Debt (Rounded)		3.43%

The current weighted cost of debt before flotation costs is 3.366 percent. The addition of flotation costs results in a rounded cost of debt of 3.43 percent. This cost of debt is the second-lowest calculation ever, higher than the 2012 record low of 3.29 percent and lower than the 3.55 percent calculated for 2015.¹⁹ A summary for the 2016 calculation of the overall cost of debt is provided in Appendix F.

IV. Common Equity Capital In 2016

A. The Market Value of Common Equity Capital

The market value of common equity is based on stock prices and shares outstanding for 2016. 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 2016

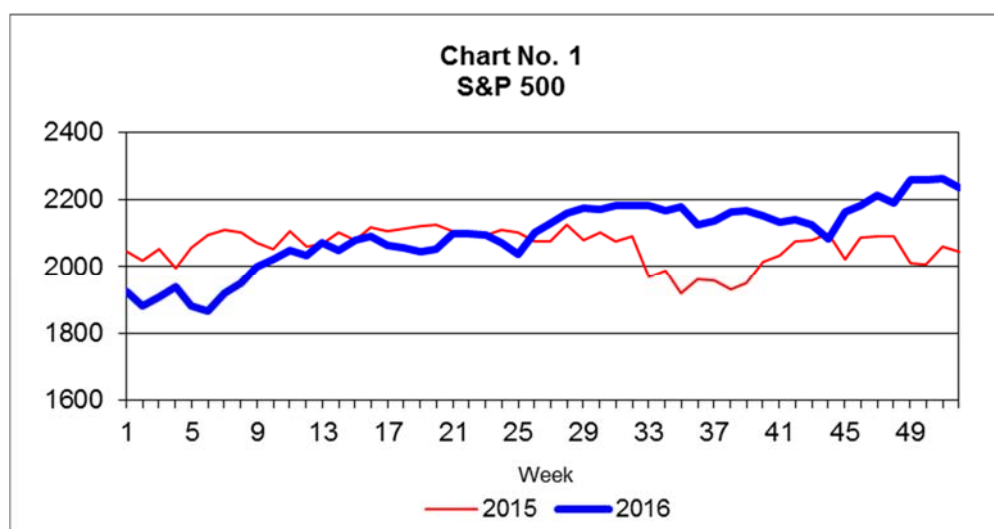
Railroad Co.	Value (\$000)	Weight %
CSX	26,798,930.0	19.62
KSU	9,527,376.9	6.97
NSC	26,072,879.4	19.09
UNP	74,196,794.9	54.32
Total	\$136,595,981.1	100.00 %
Prior Year	\$156,111,383.0	
Change	-12.5%	

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

¹⁹ 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 2016 edition lists, on page 20, data from 1990 through 2015.

reports multiplied by stock prices at the close of each week in 2016.²⁰ Calculations for 2016 included 52 weeks. Week 1 began on Monday January 4, 2016, and is the first week after 2015's week 52 used in last year's calculation.²¹ The week beginning Tuesday December 27, 2016, qualifies as the final week for 2016. Thus, 2016 is a 52-week year for the purpose of calculating the market value of common equity (and for the regression data set used by this year's Capital Asset Pricing Model).

The 52-week average market capitalization of the composite railroad (the four railroads that comprise the composite sample), listed on page 5 of Appendix G, is \$136.6 billion. This is a 12.5 percent decrease from last year's average. Railroad market capitalization for the first 32 weeks of 2016 was lower than the corresponding week of the previous year. For the first five months, it was lower by 20 to 40 percent.



²⁰ The 10-Q and 10-K reports are filed with the U.S. Securities and Exchange Commission (SEC), and are available from railroad web sites or the SEC web site.

²¹ Week 52 for 2015 started Monday December 28, and is not considered by the Board as part of 2016 because it did not have 3 days of trading in 2016. (It had 0 since January 1 was a holiday and January 2 was a Saturday.)

As shown in Chart 1, the stock market in general, as represented by the Standard & Poor's 500, finished the year 9.5 percent higher than it had been a year earlier. During the second half, the market was above the previous year for all but one week.

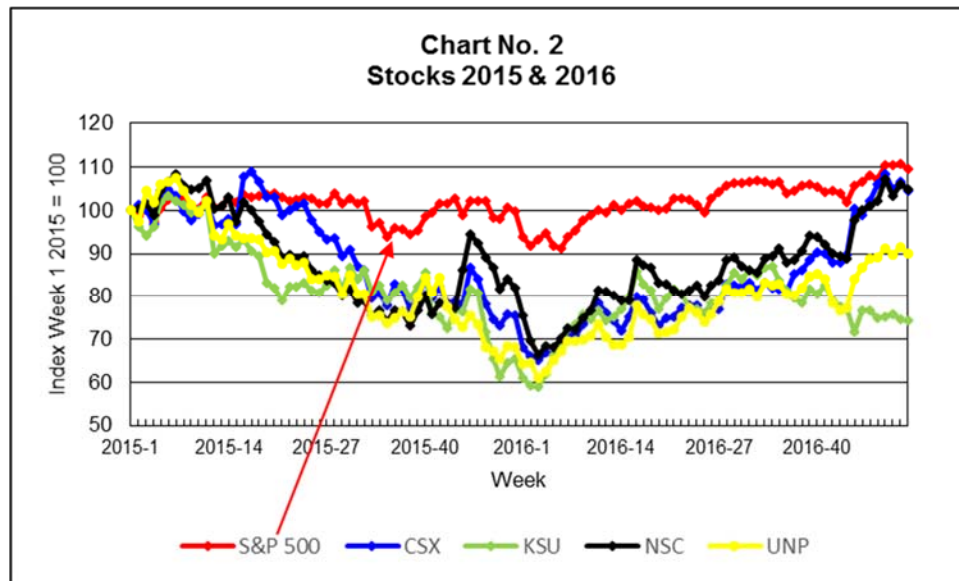


Chart 2 compares stock performance for 2015 and 2016. The railroads had a better 2016 than the Standard & Poor's 500 index, but two of the four railroads were still lower than they were at the beginning of 2015. It can be easy to forget that stocks with betas higher than 1.0 can go *down* faster than the market – in addition to potentially going up faster than the market.

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. 19). The CAPM is discussed herein, and the MSDCF is discussed in the next section.

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 regarded a particular firm or group of firms. In formulaic terms, the cost of equity as estimated by the CAPM may be expressed as:

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

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. 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 2015 Cost of Capital decision.²²

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 2016.²³ A copy of the “download” from the Federal Reserve web site is included in my work papers. Table 11 (next page) lists a 10-year history of this bond. As the table shows, the average rate for 20-Year U.S. Treasury Bonds in 2016 is a decrease from the previous year. Appendix H lists all of the annual 20-Year U.S. Treasury Bond rates available since 1980, and the 20-year rate for 2016 is the lowest rate during that period.²⁴

²² Ex Parte No. 558 (Sub-No. 19), Railroad Cost of Capital – 2015, served August 5, 2016.

²³ 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 Y 20 20-year. For Frequency, select Annual.

²⁴ 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.

Table No. 11
20-Year U.S. Treasury Bonds 2007 - 2016

Year	Average Annual Rate
2007	4.91 %
2008	4.36
2009	4.11
2010	4.03
2011	3.62
2012	2.54
2013	3.12
2014	3.07
2015	2.55
2016	2.22

Source: Federal Reserve

Using the average yield to maturity in 2016 for a 20-year U.S. Treasury Bond, as directed in STB Ex Parte No. 558 (Sub No. 20), the CAPM's risk-free rate is 2.22 percent.

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.²⁵ 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 2016, Morningstar decided to discontinue its *Ibbotson SBBI Classic Yearbook*, which would have been the source for the 2015 equity risk premium. The valuation and financial advisory firm Duff & Phelps maintains many of the same series formerly published by Ibbotson. Those that order the Duff & Phelps *Valuation Handbook-Guide to Cost of Capital* receive a special preview document that includes a page that lists the long-horizon expected equity risk premium.²⁶ The first equity risk premium listed by Duff & Phelps is 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 2016, this premium is 6.94 percent – as found in the Duff & Phelps *2017 Valuation Handbook – Guide to Cost of Capital*. This is a small increase from the 6.90 percent figure used by the Board for 2015. (Appendix H shows Equity Risk

²⁵ Ibbotson Associates is a wholly-owned subsidiary of Morningstar, Inc. “SBBI” stands for “Stocks, Bonds, Bills, and Inflation.

²⁶ The Duff & Phelps *2017 Valuation Handbook – Guide to Cost of Capital* is published by John Wiley & Sons. The pre-order preview is a 38-page PDF. The equity risk premium is on the 19th page of the PDF (also numbered as 19). The Handbook, which was not shipped until March 30 (and matches the preview), lists the premium on page 36 of chapter 3 (and page 14 of chapter 5). The last 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).”

Premiums since 1980.) Thus, I used 6.94 percent as the rate for the CAPM's market risk premium, and I have utilized the same source as used in the previous cost of capital determination.

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:

$$R - \text{SRRF} = \text{Alpha} + \text{beta} (\text{RM} - \text{SRRF}) + E$$

Where:

R	=	merger-adjusted stock returns for the portfolio of railroads; ²⁷
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.

²⁷ Railroads must meet the screening criteria set forth in *Railroad Cost of Capital – 1984* and modified currently by the Board.

Using the STB instructions, the value for beta can be solved for 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 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 is derived from publicly available data from web sites on the internet (for further information, see the work papers). 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 2011 (Week 0) through the last week of 2016 (Week 261). Each week in the data set is identified by the first trading day of the week (typically Monday), but the prices are actually for the last day of trading in the week (typically Friday).²⁸ Week 1 in the regression data set is the week beginning Tuesday, January 3, 2012.²⁹ The last week of 2016, Week 261, began on Tuesday, December 27. This week had no days of trading in 2017 (Friday, December 30, is the last trading day of the week) – meaning that it could not meet the Board's "3 or more trading days" criterion to qualify as week 1 for 2017. Week 0 began in 2011 on Monday December 26, 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 (instead of the

²⁸ In some cases, stock did not trade on Monday. For example, trading during Week 245 began Tuesday, September 6, 2016, because Monday, September 5, 2016 was the Labor Day holiday. There are also cases where the last trading day of the week was not Friday because of a holiday.

²⁹ Following the Board's clarification in Ex Parte No. 558 (Sub-No. 12), the week beginning January 3, 2012, is the first week in the relevant year that contains 3 or more trading days.

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.³⁰

Three categories of data are necessary for the raw regression data set. First, weekly stock prices for CSX, KSU, NSC, and UNP are downloaded from a web site.³¹ The price data were downloaded on January 26, 2017, and are included in my work papers.³² Stock prices adjusted for dividends and splits are used as the regression's dependent variable, while prices that are only adjusted for splits are used for weighting.³³ (I have adjusted shares outstanding and stock prices for splits for easier comparison to the dividend-adjusted prices. However, original shares outstanding used with original prices will achieve the same results when used for weighting purposes.) The price index values for Standard & Poor's 500 Price Index were also downloaded from the same web site.

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.³⁴

³⁰ Ex Parte No. 558 (Sub-No. 12), served September 25, 2009.

³¹ CSX Corporation has a stock symbol of CSX, Kansas City Southern is KSU, Norfolk Southern Corporation is NSC, and Union Pacific Corporation is UNP.

³² The Yahoo! Finance web site was used. Go to <http://finance.yahoo.com/q/hp?s=CSX> to start with the first railroad (CSX). Select weekly data and a date range.

³³ 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.

³⁴ 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.³⁵ 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.³⁶ 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 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 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

³⁵ SAS Institute Inc., Cary, NC.

³⁶ 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 resulted in a beta estimate of 1.146742833, which rounds to 1.1467.

The 2016 beta is lower than the beta for 2015 (1.2167), and closest to the beta used for 2012 (1.1543). This is the eighth consecutive year that the railroad beta has been above 1.0. Based on a beta that has decreased for three consecutive years, one might conclude that the railroad beta will continue its trend of falling. However, a test regression using only the last 26 weeks of 2016 resulted in a beta of 1.3209.

Additional checks were performed on our beta calculation. A new spreadsheet data set was created using data downloaded in early April. Changes in download date and data captured can cause different adjusted values in the regression data set, often affecting the beta calculation at the third to eighth digit after the decimal. The beta calculated in this second spreadsheet was 1.146742866, which also rounds to 1.1467. This is extremely close to our calculation using data retrieved in January.

We have evaluated our beta calculation by (1) comparing it to previous years and expectations, and (2) comparing the results of two data sets created at different times. The value of 1.1467 for beta, as calculated in our initial regression, is used as an input to the Capital Asset Pricing Model.

4. Cost of Common Equity Using the CAPM

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

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

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 used by the STB in the previous cost of capital determination, Ex Parte No. 558 (Sub-No. 19). Table 12 is a summary of our CAPM cost of common equity calculation, which resulted in an average 2016 cost of equity estimate for the composite railroad of 10.18 percent. This is a decrease from 2015's 10.95 percent.

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

Inputs to Model

Risk-Free Rate	2.22 %	From Table No. 13
Market Risk Premium	6.94 %	From D&P, Ch 3, p.36
Beta	1.1467	From Appendix I

Calculation

Risk-Free Rate	2.22 %	Given
Plus: Beta Adjusted Risk Premium	7.96 %	Beta x Mkt. Risk Prem.
CAPM Cost of Equity	10.18 %	Risk-Free 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.

These features 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. Thus, 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.

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.³⁷ 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. Major 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 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 2015 cost of capital.

1. Cash Flows

The Morningstar/Ibbotson MSDCF model uses an initial cash flow and a terminal cash flow as inputs. The initial cash flow is defined as income before extraordinary items minus capital expenditures plus depreciation plus deferred taxes. Income before

³⁷ 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.

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. The years used in this case are 2012 through 2016. 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 KSU in 2016
(\$ in millions)

	2012	2013	2014	2015	2016	Total
Net Income	\$377	\$351	\$502	\$483	\$478	\$2,192
Less Extraord. Items	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Inc. Bef. Extraord. Items (+)	\$377	\$351	\$502	\$483	\$478	\$2,192
Capital Expenditures (-)	\$567	\$838	\$997	\$850	\$624	\$3,876
Depreciation (+)	199	223	258	285	305	1,270
Deferred Taxes (+)	<u>197</u>	<u>111</u>	<u>140</u>	<u>136</u>	<u>105</u>	<u>689</u>
Cash Flow	\$206	-\$153	-\$96	\$54	\$264	\$275
Revenue (a.k.a. "Sales")	\$2,239	\$2,369	\$2,577	\$2,419	\$2,334	\$11,938
Ratio of Cash Flow to Sales (Smoothed Ibbotson-style) = (\$275 / \$11,938) =						0.02304
Initial Cash Flow in 2016 (Smoothed Ibbotson-style) = (0.02304 x \$2,334) =						\$53.79
Ratio of IBEL to Sales (Smoothed Ibbotson-style) = (\$2,192 / \$11,938) =						0.18361
Terminal Cash Flow input (Smoothed Ibbotson-style) = (0.18361 x \$2,334) =						\$428.58

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 2016, which is the initial cash flow in the model, is calculated by multiplying revenue for 2016 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 \$53.79 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, depreciation equals capital expenditures, and deferred taxes are zero. Therefore, the depreciation and capital expenditures from the initial cash flow formula cancel each other, and deferred taxes are eliminated because they are zero. The remaining part of the equation for the model's terminal cash flow is income before extraordinary items (IBEL), which we calculate by subtracting extraordinary items from new income. In

our Table 13 example, the model's input for the terminal cash flow is \$428.58 million. The model's terminal cash flow input is calculated by multiplying revenue for 2016 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 AAR for the previous cost of capital determination. Appendix K contains the cash flow calculations for all four railroads. The pages from the 2016 10-K reports that were used as data sources for cash flows are included in my work papers. Data for prior years (2012-2015) used in this year's calculation are unchanged from last year's submission – unless restated/revised data were found in the 2016 10-K statements.

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 (2016) 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

³⁸ STB Ex Parte No. 558 (Sub-No. 12), Railroad Cost of Capital – 2008, served September 25, 2009.

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 2016, and stock prices as of December 30, 2016 – the prices at the end of the last full week for 2016.³⁹ Each growth rate projection was reviewed by the brokerage firm’s analyst during 2016, and the stock prices (like the data used in the CAPM) 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 through its Thomson ONE Investment Management service. 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 also distributes 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 do not always reflect the full set of growth rate estimates. Therefore, I have utilized all estimates available from the Thomson ONE Investment Management 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 below lists the median growth rate estimates.

³⁹ Friday, December 30, 2016 was the last trading day for the week.

Table No. 14
2016 Thomson Median Growth Rate Estimates

Company	Stock Symbol	Growth Rate
CSX Corporation	CSX	5.10 %
Kansas City Southern	KSU	8.12
Norfolk Southern Corporation	NSC	10.17
Union Pacific Corporation	UNP	6.49
Simple Average		7.47

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 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”.⁴⁰ 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 7.47 percent, an increase from 2015 (5.49 percent) – but well below the 12.68 percent rate used for 2014. For all

⁴⁰ Ibbotson SBBI 2013 Valuation Yearbook, page 51.

railroads in the Morningstar/Ibbotson MSDCF model, a second stage growth rate of 7.47 percent is used.⁴¹

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 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.

The real GDP growth rate is simply a 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, including replication of Morningstar/Ibbotson calculations. This procedure has been used, and accepted, since the 2013 Cost of Capital determination.

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

⁴¹ The model used an average rounded to 2 digits after the decimal.

Yields (which are not inflation indexed). Using data from the Ibbotson and the Federal Reserve, I have replicated the 2009 through 2012 Ibbotson calculations for expected long-term inflation (page 5 of Appendix M). 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 (Federal Reserve data as shown on page 5 of Appendix M), and Long-Term Government yields were available from Morningstar's Ibbotson SBBI Classic yearbook. This methodology to determine expected inflation was accepted in the 2013 and 2014 Cost of Capital determinations.

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 (see page 5 of Appendix M), which are very close to the numbers used by Ibbotson.⁴² This methodology was accepted in the 2015 cost of capital determination, and has been used again for 2016.

Appendix M contains my calculations for the Stage 3 growth rate for 2013 through 2016. Because expected real growth in output is 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 2016 is 5.19 percent (as shown on page 1 of Appendix M),

⁴² 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.

which matches the number used for 2011. Higher expected inflation caused the rate to be higher than the numbers used for 2014 and 2015. The rate for 2016 is lower than the rates for 2009, 2010, and 2012 – because those years had higher inflation expectations. The long-term expected inflation rate (1.97 percent) used in the current calculation of the Stage 3 rate is within the lower end of the year-end range of expected inflation forecasts (1.9 to 2.3 percent) listed on page 22 of chapter 3 in the Duff & Phelps *2017 Valuation Handbook-Guide to Cost of Capital*. I will continue to follow the procedure used in the past, which I believe is logical. Thus, I have calculated a Stage 3 growth rate of 5.19 percent based on expected real growth of the economy of 3.22 percent plus expected inflation of 1.97 percent. 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 30, 2016

Company	Stock Price	Shares Outstanding	Market Value (\$mil)	Weight
CSX	\$35.93	936,661,112	33,654.2	21.063 %
KSU	\$84.85	107,579,057	9,128.1	5.713
NSC	\$108.07	291,942,235	31,550.2	19.746
UNP	\$103.68	824,112,432	85,444.0	53.477
Total		2,160,294,836	\$159,776.5	100.000 %

As directed by the Board, I have used stock prices (from Yahoo Finance) for December 30, 2016, the last trading day of the week that qualifies as the last week of 2016 for cost of capital purposes. For 2016, the last trading day of the week is Friday, December 30. I have also used the shares outstanding for that day from the 2016 Q3 10-Q reports (the latest information available prior to December 30, 2016) 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.

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. 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.⁴³

Applying the methods described above, I have calculated a cost of common equity for each of the four railroads specified using a spreadsheet like the one utilized in the 2015 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 30, 2016, 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. 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.

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

Company	Weight	Cost of Equity	Weighted Calculation
CSX	21.063%	10.13 %	2.13
KSU	5.713%	9.61	0.55
NSC	19.746%	11.04	2.18
UNP	53.477%	10.43	5.58
Total	100.000%		
Weighted Current Cost of Equity			10.44 %

⁴³ 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.

Thus, the MSDCF produces a cost of common equity of 10.44 percent for 2016 – a drop from the 10.97 percent used by the Board for 2015. This is the lowest cost of common equity calculated using the MSDCF since it began being used by the Board for 2008.

D. Conclusion as to the Cost of Common Equity Capital

In the STB’s Ex Parte No. 558 (Sub-No. 20) decision served February 28, 2017, the Board specified that comments “should focus ... using the methodology followed in *Railroad Cost of Capital – 2015*”, 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.

Table No. 17
Cost of of Common Equity Capital

<i>Model</i>		
Capital Asset Pricing Model	10.18 %	From Table No. 12
Multi-Stage Discounted Cash Flow	10.44	From Table No. 16
Cost of Common Equity	10.31 %	Average

The cost of common equity for 2016 is 10.31 percent, which is below the 10.96 percent decided for 2015 – and the lowest ever calculated for a railroad cost of capital proceeding. It should also be noted that the cost of equity estimate produced by the Capital Asset Pricing Model is reasonably close to the estimate produced by the Multi-Stage Discounted Cash Flow model. If this year’s beta calculation had been the same as that for

2015, the CAPM would have produced a higher cost of equity (10.66 percent) than the Multi-Stage Discounted Cash Flow model.

V. Preferred Equity Capital in 2016

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. This continues in 2016, although the market value of the preferred stock remains very small.

A. Overview of Preferred Stock

Preferred stock is a hybrid security which has some characteristics of debt and some characteristics of equity. The general characteristics of preferred stock are as follows:

1. It is an equity security similar to common stock in that it represents ownership in the corporation.
2. It has dividend preference over common stock in that it has prior claim on the corporation's earnings before dividends are paid to holders of common stock.
3. It is a security which typically has a stated rate of return or fixed dividend. (If the stock has a par value, it will state the annual dividend payments in terms of percentage of par value – for example, a 6 percent preferred. No-par value preferred stock has a dividend stated in a dollar amount, for example, a \$6 preferred.)
4. It is a security that pays dividends only if they are declared by the board of directors. (If there are no earnings, the dividends may be paid out of earned surplus. In any event, dividends must be declared by the board.)
5. It has prior claim over assets at dissolution. If the corporation is liquidated, the holders of preferred stock, like bondholders, have a prior claim on assets over common stock shareholders. Therefore, preferred stock is also referred to as a senior security.
6. Ownership privileges are limited. (Preferred stock usually carries no voting right. In most instances, it does not participate in earnings above a set amount. The preemptive right to buy new securities is limited.)
7. It generally has no maturity date or maturity value. (The exception is sinking fund preferred issues which effectively must be retired at some future date.)

