

# Surface Transportation Ex Parte 722 & 754

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# Congress Gave the STB Two Revenue Adequacy Duties in 49 U.S.C. § 10704(a)(2) & (3)

(2) The Board shall maintain and revise as necessary standards and procedures for establishing revenue levels for rail carriers providing transportation subject to its jurisdiction under this part that are adequate, under honest, economical, and efficient management, to cover total operating expenses, including depreciation and obsolescence, plus a reasonable and economic profit or return (or both) on capital employed in the business. The Board shall make an adequate and continuing effort to assist those carriers in attaining revenue levels prescribed under this paragraph. Revenue levels established under this paragraph should—

(A) provide a flow of net income plus depreciation adequate to support prudent capital outlays, assure the repayment of a reasonable level of debt, permit the raising of needed equity capital, and cover the effects of inflation; and

(B) attract and retain capital in amounts adequate to provide a sound transportation system in the United States.

(3) On the basis of the standards and procedures described in paragraph (2), the Board shall annually determine which rail carriers are earning adequate revenues.

## Revenue Adequacy Duty 1:

The STB shall make an adequate and continuing effort to assist those carriers in attaining revenue levels prescribed under this paragraph

## Revenue Adequacy Duty 2:

The STB shall annually determine which carriers are earning adequate revenues

# Congress Expected Revenue Adequacy Determinations to Consider Railroads' Ability To Successfully Compete For Capital

(2) The Board shall maintain and revise as necessary standards and procedures for establishing revenue levels for rail carriers providing transportation subject to its jurisdiction under this part that are adequate, under honest, economical, and efficient management, to cover total operating expenses, including depreciation and obsolescence, plus a reasonable and economic profit or return (or both) on capital employed in the business. The Board shall make an adequate and continuing effort to assist those carriers in attaining revenue levels prescribed under this paragraph. Revenue levels established under this paragraph should—

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(3) On the basis of the standards and procedures described in paragraph (2), the Board shall annually determine which rail carriers are earning adequate revenues.

“a reasonable and economic profit or return (or both) on capital employed in the business”

“permit the raising of needed equity capital”

“attract and retain capital in amounts adequate to provide a sound transportation system in the United States”

# Economic Principles for Evaluating Railroad Revenue Adequacy

# Economic Principles for Evaluating Railroad Revenue Adequacy

- STB needs a proper economic context for understanding the implications of any proposed measure of revenue adequacy for railroads' financial health and ability to satisfy customer needs
- Prospect of financial success motivates competitive firms; taxing the return on railroad success will weaken incentives to compete strongly
- STB needs to understand context of its revenue adequacy measures if it is to reach informed decisions about whether they indicate the potential for concern about absence of competition

# Reasons Why Context is Important

- First, railroads have to compete for capital; ability to do so will depend on return investors can expect on capital provided to the railroads compared with investments in other firms
- Second, economics informs us that competitive realized economic rates of return can and will be higher or lower than the cost of capital
  - These differentials will vary across firms and over time for a given industry or firm, even over relatively long periods of time
  - Any deviation observed for a given firm or industry must be viewed in the context of the variation that we would expect in the marketplace
- Third, since we cannot measure true economic rate of return directly, we have to rely on accounting measures which will provide only a noisy measure of the underlying realized economic returns; thus, it is essential to interpret accounting measures of railroad performance by comparing them with comparable measures for non-railroad firms
- Like most empirical measures, STB's revenue adequacy measure must be considered in context to understand whether the level is high or low and whether the trends are atypical. This can only be done by comparing the results for railroads with what such measures yield for other firms in the marketplace

# Using Accounting-Based Rates of Return to Assess Economic Rates of Return

# Accounting-Based Rates of Return Do Not Equal Economic Rates of Return

- Since the 1960s, economic research has documented that accounting-based rates of return are not reasonable estimates of economic rates of return<sup>1</sup>
- E.g., Fisher and McGowan (1983) state:  
... there is no way in which one can look at accounting rates of return and infer anything about relative economic profitability ... Economists (and others) who believe that analysis of accounting rates of return will tell them much ... are deluding themselves

## Notes:

1. Solomon (1961), Harcourt (1965), Solomon (1966, 1970), Sarnat and Levy (1969), Livingstone and Solomon (1970), ..., Fisher and McGowan (1983), Fisher (1984), Benston (1979, 1985), Salamon (1985), ..., Rajan, Reichelstein, and Soliman (2007).