There are numerous types of preferred stock. The chief distinction among different types of preferred stock is the method and amount of dividend payment to the investor. In addition, there are specific privileges related to each type. Major types of preferred stock are listed below.

1. *Cumulative* - Occasionally, a board will decide not to pay dividends. If the stock is cumulative, unpaid dividends accumulate and the total accumulated (in arrears) must be paid to the holder of cumulative preferred stock before any dividends can be paid to the common stockholders. Most preferred stocks are cumulative.
2. *Noncumulative* - When business is such that the corporation's board of directors decides not to pay dividends, holders of noncumulative preferred stock lose their dividends. These dividends cannot be claimed in the future.
3. *Participating* - Owners of participating preferred stock receive – in addition to their fixed dividend – a share in the earnings remaining after all senior securities have been paid. If any additional dividend is declared, it is generally declared along with the common stock dividend. Participating preferred stock may also be cumulative, noncumulative or convertible.
4. *Redeemable* - Preferred stock is usually callable immediately. This means that the issuer can retire the stock at any time, if the company has the necessary cash. In some instances, as with so-called sinking fund preferred, the issuer is required to redeem the stock over a specified period of time. Generally, when redemption occurs, the firm must pay a premium price to the holder of the instrument.
5. *Auction Market* - This stock represents a new variety of variable-rate preferred stock. This security is generally appropriate for corporations with "temporary" idle corporate funds. The dividends, payable every seven weeks in the case of most issues, are determined by bids from current holders and potential buyers. The Auction Market Preferred shares are redeemable at the issuer's option, in whole or in part, on or near the interest payment date.
6. *Convertible* - A preferred stock is convertible if the holder has the privilege of converting the preferred stock into common stock at specified prices. This is an advantage to the holder if the market price of common stock increases. Often the convertible preferred will sell at a premium (above conversion parity) because of the conversion feature, especially as the selling price of common issues increase. Dividends of convertible preferred stock can also be cumulative or noncumulative.

B. The Market Value of Preferred Equity Capital

The market value of preferred equity is based on stock prices and shares outstanding for 2016. Kansas City Southern is the only railroad included in the composite

railroad sample that has preferred stock. Table 18 below summarizes the market value calculation. The Weight column, which is not used directly in our calculation, is provided as additional information (which would be more useful if more than one railroad had preferred stock). Calculations are shown in Appendix P.

Table No. 18
Average Market Value
For Preferred Equity in 2016

Railroad Co.	Value (\$000)	Weight %
CSX	\$0.0	0.00
KSU	6,655.7	100.00
NSC	0.0	0.00
UNP	0.0	0.00
Total	\$6,655.7	100.00 %
Prior Year	\$6,588.2	

C. The Cost of Preferred Equity Capital

The cost of preferred equity depends, in large part, on its specific features. Three methods for determining the cost of preferred equity capital are listed below.

1. *The Dividend Yield Method* is used when the preferred stock is not convertible and there is no specific requirement to redeem the preferred. It is also used to cost preferred issues retired or redeemed during the year. The current cost in this instance is computed by dividing the stated dividend by the current market price. This method was used for all preferred stock in the 2002 cost of capital proceeding. This was also the method used for Kansas City Southern preferred stock in 1999, which was the last time Kansas City Southern was part of the composite railroad until 2013.
2. *The Internal Rate of Return Method* is used for preferred stocks which are not convertible but are subject to a mandatory redemption schedule providing a premium over the stated/par value. The current cost is equal to rate of return which equates the current price with the present value of dividends plus the redemption price.

3. The *Common Equity Method* is used when the preferred stock is convertible at the option of the holder, and the market values of the preferred and common stock indicate that conversion is likely to occur or the conversion right is influencing the price of the preferred stock. In this case, the preferred equity has the same cost as common equity.

The preferred stock that is part of the composite railroad belongs to Kansas City Southern. This stock is not convertible, and is non-cumulative. Therefore, I have used the Dividend Yield Method to estimate the cost of preferred equity. This is the same method used for 2013 through 2015. The formula for the Dividend Yield Method is simply the annual dividends divided by the average price for the year. In this year's case, the cost of preferred equity is 3.64 percent, which is very close to the 3.68 percent calculated for 2015. Appendix P provides more detail for this calculation, and the table below summarizes my findings.

Table No. 19
Cost of Preferred Equity Capital

Company	Weight	Cost of Equity	Weighted Calculation
CSX	0.00%	-- %	0.00
KSU	100.00%	3.64	3.64
NSC	0.00%	--	0.00
UNP	0.00%	--	0.00
Total	100.00%		
Weighted Current Cost of Equity			3.64 %

VI. The Overall Cost of Capital In 2016

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 \$36.5 billion, \$136.6 billion, and \$6.7 million, respectively. More market value detail are provided in Appendixes D, G, and P. 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 2016 has weights for debt, common equity, and preferred equity of 21.09 percent, 78.91 percent, and 0.00 percent, respectively. Table 20 contains the weights computation and a comparison to the previous year. Note that the weight for preferred equity again rounds to zero.

Table No. 20
Capital Structure and Weights

	Source Table	2016		2015	
		Market Value (mil)	Capital Structure Weight	Market Value (mil)	Capital Structure Weight
Debt	6	\$36,507.7	21.09 %	\$34,645.5	18.16 %
Common Equity	10	136,596.0	78.91	156,111.4	81.84
Preferred Equity	18	6.7	0.00	6.6	0.00
Total		\$173,110.3	100.00 %	\$190,763.5	100.00 %

The market value for debt and preferred stock increased from 2015 to 2016, while common equity decreased in value. Weights shifted closer to their values for 2007 and

2008. Debt increased 2.93 percentage points from 2015, while common equity dropped 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 2016 overall cost of capital of 8.86 percent, as shown in Table 21. This is the lowest cost of capital ever calculated. About three fourths of the drop was caused by the shift in capital structure.

Table No. 21
Weighted Current Cost of Capital for 2016

	Source Table	Capital Structure Weight	Current Cost
Debt	11	21.09 %	3.43 %
Common Equity	18	78.91	10.31
Preferred Equity	20	0.00	3.64
Total		100.000 %	
Weighted Current Cost of Capital			8.86 %

VII. Qualifications of John T. Gray

My name is John T. Gray. I am Senior Vice President — Policy and Economics for the Association of American Railroads (AAR), with offices located at 425 Third Street SW, Suite 1000, Washington, D.C. 20024. Among other responsibilities, my duties include the collection, analysis, and presentation of economic data related to railroads and their economic environment. One of my principal duties is conducting and supervising

economic, financial, statistical and cost studies dealing with various aspects of the rail industry.

Prior to joining the AAR, I worked for Union Pacific Railroad where my most recent position was as Executive Director, responsible for the commercial relationship with other transportation carriers and ports, and for strategic policy analysis on issues involving regulatory proposals, legislation and potential litigation. I have also held marketing, planning, and operating positions with other railroads including the Southern Pacific, the Burlington Northern and the Alaska Railroad. I began my railroad career at Atchison, Topeka, and Santa Fe in their cost analysis organization. Additionally, I have also worked for ARCO Alaska.

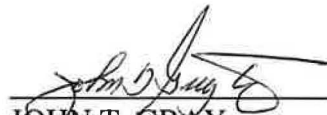
At Southern Pacific, I was responsible for network planning, analysis, and management, as well as the company's cost analysis organization. I provided testimony on behalf of Southern Pacific regarding the economic impact to the company of the proposed combination of the Chicago and North Western Transportation Company with Union Pacific Railroad. Later, I provided extensive testimony on the economic position of Southern Pacific during the STB's review of the merger application for Union Pacific and Southern Pacific.

I hold both a Bachelors and Masters degree in Civil Engineering from Tulane University and did post-graduate work in mathematical modeling of transportation networks and rail cost systems at Northwestern University. I have also served on the faculty at the University of Alaska, where my work included network modeling and research concerning the interrelationship of transportation and economic development.

VERIFICATION

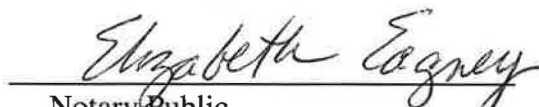
WASHINGTON, D.C.)
) SS.

I, John T. Gray, being duly sworn, state that I have read the foregoing statement, that I know its contents, and that those contents are true as stated.



JOHN T. GRAY

Subscribed and sworn to before me this 20 day of April 2017.



Notary Public

My Commission expires:

ELIZABETH J. EAGNEY
NOTARY PUBLIC DISTRICT OF COLUMBIA
My Commission Expires August 14, 2017



Appendix A
Bonds, Notes and Debentures

Summaries

CSX Corporation	A-1
Kansas City Southern	A-4
Norfolk Southern Corporation	A-7
Union Pacific Corporation	A-10

Individual Bonds, Notes, and Debentures

CSX Corporation	A-13
Kansas City Southern	A-40
Norfolk Southern Corporation	A-52
Union Pacific Corporation	A-77

CSX Corporation
12/31/2016

										Market	Interest
				Coupon	Maturity	Amt. Outstanding (\$000)		Average	Value	Average	Cost
Type	Description	No.	CUSIP	Rate	Date	Year-End	Used	Price	(\$ 000)	Yield	(\$ 000)
Traded											
1	Notes	CSX Corp.	1 126408GT4	3.700%	10/30/2020	\$500,000	\$500,000	106.093	\$530,465	2.200%	\$11,670
2	Notes	CSX Corp.	2 12641LBD4	9.870%	2/12/2021	\$10,000	\$10,000	128.155	\$12,816	3.190%	\$409
3	Notes	CSX Corp.	3 126408GV9	4.250%	6/1/2021	\$350,000	\$350,000	108.858	\$381,002	2.310%	\$8,801
4	Notes	CSX Corp.	4 126408AQ6	8.100%	9/15/2022	\$69,081	\$69,081	126.013	\$87,051	3.380%	\$2,942
5	Notes	CSX Corp.	5 126408AM5	8.625%	5/15/2022	\$81,517	\$81,517	129.332	\$105,427	3.080%	\$3,247
6	Debentures	CSX Corp.	6 126408GZ0	3.700%	11/1/2023	\$500,000	\$500,000	106.782	\$533,909	2.670%	\$14,255
7	Debentures	CSX Corp.	7 126408HB2	3.400%	8/1/2024	\$550,000	\$550,000	104.726	\$575,993	2.740%	\$15,782
8	Notes	CSX Corp.	8 126408HD8	3.350%	11/1/2025	\$600,000	\$600,000	103.737	\$622,420	2.890%	\$17,988
9	Notes	CSX Corp. (New)	9 126408HE6	2.600%	11/1/2026	\$700,000	\$145,833	95.136	\$138,740	3.180%	\$4,412
10	Debentures	CSX Corp.	10 126408BP7	7.250%	5/1/2027	\$83,312	\$83,312	129.892	\$108,216	3.850%	\$4,166
11	Debentures	CSX Corp.	11 126408BM4	7.950%	5/1/2027	\$64,266	\$64,266	134.739	\$86,591	3.960%	\$3,429
12	Debentures	CSX Corp.	12 12641LBU6	6.800%	12/1/2028	\$200,000	\$200,000	129.190	\$258,379	3.820%	\$9,870
13	Notes	CSX Corp.	13 126408GH0	6.000%	10/1/2036	\$400,000	\$400,000	123.874	\$495,494	4.240%	\$21,009
14	Notes	CSX Corp.	14 126408GK3	6.150%	5/1/2037	\$700,000	\$700,000	126.143	\$882,998	4.250%	\$37,527
15	Notes	CSX Corp.	15 126408GP2	7.450%	4/1/2038	\$79,226	\$79,226	137.917	\$109,266	4.660%	\$5,092
16	Notes	CSX Corp.	16 126408GS6	6.220%	4/30/2040	\$660,000	\$660,000	128.800	\$850,077	4.290%	\$36,468
17	Notes	CSX Corp.	17 126408GU1	5.500%	4/15/2041	\$550,000	\$550,000	119.009	\$654,548	4.260%	\$27,884
18	Notes	CSX Corp.	18 126408GW7	4.750%	5/30/2042	\$600,000	\$600,000	109.163	\$654,980	4.180%	\$27,378
19	Notes	CSX Corp.	19 126408GX5	4.400%	3/1/2043	\$300,000	\$300,000	104.721	\$314,162	4.120%	\$12,943
20	Notes	CSX Corp.	20 126408GY3	4.100%	3/15/2044	\$800,000	\$800,000	101.270	\$810,163	4.040%	\$32,731
21	Notes	CSX Corp. (New)	21 126408HF3	3.800%	11/1/2046	\$800,000	\$166,667	93.996	\$156,660	4.160%	\$6,517
22	Notes	CSX Corp.	22 126408HC0	3.950%	5/1/2050	\$600,000	\$600,000	95.235	\$571,411	4.230%	\$24,171
23	Notes	CSX Corp.	23 126408HA4	4.500%	8/1/2054	\$450,000	\$450,000	102.413	\$460,857	4.390%	\$20,232
24	Notes	CSX Corp. (New)	24 126408HG1	4.250%	11/1/2066	\$700,000	\$145,833	93.193	\$135,906	4.600%	\$6,252
25	Notes	CSXT - Conrail	25 126410LK3	9.750%	6/15/2020	\$227,171	\$227,171	126.121	\$286,510	2.640%	\$7,564
26	Notes	CSXT - Conrail	26 126410LL1	7.875%	5/15/2043	\$99,989	\$99,989	145.407	\$145,391	4.850%	\$7,051
27	Sec'd Eq Notes	CSXT	27 126410LM9	6.251%	1/15/2023	\$232,700	\$232,700	116.782	\$271,751	3.350%	\$9,104
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45											
46											
47											
Total						\$10,907,262	\$9,165,595		\$10,241,181	3.700%	\$378,895

CSX Corporation
12/31/2016

ASSETS												
	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Market Value (\$ 000)	Average Yield	Interest Cost (\$ 000)
							Year-End	Used				
	Trading Data Not Available or Did Not Trade											
1	Notes	CSX Corp.			2.890%	10/22/2044	73,304	73,304	100.000	\$73,304		
2	Conrail Tax Note	CSXT			2.890%	10/22/2044	151,334	151,334	100.000	\$151,334		
3	Other Notes	TORCO Toledo Ore Railroad Co.			6.450%	12/15/2021	29,700	29,700	100.000	\$29,700		
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30												
Total							\$254,338	\$254,338		\$254,338		

CSX Corporation
12/31/2016

										Market	Interest
Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Market Value (\$ 000)	Average Yield	Cost (\$ 000)
						Year-End	Used				
Matures in 2017											
1	Debentures		CSX Corp.		126408BL6	7.900%	5/1/2017	312,596			
2											
3											
4											
5											
6											
7											
8											
9											
10											
Total								\$312,596			

Grand Totals

Total Traded and Trading Data Not Available **\$11,161,600** **\$9,419,934** **\$10,495,519**

Grand Total (for reconciliation to carrier data only) **\$11,474,196**

From CSX:

Corporate Notes	\$10,733,302
Convertible Debt	0
CSXT Notes	478,494
Secured Equipment Notes	232,700
Other Notes	29,700
Total	\$11,474,196

Kansas City Southern Corporation
12/31/2016

										Market		Interest
Type		Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Value (\$ 000)	Average Yield	Cost (\$ 000)
							Year-End	Used				
Traded												
1	Sr Note	KCSR	28	485188AN6	4.300%	5/15/2043	\$1,329	\$1,329	96.928	\$1,288	4.510%	\$58
2	Sr Note	KCSR	29	485188AM8	3.850%	11/15/2023	\$776	\$776	103.775	\$805	3.270%	\$26
3	Sr Note	KCSR	30	485188AP1	4.950%	8/15/2045	\$792	\$792	106.895	\$847	4.530%	\$38
4	Sr Note	KCS	31	485170AF1	7.000%	12/15/2025	\$221	\$221	118.190	\$261	4.600%	\$12
5	Sr Note	KCS (New)	32	485170AQ7	4.300%	5/15/2043	\$448,651	\$224,326	99.112	\$222,334	4.370%	\$9,716
6	Sr Note	KCS (New)	33	485170AR5	3.850%	11/15/2023	\$199,224	\$99,612	103.363	\$102,962	3.320%	\$3,418
7	Sr Note	KCS (New)	34	485170AS3	4.950%	8/15/2045	\$499,165	\$249,583	109.033	\$272,127	4.410%	\$12,001
8	Sr Note	KCS (New)	35	485170AU8	2.350%	5/15/2020	\$257,346	\$128,673	99.987	\$128,656	2.360%	\$3,036
9	Sr Note	KCS (New)	36	485170AV6	3.000%	5/15/2023	\$439,123	\$219,562	99.882	\$219,302	3.030%	\$6,645
10	Sr Note	KCS (New)	37	485170BA1	3.125%	6/1/2026	\$250,000	\$156,250	99.992	\$156,238	3.140%	\$4,906
11	Sr Note	KCSM	38	485161AQ6	2.350%	5/15/2020	\$17,594	\$17,594	99.079	\$17,432	2.600%	\$453
12	Sr Note	KCSM	39	485161AS2	3.000%	5/15/2023	\$10,877	\$10,877	98.584	\$10,723	3.230%	\$346
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Total							\$2,125,098	\$1,109,594		\$1,132,975	3.588%	\$40,657

Kansas City Southern Corporation
12/31/2016

										Market	Interest
Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Market Value (\$ 000)	Average Yield	Cost (\$ 000)
						Year-End	Used				
Trading Data Not Available or Did Not Trade											
1	RRIF Loan			KCSR	2.960%	2/24/2037	47,113	47,113	100.000	\$47,113	
2	IDOT-GWE			KCSR	3.000%	2/19/2018	122	122	100.000	\$122	
3	FRA RRIF			TexMex	4.290%	7/13/2030	34,265	34,265	100.000	\$34,265	
4	EDC Loan			KCSM	5.737%	2/28/2023	29,949	29,949	100.000	\$29,949	
5	DVB Loan			KCSM	6.195%	9/29/2023	23,490	23,490	100.000	\$23,490	
6	WF Loan			KCSM	9.310%	12/15/2020	49,080	49,080	100.000	\$49,080	
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30											
Total							\$184,019	\$184,019		\$184,019	

Kansas City Southern Corporation
12/31/2016

Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Market Value (\$ 000)	Average Yield	Interest Cost (\$ 000)
						Year-End	Used				
Matures in 2017											
1											
2											
3											
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10											
Total						\$0					

Grand Totals

Total Traded and Trading Data Not Available	\$2,309,117	\$1,293,613	\$1,316,994
Grand Total (for reconciliation to carrier data only)	\$2,309,117		

From KSU:

KCSR	\$50,132
TexMex	34,265
KCS	2,093,730
KCSM	<u>130,990</u>
Total	\$2,309,117

Norfolk Southern Corporation
12/31/2016

										Market	Interest	
Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Value (\$ 000)	Average Yield	Cost (\$ 000)	
						Year-End	Used					
Traded												
1	Debenture	Southern Railway	40	655855FA7	9.750%	6/15/2020	\$313,741	\$313,741	126.730	\$397,604	2.190%	\$8,708
2	Debenture	Conrail	41	655855FB5	7.875%	5/15/2043	\$138,085	\$138,085	150.495	\$207,810	4.590%	\$9,538
3	Notes	Series A NSC	42	655844AA6	9.000%	3/1/2021	\$83,372	\$83,372	126.039	\$105,081	2.930%	\$3,079
4	Notes	Senior	43	655844AQ1	7.250%	2/15/2031	\$316,316	\$316,316	137.769	\$435,786	3.850%	\$16,778
5	Notes	Senior	44	655844AZ1	5.750%	4/1/2018	\$595,925	\$595,925	107.040	\$637,879	1.520%	\$9,696
6	Notes	Senior 144A	45	655844AY4	5.750%	4/1/2018	\$4,075	\$4,075	106.563	\$4,342	1.420%	\$62
7	Notes	Senior	46	655844BC1	5.900%	6/15/2019	\$500,000	\$500,000	111.228	\$556,139	1.900%	\$10,567
8	Notes	Senior	47	655844BG2	3.250%	12/1/2021	\$500,000	\$500,000	104.387	\$521,933	2.370%	\$12,370
9	Notes	Senior	48	655844BJ6	3.000%	4/1/2022	\$600,000	\$600,000	102.882	\$617,293	2.450%	\$15,124
10	Notes	Senior	49	655844BL1	2.903%	2/15/2023	\$596,450	\$596,450	101.399	\$604,793	2.670%	\$16,148
11	Notes	Senior 144A	50	655844BK3	2.903%	2/15/2023	\$3,550	\$3,550	101.656	\$3,609	2.630%	\$95
12	Notes	Senior	51	655844BD9	6.000%	5/23/2111	\$504,492	\$504,492	117.226	\$591,396	5.130%	\$30,339
13	Notes	Senior 2105	52	655844AV0	6.000%	3/15/2105	\$550,000	\$550,000	116.175	\$638,963	5.170%	\$33,034
14	Notes	Senior	53	655844AX6	5.640%	5/17/2029	\$210,316	\$210,316	120.359	\$253,134	3.640%	\$9,214
15	Notes	Senior	54	655844AW8	5.590%	5/17/2025	\$251,172	\$251,172	118.332	\$297,216	3.190%	\$9,481
16	Notes	Senior	55	655844BH0	4.837%	10/1/2041	\$595,504	\$595,504	111.297	\$662,775	4.120%	\$27,306
17	Notes	Senior	56	655844BM9	3.950%	10/1/2042	\$600,000	\$600,000	98.898	\$593,388	4.030%	\$23,914
18	Notes	Senior	57	655844BN7	4.800%	8/15/2043	\$500,000	\$500,000	111.438	\$557,191	4.110%	\$22,901
19	Notes	Senior	58	655844BP2	3.850%	1/15/2024	\$400,000	\$400,000	107.099	\$428,395	2.800%	\$11,995
20	Notes	Senior	59	655844BQ0	4.450%	6/15/2045	\$500,000	\$500,000	106.914	\$534,568	4.060%	\$21,703
21	Notes	Senior	60	655844BR8	4.650%	1/15/2046	\$600,000	\$600,000	110.497	\$662,983	4.050%	\$26,851
22	Notes	Senior (New)	61	655844BS6	2.900%	6/15/2026	\$600,000	\$350,000	101.025	\$353,587	2.790%	\$9,865
23	Conrail Notes	CR NSC 2027	62	655844AJ7	7.800%	5/15/2027	\$368,199	\$368,199	138.885	\$511,372	3.470%	\$17,745
24	Conrail Notes	CR NSC 2037	63	655844AF5	7.050%	5/1/2037	\$256,690	\$256,690	139.317	\$357,612	4.190%	\$14,984
25	Conrail Notes	CR NSC 2097	64	655844AK4	7.900%	5/15/2097	\$273,317	\$273,317	151.156	\$413,136	5.210%	\$21,524
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Total							\$9,861,204	\$9,611,204		\$10,947,983	3.499%	\$383,019

Norfolk Southern Corporation
12/31/2016

2019-2019												
	Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Market Value (\$ 000)	Average Yield	Interest Cost (\$ 000)
							Year-End	Used				
	Trading Data Not Available or Did Not Trade											
1	Other Bond	NSC Poca Dev Timber Bond			8.250%	10/1/2019	75,734	75,734	100.000	\$75,734		
2	Other Bond	NSC Poca Dev Timber Zero Coupon			0.000%	10/1/2019	9,168	9,168	100.000	\$9,168		
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Total							\$84,902	\$84,902		\$84,902		

Norfolk Southern Corporation
12/31/2016

Maturities											
Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Market Value (\$ 000)	Average Yield	Interest Cost (\$ 000)
						Year-End	Used				
Matures in 2017											
1	Conrail Notes		CR NSC 2017		655844AE8	7.700%	05/15/17	550,000			
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10											
Total						\$550,000					

Grand Totals

Total Traded and Trading Data Not Available **\$9,946,106** **\$9,696,106** **\$11,032,885**

Grand Total (for reconciliation to carrier data only) **\$10,496,106**

From NSC:

Income Debentures	\$451,826
Medium Term Notes & Conrail Notes	9,959,378
Other Debt (Poca Dev)	84,902
Total	\$10,496,106

Union Pacific Corporation
12/31/2016

										Market		Interest
Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Value (\$ 000)	Average Yield	Cost (\$ 000)	
						Year-End	Used					
Traded												
1	Debentures	UP Corp.	65	907818CS5	5.375%	6/1/2033	\$182,375	\$182,375	118.395	\$215,922	3.880%	\$8,378
2	Debentures	UP Corp.	66	907818CX4	6.150%	5/1/2037	\$108,707	\$108,707	129.090	\$140,330	4.070%	\$5,711
3	Debentures	UP Corp.	67	907818CU0	6.250%	5/1/2034	\$175,637	\$175,637	129.360	\$227,204	3.940%	\$8,952
4	Debentures	UP Corp.	68	907818CF3	6.625%	2/1/2029	\$393,175	\$393,175	135.411	\$532,403	3.180%	\$16,930
5	Debentures	UP Corp.	69	907818BY3	7.125%	2/1/2028	\$173,331	\$173,331	135.322	\$234,554	3.400%	\$7,975
6	Notes	UP Corp.	70	907818EA2	1.800%	2/1/2020	\$248,552	\$248,552	100.509	\$249,817	1.650%	\$4,122
7	Notes	UP Corp.	71	907818DW5	2.250%	2/15/2019	\$298,897	\$298,897	101.992	\$304,852	1.460%	\$4,451
8	Notes	UP Corp.	72	907818EE4	2.250%	6/19/2020	\$397,790	\$397,790	102.115	\$406,205	1.700%	\$6,905
9	Notes	UP Corp.	73	907818DN5	2.750%	4/15/2023	\$322,099	\$322,099	102.420	\$329,895	2.360%	\$7,786
10	Notes	UP Corp. (New)	74a	907818EH7	2.750%	3/1/2026	\$467,245	\$389,371	101.943	\$396,937	2.530%	\$10,043
11	Notes	UP Corp. (New)	74b	907818EH7	2.750%	3/1/2026	\$179,441	\$74,767	101.059	\$75,559	2.630%	\$1,987
12	Notes	UP Corp.	75	907818DM7	2.950%	1/15/2023	\$298,528	\$298,528	103.837	\$309,982	2.310%	\$7,161
13	Notes	UP Corp.	76	907818DY1	3.250%	1/15/2025	\$347,008	\$347,008	105.648	\$366,606	2.510%	\$9,202
14	Notes	UP Corp.	77	907818ED6	3.250%	8/15/2025	\$498,645	\$498,645	105.926	\$528,196	2.520%	\$13,311
15	Notes	UP Corp. (New)	78	907818EK0	3.350%	8/15/2046	\$295,855	\$123,273	94.468	\$116,454	3.670%	\$4,274
16	Notes	UP Corp.	79	907818EB0	3.375%	2/1/2035	\$444,581	\$444,581	98.061	\$435,960	3.530%	\$15,389
17	Notes	UP Corp.	80	907818DR6	3.646%	2/15/2024	\$368,474	\$368,474	107.872	\$397,479	2.500%	\$9,937
18	Notes	UP Corp.	81	907818DV7	3.750%	3/15/2024	\$395,464	\$395,464	108.652	\$429,681	2.510%	\$10,785
19	Notes	UP Corp. (New)	82	907818EM6	3.799%	10/1/2051	\$690,191	\$57,516	94.192	\$54,175	4.110%	\$2,227
20	Notes	UP Corp.	83	907818EC8	3.875%	2/1/2055	\$443,766	\$406,786	97.252	\$395,606	4.030%	\$15,943
21	Notes	UP Corp.	84	907818DG0	4.000%	2/1/2021	\$497,342	\$497,342	108.750	\$540,858	1.970%	\$10,655
22	Notes	UP Corp.	85	907818EF1	4.050%	11/15/2045	\$493,018	\$493,018	104.822	\$516,791	3.790%	\$19,586
23	Notes	UP Corp. (New)	86	907818EJ3	4.050%	3/1/2046	\$586,349	\$488,624	105.759	\$516,764	3.740%	\$19,327
24	Notes	UP Corp.	87	907818DZ8	4.150%	1/15/2045	\$341,641	\$341,641	106.048	\$362,302	3.810%	\$13,804
25	Notes	UP Corp.	88	907818DK1	4.163%	7/15/2022	\$651,447	\$651,447	111.098	\$723,746	2.180%	\$15,778
26	Notes	UP Corp.	89	907818DP0	4.250%	4/15/2043	\$317,805	\$317,805	106.819	\$339,476	3.850%	\$13,070
27	Notes	UP Corp.	90	907818DL9	4.300%	6/15/2042	\$296,994	\$296,994	107.409	\$318,997	3.850%	\$12,281
28	Notes	UP Corp.	91a	907818EG9	4.375%	11/15/2065	\$380,411	\$380,411	103.481	\$393,652	4.220%	\$16,612
29	Notes	UP Corp. (New)	91b	907818EG9	4.375%	11/15/2065	\$188,333	\$156,944	105.350	\$165,341	4.130%	\$6,829
30	Notes	UP Corp.	92	907818DJ4	4.750%	9/15/2041	\$315,951	\$315,951	114.018	\$360,240	3.880%	\$13,977
31	Notes	UP Corp.	93	907818DU9	4.750%	12/15/2043	\$292,877	\$292,877	114.620	\$335,694	3.890%	\$13,059
32	Notes	UP Corp.	94	907818DT2	4.821%	2/1/2044	\$219,862	\$219,862	115.721	\$254,427	3.900%	\$9,923
33	Notes	UP Corp.	95	907818DX3	4.850%	6/15/2044	\$143,804	\$143,804	116.152	\$167,031	3.910%	\$6,531
34	Notes	UP Corp.	96	907818DA3	5.700%	8/15/2018	\$368,526	\$368,526	108.832	\$401,075	1.360%	\$5,455
35	Notes	UP Corp.	97	907818DF2	5.780%	7/15/2040	\$62,553	\$62,553	123.290	\$77,121	4.230%	\$3,262
36	Notes	UP Corp. 144A	98	907818DE5	5.780%	7/15/2040	\$10	\$10	124.910	\$12	4.140%	\$1
37	Notes	UP Corp.	99	907818DD7	6.125%	2/15/2020	\$161,871	\$161,871	114.050	\$184,613	2.030%	\$3,748
38	Notes	UP Corp.	100	907818DB1	7.875%	1/15/2019	\$158,152	\$158,152	114.570	\$181,195	1.850%	\$3,352
39	Mort. Bond	UPRR-MP	101	606198LF4	4.750%	1/1/2020	\$29,905	\$29,905	100.093	\$29,933	4.720%	\$1,413
40	Mort. Bond	UPRR-MP	102	606198LG2	4.750%	1/1/2030	\$27,381	\$27,381	98.403	\$26,944	4.920%	\$1,326
41	Debentures	UPRR-MP	103	606198LH0	5.000%	1/1/2045	\$96,025	\$96,025	95.702	\$91,898	5.300%	\$4,871
42												
43												
44												
45												
46												
47												
Total							\$12,360,018	\$11,206,119		\$12,135,928	3.019%	\$366,325

Union Pacific Corporation
12/31/2016

										Market	Interest
Type	Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Value (\$ 000)	Average Yield	Cost (\$ 000)
						Year-End	Used				
Trading Data Not Available or Did Not Trade											
1	Debentures		167123AP3	5.000%	1/1/2054	1,641	1,641	100.000	\$1,641		
2	Debt Security			3.000%	12/31/2019	4,848	4,848	100.000	\$4,848		
3	Debt Security			3.000%	3/14/2018	321	321	100.000	\$321		
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30											
Total						\$6,810	\$6,810		\$6,810		

Union Pacific Corporation
12/31/2016

Matures in 2017												
Type		Description	No.	CUSIP	Coupon Rate	Maturity Date	Amt. Outstanding (\$000)		Average Price	Market Value (\$ 000)	Average Yield	Interest Cost (\$ 000)
							Year-End	Used				
Matures in 2017												
1	Notes	UP Corp.		907818CW6	5.650%	05/01/17	193,802					
2	Notes	UP Corp.		907818CZ9	5.750%	11/15/17	251,748					
3												
4												
5												
6												
7												
8												
9												
10												
Total							\$445,550					

Grand Totals

Total Traded and Trading Data Not Available **\$12,366,828** **\$11,212,929** **\$12,142,738**

Grand Total (for reconciliation to carrier data only) **\$12,812,378**

From UNP:

Corporate Debentures, Notes, and Floating Rate Loans	\$12,775,152
Removal of Floating Rate Loans & Commercial Paper	-122,893
RR Misc Debt Securities (Albany County, MP, IL DOT....)	70,286
Removal of MP Debt Discount, and SP Purch. Acct. Debt Premium	89,835
Removal of Sale of Receivables	0
Total	\$12,812,380

CSX Corporation		
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1	Type:	Notes
	Description:	CSX Corp.
	CUSIP:	126408GT4
	Coupon Rate:	3.700%
	Maturity Date:	10/30/2020
	Amount Outstanding (\$ 000)	\$500,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	105.590	2.44 %
February	105.570	2.43
March	106.162	2.27
April	106.382	2.20
May	106.041	2.25
June	107.171	1.96
July	107.398	1.88
August	106.755	2.00
September	107.023	1.90
October	106.277	2.05
November	104.544	2.47
December	104.202	2.54
Average	106.093	2.20 %

Source: Bloomberg

CSX Corporation		
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2	Type:	Notes
	Description:	CSX Corp.
	CUSIP:	12641LBD4
	Coupon Rate:	9.870%
	Maturity Date:	2/12/2021
	Amount Outstanding (\$ 000)	\$10,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	128.433	3.63 %
February	128.598	3.52
March	129.400	3.27
April	129.947	3.07
May	129.080	3.15
June	129.897	2.88
July	129.820	2.81
August	128.834	2.89
September	128.654	2.83
October	127.106	3.06
November	124.409	3.54
December	123.684	3.61
Average	128.155	3.19 %

Source: Bloomberg

CSX Corporation		
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3	Type:	Notes
	Description:	CSX Corp.
	CUSIP:	126408GV9
	Coupon Rate:	4.250%
	Maturity Date:	6/1/2021
	Amount Outstanding (\$ 000)	\$350,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	107.130	2.80 %
February	107.449	2.72
March	109.099	2.36
April	109.491	2.26
May	109.296	2.27
June	109.854	2.12
July	111.037	1.85
August	110.009	2.02
September	110.172	1.95
October	109.294	2.11
November	106.835	2.63
December	106.626	2.65
Average	108.858	2.31 %

Source: Bloomberg

CSX Corporation		
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4	Type:	Notes
	Description:	CSX Corp.
	CUSIP:	126408AQ6
	Coupon Rate:	8.100%
	Maturity Date:	9/15/2022
	Amount Outstanding (\$ 000)	\$69,081
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	125.969	3.65 %
February	126.499	3.52
March	127.309	3.35
April	126.367	3.45
May	126.148	3.44
June	127.800	3.13
July	128.240	3.01
August	126.916	3.16
September	126.687	3.14
October	125.571	3.27
November	122.559	3.72
December	122.090	3.75
Average	126.013	3.38 %

Source: Bloomberg

CSX Corporation		
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5	Type:	Notes
	Description:	CSX Corp.
	CUSIP:	126408AM5
	Coupon Rate:	8.625%
	Maturity Date:	5/15/2022
	Amount Outstanding (\$ 000)	\$81,517
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	128.368	3.55 %
February	128.766	3.43
March	129.545	3.25
April	130.527	3.05
May	130.100	3.05
June	131.542	2.76
July	131.503	2.70
August	130.089	2.86
September	130.433	2.74
October	129.165	2.88
November	126.252	3.32
December	125.693	3.35
Average	129.332	3.08 %

Source: Bloomberg

CSX Corporation		
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6	Type:	Debentures
	Description:	CSX Corp.
	CUSIP:	126408GZ0
	Coupon Rate:	3.700%
	Maturity Date:	11/1/2023
	Amount Outstanding (\$ 000)	\$500,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	103.931	3.12 %
February	104.950	2.97
March	107.065	2.66
April	107.335	2.62
May	106.997	2.65
June	108.371	2.44
July	109.551	2.26
August	108.942	2.34
September	108.611	2.37
October	107.583	2.51
November	104.154	3.03
December	103.892	3.06
Average	106.782	2.67 %

Source: Bloomberg

CSX Corporation		
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7	Type:	Debentures
	Description:	CSX Corp.
	CUSIP:	126408HB2
	Coupon Rate:	3.400%
	Maturity Date:	8/1/2024
	Amount Outstanding (\$ 000)	\$550,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	100.546	3.33 %
February	101.792	3.16
March	104.495	2.79
April	105.222	2.69
May	105.111	2.70
June	107.591	2.36
July	107.936	2.31
August	106.922	2.43
September	107.294	2.37
October	105.766	2.57
November	102.014	3.10
December	102.023	3.10
Average	104.726	2.74 %

Source: Bloomberg

CSX Corporation		
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8	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 2016	Price	Yield
January	98.934	3.48 %
February	100.425	3.30
March	103.427	2.94
April	104.495	2.81
May	103.623	2.91
June	106.412	2.57
July	107.419	2.45
August	106.807	2.51
September	107.079	2.47
October	105.393	2.67
November	100.252	3.32
December	100.573	3.27
Average	103.737	2.89 %

Source: Bloomberg

CSX Corporation

9	Type:	Notes
	Description:	CSX Corp. (New)
	CUSIP:	126408HE6
	Coupon Rate:	2.600%
	Maturity Date:	11/1/2026
	Amount Outstanding (\$ 000)	\$700,000
	Months Outstanding	2.5

End of Month in 2016	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	97.951	2.84
November	93.611	3.36
December	93.846	3.34
Average	95.136	3.18 %

Source: Bloomberg

CSX Corporation		
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10	Type:	Debentures
	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 2016	Price	Yield
January	117.753	5.15 %
February	119.709	4.93
March	123.539	4.52
April	126.120	4.25
May	131.761	3.69
June	135.261	3.34
July	135.826	3.27
August	136.344	3.20
September	135.940	3.21
October	135.030	3.28
November	130.784	3.66
December	130.637	3.66
Average	129.892	3.85 %

Source: Bloomberg

CSX Corporation		
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11	Type:	Debentures
	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 2016	Price	Yield
January	130.832	4.44 %
February	132.014	4.31
March	133.872	4.11
April	135.895	3.90
May	136.215	3.85
June	138.230	3.64
July	139.255	3.53
August	137.927	3.63
September	137.430	3.65
October	135.067	3.86
November	130.056	4.33
December	130.071	4.31
Average	134.739	3.96 %

Source: Bloomberg

CSX Corporation		
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12	Type:	Debentures
	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 2016	Price	Yield
January	125.127	4.24 %
February	126.493	4.11
March	128.653	3.91
April	128.881	3.88
May	129.435	3.82
June	132.843	3.51
July	134.082	3.39
August	132.905	3.48
September	133.515	3.41
October	130.941	3.62
November	123.594	4.27
December	123.807	4.23
Average	129.190	3.82 %

Source: Bloomberg

CSX Corporation		
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13	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 2016	Price	Yield
January	115.333	4.82 %
February	116.958	4.70
March	120.313	4.48
April	122.699	4.32
May	125.018	4.16
June	129.624	3.87
July	131.950	3.73
August	130.284	3.83
September	129.067	3.89
October	125.644	4.10
November	118.690	4.56
December	120.902	4.40
Average	123.874	4.24 %

Source: Bloomberg

CSX Corporation		
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14	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 2016	Price	Yield
January	118.042	4.79 %
February	118.492	4.75
March	123.356	4.43
April	125.371	4.30
May	127.067	4.19
June	131.697	3.91
July	134.066	3.77
August	132.814	3.84
September	131.169	3.93
October	126.853	4.19
November	121.436	4.53
December	123.347	4.40
Average	126.143	4.25 %

Source: Bloomberg

CSX Corporation		
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15	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 2016	Price	Yield
January	131.385	5.07 %
February	132.895	4.98
March	136.438	4.76
April	136.406	4.76
May	137.683	4.68
June	142.693	4.38
July	145.376	4.23
August	144.925	4.25
September	143.545	4.32
October	139.198	4.56
November	131.796	5.01
December	132.668	4.95
Average	137.917	4.66 %

Source: Bloomberg

CSX Corporation		
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16	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 2016	Price	Yield
January	120.130	4.81 %
February	120.765	4.76
March	124.637	4.53
April	128.253	4.32
May	129.313	4.25
June	134.814	3.95
July	137.540	3.80
August	136.177	3.87
September	134.393	3.96
October	129.738	4.21
November	123.762	4.56
December	126.073	4.42
Average	128.800	4.29 %

Source: Bloomberg

CSX Corporation

17	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 2016	Price	Yield
January	111.290	4.73 %
February	112.449	4.65
March	115.619	4.46
April	117.775	4.33
May	119.459	4.23
June	124.576	3.94
July	128.320	3.73
August	126.435	3.83
September	124.209	3.95
October	120.079	4.18
November	112.683	4.63
December	115.211	4.47
Average	119.009	4.26 %

Source: Bloomberg

\$300,000	}	same CUSIP
250,000		
\$550,000		

CSX Corporation		
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18	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 2016	Price	Yield
January	100.688	4.70 %
February	101.499	4.65
March	105.952	4.37
April	108.885	4.19
May	109.862	4.13
June	114.516	3.86
July	117.529	3.69
August	115.816	3.78
September	114.581	3.85
October	111.114	4.05
November	103.717	4.50
December	105.800	4.37
Average	109.163	4.18 %

Source: Bloomberg

CSX Corporation		
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19	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 2016	Price	Yield
January	95.607	4.69 %
February	96.415	4.63
March	101.735	4.29
April	103.841	4.16
May	105.492	4.06
June	110.899	3.75
July	113.668	3.60
August	111.926	3.69
September	109.881	3.80
October	105.942	4.03
November	99.372	4.44
December	101.868	4.28
Average	104.721	4.12 %

Source: Bloomberg

CSX Corporation		
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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 2016	Price	Yield
January	92.130	4.60 %
February	93.120	4.54
March	98.983	4.16
April	101.582	4.01
May	101.755	4.00
June	106.522	3.72
July	109.724	3.55
August	108.964	3.59
September	106.891	3.70
October	101.900	3.99
November	95.361	4.39
December	98.312	4.20
Average	101.270	4.04 %

Source: Bloomberg

CSX Corporation		
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21	Type:	Notes
	Description:	CSX Corp. (New)
	CUSIP:	126408HF3
	Coupon Rate:	3.800%
	Maturity Date:	11/1/2046
	Amount Outstanding (\$ 000)	\$800,000
	Months Outstanding	2.5

End of Month in 2016	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	97.383	3.95
November	91.356	4.32
December	93.249	4.20
Average	93.996	4.16 %

Source: Bloomberg

CSX Corporation		
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22	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 2016	Price	Yield
January	85.853	4.80 %
February	86.533	4.75
March	91.188	4.46
April	95.483	4.20
May	96.219	4.16
June	101.706	3.86
July	104.697	3.71
August	103.050	3.79
September	99.997	3.95
October	97.898	4.07
November	89.186	4.59
December	91.012	4.47
Average	95.235	4.23 %

Source: Bloomberg

CSX Corporation		
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23	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 2016	Price	Yield
January	92.081	4.96 %
February	93.449	4.88
March	97.155	4.66
April	102.383	4.37
May	102.784	4.35
June	107.974	4.09
July	111.918	3.90
August	110.747	3.95
September	108.761	4.05
October	105.452	4.21
November	97.081	4.67
December	99.168	4.55
Average	102.413	4.39 %

Source: Bloomberg

CSX Corporation		
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24	Type:	Notes
	Description:	CSX Corp. (New)
	CUSIP:	126408HG1
	Coupon Rate:	4.250%
	Maturity Date:	11/1/2066
	Amount Outstanding (\$ 000)	\$700,000
	Months Outstanding	2.5

End of Month in 2016	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	97.288	4.38
November	90.151	4.77
December	92.139	4.66
Average	93.193	4.60 %

Source: Bloomberg

CSX Corporation		
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25	Type:	Notes
	Description:	CSXT - Conrail
	CUSIP:	126410LK3
	Coupon Rate:	9.750%
	Maturity Date:	6/15/2020
	Amount Outstanding (\$ 000)	\$227,171
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	126.478	3.20 %
February	126.308	3.14
March	126.464	2.99
April	126.759	2.81
May	125.796	2.92
June	127.678	2.36
July	128.437	2.06
August	125.936	2.51
September	126.464	2.24
October	126.056	2.21
November	123.921	2.61
December	123.153	2.67
Average	126.121	2.64 %

Source: Bloomberg

CSX Corporation		
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26	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 2016	Price	Yield
January	129.152	5.75 %
February	140.135	5.12
March	145.944	4.82
April	144.860	4.87
May	147.315	4.75
June	152.998	4.47
July	156.454	4.30
August	152.004	4.51
September	149.909	4.60
October	146.172	4.78
November	138.791	5.17
December	141.144	5.04
Average	145.407	4.85 %

Source: Bloomberg

CSX Corporation		
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27	Type:	Sec'd Eq Notes
	Description:	CSXT
	CUSIP:	126410LM9
	Coupon Rate:	6.251%
	Maturity Date:	1/15/2023
	Amount Outstanding (\$ 000)	\$232,700
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	115.192	3.75 %
February	115.618	3.66
March	116.720	3.46
April	115.878	3.56
May	116.171	3.49
June	116.659	3.38
July	118.741	3.03
August	118.330	3.06
September	118.405	3.01
October	117.925	3.06
November	116.599	3.24
December	115.142	3.45
Average	116.782	3.35 %

Source: Bloomberg

Kansas City Southern Corp.

28	Type:	Sr Note
	Description:	KCSR
	CUSIP:	485188AN6
	Coupon Rate:	4.300%
	Maturity Date:	5/15/2043
	Amount Outstanding (\$ 000)	\$1,329
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	91.253	4.88 %
February	91.545	4.86
March	94.236	4.68
April	96.248	4.54
May	98.068	4.42
June	101.771	4.19
July	104.400	4.03
August	104.398	4.03
September	103.463	4.09
October	99.063	4.36
November	92.310	4.82
December	86.386	5.26
Average	96.928	4.51 %

Source: Bloomberg

Kansas City Southern Corp.		
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29	Type:	Sr Note
	Description:	KCSR
	CUSIP:	485188AM8
	Coupon Rate:	3.850%
	Maturity Date:	11/15/2023
	Amount Outstanding (\$ 000)	\$776
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	101.971	3.56 %
February	103.206	3.37
March	103.551	3.32
April	104.907	3.11
May	103.322	3.34
June	105.538	3.01
July	105.578	2.99
August	105.943	2.93
September	105.832	2.94
October	104.398	3.15
November	100.608	3.75
December	100.448	3.78
Average	103.775	3.27 %

Source: Bloomberg

Kansas City Southern Corp.

30	Type:	Sr Note
	Description:	KCSR
	CUSIP:	485188AP1
	Coupon Rate:	4.950%
	Maturity Date:	8/15/2045
	Amount Outstanding (\$ 000)	\$792
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	100.753	4.90 %
February	103.847	4.71
March	98.361	5.06
April	106.165	4.57
May	106.315	4.56
June	109.181	4.39
July	113.031	4.17
August	114.369	4.10
September	114.781	4.07
October	110.981	4.28
November	102.248	4.80
December	102.709	4.78
Average	106.895	4.53 %

Source: Bloomberg

Kansas City Southern Corp.		
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31	Type:	Sr Note
	Description:	KCS
	CUSIP:	485170AF1
	Coupon Rate:	7.000%
	Maturity Date:	12/15/2025
	Amount Outstanding (\$ 000)	\$221
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	114.049	5.16 %
February	114.014	5.16
March	115.523	4.96
April	117.765	4.68
May	120.819	4.31
June	122.751	4.07
July	122.115	4.13
August	121.569	4.17
September	121.417	4.17
October	118.942	4.45
November	114.934	4.93
December	114.384	4.99
Average	118.190	4.60 %

Source: Bloomberg

Kansas City Southern Corp.

32	Type:	Sr Note
	Description:	KCS (New)
	CUSIP:	485170AQ7
	Coupon Rate:	4.300%
	Maturity Date:	5/15/2043
	Amount Outstanding (\$ 000)	\$448,651
	Months Outstanding	6.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	105.835	3.94
September	103.577	4.08
October	100.994	4.24
November	93.005	4.77
December	92.151	4.83
Average	99.112	4.37 %

Source: Bloomberg

Exchanged in 2016

Kansas City Southern Corp.

33	Type:	Sr Note
	Description:	KCS (New)
	CUSIP:	485170AR5
	Coupon Rate:	3.850%
	Maturity Date:	11/15/2023
	Amount Outstanding (\$ 000)	\$199,224
	Months Outstanding	6.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	105.025	3.07
September	105.019	3.06
October	103.813	3.24
November	101.183	3.66
December	101.774	3.56
Average	103.363	3.32 %

Source: Bloomberg

Exchanged in 2016

Kansas City Southern Corp.

34	Type:	Sr Note
	Description:	KCS (New)
	CUSIP:	485170AS3
	Coupon Rate:	4.950%
	Maturity Date:	8/15/2045
	Amount Outstanding (\$ 000)	\$499,165
	Months Outstanding	6.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	116.847	3.97
September	114.344	4.10
October	110.513	4.31
November	101.662	4.84
December	101.799	4.83
Average	109.033	4.41 %

Source: Bloomberg

Exchanged in 2016

Kansas City Southern Corp.

35	Type:	Sr Note
	Description:	KCS (New)
	CUSIP:	485170AU8
	Coupon Rate:	2.350%
	Maturity Date:	5/15/2020
	Amount Outstanding (\$ 000)	\$257,346
	Months Outstanding	6.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	100.674	2.16
September	100.832	2.11
October	100.566	2.18
November	99.088	2.63
December	98.773	2.73
Average	99.987	2.36 %

Source: Bloomberg

Exchanged in 2016

Kansas City Southern Corp.

36	Type:	Sr Note
	Description:	KCS (New)
	CUSIP:	485170AV6
	Coupon Rate:	3.000%
	Maturity Date:	5/15/2023
	Amount Outstanding (\$ 000)	\$439,123
	Months Outstanding	6.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	101.724	2.72
September	102.041	2.66
October	100.859	2.86
November	97.593	3.42
December	97.192	3.50
Average	99.882	3.03 %

Source: Bloomberg

Exchanged in 2016

Kansas City Southern Corp.

37	Type:	Sr Note
	Description:	KCS (New)
	CUSIP:	485170BA1
	Coupon Rate:	3.125%
	Maturity Date:	6/1/2026
	Amount Outstanding (\$ 000)	\$250,000
	Months Outstanding	7.5

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	99.817	3.15
June	102.642	2.82
July	102.793	2.80
August	101.957	2.89
September	101.598	2.93
October	99.982	3.13
November	95.495	3.69
December	95.654	3.68
Average	99.992	3.14 %

Source: Bloomberg

Kansas City Southern Corp.		
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38	Type:	Sr Note
	Description:	KCSM
	CUSIP:	485161AQ6
	Coupon Rate:	2.350%
	Maturity Date:	5/15/2020
	Amount Outstanding (\$ 000)	\$17,594
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	98.341	2.76 %
February	98.095	2.83
March	98.137	2.83
April	97.770	2.94
May	97.987	2.89
June	100.088	2.33
July	100.655	2.17
August	99.797	2.41
September	99.558	2.48
October	100.755	2.13
November	98.452	2.83
December	99.312	2.57
Average	99.079	2.60 %

Source: Bloomberg

Kansas City Southern Corp.

39	Type:	Sr Note
	Description:	KCSM
	CUSIP:	485161AS2
	Coupon Rate:	3.000%
	Maturity Date:	5/15/2023
	Amount Outstanding (\$ 000)	\$10,877
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	97.452	3.40 %
February	98.549	3.23
March	97.753	3.36
April	97.710	3.37
May	97.309	3.44
June	98.708	3.21
July	Not Traded	-
August	101.513	2.75
September	101.687	2.72
October	99.300	3.12
November	97.309	3.47
December	97.137	3.51
Average	98.584	3.23 %

Source: Bloomberg

Norfolk Southern Corp.		
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40	Type:	Debenture
	Description:	Southern Railway
	CUSIP:	655855FA7
	Coupon Rate:	9.750%
	Maturity Date:	6/15/2020
	Amount Outstanding (\$ 000)	\$313,741
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	128.642	2.13
July	128.442	2.06
August	127.204	2.20
September	127.044	2.10
October	127.074	1.96
November	124.579	2.44
December	124.125	2.41
Average	126.730	2.19 %

Source: Bloomberg

Norfolk Southern Corp.

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

End of Month in 2016	Price	Yield
January	139.222	5.18 %
February	141.394	5.06
March	147.086	4.76
April	151.416	4.55
May	151.682	4.53
June	157.820	4.25
July	159.768	4.16
August	157.770	4.24
September	155.962	4.32
October	151.800	4.51
November	144.801	4.85
December	147.214	4.72
Average	150.495	4.59 %

Source: Bloomberg

Norfolk Southern Corp.

42	Type:	Notes
	Description:	Series A NSC
	CUSIP:	655844AA6
	Coupon Rate:	9.000%
	Maturity Date:	3/1/2021
	Amount Outstanding (\$ 000)	\$83,372
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	126.574	3.28 %
February	126.673	3.18
March	127.752	2.89
April	127.299	2.90
May	126.542	2.96
June	127.972	2.58
July	127.672	2.56
August	126.477	2.69
September	126.089	2.68
October	125.130	2.79
November	122.589	3.25
December	121.701	3.36
Average	126.039	2.93 %

Source: Bloomberg

Norfolk Southern Corp.		
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43	Type:	Notes
	Description:	Senior
	CUSIP:	655844AQ1
	Coupon Rate:	7.250%
	Maturity Date:	2/15/2031
	Amount Outstanding (\$ 000)	\$316,316
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	128.080	4.64 %
February	129.119	4.55
March	136.964	3.94
April	139.288	3.76
May	138.724	3.79
June	143.621	3.43
July	145.498	3.29
August	143.979	3.38
September	143.148	3.42
October	140.117	3.63
November	132.933	4.16
December	131.761	4.24
Average	137.769	3.85 %

Source: Bloomberg

Norfolk Southern Corp.

44	Type:	Notes
	Description:	Senior
	CUSIP:	655844AZ1
	Coupon Rate:	5.750%
	Maturity Date:	4/1/2018
	Amount Outstanding (\$ 000)	\$595,925
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	108.077	1.92 %
February	107.899	1.86
March	108.166	1.56
April	107.823	1.57
May	107.585	1.53
June	107.661	1.27
July	107.449	1.21
August	106.938	1.27
September	106.542	1.30
October	106.078	1.39
November	105.339	1.65
December	104.924	1.71
Average	107.040	1.52 %

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.

Norfolk Southern Corp.

45	Type:	Notes
	Description:	Senior 144A
	CUSIP:	655844AY4
	Coupon Rate:	5.750%
	Maturity Date:	4/1/2018
	Amount Outstanding (\$ 000)	\$4,075
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	107.576	1.53
June	107.669	1.27
July	107.424	1.22
August	106.932	1.27
September	106.526	1.31
October	106.087	1.38
November	105.364	1.63
December	104.926	1.71
Average	106.563	1.42 %

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.

Norfolk Southern Corp.		
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46	Type:	Notes
	Description:	Senior
	CUSIP:	655844BC1
	Coupon Rate:	5.900%
	Maturity Date:	6/15/2019
	Amount Outstanding (\$ 000)	\$500,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	111.793	2.24 %
February	111.337	2.29
March	111.969	2.01
April	111.794	1.98
May	111.390	2.01
June	112.240	1.62
July	111.890	1.64
August	111.598	1.61
September	111.361	1.58
October	110.876	1.64
November	109.434	2.05
December	109.051	2.08
Average	111.228	1.90 %

Source: Bloomberg

Norfolk Southern Corp.

47	Type:	Notes
	Description:	Senior
	CUSIP:	655844BG2
	Coupon Rate:	3.250%
	Maturity Date:	12/1/2021
	Amount Outstanding (\$ 000)	\$500,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	101.401	2.99 %
February	101.832	2.90
March	104.491	2.40
April	104.507	2.38
May	104.171	2.43
June	105.961	2.08
July	106.498	1.96
August	105.801	2.08
September	106.170	1.99
October	105.928	2.02
November	103.101	2.58
December	102.777	2.64
Average	104.387	2.37 %

Source: Bloomberg

Norfolk Southern Corp.

48	Type:	Notes
	Description:	Senior
	CUSIP:	655844BJ6
	Coupon Rate:	3.000%
	Maturity Date:	4/1/2022
	Amount Outstanding (\$ 000)	\$600,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	100.236	2.96 %
February	100.032	2.99
March	102.485	2.55
April	103.259	2.41
May	103.109	2.42
June	104.619	2.14
July	105.251	2.01
August	104.777	2.09
September	104.703	2.09
October	103.926	2.23
November	101.190	2.76
December	100.998	2.79
Average	102.882	2.45 %

Source: Bloomberg

Norfolk Southern Corp.

49	Type:	Notes
	Description:	Senior
	CUSIP:	655844BL1
	Coupon Rate:	2.903%
	Maturity Date:	2/15/2023
	Amount Outstanding (\$ 000)	\$596,450
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	98.328	3.17 %
February	98.558	3.14
March	101.019	2.74
April	101.665	2.63
May	101.284	2.69
June	103.607	2.31
July	104.218	2.21
August	103.334	2.34
September	103.494	2.31
October	102.579	2.46
November	99.515	2.99
December	99.184	3.05
Average	101.399	2.67 %

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.

Norfolk Southern Corp.		
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50	Type:	Notes
	Description:	Senior 144A
	CUSIP:	655844BK3
	Coupon Rate:	2.903%
	Maturity Date:	2/15/2023
	Amount Outstanding (\$ 000)	\$3,550
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	97.283	3.36
June	103.678	2.30
July	104.060	2.23
August	103.286	2.35
September	103.322	2.34
October	102.713	2.43
November	99.649	2.97
December	99.256	3.04
Average	101.656	2.63 %

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.

Norfolk Southern Corp.

51	Type:	Notes
	Description:	Senior
	CUSIP:	655844BD9
	Coupon Rate:	6.000%
	Maturity Date:	5/23/2111
	Amount Outstanding (\$ 000)	\$504,492
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	108.898	5.51 %
February	109.489	5.48
March	112.052	5.35
April	116.120	5.16
May	115.726	5.18
June	125.327	4.78
July	127.843	4.68
August	124.778	4.80
September	122.297	4.90
October	117.572	5.10
November	109.022	5.50
December	117.589	5.10
Average	117.226	5.13 %

Source: Bloomberg

\$404,492	}	same CUSIP
100,000		
\$504,492		

Norfolk Southern Corp.

52	Type:	Notes
	Description:	Senior 2105
	CUSIP:	655844AV0
	Coupon Rate:	6.000%
	Maturity Date:	3/15/2105
	Amount Outstanding (\$ 000)	\$550,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	108.554	5.52 %
February	108.994	5.50
March	108.393	5.53
April	114.347	5.24
May	115.082	5.21
June	123.436	4.85
July	126.563	4.72
August	124.264	4.81
September	121.800	4.91
October	117.438	5.10
November	108.471	5.53
December	116.759	5.13
Average	116.175	5.17 %

Source: Bloomberg

\$300,000	}	same CUSIP
<u>250,000</u>		
\$550,000		

Norfolk Southern Corp.

53	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 2016	Price	Yield
January	117.012	3.98 %
February	118.119	3.87
March	122.005	3.53
April	121.027	3.60
May	120.701	3.62
June	124.606	3.28
July	125.929	3.16
August	123.588	3.34
September	122.897	3.39
October	120.507	3.59
November	114.327	4.15
December	113.589	4.22
Average	120.359	3.64 %

Source: Bloomberg

Norfolk Southern Corp.		
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54	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 2016	Price	Yield
January	115.564	3.60 %
February	116.527	3.48
March	118.657	3.21
April	117.787	3.30
May	118.300	3.22
June	121.250	2.86
July	122.414	2.71
August	121.272	2.82
September	120.840	2.85
October	119.389	3.00
November	114.365	3.60
December	113.613	3.68
Average	118.332	3.19 %

Source: Bloomberg

Norfolk Southern Corp.

55	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 2016	Price	Yield
January	102.092	4.70 %
February	103.219	4.62
March	108.827	4.27
April	111.469	4.11
May	111.153	4.12
June	116.448	3.82
July	120.029	3.62
August	117.790	3.74
September	116.033	3.83
October	113.852	3.96
November	105.929	4.44
December	108.717	4.26
Average	111.297	4.12 %

Source: Bloomberg

\$595,502	}	same CUSIP
2		
\$595,504		

Norfolk Southern Corp.

56	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 2016	Price	Yield
January	89.784	4.62 %
February	90.162	4.60
March	96.469	4.17
April	99.260	4.00
May	98.750	4.03
June	104.365	3.69
July	107.258	3.52
August	106.159	3.58
September	104.209	3.70
October	101.002	3.89
November	94.828	4.28
December	94.530	4.30
Average	98.898	4.03 %

Source: Bloomberg

Norfolk Southern Corp.		
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57	Type:	Notes
	Description:	Senior
	CUSIP:	655844BN7
	Coupon Rate:	4.800%
	Maturity Date:	8/15/2043
	Amount Outstanding (\$ 000)	\$500,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	101.107	4.73 %
February	102.469	4.64
March	109.553	4.21
April	112.171	4.06
May	111.653	4.09
June	117.564	3.76
July	119.746	3.65
August	119.166	3.67
September	116.263	3.83
October	113.522	3.98
November	105.399	4.45
December	108.645	4.25
Average	111.438	4.11 %

Source: Bloomberg

Norfolk Southern Corp.

58	Type:	Notes
	Description:	Senior
	CUSIP:	655844BP2
	Coupon Rate:	3.850%
	Maturity Date:	1/15/2024
	Amount Outstanding (\$ 000)	\$400,000
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	103.705	3.32 %
February	104.234	3.24
March	106.862	2.86
April	107.415	2.77
May	106.985	2.82
June	109.639	2.44
July	110.289	2.34
August	109.440	2.44
September	109.378	2.44
October	108.394	2.57
November	104.708	3.11
December	104.137	3.19
Average	107.099	2.80 %

Source: Bloomberg

Norfolk Southern Corp.		
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59	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 2016	Price	Yield
January	96.433	4.67 %
February	96.811	4.65
March	104.341	4.19
April	107.457	4.01
May	107.246	4.03
June	112.650	3.73
July	116.161	3.55
August	115.400	3.59
September	112.205	3.75
October	109.543	3.89
November	100.777	4.40
December	103.938	4.21
Average	106.914	4.06 %

Source: Bloomberg

Norfolk Southern Corp.

60	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 2016	Price	Yield
January	99.404	4.69 %
February	100.019	4.65
March	107.809	4.19
April	110.818	4.02
May	110.861	4.02
June	116.560	3.72
July	120.433	3.53
August	118.372	3.63
September	115.779	3.76
October	112.761	3.91
November	105.331	4.33
December	107.819	4.18
Average	110.497	4.05 %

Source: Bloomberg

Norfolk Southern Corp.		
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61	Type:	Notes
	Description:	Senior (New)
	CUSIP:	655844BS6
	Coupon Rate:	2.900%
	Maturity Date:	6/15/2026
	Amount Outstanding (\$ 000)	\$600,000
	Months Outstanding	7.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	103.074	2.55
July	104.187	2.42
August	103.324	2.51
September	102.899	2.56
October	101.073	2.77
November	96.351	3.35
December	96.266	3.37
Average	101.025	2.79 %

Source: Bloomberg

Note: Announced 5/31/2016

Norfolk Southern Corp.

62	Type:	Conrail Notes
	Description:	CR NSC 2027
	CUSIP:	655844AJ7
	Coupon Rate:	7.800%
	Maturity Date:	5/15/2027
	Amount Outstanding (\$ 000)	\$368,199
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	134.410	3.98 %
February	135.495	3.87
March	139.063	3.52
April	141.625	3.27
May	141.207	3.29
June	144.546	2.97
July	144.610	2.94
August	141.786	3.16
September	141.112	3.20
October	138.786	3.39
November	132.472	3.97
December	131.504	4.05
Average	138.885	3.47 %

Source: Bloomberg

Norfolk Southern Corp.		
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63	Type:	Conrail Notes
	Description:	CR NSC 2037
	CUSIP:	655844AF5
	Coupon Rate:	7.050%
	Maturity Date:	5/1/2037
	Amount Outstanding (\$ 000)	\$256,690
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	145.394	3.87
June	140.967	4.10
July	141.835	4.05
August	142.771	3.99
September	141.574	4.05
October	138.382	4.23
November	131.416	4.65
December	132.193	4.60
Average	139.317	4.19 %

Source: Bloomberg

Norfolk Southern Corp.		
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64	Type:	Conrail Notes
	Description:	CR NSC 2097
	CUSIP:	655844AK4
	Coupon Rate:	7.900%
	Maturity Date:	5/15/2097
	Amount Outstanding (\$ 000)	\$273,317
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	148.875	5.28 %
February	151.542	5.19
March	166.095	4.71
April	153.947	5.10
May	140.984	5.58
June	149.604	5.25
July	156.336	5.02
August	157.167	4.99
September	153.252	5.12
October	149.772	5.25
November	138.235	5.70
December	148.065	5.31
Average	151.156	5.21 %

Source: Bloomberg

Union Pacific Corp.		
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65	Type:	Debentures
	Description:	UP Corp.
	CUSIP:	907818CS5
	Coupon Rate:	5.375%
	Maturity Date:	6/1/2033
	Amount Outstanding (\$ 000)	\$182,375
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	110.989	4.46 %
February	115.029	4.15
March	116.931	4.00
April	119.319	3.82
May	118.835	3.85
June	122.501	3.59
July	124.464	3.45
August	123.106	3.53
September	122.676	3.56
October	119.729	3.76
November	113.262	4.25
December	113.896	4.19
Average	118.395	3.88 %

Source: Bloomberg

Union Pacific Corp.		
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66	Type:	Debentures
	Description:	UP Corp.
	CUSIP:	907818CX4
	Coupon Rate:	6.150%
	Maturity Date:	5/1/2037
	Amount Outstanding (\$ 000)	\$108,707
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	122.253	4.51 %
February	126.256	4.26
March	128.505	4.11
April	128.618	4.10
May	128.547	4.10
June	132.975	3.84
July	135.660	3.68
August	134.951	3.71
September	134.211	3.75
October	130.494	3.96
November	122.901	4.43
December	123.708	4.38
Average	129.090	4.07 %

Source: Bloomberg

Union Pacific Corp.		
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67	Type:	Debentures
	Description:	UP Corp.
	CUSIP:	907818CU0
	Coupon Rate:	6.250%
	Maturity Date:	5/1/2034
	Amount Outstanding (\$ 000)	\$175,637
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	123.983	4.33 %
February	127.831	4.07
March	129.736	3.94
April	128.025	4.04
May	127.886	4.05
June	131.922	3.77
July	134.046	3.63
August	134.383	3.60
September	133.886	3.63
October	130.617	3.83
November	123.566	4.31
December	126.437	4.10
Average	129.360	3.94 %

Source: Bloomberg

Union Pacific Corp.		
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68	Type:	Debentures
	Description:	UP Corp.
	CUSIP:	907818CF3
	Coupon Rate:	6.625%
	Maturity Date:	2/1/2029
	Amount Outstanding (\$ 000)	\$393,175
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	131.063	3.61 %
February	134.526	3.32
March	136.210	3.17
April	136.358	3.14
May	135.785	3.17
June	138.882	2.91
July	140.429	2.77
August	138.832	2.88
September	138.142	2.92
October	135.459	3.12
November	129.287	3.62
December	129.961	3.55
Average	135.411	3.18 %

Source: Bloomberg

Union Pacific Corp.		
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69	Type:	Debentures
	Description:	UP Corp.
	CUSIP:	907818BY3
	Coupon Rate:	7.125%
	Maturity Date:	2/1/2028
	Amount Outstanding (\$ 000)	\$173,331
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	129.282	4.02 %
February	132.441	3.73
March	133.802	3.59
April	137.030	3.30
May	136.587	3.32
June	139.572	3.04
July	140.840	2.92
August	138.995	3.05
September	138.516	3.07
October	136.170	3.26
November	130.348	3.77
December	130.276	3.76
Average	135.322	3.40 %

Source: Bloomberg

Union Pacific Corp.		
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70	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818EA2
	Coupon Rate:	1.800%
	Maturity Date:	2/1/2020
	Amount Outstanding (\$ 000)	\$248,552
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	99.039	2.05 %
February	99.954	1.81
March	100.511	1.66
April	100.722	1.60
May	100.546	1.65
June	101.436	1.39
July	101.645	1.32
August	101.139	1.46
September	101.288	1.40
October	101.309	1.39
November	99.373	2.01
December	99.146	2.09
Average	100.509	1.65 %

Source: Bloomberg

Union Pacific Corp.		
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71	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DW5
	Coupon Rate:	2.250%
	Maturity Date:	2/15/2019
	Amount Outstanding (\$ 000)	\$298,897
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	101.537	1.73 %
February	101.931	1.58
March	102.279	1.43
April	102.311	1.40
May	102.087	1.46
June	102.700	1.20
July	102.641	1.19
August	102.189	1.34
September	102.120	1.34
October	101.989	1.36
November	101.168	1.71
December	100.954	1.79
Average	101.992	1.46 %

Source: Bloomberg

Union Pacific Corp.		
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72	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818EE4
	Coupon Rate:	2.250%
	Maturity Date:	6/19/2020
	Amount Outstanding (\$ 000)	\$397,790
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	101.107	1.98 %
February	101.949	1.78
March	102.907	1.53
April	103.122	1.47
May	102.379	1.64
June	103.136	1.43
July	103.081	1.43
August	102.626	1.53
September	102.586	1.53
October	102.077	1.66
November	100.225	2.18
December	100.189	2.19
Average	102.115	1.70 %

Source: Bloomberg

Announcement Date = 6/16/2015.

Union Pacific Corp.		
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73	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DN5
	Coupon Rate:	2.750%
	Maturity Date:	4/15/2023
	Amount Outstanding (\$ 000)	\$322,099
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	99.167	2.88 %
February	101.577	2.51
March	102.530	2.36
April	102.625	2.34
May	102.844	2.30
June	104.544	2.03
July	105.112	1.93
August	104.154	2.07
September	103.937	2.10
October	102.909	2.26
November	99.892	2.77
December	99.754	2.79
Average	102.420	2.36 %

Source: Bloomberg

Union Pacific Corp.

74a	Type:	Notes
	Description:	UP Corp. (New)
	CUSIP:	907818EH7
	Coupon Rate:	2.750%
	Maturity Date:	3/1/2026
	Amount Outstanding (\$ 000)	\$467,245
	Months Outstanding	10.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	99.995	2.75
March	101.958	2.53
April	102.550	2.46
May	101.868	2.53
June	104.254	2.26
July	105.457	2.12
August	103.764	2.31
September	103.803	2.30
October	102.283	2.47
November	97.931	3.01
December	97.512	3.06
Average	101.943	2.53 %

Source: Bloomberg

The series of notes identified with CUSIP 907818EH7 was issued twice during 2016. The first portion was announced in a prospectus supplement dated February 25, 2016, and was issued on March 1. It was valued at \$500 million. It is identified herein as "74a".

The second portion of these notes, valued at \$150 million before selling at a premium, was announced in a prospectus supplement dated August 1, and issued on August 8. This portion is identified herein as "74b".

Splitting this series of notes makes it easier to follow the Surface Transportation Board's cost of capital procedure where newly-issued securities are prorated by the ratio of the number of months outstanding to the twelve-month year.

From the second Prospectus Supplement:

"The 2026 notes offered hereby form a part of the series of our currently outstanding 2.750% notes due 2026 and have the same terms as the existing notes of this series issued by us on March 1, 2016 (the "existing 2026 notes"). The 2026 notes will have the same CUSIP number as the existing 2026 notes and will trade interchangeably with the existing 2026 notes immediately upon settlement".

179,441
467,245
 646,686

Union Pacific Corp.

74b	Type:	Notes
	Description:	UP Corp. (New)
	CUSIP:	907818EH7
	Coupon Rate:	2.750%
	Maturity Date:	3/1/2026
	Amount Outstanding (\$ 000)	\$179,441
	Months Outstanding	5.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	103.764	2.31
September	103.803	2.30
October	102.283	2.47
November	97.931	3.01
December	97.512	3.06
Average	101.059	2.63 %

Source: Bloomberg

The series of notes identified with CUSIP 907818EH7 was issued twice during 2016. The first portion was announced in a prospectus supplement dated February 25, 2016, and was issued on March 1. It was valued at \$500 million. It is identified herein as "74a".

The second portion of these notes, valued at \$150 million before selling at a premium, was announced in a prospectus supplement dated August 1, and issued on August 8. This portion is identified herein as "74b".

Splitting this series of notes makes it easier to follow the Surface Transportation Board's cost of capital procedure where newly-issued securities are prorated by the ratio of the number of months outstanding to the twelve-month year.

From the second Prospectus Supplement:

"The 2026 notes offered hereby form a part of the series of our currently outstanding 2.750% notes due 2026 and have the same terms as the existing notes of this series issued by us on March 1, 2016 (the "existing 2026 notes"). The 2026 notes will have the same CUSIP number as the existing 2026 notes and will trade interchangeably with the existing 2026 notes immediately upon settlement".

179,441
467,245
 646,686

Union Pacific Corp.		
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75	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DM7
	Coupon Rate:	2.950%
	Maturity Date:	1/15/2023
	Amount Outstanding (\$ 000)	\$298,528
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	101.094	2.78 %
February	103.145	2.45
March	104.346	2.26
April	104.623	2.20
May	104.432	2.23
June	105.886	1.98
July	106.293	1.91
August	105.181	2.08
September	105.137	2.07
October	104.074	2.24
November	101.131	2.75
December	100.699	2.82
Average	103.837	2.31 %

Source: Bloomberg

Union Pacific Corp.		
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76	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DY1
	Coupon Rate:	3.250%
	Maturity Date:	1/15/2025
	Amount Outstanding (\$ 000)	\$347,008
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	102.255	2.96 %
February	103.934	2.75
March	105.355	2.56
April	106.170	2.46
May	106.324	2.43
June	108.341	2.17
July	109.361	2.04
August	107.803	2.22
September	107.780	2.22
October	106.390	2.39
November	102.202	2.94
December	101.858	2.99
Average	105.648	2.51 %

Source: Bloomberg

Union Pacific Corp.

77	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818ED6
	Coupon Rate:	3.250%
	Maturity Date:	8/15/2025
	Amount Outstanding (\$ 000)	\$498,645
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	101.775	3.03 %
February	104.841	2.67
March	107.063	2.40
April	107.093	2.39
May	106.772	2.42
June	108.851	2.17
July	109.466	2.09
August	108.103	2.25
September	107.573	2.30
October	105.926	2.49
November	101.917	3.00
December	101.736	3.02
Average	105.926	2.52 %

Source: Bloomberg

Union Pacific Corp.

78	Type:	Notes
	Description:	UP Corp. (New)
	CUSIP:	907818EK0
	Coupon Rate:	3.350%
	Maturity Date:	8/15/2046
	Amount Outstanding (\$ 000)	\$295,855
	Months Outstanding	5.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	100.203	3.34
September	98.419	3.44
October	95.129	3.62
November	88.252	4.03
December	90.339	3.90
Average	94.468	3.67 %

Source: Bloomberg

Note: Announced 8/1/2016

Union Pacific Corp.		
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79	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818EB0
	Coupon Rate:	3.375%
	Maturity Date:	2/1/2035
	Amount Outstanding (\$ 000)	\$444,581
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	91.296	4.04 %
February	93.598	3.86
March	96.650	3.62
April	97.329	3.57
May	97.455	3.56
June	100.813	3.32
July	103.909	3.10
August	103.743	3.11
September	102.593	3.19
October	99.759	3.39
November	94.084	3.83
December	95.501	3.72
Average	98.061	3.53 %

Source: Bloomberg

Union Pacific Corp.		
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80	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DR6
	Coupon Rate:	3.646%
	Maturity Date:	2/15/2024
	Amount Outstanding (\$ 000)	\$368,474
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	104.977	2.95 %
February	106.880	2.68
March	108.217	2.49
April	108.592	2.43
May	108.537	2.42
June	110.276	2.17
July	110.863	2.08
August	109.852	2.20
September	109.538	2.23
October	108.071	2.43
November	104.570	2.94
December	104.086	3.00
Average	107.872	2.50 %

Source: Bloomberg

Union Pacific Corp.		
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81	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DV7
	Coupon Rate:	3.750%
	Maturity Date:	3/15/2024
	Amount Outstanding (\$ 000)	\$395,464
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	105.528	2.98 %
February	107.876	2.66
March	109.051	2.49
April	109.644	2.40
May	109.515	2.40
June	111.100	2.18
July	111.638	2.09
August	110.331	2.25
September	110.099	2.27
October	108.817	2.44
November	105.305	2.94
December	104.924	2.98
Average	108.652	2.51 %

Source: Bloomberg

Union Pacific Corp.

82	Type:	Notes
	Description:	UP Corp. (New)
	CUSIP:	907818EM6
	Coupon Rate:	3.799%
	Maturity Date:	10/1/2051
	Amount Outstanding (\$ 000)	\$690,191
	Months Outstanding	1.0

End of Month in 2016	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	Not Traded	-
December	94.192	4.11
Average	94.192	4.11 %

Source: Bloomberg

Exchange in 2016

Union Pacific Corp.		
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83	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818EC8
	Coupon Rate:	3.875%
	Maturity Date:	2/1/2055
	Amount Outstanding (\$ 000)	\$443,766
	Months Outstanding	11.0

End of Month in 2016	Price	Yield
January	87.794	4.55 %
February	91.721	4.32
March	95.132	4.13
April	98.446	3.95
May	98.809	3.94
June	103.431	3.71
July	106.056	3.58
August	104.908	3.64
September	102.466	3.75
October	97.563	4.00
November	89.603	4.44
December	91.092	4.36
Average	97.252	4.03 %

Source: Bloomberg

Union Pacific Corp.		
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84	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DG0
	Coupon Rate:	4.000%
	Maturity Date:	2/1/2021
	Amount Outstanding (\$ 000)	\$497,342
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	107.547	2.39 %
February	108.556	2.15
March	109.335	1.96
April	109.663	1.86
May	109.102	1.95
June	110.480	1.61
July	110.314	1.61
August	109.486	1.75
September	109.395	1.73
October	108.766	1.84
November	106.410	2.37
December	105.942	2.46
Average	108.750	1.97 %

Source: Bloomberg

Union Pacific Corp.		
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85	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818EF1
	Coupon Rate:	4.050%
	Maturity Date:	11/15/2045
	Amount Outstanding (\$ 000)	\$493,018
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	96.463	4.26 %
February	100.593	4.02
March	103.189	3.87
April	103.619	3.84
May	103.412	3.86
June	108.569	3.58
July	114.027	3.30
August	111.951	3.40
September	110.101	3.49
October	105.929	3.71
November	98.897	4.12
December	101.114	3.98
Average	104.822	3.79 %

Source: Bloomberg

Union Pacific Corp.

86	Type:	Notes
	Description:	UP Corp. (New)
	CUSIP:	907818EJ3
	Coupon Rate:	4.050%
	Maturity Date:	3/1/2046
	Amount Outstanding (\$ 000)	\$586,349
	Months Outstanding	10.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	99.131	4.10
March	103.464	3.85
April	104.359	3.80
May	104.032	3.82
June	110.004	3.51
July	113.946	3.31
August	112.515	3.38
September	110.434	3.48
October	105.725	3.73
November	98.835	4.12
December	100.905	4.00
Average	105.759	3.74 %

Source: Bloomberg

Announcement Date = 2/25/2016

Union Pacific Corp.		
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87	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DZ8
	Coupon Rate:	4.150%
	Maturity Date:	1/15/2045
	Amount Outstanding (\$ 000)	\$341,641
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	98.429	4.25 %
February	100.712	4.11
March	104.135	3.91
April	105.429	3.84
May	105.067	3.86
June	110.697	3.55
July	114.678	3.35
August	113.778	3.39
September	111.364	3.51
October	107.125	3.74
November	99.940	4.15
December	101.217	4.08
Average	106.048	3.81 %

Source: Bloomberg

Union Pacific Corp.		
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88	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DK1
	Coupon Rate:	4.163%
	Maturity Date:	7/15/2022
	Amount Outstanding (\$ 000)	\$651,447
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	109.128	2.62 %
February	110.567	2.37
March	111.634	2.17
April	111.790	2.12
May	111.115	2.21
June	113.019	1.87
July	113.233	1.81
August	112.509	1.90
September	112.391	1.89
October	111.807	1.96
November	108.307	2.56
December	107.679	2.66
Average	111.098	2.18 %

Source: Bloomberg

Union Pacific Corp.		
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89	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DP0
	Coupon Rate:	4.250%
	Maturity Date:	4/15/2043
	Amount Outstanding (\$ 000)	\$317,805
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	99.088	4.31 %
February	102.618	4.09
March	105.005	3.95
April	106.049	3.89
May	105.492	3.92
June	110.536	3.63
July	115.279	3.38
August	113.789	3.45
September	112.279	3.53
October	107.684	3.79
November	100.529	4.22
December	103.478	4.03
Average	106.819	3.85 %

Source: Bloomberg

Union Pacific Corp.		
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90	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DL9
	Coupon Rate:	4.300%
	Maturity Date:	6/15/2042
	Amount Outstanding (\$ 000)	\$296,994
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	99.556	4.33 %
February	103.594	4.08
March	106.219	3.92
April	106.853	3.88
May	106.664	3.89
June	111.700	3.60
July	114.632	3.44
August	113.790	3.49
September	112.360	3.56
October	108.297	3.79
November	101.594	4.20
December	103.644	4.07
Average	107.409	3.85 %

Source: Bloomberg

Union Pacific Corp.		
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91a	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818EG9
	Coupon Rate:	4.375%
	Maturity Date:	11/15/2065
	Amount Outstanding (\$ 000)	\$380,411
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	93.552	4.71 %
February	94.712	4.65
March	98.919	4.43
April	102.999	4.23
May	102.674	4.25
June	108.571	3.98
July	112.120	3.83
August	111.548	3.85
September	109.659	3.93
October	107.026	4.04
November	98.937	4.43
December	101.051	4.32
Average	103.481	4.22 %

Source: Bloomberg

The series of notes identified with CUSIP 907818EG9 was issued in 2015 and 2016. The first portion was described in a prospectus supplement dated February 9, 2015, and issued on October 29, 2015. It was valued at \$400 million before selling at a discount. It is identified herein as "74a".

The second portion of these notes, valued at \$200 million before selling at a discount, was announced in a prospectus supplement dated February 25, 2016, Delivery of this portion of the notes was around March 1, 2016.. This portion is identified herein as "91b".

Splitting this series of notes makes it easier to follow the Surface Transportation Board's cost of capital procedure where newly-issued securities are prorated by the ratio of the number of months outstanding to the twelve-month year.

From the second Prospectus Supplement:

"The 2065 notes offered hereby form a part of the series of our currently outstanding 4.375% notes due 2065 and have the same terms as the existing notes of this series issued by us on October 29, 2015 (the "existing 2065 notes"). The 2065 notes will have the same CUSIP number as the existing 2065 notes and will trade interchangeably with the existing 2065 notes immediately upon settlement".

380,411
188,333
 568,744

Union Pacific Corp.

91b	Type:	Notes
	Description:	UP Corp. (New)
	CUSIP:	907818EG9
	Coupon Rate:	4.375%
	Maturity Date:	11/15/2065
	Amount Outstanding (\$ 000)	\$188,333
	Months Outstanding	10.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	98.919	4.43
April	102.999	4.23
May	102.674	4.25
June	108.571	3.98
July	112.120	3.83
August	111.548	3.85
September	109.659	3.93
October	107.026	4.04
November	98.937	4.43
December	101.051	4.32
Average	105.350	4.13 %

Source: Bloomberg

The series of notes identified with CUSIP 907818EH7 was issued twice during 2016. The first portion was announced in a prospectus supplement dated February 25, 2016, and was issued on March 1. It was valued at \$500 million. It is identified herein as "74a".

The second portion of these notes, valued at \$150 million before selling at a premium, was announced in a prospectus supplement dated August 1, and issued on August 8. This portion is identified herein as "74b".

Splitting this series of notes makes it easier to follow the Surface Transportation Board's cost of capital procedure where newly-issued securities are prorated by the ratio of the number of months outstanding to the twelve-month year.

From the second Prospectus Supplement:

"The 2026 notes offered hereby form a part of the series of our currently outstanding 2.750% notes due 2026 and have the same terms as the existing notes of this series issued by us on March 1, 2016 (the existing 2026 notes)". The 2026 notes will have the same CUSIP number as the existing 2026 notes and will trade interchangeably with the existing 2026 notes immediately upon settlement"

380,411

188,333

568,744

Union Pacific Corp.		
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92	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DJ4
	Coupon Rate:	4.750%
	Maturity Date:	9/15/2041
	Amount Outstanding (\$ 000)	\$315,951
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	106.373	4.34 %
February	110.230	4.10
March	112.110	3.99
April	113.524	3.91
May	112.907	3.94
June	117.467	3.68
July	123.134	3.38
August	121.206	3.48
September	119.520	3.56
October	114.980	3.81
November	107.261	4.27
December	109.500	4.13
Average	114.018	3.88 %

Source: Bloomberg

Union Pacific Corp.		
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93	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DU9
	Coupon Rate:	4.750%
	Maturity Date:	12/15/2043
	Amount Outstanding (\$ 000)	\$292,877
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	106.037	4.37 %
February	110.307	4.12
March	112.329	4.01
April	113.446	3.95
May	113.434	3.95
June	118.930	3.65
July	123.977	3.40
August	122.041	3.49
September	121.097	3.54
October	116.210	3.79
November	107.456	4.28
December	110.170	4.12
Average	114.620	3.89 %

Source: Bloomberg

Union Pacific Corp.		
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94	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DT2
	Coupon Rate:	4.821%
	Maturity Date:	2/1/2044
	Amount Outstanding (\$ 000)	\$219,862
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	106.714	4.40 %
February	111.554	4.12
March	113.498	4.01
April	114.775	3.94
May	115.153	3.92
June	120.772	3.62
July	124.804	3.42
August	122.843	3.52
September	121.431	3.58
October	116.832	3.82
November	108.871	4.27
December	111.409	4.12
Average	115.721	3.90 %

Source: Bloomberg

Union Pacific Corp.		
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95	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DX3
	Coupon Rate:	4.850%
	Maturity Date:	6/15/2044
	Amount Outstanding (\$ 000)	\$143,804
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	108.015	4.36 %
February	111.703	4.14
March	114.630	3.98
April	115.351	3.94
May	114.991	3.96
June	120.573	3.67
July	125.109	3.44
August	123.694	3.51
September	122.028	3.59
October	116.988	3.85
November	109.029	4.29
December	111.714	4.13
Average	116.152	3.91 %

Source: Bloomberg

Union Pacific Corp.		
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96	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DA3
	Coupon Rate:	5.700%
	Maturity Date:	8/15/2018
	Amount Outstanding (\$ 000)	\$368,526
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	109.955	1.67 %
February	110.140	1.47
March	110.013	1.38
April	110.050	1.22
May	109.596	1.26
June	109.525	1.12
July	109.162	1.13
August	108.481	1.26
September	108.190	1.23
October	107.652	1.34
November	106.824	1.60
December	106.400	1.66
Average	108.832	1.36 %

Source: Bloomberg

Union Pacific Corp.		
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97	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DF2
	Coupon Rate:	5.780%
	Maturity Date:	7/15/2040
	Amount Outstanding (\$ 000)	\$62,553
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	116.027	4.67 %
February	120.128	4.42
March	122.585	4.28
April	122.867	4.26
May	122.828	4.26
June	127.533	3.99
July	130.239	3.84
August	129.195	3.89
September	128.361	3.93
October	124.447	4.15
November	117.151	4.58
December	118.116	4.52
Average	123.290	4.23 %

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.

Union Pacific Corp.		
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98	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 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	127.758	3.98
July	130.092	3.85
August	129.227	3.89
September	128.133	3.95
October	124.242	4.16
November	116.800	4.61
December	118.116	4.52
Average	124.910	4.14 %

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.

Union Pacific Corp.		
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99	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DD7
	Coupon Rate:	6.125%
	Maturity Date:	2/15/2020
	Amount Outstanding (\$ 000)	\$161,871
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	114.107	2.43 %
February	114.964	2.15
March	115.453	1.95
April	115.294	1.91
May	114.756	1.97
June	115.391	1.71
July	115.023	1.72
August	114.089	1.88
September	113.803	1.87
October	113.237	1.94
November	111.548	2.35
December	110.929	2.45
Average	114.050	2.03 %

Source: Bloomberg

Union Pacific Corp.		
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100	Type:	Notes
	Description:	UP Corp.
	CUSIP:	907818DB1
	Coupon Rate:	7.875%
	Maturity Date:	1/15/2019
	Amount Outstanding (\$ 000)	\$158,152
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	116.228	2.17 %
February	116.432	1.95
March	116.219	1.86
April	115.816	1.84
May	115.142	1.91
June	115.298	1.66
July	114.639	1.74
August	114.528	1.57
September	114.018	1.58
October	113.457	1.62
November	111.950	2.06
December	111.116	2.24
Average	114.570	1.85 %

Source: Bloomberg

Union Pacific Corp.		
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101	Type:	Mort. Bond
	Description:	UPRR-MP
	CUSIP:	606198LF4
	Coupon Rate:	4.750%
	Maturity Date:	1/1/2020
	Amount Outstanding (\$ 000)	\$29,905
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	100.073	4.73 %
February	99.981	4.76
March	99.940	4.77
April	100.086	4.73
May	100.080	4.73
June	100.097	4.72
July	100.124	4.71
August	100.139	4.70
September	100.142	4.70
October	100.157	4.69
November	100.148	4.70
December	100.144	4.70
Average	100.093	4.72 %

Source: Bloomberg

Union Pacific Corp.

102	Type:	Mort. Bond
	Description:	UPRR-MP
	CUSIP:	606198LG2
	Coupon Rate:	4.750%
	Maturity Date:	1/1/2030
	Amount Outstanding (\$ 000)	\$27,381
	Months Outstanding	12.0

End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	Not Traded	-
July	Not Traded	-
August	98.774	4.88
September	98.501	4.91
October	98.856	4.87
November	98.394	4.92
December	97.489	5.02
Average	98.403	4.92 %

Source: Bloomberg

Union Pacific Corp.

103	Type:	Debentures
	Description:	UPRR-MP
	CUSIP:	606198LH0
	Coupon Rate:	5.000%
	Maturity Date:	1/1/2045
	Amount Outstanding (\$ 000)	\$96,025
	Months Outstanding	12.0

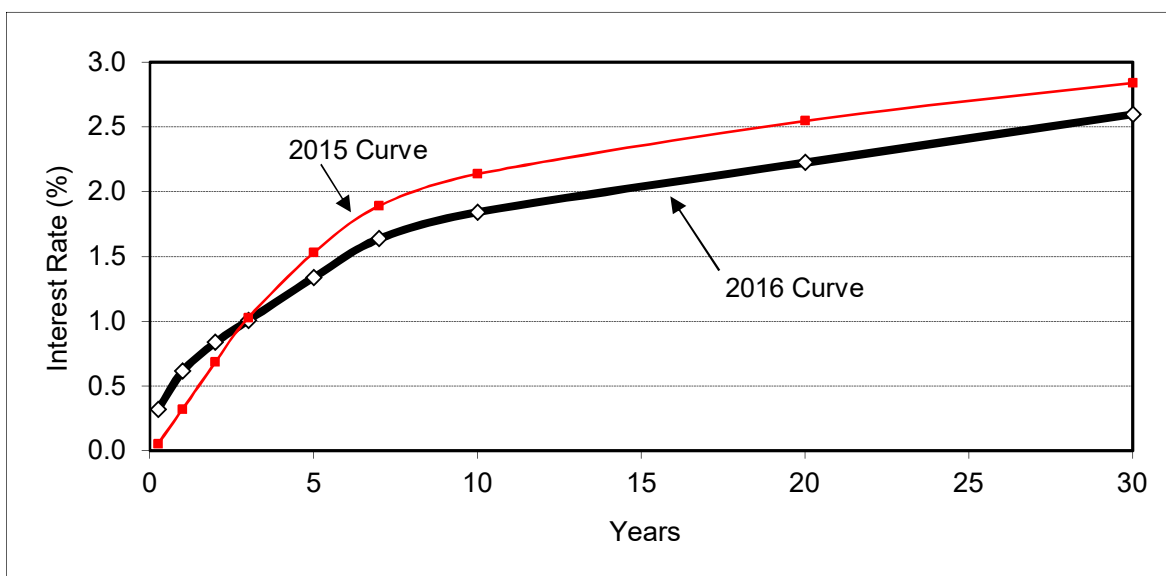
End of Month in 2016	Price	Yield
January	Not Traded	- %
February	Not Traded	-
March	Not Traded	-
April	Not Traded	-
May	Not Traded	-
June	96.060	5.27
July	95.575	5.30
August	97.794	5.15
September	97.293	5.18
October	Not Traded	-
November	93.625	5.45
December	93.863	5.43
Average	95.702	5.30 %

Source: Bloomberg

Interest Rates on Selected Government Instruments

Yield in Percent Per Annum, Constant Maturity Rates for 2016

	3 Mo.	1 Yr	2 Yr	3 Yr	5 Yr	7 Yr	10 Yr	20 Yr	30 Yr
January	0.26	0.54	0.90	1.14	1.52	1.85	2.09	2.49	2.86
February	0.31	0.53	0.73	0.90	1.22	1.53	1.78	2.20	2.62
March	0.30	0.66	0.88	1.04	1.38	1.68	1.89	2.28	2.68
April	0.23	0.56	0.77	0.92	1.26	1.57	1.81	2.21	2.62
May	0.28	0.59	0.82	0.97	1.30	1.60	1.81	2.22	2.63
June	0.27	0.55	0.73	0.86	1.17	1.44	1.64	2.02	2.45
July	0.30	0.51	0.67	0.79	1.07	1.33	1.50	1.82	2.23
August	0.30	0.57	0.74	0.85	1.13	1.40	1.56	1.89	2.26
September	0.29	0.59	0.77	0.90	1.18	1.46	1.63	2.02	2.35
October	0.33	0.66	0.84	0.99	1.27	1.56	1.76	2.17	2.50
November	0.45	0.74	0.98	1.22	1.60	1.93	2.14	2.54	2.86
December	0.51	0.87	1.20	1.49	1.96	2.29	2.49	2.84	3.11
Average	0.32	0.61	0.84	1.01	1.34	1.64	1.84	2.23	2.60



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

Equipment Trust Certificates for CSX

Modeled ETCs

ETC ID	Maturity	Balance For 2016 (\$000)			Current Valuation		Current	
		Beg.	Ending	Avg O/S	Interest Rate	Valuation Factor	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 2016 (\$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 2016 (\$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 2016 (\$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 KCS

Modeled ETCs

ETC ID	Maturity	Balance For 2016 (\$000)			Current Valuation		Current	
		Beg.	Ending	Avg O/S	Interest Rate	Valuation Factor	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 2016 (\$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 KCS (continued)

Entire ETC Current – Not Used for Cost or Market Value

ETC ID	Maturity	Balance 2016 (\$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 2016 (\$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 KCS:		
Total ETCs		\$0
Difference		\$0

Equipment Trust Certificates for NS

Modeled ETCs

ETC ID	Maturity	Balance For 2016 (\$000)			Current Valuation		Current	
		Beg.	Ending	Avg O/S	Interest Rate	Valuation Factor	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 2016 (\$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 NS (continued)

Entire ETC Current – Not Used for Cost or Market Value

ETC ID	Maturity	Balance 2016 (\$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 2016 (\$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 2016 (\$000)			Current Valuation		Current	
		Beg.	Ending	Avg O/S	Interest Rate	Valuation Factor	Market Value	Interest
1. ETC UPC Series I	2/23/2019	20,614	13,518	17,066	1.796%	1.11906	19,098	343
2. ETC UPC Series J	1/2/2031	59,925	53,122	56,524	2.651%	1.26035	71,239	1,889
3. ETC UPC Series A	5/14/2026	479,569	462,699	471,134	2.465%	1.04229	491,059	12,105
4. ETC UPC Series 2015 A	5/12/2027	395,646	382,227	388,937	2.512%	1.01162	393,457	9,882
5. ETC UPC Series 2016 A	11/9/2029	150,773	149,532	150,153	2.592%	0.99469	93,347	2,419
6.				--			--	--
7.				--			--	--
8.				--			--	--
9.				--			--	--
10.				--			--	--
11.				--			--	--
12.				--			--	--
13.				--			--	--
14.				--			--	--
15.				--			--	--
Total		\$1,106,527	\$1,061,098	\$1,083,813	2.494%		\$1,068,200	\$26,638

New ETC issued 5/9/2016 market value has been pro-rated at (7.5 months / 12 months) times market value of \$149,356. Beginning balance column contains \$150,773 thousand that was not outstanding until May 9.

Non-Modeled ETCs

ETC ID	Maturity	Balance For 2016 (\$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 2016 (\$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 2016 (\$000)
	Ending
Total Modeled	\$1,061,098
Total Non-Modeled	0
Sub Total	1,061,098
Total All Current	0
Grand Total	\$1,061,098
From UP:	
Total ETCs	\$1,061,097
Difference	\$1 (assumed to be rounding)

2016 Market Value of Debt (\$000)

Type of Debt	Market Value			Percent of	
	Traded or Modeled	Non-Traded or Non-Modeled	Total	Subtotal	Total
Bonds, Notes & Debentures	\$34,458,067	\$530,069	\$34,988,136	97.04%	95.84%
Equipment Trust Certificates	1,068,200		1,068,200	2.96%	2.93%
Conditional Sales Agreements	0		0	0.00%	0.00%
Sub Total	\$35,526,267	\$530,069	\$36,056,336	100.00%	98.76%
All Other — Capital Leases		\$1,119,367	\$1,119,367	247.99%	3.07%
All Other — Misc. Debt		-667,992	-667,992	-147.99%	-1.83%
All Other — Non-Modeled ETC		0	0	0.00%	0.00%
All Other — Non-Modeled CSA		0	0	0.00%	0.00%
Sub Total			\$451,375	100.00%	1.24%
Total Market Value			\$36,507,712		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 98.49 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 \$451,375 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 \$451,375 thousand, or 1.2 percent of total debt.

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

2016 Flotation Costs for Bonds

	CSX Notes 2/16/2016	CSX Notes 2/16/2016	CSX Notes 2/16/2016	KSU 5/11/2016	NSC Notes 5/31/2016	UNP Notes 2/25/2016	UNP Notes 2/25/2016	UNP Notes 2/25/2016	UNP Notes 8/1/2016	UNP Notes 8/1/2016
<i>From 424(b)</i>										
Face Amount	\$700,000,000	\$800,000,000	\$700,000,000	\$250,000,000	\$600,000,000	\$500,000,000	\$600,000,000	\$200,000,000	\$150,000,000	\$300,000,000
Coupon Rate	2.600%	3.800%	4.250%	3.125%	2.900%	2.750%	4.050%	4.375%	2.750%	3.350%
Maturity Date	11/1/2026	11/1/2046	11/1/2066	6/1/2026	6/15/2026	3/1/2026	3/1/2046	11/15/2065	3/1/2026	8/15/2046
Frequency of Coupon Payment	2	2	2	2	2	2	2	2	2	2
Interest Accrual Date	10/18/2016	10/18/2016	10/18/2016	5/16/2016	6/3/2016	3/1/2016	3/1/2016	10/29/2016	8/8/2016	8/8/2016
Price To Investors	99.596	99.431	99.751	99.487	99.662	99.058	98.682	95.106	103.959	99.605
Proceeds from Sale (before expenses)	\$697,172,000	\$795,448,000	\$698,257,000	\$248,717,500	\$597,972,000	\$495,290,000	\$592,092,000	\$190,212,000	\$155,938,500	\$298,815,000
Underwriter Fee as % of Gross Proceeds	0.650%	0.875%	0.875%	0.650%	0.650%	0.650%	0.875%	0.875%	0.650%	0.875%
Underwriter's Fee	\$4,550,000	\$7,000,000	\$6,125,000	\$1,625,000	\$3,900,000	\$3,250,000	\$5,250,000	\$1,750,000	\$975,000	\$2,625,000
Railroad Expenses Excluding Fee	\$159,090.91	\$181,818.18	\$159,090.91	\$750,000.00	\$200,000.00	\$28,846.15	\$34,615.38	\$11,538.46	\$25,000.00	\$50,000.00
Page in 424(b) for Expenses	S-20	S-20	S-20	S-32	S-16	S-10	S-10	S-10	S-10	S-10
<i>Calculated</i>										
Yield Based on Price to Investors	2.646%	3.832%	4.262%	3.185%	2.939%	2.859%	4.127%	4.628%	2.287%	3.371%
Issue Price Per \$100 Less Flotation	\$98.92	\$98.53	\$98.85	\$98.54	\$98.98	\$98.40	\$97.80	\$94.23	\$103.29	\$98.71
Yield on New Issue Including Flotation	2.723%	3.883%	4.306%	3.297%	3.019%	2.936%	4.179%	4.676%	2.363%	3.419%
Flotation Costs (Diff. in Pct Pts)	0.077%	0.051%	0.044%	0.112%	0.080%	0.077%	0.052%	0.048%	0.077%	0.048%
Avg. Flotation Cost (Pct. Points)	<u>0.067%</u>									
Previous Year's Average	0.071%									

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

Note: The UNP notes maturing in 2026 that were offered in August 2016 are part of the series issued during February 2016, and will have the same CUSIP number.

Example of Source for Bond Flotation Costs

Prospectus Supplement
(To Prospectus dated February 16, 2016)

\$2,200,000,000



\$700,000,000 2.600% Notes due 2026

\$800,000,000 3.800% Notes due 2046

\$700,000,000 4.250% Notes due 2066

We are offering \$700,000,000 aggregate principal amount of 2.600% Notes due 2026 (the "2026 Notes"), \$800,000,000 aggregate principal amount of 3.800% Notes due 2046 (the "2046 Notes") and \$700,000,000 aggregate principal amount of 4.250% Notes due 2066 (the "2066 Notes" and, together with the 2026 Notes and the 2046 Notes, the "Notes"). The 2026 Notes will mature on November 1, 2026, the 2046 Notes will mature on November 1, 2046 and the 2066 Notes will mature on November 1, 2066. Interest is payable on the Notes on May 1 and November 1 of each year, commencing May 1, 2017. Interest on the Notes will accrue from October 18, 2016. We may redeem the Notes of any series, in whole or in part, at any time, at the redemption prices set forth under the caption "Description of Notes—Optional Redemption."

The Notes will be senior obligations of our company and will rank equally with all of our other unsecured senior indebtedness.

The Notes of each series 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 of each series 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 25, 2015, as they may be amended, updated and modified periodically in our reports filed with the Securities and Exchange Commission.

Neither the Securities and Exchange Commission 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
Per 2026 Note	99.596%	0.650%	98.946%
2026 Notes Total	\$ 697,172,000	\$ 4,550,000	\$ 692,622,000
Per 2046 Note	99.431%	0.875%	98.556%
2046 Notes Total	\$ 795,448,000	\$ 7,000,000	\$ 788,448,000
Per 2066 Note	99.751%	0.875%	98.876%
2066 Notes Total	\$ 698,257,000	\$ 6,125,000	\$ 692,132,000

(1) Plus accrued interest from October 18, 2016 if settlement occurs after that.

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 October 18, 2016, 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*.

Example of Source for Bond Flotation Costs

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Purchasers of the Notes may be required to pay stamp taxes and other charges in accordance with the laws and practices of the country of purchase, in addition to the relevant issue prices set forth on the cover page of this prospectus supplement.

In connection with the offering, the representatives, on behalf of the underwriters, may purchase and sell Notes of any series in the open market. These transactions may include over-allotment, syndicate covering transactions and stabilizing transactions. Over-allotment involves syndicate sales of the applicable series of Notes in excess of the principal amount of such Notes to be purchased by the underwriters in the offering, which creates a syndicate short position. Syndicate covering transactions involve purchases of the applicable series of 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 applicable series of 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 each series of the Notes. They may also cause the price of such 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 underwriting discounts and commissions) for this offering will be approximately \$500,000.

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

In relation to each Member State of the European Economic Area that has implemented the Prospectus Directive (each, a "Relevant Member State"), each underwriter has represented and agreed that with effect from and including the date on which the Prospectus Directive is implemented in that Relevant Member State (the "Relevant Implementation Date"), it has not made and will not make an offer of Notes described in this prospectus supplement to the public in that Relevant Member State other than:

- (a) to any legal entity which is a "qualified investor" as defined in the Prospectus Directive;
- (b) to fewer than 150 natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the underwriters for any such offer; or
- (c) in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of Notes shall require the publication by CSX or any underwriter of a prospectus pursuant to Article 3 of the Prospectus Directive or a supplement to a prospectus pursuant to Article 16 of the Prospectus Directive.

2016 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	97.04%	3.392%	3.292%
Equipment Trust Certificates	App. C & Table 5	2.96%	2.494%	0.074%
Conditional Sales Agreements	Railroad Data	0.00%	--	--
Total Without Floatation Costs		100.00%		3.366%
Floatation Costs				
Bonds, Notes & Debentures	App. F & Table 8	97.04%	0.067%	0.065%
Equipment Trust Certificates	Tables 7 and 8	2.96%	0.072%	0.002%
Conditional Sales Agreements	Table 8	0.00%	not calculated	--
Total Floatation Costs		100.00%		0.067%
Weighted Cost of Debt				3.433%
Weighted Cost of Debt (rounded)				3.43%

Historical Weighted Cost of Debt (for comparison purposes only)			
Item	Year	Reference	Weighted Cost
Previous Year	2015	EP 558 (Sub-No. 19) Served August 5, 2016	3.55%
Highest	1982	EP 436 Decided July 22, 1983	14.0%
Lowest	2012	EP 558 (Sub-No. 16) Served August 30, 2013	3.29%

Market Value for Common Equity

CSX Data from Yahoo Finance 1-25-2017

Beg. of Wk. Date	Open	High	Low	End of Wk Close	Volume	Shares Outstanding	Capitalization (\$000)
1/4/2016	25.37	25.99	23.44	23.48	8534200	974,944,791	22,891,704
1/11/2016	23.38	24.14	21.75	22.76	14832300	974,944,791	22,189,743
1/19/2016	23.12	23.30	21.33	22.42	10409300	963,150,011	21,593,823
1/25/2016	22.35	23.03	21.80	23.02	7867400	963,150,011	22,171,713
2/1/2016	22.60	23.45	21.64	22.83	7950600	963,150,011	21,988,715
2/8/2016	22.64	24.37	22.28	24.19	11365000	963,150,011	23,298,600
2/16/2016	24.78	25.18	23.75	24.51	16514400	963,150,011	23,606,807
2/22/2016	25.44	25.71	23.58	24.31	8620500	963,150,011	23,414,176
2/29/2016	24.26	25.50	24.01	25.23	17212200	963,150,011	24,300,275
3/7/2016	25.21	26.18	24.67	26.10	8242300	963,150,011	25,138,215
3/14/2016	26.19	27.27	25.61	27.02	8622400	963,150,011	26,024,313
3/21/2016	27.06	27.14	25.51	26.17	5125100	963,150,011	25,205,636
3/28/2016	26.04	26.46	25.03	25.62	7672300	955,867,082	24,489,316
4/4/2016	25.53	25.74	24.46	24.80	11360000	955,867,082	23,705,503
4/11/2016	24.73	26.44	24.36	25.93	11212400	955,867,082	24,785,633
4/18/2016	25.74	27.62	25.61	27.53	8095900	955,867,082	26,315,022
4/25/2016	27.40	27.97	26.82	27.27	7881300	955,867,082	26,066,495
5/2/2016	27.27	27.54	25.84	26.16	6754600	955,867,082	25,005,483
5/9/2016	26.18	26.49	24.93	25.12	6600200	955,867,082	24,011,382
5/16/2016	25.13	26.02	25.06	25.82	7140500	955,867,082	24,680,488
5/23/2016	25.71	25.94	25.25	25.89	5627800	955,867,082	24,747,398
5/31/2016	26.00	26.75	25.87	26.64	6147100	955,867,082	25,464,298
6/6/2016	26.69	27.26	26.24	26.78	6347600	955,867,082	25,598,121
6/13/2016	26.76	26.97	25.85	26.75	6461000	955,867,082	25,569,444
6/20/2016	27.08	27.41	25.51	25.70	7302000	945,990,945	24,311,968
6/27/2016	25.41	26.54	24.43	26.21	7581200	945,990,945	24,794,422
7/5/2016	26.04	26.70	25.33	26.53	6579300	945,990,945	25,097,141
7/11/2016	26.53	29.41	26.51	28.52	13215200	945,990,945	26,979,662
7/18/2016	28.66	28.67	28.10	28.48	5657200	945,990,945	26,941,822
7/25/2016	28.44	28.82	28.03	28.33	5691000	945,990,945	26,799,923
8/1/2016	28.33	28.72	27.46	28.63	5041300	945,990,945	27,083,720
8/8/2016	28.54	28.88	27.88	28.06	3974200	945,990,945	26,544,505
8/15/2016	28.08	28.75	27.82	28.67	4871500	945,990,945	27,121,560
8/22/2016	28.59	28.74	28.00	28.19	4182600	945,990,945	26,667,486
8/29/2016	28.14	28.73	27.93	28.14	4837900	945,990,945	26,620,184
9/6/2016	28.13	28.98	27.89	27.89	6818100	945,990,945	26,383,687
9/12/2016	28.00	29.41	27.91	29.33	10463200	945,990,945	27,745,914
9/19/2016	29.46	30.11	29.09	29.64	5493400	936,661,112	27,762,634
9/26/2016	29.43	30.60	29.39	30.50	6170100	936,661,112	28,568,164
10/3/2016	30.33	31.16	30.15	31.05	7866900	936,661,112	29,083,327
10/10/2016	31.10	31.73	30.11	31.03	11292500	936,661,112	29,064,595
10/17/2016	31.03	31.45	30.04	30.29	8164500	936,661,112	28,371,466
10/24/2016	30.56	31.02	30.01	30.28	7908200	936,661,112	28,362,099
10/31/2016	30.46	31.38	30.15	30.92	8926700	936,661,112	28,961,562
11/7/2016	31.30	34.75	31.30	34.58	14591500	936,661,112	32,389,743
11/14/2016	34.72	35.12	33.79	34.00	10532100	936,661,112	31,846,478
11/21/2016	34.01	35.23	34.01	35.19	6035900	936,661,112	32,961,104
11/28/2016	34.79	36.86	34.44	36.48	10114400	936,661,112	34,169,397
12/5/2016	36.69	37.42	35.84	37.27	10004900	936,661,112	34,909,360
12/12/2016	37.27	37.38	35.88	36.04	8129400	936,661,112	33,757,267
12/19/2016	36.17	36.85	35.96	36.65	4088200	936,661,112	34,328,632
12/27/2016	36.80	37.01	35.79	35.93	3758400	936,661,112	33,654,234

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

Market Value for Common Equity

KSU Data from Yahoo Finance 1-25-2017

Beg. of Wk. Date	Open	High	Low	End of Wk Close	Volume	Shares Outstanding	Capitalization (\$000)
1/4/2016	73.18	74.58	68.81	69.73	2215000	109,136,453	7,610,085
1/11/2016	70.01	71.62	66.30	67.66	1529500	109,136,453	7,384,173
1/19/2016	68.63	72.21	62.20	67.41	3233300	108,498,752	7,313,901
1/25/2016	67.13	71.76	64.62	70.88	1352000	108,498,752	7,690,391
2/1/2016	70.00	76.51	69.60	75.71	1735400	108,498,752	8,214,440
2/8/2016	74.62	79.97	73.50	79.40	2312100	108,498,752	8,614,801
2/16/2016	80.30	82.81	79.02	82.71	1655600	108,498,752	8,973,932
2/22/2016	83.50	85.27	79.07	83.93	1597100	108,498,752	9,106,300
2/29/2016	83.72	88.00	81.54	86.65	1677000	108,498,752	9,401,417
3/7/2016	86.07	87.03	81.43	85.32	1519200	108,498,752	9,257,114
3/14/2016	85.00	88.84	82.81	87.51	1474300	108,498,752	9,494,726
3/21/2016	87.51	88.00	83.58	84.94	1054000	108,498,752	9,215,884
3/28/2016	84.83	86.27	82.87	85.82	1330200	108,498,752	9,311,363
4/4/2016	85.63	88.82	83.83	87.87	1152200	108,498,752	9,533,786
4/11/2016	88.04	91.95	86.71	91.46	1743400	107,987,657	9,876,551
4/18/2016	91.04	98.99	89.91	98.22	2294500	107,987,657	10,606,548
4/25/2016	97.75	98.16	93.82	94.75	1217200	107,987,657	10,231,831
5/2/2016	95.55	95.77	91.20	93.17	1362200	107,987,657	10,061,210
5/9/2016	92.91	94.05	87.27	87.97	1397000	107,987,657	9,499,674
5/16/2016	88.06	92.23	87.71	91.07	1485400	107,987,657	9,834,436
5/23/2016	91.11	94.51	89.68	93.37	1206100	107,987,657	10,082,808
5/31/2016	93.51	94.60	90.36	91.90	995200	107,987,657	9,924,066
6/6/2016	92.48	93.45	87.97	88.50	1207700	107,987,657	9,556,908
6/13/2016	88.26	90.72	85.63	88.01	1828600	107,987,657	9,503,994
6/20/2016	88.98	91.79	86.09	87.10	1352900	107,987,657	9,405,725
6/27/2016	85.96	90.59	84.01	89.58	1129400	107,987,657	9,673,535
7/5/2016	88.64	90.42	86.52	90.20	1133300	107,987,657	9,740,486
7/11/2016	90.52	95.59	89.91	94.38	1267900	107,983,492	10,191,482
7/18/2016	94.04	99.20	92.75	97.84	2044900	107,983,492	10,565,104
7/25/2016	97.66	97.83	94.45	96.11	973700	107,983,492	10,378,294
8/1/2016	95.96	98.93	93.17	98.51	913300	107,983,492	10,637,454
8/8/2016	98.64	99.75	95.99	96.98	737900	107,983,492	10,472,239
8/15/2016	97.31	99.27	95.77	99.07	1116200	107,983,492	10,697,925
8/22/2016	98.52	100.69	98.28	99.47	769500	107,983,492	10,741,118
8/29/2016	99.47	100.00	95.38	95.77	1185200	107,983,492	10,341,579
9/6/2016	95.78	97.37	93.13	93.16	1148400	107,983,492	10,059,743
9/12/2016	93.14	94.70	90.37	91.07	1561500	107,983,492	9,834,057
9/19/2016	91.76	91.77	88.86	89.65	1388200	107,983,492	9,680,720
9/26/2016	89.05	93.63	89.05	93.32	1314100	107,983,492	10,077,019
10/3/2016	92.71	93.83	91.68	92.02	890600	107,983,492	9,936,641
10/10/2016	92.42	96.83	91.79	94.55	1621100	107,579,057	10,171,600
10/17/2016	94.53	96.82	90.19	90.33	1785800	107,579,057	9,717,616
10/24/2016	91.12	91.17	87.85	88.76	1306300	107,579,057	9,548,717
10/31/2016	89.15	89.25	85.36	87.97	1494400	107,579,057	9,463,730
11/7/2016	91.98	93.09	79.30	82.05	5314800	107,579,057	8,826,862
11/14/2016	82.46	87.66	82.25	87.57	1948000	107,579,057	9,420,698
11/21/2016	87.75	89.90	86.32	87.79	1372500	107,579,057	9,444,366
11/28/2016	87.88	89.81	85.48	85.72	1624400	107,579,057	9,221,677
12/5/2016	86.50	86.65	83.36	86.02	2015100	107,579,057	9,253,950
12/12/2016	86.13	87.05	84.53	86.61	2109000	107,579,057	9,317,422
12/19/2016	86.47	86.83	84.82	85.29	1142800	107,579,057	9,175,418
12/27/2016	85.30	86.60	83.89	84.85	756800	107,579,057	9,128,083

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

Market Value for Common Equity

NSC Data from Yahoo Finance 1-25-2017

Beg. of Wk.	End of Wk				Shares		Capitalization
Date	Open	High	Low	Close	Volume	Outstanding	(\$000)
1/4/2016	83.64	83.66	77.55	77.79	1653100	298,569,765	23,225,742
1/11/2016	78.02	78.34	70.09	71.77	1815600	298,569,765	21,428,351
1/19/2016	72.26	72.57	66.51	68.59	2465300	298,569,765	20,478,899
1/25/2016	68.64	71.47	67.51	70.50	1707800	298,569,765	21,049,168
2/1/2016	70.16	70.61	64.51	70.14	1675500	298,198,651	20,915,653
2/8/2016	69.35	73.66	69.12	72.56	2411600	298,198,651	21,637,294
2/16/2016	72.95	76.21	72.56	75.00	1477700	298,198,651	22,364,899
2/22/2016	75.00	77.15	72.01	74.70	1177400	298,198,651	22,275,438
2/29/2016	74.69	78.69	73.16	77.40	1570500	298,198,651	23,080,576
3/7/2016	77.04	79.99	74.70	79.01	3150000	298,198,651	23,560,676
3/14/2016	78.31	84.57	77.30	84.02	1800600	298,198,651	25,054,650
3/21/2016	83.74	85.25	81.40	83.87	1142400	298,198,651	25,009,922
3/28/2016	83.78	86.66	80.49	82.97	1439300	295,737,821	24,537,367
4/4/2016	83.13	84.09	79.52	81.49	1316500	295,737,821	24,099,674
4/11/2016	79.12	82.60	78.15	81.63	2692900	295,737,821	24,141,077
4/18/2016	81.60	91.43	80.70	91.33	2778400	295,737,821	27,009,736
4/25/2016	91.25	94.10	89.45	90.11	2086100	295,737,821	26,648,935
5/2/2016	90.82	91.05	87.82	89.66	1467200	295,737,821	26,515,854
5/9/2016	89.17	90.70	85.29	85.97	1485300	295,737,821	25,424,581
5/16/2016	86.00	88.00	83.67	85.44	1777700	295,737,821	25,267,840
5/23/2016	85.36	85.79	81.48	84.00	2305800	295,737,821	24,841,977
5/31/2016	83.97	85.65	81.79	83.11	1444700	295,737,821	24,578,771
6/6/2016	83.54	86.69	82.58	84.09	1496400	295,737,821	24,868,592
6/13/2016	84.00	85.72	82.28	85.19	1642300	295,737,821	25,193,906
6/20/2016	86.21	87.50	82.49	82.64	1590900	295,737,821	24,439,773
6/27/2016	81.65	85.64	78.73	85.20	1439800	293,549,767	25,010,439
7/5/2016	84.82	86.94	83.23	86.42	1707200	293,549,767	25,368,570
7/11/2016	86.65	92.64	86.64	91.49	1826200	293,549,767	26,856,868
7/18/2016	91.28	92.16	90.53	92.01	1184500	293,549,767	27,009,515
7/25/2016	92.00	93.09	88.88	89.78	1780000	293,549,767	26,354,898
8/1/2016	89.67	89.67	86.88	88.88	1443500	293,549,767	26,090,702
8/8/2016	89.00	90.47	87.97	88.36	1177200	293,549,767	25,938,058
8/15/2016	88.86	91.96	88.07	91.58	1135200	293,549,767	26,883,288
8/22/2016	91.50	92.97	91.01	92.27	945200	293,549,767	27,085,836
8/29/2016	92.23	94.80	92.12	94.16	1316200	293,549,767	27,640,647
9/6/2016	94.16	95.97	90.75	90.78	1724700	293,549,767	26,648,448
9/12/2016	90.69	93.03	89.92	91.35	1556100	293,549,767	26,815,771
9/19/2016	91.76	94.39	91.61	93.62	1180700	293,549,767	27,482,130
9/26/2016	93.07	97.28	92.84	97.06	1403800	291,942,235	28,335,913
10/3/2016	96.59	97.82	95.37	96.78	1417400	291,942,235	28,254,169
10/10/2016	97.22	97.59	92.47	94.94	2070200	291,942,235	27,716,996
10/17/2016	94.82	96.38	92.07	92.92	1296800	291,942,235	27,127,272
10/24/2016	93.84	94.27	89.95	92.27	2147100	291,942,235	26,937,509
10/31/2016	92.73	93.54	90.98	91.62	1426400	291,942,235	26,747,748
11/7/2016	92.49	101.19	92.49	100.91	3190300	291,942,235	29,459,892
11/14/2016	101.00	104.87	100.91	103.45	2310700	291,942,235	30,201,423
11/21/2016	103.76	105.50	103.62	104.34	1488800	291,942,235	30,461,252
11/28/2016	103.72	107.89	102.77	105.60	2209500	291,942,235	30,829,099
12/5/2016	106.20	110.72	105.16	110.60	1563300	291,942,235	32,288,811
12/12/2016	110.78	111.43	106.11	106.67	1873200	291,942,235	31,141,478
12/19/2016	106.56	109.79	106.17	109.28	1486500	291,942,235	31,903,447
12/27/2016	109.34	110.26	107.50	108.07	1047100	291,942,235	31,550,197

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

Market Value for Common Equity

UNP Data from Yahoo Finance 1-25-2017

Beg. of Wk.	End of Wk				Volume	Shares	Capitalization
Date	Open	High	Low	Close		Outstanding	(\$000)
1/4/2016	76.87	79.34	72.42	73.86	7558000	854,120,634	63,085,351
1/11/2016	74.36	76.84	72.63	74.11	7657000	854,120,634	63,298,881
1/19/2016	74.99	75.16	67.06	69.99	13229600	854,120,634	59,779,901
1/25/2016	69.66	72.03	68.66	72.00	6755300	846,414,350	60,941,833
2/1/2016	70.90	76.42	70.35	75.03	7315300	846,414,350	63,506,468
2/8/2016	74.48	78.62	73.46	77.20	6740000	846,414,350	65,343,185
2/16/2016	78.00	80.50	76.90	79.90	5829800	846,414,350	67,628,508
2/22/2016	79.90	82.26	77.07	80.00	4459000	846,414,350	67,713,148
2/29/2016	79.81	81.45	78.75	80.50	5692000	846,414,350	68,136,355
3/7/2016	80.03	81.57	78.15	81.26	5238500	846,414,350	68,779,632
3/14/2016	80.70	85.30	78.63	84.42	5125300	846,414,350	71,454,298
3/21/2016	84.39	84.98	80.04	80.92	4373800	846,414,350	68,491,848
3/28/2016	80.75	81.45	77.80	78.92	4640700	846,414,350	66,799,019
4/4/2016	78.72	80.58	77.29	79.17	3982000	846,414,350	67,010,622
4/11/2016	79.14	83.03	78.19	81.21	4429200	841,034,308	68,300,395
4/18/2016	79.98	89.91	78.62	89.63	7503500	841,034,308	75,381,903
4/25/2016	89.09	89.80	86.73	87.23	4479800	841,034,308	73,363,425
5/2/2016	87.99	88.50	84.50	85.73	3925100	841,034,308	72,101,874
5/9/2016	85.66	86.74	81.79	82.00	4096200	841,034,308	68,964,813
5/16/2016	82.09	83.48	80.68	82.41	4418000	841,034,308	69,309,641
5/23/2016	82.25	83.31	80.87	82.97	3712700	841,034,308	69,780,617
5/31/2016	83.11	86.65	82.61	86.38	4709600	841,034,308	72,648,541
6/6/2016	86.42	90.14	85.93	88.78	4496400	841,034,308	74,667,025
6/13/2016	88.49	89.61	85.50	87.58	4001200	841,034,308	73,657,786
6/20/2016	88.36	89.25	84.14	85.25	5748700	841,034,308	71,698,175
6/27/2016	84.42	88.19	81.96	87.34	5043100	841,034,308	73,455,933
7/5/2016	86.85	91.29	86.01	90.69	4823300	841,034,308	76,273,403
7/11/2016	90.71	96.00	90.69	93.98	4961100	832,913,826	78,277,244
7/18/2016	93.98	94.36	90.29	92.85	4229500	832,913,826	77,336,047
7/25/2016	92.71	93.41	90.94	93.05	3012500	832,913,826	77,502,634
8/1/2016	92.92	94.65	90.68	93.85	3176800	832,913,826	78,168,961
8/8/2016	93.88	94.95	91.74	91.90	2579900	832,913,826	76,544,782
8/15/2016	92.46	96.05	91.88	95.68	3866000	832,913,826	79,693,195
8/22/2016	95.30	96.23	94.74	95.12	2227500	832,913,826	79,226,766
8/29/2016	94.86	96.28	94.41	95.28	2440200	832,913,826	79,360,029
9/6/2016	95.63	97.05	92.72	92.72	2781000	832,913,826	77,227,771
9/12/2016	91.91	94.70	91.32	92.38	3968100	832,913,826	76,944,577
9/19/2016	92.97	96.17	92.73	94.33	2814100	832,913,826	78,568,763
9/26/2016	94.11	98.00	93.53	97.53	3437700	832,913,826	81,234,085
10/3/2016	97.18	98.84	96.57	98.07	2918800	832,913,826	81,683,859
10/10/2016	98.52	98.72	94.30	96.84	3980500	824,112,432	79,807,045
10/17/2016	96.71	98.44	89.37	90.37	6805300	824,112,432	74,475,043
10/24/2016	90.78	91.49	87.79	88.37	5107700	824,112,432	72,826,818
10/31/2016	88.75	89.64	87.06	88.76	4062600	824,112,432	73,148,221
11/7/2016	90.00	98.79	87.88	96.88	6819400	824,112,432	79,840,010
11/14/2016	97.52	100.63	97.48	99.83	4355800	824,112,432	82,271,146
11/21/2016	100.10	102.16	100.00	102.10	2892800	824,112,432	84,141,878
11/28/2016	101.32	103.96	100.10	102.65	4163100	824,112,432	84,595,143
12/5/2016	103.32	106.62	102.30	104.99	3892200	824,112,432	86,523,563
12/12/2016	105.33	105.33	102.51	103.31	4482400	824,112,432	85,139,054
12/19/2016	103.08	105.55	102.63	105.18	2645100	824,112,432	86,680,146
12/27/2016	105.51	106.32	103.25	103.68	2079700	824,112,432	85,443,977

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

Market Value for Common Equity

Total Market Value for CSX, KSU, 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		Capitalization
Beginning	End	(\$000)
1. Monday, January 4, 2016	Friday, January 8, 2016	\$116,812,882
2. Monday, January 11, 2016	Friday, January 15, 2016	\$114,301,148
3. Tuesday, January 19, 2016	Friday, January 22, 2016	\$109,166,525
4. Monday, January 25, 2016	Friday, January 29, 2016	\$111,853,106
5. Monday, February 1, 2016	Friday, February 5, 2016	\$114,625,276
6. Monday, February 8, 2016	Friday, February 12, 2016	\$118,893,880
7. Tuesday, February 16, 2016	Friday, February 19, 2016	\$122,574,146
8. Monday, February 22, 2016	Friday, February 26, 2016	\$122,509,062
9. Monday, February 29, 2016	Friday, March 4, 2016	\$124,918,623
10. Monday, March 7, 2016	Friday, March 11, 2016	\$126,735,637
11. Monday, March 14, 2016	Friday, March 18, 2016	\$132,027,987
12. Monday, March 21, 2016	Thursday, March 24, 2016	\$127,923,289
13. Monday, March 28, 2016	Friday, April 1, 2016	\$125,137,065
14. Monday, April 4, 2016	Friday, April 8, 2016	\$124,349,585
15. Monday, April 11, 2016	Friday, April 15, 2016	\$127,103,657
16. Monday, April 18, 2016	Friday, April 22, 2016	\$139,313,208
17. Monday, April 25, 2016	Friday, April 29, 2016	\$136,310,686
18. Monday, May 2, 2016	Friday, May 6, 2016	\$133,684,421
19. Monday, May 9, 2016	Friday, May 13, 2016	\$127,900,450
20. Monday, May 16, 2016	Friday, May 20, 2016	\$129,092,405
21. Monday, May 23, 2016	Friday, May 27, 2016	\$129,452,800
22. Tuesday, May 31, 2016	Friday, June 3, 2016	\$132,615,676
23. Monday, June 6, 2016	Friday, June 10, 2016	\$134,690,646
24. Monday, June 13, 2016	Friday, June 17, 2016	\$133,925,130
25. Monday, June 20, 2016	Friday, June 24, 2016	\$129,855,641
26. Monday, June 27, 2016	Friday, July 1, 2016	\$132,934,329
27. Tuesday, July 5, 2016	Friday, July 8, 2016	\$136,479,600
28. Monday, July 11, 2016	Friday, July 15, 2016	\$142,305,255
29. Monday, July 18, 2016	Friday, July 22, 2016	\$141,852,488
30. Monday, July 25, 2016	Friday, July 29, 2016	\$141,035,749
31. Monday, August 1, 2016	Friday, August 5, 2016	\$141,980,837
32. Monday, August 8, 2016	Friday, August 12, 2016	\$139,499,584
33. Monday, August 15, 2016	Friday, August 19, 2016	\$144,395,968
34. Monday, August 22, 2016	Friday, August 26, 2016	\$143,721,205
35. Monday, August 29, 2016	Friday, September 2, 2016	\$143,962,439
36. Tuesday, September 6, 2016	Friday, September 9, 2016	\$140,319,647
37. Monday, September 12, 2016	Friday, September 16, 2016	\$141,340,318
38. Monday, September 19, 2016	Friday, September 23, 2016	\$143,494,248
39. Monday, September 26, 2016	Friday, September 30, 2016	\$148,215,181
40. Monday, October 3, 2016	Friday, October 7, 2016	\$148,957,995
41. Monday, October 10, 2016	Friday, October 14, 2016	\$146,760,236
42. Monday, October 17, 2016	Friday, October 21, 2016	\$139,691,397
43. Monday, October 24, 2016	Friday, October 28, 2016	\$137,675,144
44. Monday, October 31, 2016	Friday, November 4, 2016	\$138,321,261
45. Monday, November 7, 2016	Friday, November 11, 2016	\$150,516,507
46. Monday, November 14, 2016	Friday, November 18, 2016	\$153,739,745
47. Monday, November 21, 2016	Friday, November 25, 2016	\$157,008,598
48. Monday, November 28, 2016	Friday, December 2, 2016	\$158,815,316
49. Monday, December 5, 2016	Friday, December 9, 2016	\$162,975,683
50. Monday, December 12, 2016	Friday, December 16, 2016	\$159,355,221
51. Monday, December 19, 2016	Friday, December 23, 2016	\$162,087,642
52. Tuesday, December 27, 2016	Friday, December 30, 2016	\$159,776,491
Average		\$136,595,981.11

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

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

AAR Regression for 2016 Beta

STB-Style 5-Year Beta using SP 500 Price Index, Weighted RR Returns, 90-Day T-Bill as RF CSX, KSU, NSC, and UNP					
The GLM Procedure					
Dependent Variable: ZRR					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.09259336	0.09259336	210.40	<.0001
Error	259	0.11398071	0.00044008		
Corrected Total	260	0.20657407			
	R-Square	Coeff Var	Root MSE	ZRR Mean	
	0.448233	715.9161	0.020978	0.002930	
Source	DF	Type I SS	Mean Square	F Value	Pr > F
ZSP5	1	0.09259336	0.09259336	210.40	<.0001
Source	DF	Type III SS	Mean Square	F Value	Pr > F
ZSP5	1	0.09259336	0.09259336	210.40	<.0001
Parameter	Estimate	Standard Error	t Value	Pr > |t|	
Intercept	0.000262592	0.00131147	0.20	0.8415	
ZSP5	<u>1.146742833</u>	0.07905729	14.51	<.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

$$MV_{i0} = \sum_{t=1}^5 \frac{CF_{i0}(1+g_{i1})^t}{(1+r_i)^t} + \sum_{t=6}^{10} \frac{CF_{i5}(1+g_{i2})}{(1+r_i)^t} + \frac{IBEI_{i10}(1+g_{i3})}{(1+r_i)^{10}},$$

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

$IBEI_{10} = IBEI_0(1+g_1)^5(1+g_2)^5$.

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

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

Cash Flow Calculation

CSX, Corp.	1	2	3	4	5	Total
	2012	2013	2014	2015	2016	
(\$ in millions)						
Revenue	11,763	12,026	12,669	11,811	11,069	59,338
Net Income	1,863	1,864	1,927	1,968	1,714	9,336
Extraordinary Items	0	0	0	0	0	0
Depreciation	1,059	1,104	1,151	1,208	1,301	5,823
Deferred Taxes	592	300	298	456	405	2,051
Capital Expenditures	2,341	2,313	2,449	2,562	2,398	12,063
Cash Flow	1,173	955	927	1,070	1,022	5,147
Cash Flow / Revenue	0.09972	0.07941	0.07317	0.09059	0.09233	0.08674
NIBEI / Revenue	0.15838	0.15500	0.15210	0.16662	0.15485	0.15734
Ibbotson Smoothed Cash Flow = \$11,069 x 0.08674 =					\$960.13	
Ibbotson Smoothed Net Income BEI = \$11,069 x 0.15734 =					\$1,741.55	

Cash Flow Calculation

Kansas City Southern	1	2	3	4	5	Total
	2012	2013	2014	2015	2016	
(\$ in millions)						
Revenue	2,238.6	2,369.3	2,577.1	2,418.8	2,334.2	11,938
Net Income	377.1	351.2	502.4	483.3	477.9	2,192
Extraordinary Items	0.0	0.0	0.0	0.0	0.0	0
Depreciation	198.8	223.3	258.1	284.6	305.0	1,270
Deferred Taxes	197.3	111.2	140.1	135.8	104.8	689
Capital Expenditures	567.4	838.2	997.0	849.6	623.6	3,876
Cash Flow	206	-153	-96	54	264	275
Cash Flow / Revenue	0.09193	-0.06437	-0.03741	0.02237	0.11314	0.02304
NIBEI / Revenue	0.16845	0.14823	0.19495	0.19981	0.20474	0.18361

Ibbotson Smoothed Cash Flow = \$2,334 x 0.02304 = \$53.79

Ibbotson Smoothed Net Income BEI = \$2,334 x 0.18361 = \$428.58

Note: Net Income is net available to common stockholders after preferred dividends and non-KCS portion of Meridian Speedway.

Capital Expenditures

Core CapX	517.1	594.8	668.2	688.0	563.9
Special programs	22.9	211.8	302.1	144.2	26.6
Meridian Speedway	35.2	31.6	26.7	17.4	33.1
Meridian, Otr RR	-7.8	0.0	0.0	0.0	0.0
Total CapX	567.4	838.2	997.0	849.6	623.6

Cash Flow Calculation

Norfolk Southern	1	2	3	4	5	Total
	2012	2013	2014	2015	2016	
(\$ in millions)						
Revenue	11,040	11,245	11,624	10,511	9,888	54,308
Net Income	1,749	1,910	2,000	1,556	1,668	8,883
Extraordinary Items	0	0	0	0	0	0
Depreciation	922	922	956	1,059	1,030	4,889
Deferred Taxes	366	262	294	320	227	1,469
Capital Expenditures	2,241	1,971	2,118	2,385	1,887	10,602
Cash Flow	796	1,123	1,132	550	1,038	4,639
Cash Flow / Revenue	0.07210	0.09987	0.09738	0.05233	0.10498	0.08542
NIBEI / Revenue	0.15842	0.16985	0.17206	0.14804	0.16869	0.16357
Ibbotson Smoothed Cash Flow = \$9,888 x 0.08542 =					\$844.63	
Ibbotson Smoothed Net Income BEI = \$9,888 x 0.16357 =					\$1,617.35	

Cash Flow Calculation

Union Pacific Corp.	1	2	3	4	5	Total
	2012	2013	2014	2015	2016	
(\$ in millions)						
Revenue	20,926	21,963	23,988	21,813	19,941	108,631
Net Income	3,943	4,388	5,180	4,772	4,233	22,516
Extraordinary Items	0	0	0	0	0	0
Depreciation	1,760	1,777	1,904	2,012	2,038	9,491
Deferred Taxes	887	723	895	765	831	4,101
Capital Expenditures	3,738	3,496	4,346	4,650	3,505	19,735
Cash Flow	2,852	3,392	3,633	2,899	3,597	16,373
Cash Flow / Revenue	0.13629	0.15444	0.15145	0.13290	0.18038	0.15072
NIBEI / Revenue	0.18843	0.19979	0.21594	0.21877	0.21228	0.20727
Ibbotson Smoothed Cash Flow = \$19,941 x 0.15072 =						\$3,005.53
Ibbotson Smoothed Net Income BEI = \$19,941 x 0.20727 =						\$4,133.18

2016 Median Growth Rates for MSDCF

Company	Rate 1	Rate 2	Rate 3	Rate 4	Rate 5	Rate 6	Rate 7	Rate 8	Median
CSX	5.30	3.58	10.00	1.90	4.89	10.00	--	--	5.10
KSU	12.00	8.12	7.00	--	--	--	--	--	8.12
NSC	8.60	10.33	10.00	9.50	11.16	15.00	--	--	10.17
UNP	6.12	10.00	8.10	3.60	6.49	--	--	--	6.49

Simple Average of Medians = 7.47 percent.

2016 Median Growth Rates for MSDCF CSX

Detail Estimates - Period Summary										
Enter RIC :	CSX		CSX Corp							
Measure :	Earnings Per Share		Period :		Long Term Growth		Currency: USD (in millions except for per share items)			
			Ests	Mean	High	Low		12/2015	3/2016	6/2016
Earnings Per Share			6	5.95	10.00	1.90	Reported	0.48	0.37	0.47
Filtered/Preliminary Mean**:			1	5.30	5.30	5.30	Surprise Mean	0.46	0.37	0.44
30 Day Ago Mean			6	5.61	10.00	1.90	Surprise (%)	4.47	1.04	6.99
** Only selected brokers below are included in the filtered mean										
Check/Un check	Contributor	Analyst	Current Estimate	Current Estimate Date	Previous Estimate	Previous Estimate Date	Review Date			
▼	BERNSTEIN	Vernon, David	5.30 ↑	Oct13, 16	4.50	Sep 15, 16	Oct13, 16			
	CREDIT SUISSE - NORTH AMERICA	Landry, Allison M	3.58 ↑	Oct13, 16	2.85	Oct 07, 16	Oct13, 16			
	OPPENHEIMER & CO., INC.	Schneeberger, Scott A	10.00	Jun 15, 16	NA	NA	Oct14, 16			
	Permission Denied 398136	Permission Denied	1.90 ↑	Oct12, 16	1.60	Oct 08, 16	Oct12, 16			
	Permission Denied 392	Permission Denied	4.89 ↑	Dec13, 16	2.87	Nov 01, 16	Dec13, 16			
	Permission Denied 32	Permission Denied	10.00 ↑	Apr 13, 16	1.80	Feb 22, 16	Dec 01, 16			

2016 Median Growth Rates for MSDCF KSU

Detail Estimates - Period Summary										
Enter RIC :	KSU		Kansas City Southern							
Measure :	Earnings Per Share		Period :	Long Term Growth		Currency: USD (in millions except for per share items)				
			Ests	Mean	High	Low		12/2015L	3/2016	6/2016
Earnings Per Share	3	9.04	12.00	7.00	Reported		1.23	1.03	1.22	1.12
Filtered/Preliminary Mean**	1	12.00	12.00	12.00	Surprise Mean		1.10	0.97	1.03	1.18
30 Day Ago Mean	3	9.04	12.00	7.00	Surprise (%)		11.71	5.87	18.86	-5.48
* Only selected brokers below are included in the filtered mean										
Check/Un Check	Contributor	Analyst	Current Estimate	Current Estimate Date	Previous Estimate	Previous Estimate Date	Review Date			
✓	OPPENHEIMER & CO., INC.	Schaeferberger, Scott A	12.00	Jun 15, 16	NA	NA	Oct 19, 16			
	CREDIT SUISSE - NORTH AMERICA	Landry, Allison M	8.12 ↓	Oct 18, 16	8.66	Oct 07, 16	Oct 18, 16			
	Permission Denied 336136	Permission Denied	7.00 ↑	Oct 18, 16	6.90	Jul '19, 16	Oct 18, 16			

2016 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		12/2015A	3/2016	6/2016	9/2016	12/2015A
Earnings Per Share	6	10.77	15.00	8.60	Reported	1.20	1.29	1.36	1.55	5.10
Filtered/Preliminary Mean**:	1	8.60	8.60	8.60	Surprise Mean	1.23	0.97	1.35	1.45	5.15
30 Day Ago Mean	6	10.64	15.00	8.60	Surprise (%)	-2.62	32.53	1.03	7.10	-0.95

* Only selected brokers below are included in the filtered mean

Check/Un-check	Contributor	Analyst	Current Estimate	Current Estimate Date	Previous Estimate	Previous Estimate Date	Review Date
✓	BERNSTEIN	Vernon, David	8.60	Oct 16, 16	8.30	Jul 27, 16	Oct 16, 16
	CREDIT SUISSE - NORTH AMERICA	Landry, Allison M	10.33	Oct 26, 16	11.21	Oct 07, 16	Oct 26, 16
	OPPENHEIMER & CO., INC.	Schneeberger, Scott A	10.00	Jun 15, 16	NA	NA	Oct 26, 16
	Permission Denied 398135	Permission Denied	9.50	Jun 30, 16	8.70	Apr 21, 16	Oct 26, 16
	Permission Denied 392	Permission Denied	11.16	Dec 13, 16	8.00	Oct 08, 88	Dec 13, 16
	Permission Denied 32	Permission Denied	15.00	Apr 13, 16	NA	NA	Dec 20, 16

2016 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		12/2015	3/2016	6/2016	9/2016	12/2016A
Earnings Per Share	5	6.86	10.00	3.60	Reported	1.31	1.16	1.17	1.36	5.49
Filtered/Preliminary Mean**	1	6.12	6.12	6.12	Surprise Mean	1.42	1.10	1.17	1.40	5.58
30 Day Ago Mean	5	6.51	10.00	3.60	Surprise (%)	-7.53	5.78	0.38	-3.18	-1.57

* 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
✓	CREDIT SUISSE - NORTH AMERICA	Lundry, Allison M	6.12 ↓	Oct 20, 16	7.13	Oct 07, 16	Oct 20, 16
	OPPENHEIMER & CO., INC.	Schneeberger, Scott A	10.00	Jun 15, 16	NA	NA	Oct 21, 16
	BERNSTEIN	Vernon, David	8.16 ↓	Oct 21, 16	8.20	Oct 16, 16	Oct 21, 16
	Permission Denied 398135	Permission Denied	3.60 ↑	Oct 03, 16	3.30	Jul 21, 16	Oct 03, 16
	Permission Denied 392	Permission Denied	6.49 ↑	Dec 13, 16	4.71	Nov 30, 16	Dec 13, 16

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		3.22 %
Historical Growth Rate for Real GDP, 1929-2016	(page 2)	
Long Term Expected Inflation Rate		<u>1.97</u>
Rate for Long-Term U.S. Government Bonds	2.79 (page 5)	
Rate for 20-year U.S. Inflation-Indexed Bonds	<u>0.82</u> (page 5)	
	1.97	
Stage 3 Growth Rate (real growth + inflation)		5.19 %

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 (<http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=realyield>) 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 this website: <http://www.bea.gov/national/index.htm#gdp>. 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

	(a)	(b)	(c)	(d)
	GDP in billions of chained 2005 dollars	Years of Growth	AAR Calc. Growth Rate	SBBI Text Growth Rate
Year				
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.

- (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 2009 dollars

	(e)	(f)	(g)
	GDP in billions of chained 2009 dollars	Years of Growth	AAR Calc. Growth Rate
Year			
1929	1,056.6		
2009	14,418.7	80	3.32%
2010	14,783.8	81	3.31%
2011	15,020.6	82	3.29%
2012	15,354.6	83	3.28%
2013	15,612.2	84	3.26%
2014	15,982.3	85	3.25%
2015	16,397.2	86	3.24%
2016	16,662.1	87	3.22%

- (e) Real GDP in 2009 \$ downloaded from BEA 2/28/2017.
- (f) Year - 1929 = number of years of growth from 1929 to year
- (g) Compound growth rate from 1929 to year

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	210.3	-56.3	1,005.2	1,007.3	1,021.0	997.4	-3.4	-1.4	-4.3	-2.3	-3.4
1939.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

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				
		Total	Goods	Services	Total	Fixed investment			Equipment and software
						Total	Nonresidential		
							Total	Structures	
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.....	4,408.5	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	5,562.7	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	9,146.2	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 2009 \$

Current-Dollar and "Real" Gross Domestic Product						3/30/17
Annual			Quarterly			
(Seasonally adjusted annual rates)						
	GDP in billions of current dollars	GDP in billions of chained 2009 dollars		GDP in billions of current dollars	GDP in billions of chained 2009 dollars	
1929	104.6	1,056.6	1947q1	243.1	1,934.5	
1930	92.2	966.7	1947q2	246.3	1,932.3	
1931	77.4	904.8	1947q3	250.1	1,930.3	
1932	59.5	788.2	1947q4	260.3	1,960.7	
2005	13,093.7	14,234.2	1966q1	797.3	4,201.9	
2006	13,855.9	14,613.8	1966q2	807.2	4,219.1	
2007	14,477.6	14,873.7	1966q3	820.8	4,249.2	
2008	14,718.6	14,830.4	1966q4	834.9	4,285.6	
2009	14,418.7	14,418.7	1967q1	846.0	4,324.9	
2010	14,964.4	14,783.8	1967q2	851.1	4,328.7	
2011	15,517.9	15,020.6	1967q3	866.6	4,366.1	
2012	16,155.3	15,354.6	1967q4	883.2	4,401.2	
2013	16,691.5	15,612.2	1968q1	911.1	4,490.6	
2014	17,393.1	15,982.3	1968q2	936.3	4,566.4	
2015	18,036.6	16,397.2	1968q3	952.3	4,599.3	
2016	18,569.1	16,662.1	Download for Bureau of Economic Analysis web			

Download for Bureau of Economic Analysis web site. Middle years and some quarters omitted to enable data to fit on this page. Use the 2009 dollars column, circled values.

<http://www.bea.gov/national/Index.htm>

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

Year	(a) Long-Term Gov. Yields From SBBI		(b) Appendix	(c) T-Bonds 20-Yr	(d) Inflation Indexed 20-Yr T-Bonds		(e) Daily	(f) Long Term Inflation Rate		(g) AAR Calc
	Text	Appendix			SBBI Text			SBBI Text		
2008	3.0 %	3.03 %		3.05 %	2.4 %		2.36 %	0.6 %		0.67 %
2009	4.6	4.58		4.58	2.0		2.03	2.6		2.55
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

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 & 2016, which is column (c) less column (e)

List of Stage 3 Growth Rates for MS-DCF

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 real 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. Listed below are the rates used by the Board since it began using the MSDCF in the 2008 Cost of Capital determination, plus the numbers calculated for 2016.

Year	Long-Term Expected		Stage 3 Growth Rate
	Real Growth in Output	Inflation Rate	
2008	3.3 %	0.6 %	3.90 %
2009	3.3	2.6	5.80
2010	3.3	2.6	5.80
2011	3.24	1.95	5.19
2012	3.22	2.26	5.48
2013	3.27	2.31	5.58
2014	3.26	1.72	4.98
2015	3.24 %	1.60 %	4.84
2016	3.22 %	1.97 %	5.19 %

Notes:

The Stage 3 Growth Rate for years 2008 through 2012 are from the Ibbotson SBBI Valuation Yearbooks for those years. Ibbotson displayed on 1 digit after the decimal for years 2008 through 2010 for the long-term expected growth rate in output and inflation rate. Figures for 2009 and 2010 rounded to the same numbers.

Market Value Data for MSDCF Stock Price for CSX - End of 2016

CSX Corporation (CSX)
NasdaqGS - NasdaqGS Real Time Price. Currency in USD [★ Add to watchlist](#)

38.04 -0.76 (-1.97 %)

As of 12:05PM EST. Market open.

[Summary](#) [Conversations](#) [Statistics](#) [Profile](#) [Financials](#)

Time Period: Jan 01, 2015 - Jan 17, 2017 [Show: Histogram](#)

Frequency: [Daily](#)

Currency in USD

Date	Open	High	Low	Close
Jan 13, 2017	38.21	38.82	38.10	38.80
Jan 12, 2017	38.06	38.39	37.80	38.38
Jan 11, 2017	37.32	38.11	37.32	38.04
Jan 10, 2017	36.89	37.57	36.78	37.42
Jan 09, 2017	37.57	37.65	36.98	36.99
Jan 08, 2017	36.71	37.73	35.96	37.52
Jan 05, 2017	36.41	37.38	36.40	36.99
Jan 04, 2017	36.05	36.71	35.95	36.63
Jan 03, 2017	36.15	36.64	35.59	35.89
Dec 30, 2016	36.35	36.40	35.79	35.93
Dec 29, 2016	36.61	36.64	36.16	36.23
Dec 28, 2016	36.82	37.01	36.50	36.52
Dec 27, 2016	36.80	36.99	36.63	36.86

Retrieved January 17, 2017.

Link to web page: <http://finance.yahoo.com/quote/CSX/history>

Market Value Data for MSDCF Stock Price for KSU - End of 2016

Kansas City Southern (KSU)

NYSE - NYSE Real Time Price. Currency in USD

[☆ Add to watchlist](#)
84.13 +0.24 (+0.29 %)

As of 12:17PM . Market open.

[Summary](#) [Conversations](#) [Statistics](#) [Profile](#) [Financials](#)
Time Period: Jan 17, 2016 - Jan 17, 2017 [Show: History](#)Frequency: [Daily](#)

Currency in USD

Date	Open	High	Low	Close
Jan 17, 2017	84.41	86.16	83.73	84.17
Jan 13, 2017	82.46	84.08	81.77	83.89
Jan 12, 2017	81.21	82.39	80.38	82.12
Jan 11, 2017	81.27	82.23	81.25	81.45
Jan 10, 2017	81.54	82.44	80.78	81.28
Jan 09, 2017	83.30	83.75	81.22	81.55
Jan 06, 2017	81.70	84.30	81.41	83.81
Jan 05, 2017	81.22	82.92	81.08	81.71
Jan 04, 2017	81.26	82.07	79.05	81.18
Jan 03, 2017	85.52	85.64	80.62	80.82
Dec 30, 2016	84.31	85.26	83.89	84.85
Dec 29, 2016	84.84	85.09	84.19	84.46
Dec 28, 2016	85.87	86.60	84.42	84.53

Retrieved January 17, 2017.

Link to web page: <http://finance.yahoo.com/quote/KSU/history>

Market Value Data for MSDCF Stock Price for NSC - End of 2016

Norfolk Southern Corporation (NSC)

NYSE - NYSE Real Time Price. Currency in USD

☆ Add to watchlist

109.92 -1.67 (-1.50 %)

As of 12:24PM . Market open.

Summary Conversations Statistics Profile Financials

Time Period: Jan 01, 2016 - Jan 17, 2017 Show: Historical

Frequency: Daily

Currency in USD

Date	Open	High	Low	Close
Jan 13, 2017	111.01	111.85	110.55	111.59
Jan 12, 2017	110.61	111.44	109.36	111.01
Jan 11, 2017	109.35	110.65	108.77	110.55
Jan 10, 2017	109.23	110.05	108.33	109.26
Jan 09, 2017	110.89	110.89	108.28	109.18
Jan 06, 2017	110.18	112.99	109.92	111.66
Jan 05, 2017	110.18	111.65	110.16	110.29
Jan 04, 2017	107.57	110.98	107.15	110.64
Jan 03, 2017	108.91	109.52	106.15	106.99
Dec 30, 2016	108.85	108.99	107.50	108.07
Dec 29, 2016	108.86	109.32	107.77	108.82
Dec 28, 2016	109.41	110.26	108.62	108.72

Retrieved January 17, 2017.

Link to web page: <http://finance.yahoo.com/quote/NSC/history>

Market Value Data for MSDCF Stock Price for UNP - End of 2016

Union Pacific Corporation (UNP)
NYSE - NYSE Real Time Price. Currency in USD

☆ Add to watchlist

103.60 -1.65 (-1.57 %)

As of 12:27PM EST. Market open.

[Summary](#) [Conversations](#) [Statistics](#) [Profile](#) [Financials](#)

Time Period: Jan 01, 2016 - Jan 17, 2017 ▼ Show: [Historical](#)

Frequency: [Daily](#) ▼

Currency in USD

Date	Open	High	Low	Close
Jan 13, 2017	104.51	105.45	104.28	105.25
Jan 12, 2017	104.27	104.98	103.35	104.70
Jan 11, 2017	103.35	104.83	103.03	104.27
Jan 10, 2017	102.58	104.24	101.91	103.42
Jan 09, 2017	103.73	103.74	101.90	102.42
Jan 08, 2017	102.03	103.77	101.20	103.19
Jan 05, 2017	103.03	103.38	101.22	102.13
Jan 04, 2017	102.89	104.31	102.51	103.14
Jan 03, 2017	104.48	105.29	102.07	102.52
Dec 30, 2016	104.18	104.84	103.25	103.68
Dec 29, 2016	104.88	105.25	103.99	104.42
Dec 28, 2016	105.75	106.32	104.59	104.76

Retrieved January 17, 2017.

Link to web page: <http://finance.yahoo.com/quote/UNP/history>

Market Value Data for MSDCF Shares Outstanding for CSX - End of 2016

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

FORM 10-Q

(X) QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the quarterly period ended September 23, 2016

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 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
(Address of principal executive offices)	(Zip Code)
	(904) 359-3200
	(Telephone number, including area code)

No Change

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

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 (X) No ()

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, 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 preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

Yes (X) No ()

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

Large Accelerated Filer (X)

Accelerated Filer ()

Non-accelerated Filer ()

Smaller Reporting Company ()

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 936,661,112 shares of common stock outstanding on September 23, 2016 (the latest practicable date that is closest to the filing date).

Market Value Data for MSDCF Shares Outstanding for KSU - End of 2016

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, 2016

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 1-4717

KANSAS CITY SOUTHERN

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

**427 West 12th Street,
Kansas City, Missouri**
(Address of principal executive offices)



44-0663509
(I.R.S. Employer
Identification No.)

64105
(Zip Code)

816.983.1303

(Registrant's telephone number, including area code)

No Change

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

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐
(Do not check if a smaller reporting company)

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
Common Stock, \$0.01 per share par value

October 11, 2016
107,579,057 Shares

Market Value Data for MSDCF Shares Outstanding for NSC - End of 2016

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549
FORM 10-Q

(X) QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 for the quarterly period ended **SEPTEMBER 30, 2016**

() 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)
Three Commercial Place
Norfolk, Virginia
(Address of principal executive offices)

52-1188014
(IRS Employer Identification No.)
23510-2191
(Zip Code)

(757) 629-2680
(Registrant's telephone number, including area code)

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

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).
Yes ☒ No ☐

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

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.

<u>Class</u>	<u>Outstanding at September 30, 2016</u>
Common Stock (\$1.00 par value per share)	291,942,235 (excluding 20,320,777 shares held by the registrant's consolidated subsidiaries)

Market Value Data for MSDCF Shares Outstanding for UNP - End of 2016

**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, 2016**

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)

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 and posted on its corporate Web site, if any, 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 preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

☒ Yes ☐ No

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

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐

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

☐ Yes ☒ No

As of October 14, 2016, there were 824,112,432 shares of the Registrant's Common Stock outstanding.

2016 Cost of Equity Using STB's MSDCF

Company Year	CSX 2016		KSU 2016		NSC 2016		UNP 2016		
Inputs									
Initial Cash Flow	\$960.13		\$53.79		\$844.63		\$3,005.53		
Input for Terminal C.F.	\$1,741.55		\$428.58		\$1,617.35		\$4,133.18		
Stage One Growth	5.100%		8.120%		10.170%		6.490%		
Stage Two Growth	7.470%		7.470%		7.470%		7.470%		
Stage Three Growth*	5.190%		5.190%		5.190%		5.190%		
	Year	Val. 12/31	Pres Val.	Val. 12/31	Pres Val.	Val. 12/31	Pres Val.	Val. 12/31	Pres Val.
	1	\$1,009	\$916	\$58	\$53	\$931	\$838	\$3,201	\$2,898
	2	1,061	874	63	52	1,025	831	3,408	2,795
	3	1,115	834	68	52	1,129	825	3,630	2,695
	4	1,171	796	74	51	1,244	818	3,865	2,599
	5	1,231	760	79	50	1,371	812	4,116	2,506
	6	1,323	741	85	49	1,473	786	4,423	2,439
	7	1,422	724	92	48	1,583	761	4,754	2,374
	8	1,528	706	99	47	1,702	736	5,109	2,310
	9	1,642	689	106	46	1,829	713	5,491	2,248
	10	1,765	672	114	46	1,965	690	5,901	2,188
	Terminal	68,112	25,941	21,609	8,633	67,657	23,740	162,880	60,392
Sum of Pres. Values									
Market Value (input)			\$33,654.23		\$9,128.08		\$31,550.20		\$85,443.98
			\$33,654.23		\$9,128.08		\$31,550.20		\$85,443.98
Cost of Equity		10.13%		9.61%		11.04%		10.43%	
Prev. Yr. Cost of Equity		11.51%		9.34%		9.86%		11.38%	

Preferred Stock

Cost of Preferred Equity Capital

Step 1: Calculate Average Stock Price and Annual Dividend

		Stock Price			Dividend	
		High	Low	Avg.		
KSU	\$25 par pref., 4%, noncum.	Q1	\$27.30	\$25.31	\$26.305	\$0.25
		Q2	\$29.00	\$25.70	\$27.350	\$0.25
		Q3	\$29.54	\$26.40	\$27.970	\$0.25
		Q4	\$31.10	\$25.52	\$28.310	\$0.25
		Year			\$27.484	\$1.00

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

		Annual Dividend	Average Price	Yield
KSU	\$25 par preferred, 4%, noncumulative	\$1.00	\$27.484	3.639%

Cost of Preferred Equity → **3.64%**

Previous Year Cost of Preferred Equity 3.68%

Market Value of Preferred Equity

		Outstanding Shares	Average Price	Market Value
KSU	\$25 par preferred, 4%, noncumulative	242,170	\$27.484	\$6,655,740