# Accounting Measures Provide Value Relevant Information

- Fisher and McGowan (1983) and other economic research studies do not imply that accounting-based measures of financial performance are not informative for other purposes, such as investors setting security prices and in financial analysis:
  - Accounting-based measures of financial performance are widely used in financial analysis (forecasting, assessing competitive advantage)<sup>1</sup>
  - Economic research demonstrates that changes in the market's expectations of accounting-based measures of financial performance are correlated with stock price movements<sup>2</sup>
    - High performing companies with no change in market expectations will not experience a movement in their stock prices
    - Low performing companies with a changes in market expectations to average performing firms will experience a positive stock price movement

## Notes:

1. See Robert W. Holthausen and Mark E. Zmijewski. Corporate Valuation: Theory, Evidence and Practice. 2nd edition, Cambridge Business Publishers, 2020.

2. See Ball and Brown (1968), Zmijewski et al. (1984, 1987, 1989), Jacobson (1987), Lev (1989), and Lev and Feng (2016).

# Standard Financial Analysis Methodology: Relative Financial Performance

- Accounting-based financial performance metrics are “noisy” and often provide biased signals of financial performance
- Standard financial analysis methodology to assess financial performance:
  - Compare the financial performance of a company relative to a group of benchmark companies over a relevant time period
- Applying this methodology to the STB’s assessment of revenue adequacy:

Railroads’ Financial Performance  
(STB’s ROIC minus the STB’s Cost of Capital)

versus

Financial Performance of Companies  
Operating in Broad Marketplace

# The STB Methodology For Assessing Revenue Adequacy

## (ROIC Minus Cost of Capital)

# STB's ROIC Calculation

$$\text{Tax Adjusted ROIC (STB ROIC)} = \frac{\text{Adjusted Net Railway Operating Income}}{\text{Tax Adjusted Net Investment Base}}$$

# STB's Methodology for ROIC Calculation

$$\text{Tax Adjusted ROIC (STB ROIC)} = \frac{\text{Adjusted Net Railway Operating Income}}{\text{Tax Adjusted Net Investment Base}}$$

- **Calculation of Numerator:**

- Adjusted Net Railway Operating Income (STB Operating Income):**

- Consolidated Net Railway Operating Income (net of income taxes)

- + Interest Income from Working Capital Allowance – Cash Portion

- + Income Taxes Associated with Non-Rail Income and Deductions

- + Gain or (Loss) from Transfer/Reclassification to Nonrail-status (Net of Income Taxes)

- = Adjusted Net Railway Operating Income (STB Operating Income)**

- **2017: STB eliminated the effect of the revaluation of deferred income taxes on the balance sheet from the decrease in the income tax rate**

# STB's Methodology for ROIC Calculation

$$\text{Tax Adjusted ROIC (STB ROIC)} = \frac{\text{Adjusted Net Railway Operating Income}}{\text{Tax Adjusted Net Investment Base}}$$

- **Calculation of Denominator:**

**Tax Adjusted Net Investment Base (STB Investment Base):**

Combined Investment in Railroad Property Used in Transportation Service

- Interest During Construction

- Other Elements of Investment

+ Net Rail Assets of Rail Related Affiliates

+ Working Capital Allowance (includes “Required” Cash + Inventory)

- Accumulated Deferred Income Tax Credits

**= Tax Adjusted Net Investment Base (STB Investment Base)**

# STB's Methodology for Measuring Cost of Capital

- **Industry Cost of Capital (“COC”):**
  - **Cost of Equity** calculated as the simple average of:
    - CAPM
    - 3-Stage DCF Model (Internal Rate of Return (“IRR”))
  - **Cost of Debt** based on weighted average yield (Bloomberg)
  - **Target Capital Structure** for industry (Market data)

**Relative Financial Performance Analysis:  
Financial Performance of Railroads Relative to Companies  
Operating in Broad Marketplace**

# Time Period and Relative Financial Performance Groups

- Time period: 2006 – 2018
- The railroads (publicly traded) are:
  - Members of the S&P 500 (have market risk about the same as the overall S&P 500;  $\beta \approx 1.0$ )
  - Members of the Industrials Sector<sup>1</sup>
- Three relative financial performance comparison groups:
  - S&P 500, excluding financial institutions and real estate companies
  - Industrials Sector in the S&P 500
  - Select Railroad Customers in the S&P 500<sup>2</sup> (86 companies)

Railroads' Financial Performance  
(STB's ROIC minus the STB's Cost of Capital)

versus

Financial Performance of Companies  
Operating in Broad Marketplace

## Notes:

1. Industry Sectors are based on the Global Industry Classification Standard ("GICS"). The GICS structure consists of 11 Sectors and the railroads are included in the Industrial Sector 20.
2. Canadian National, Norfolk Southern, and Union Pacific provided us the identities of customers in the S&P 500. Our calculations are based on customers with at least \$1 million of annual combined shipping with these railroads.

## Data Sources for ROIC and Cost of Capital (COC)

- **Source of data for ROIC**

- Railroads: STB regulatory filings on Form R-1 and STB Revenue Adequacy Annual Determinations
- S&P 500 Companies: S&P's Compustat<sup>1</sup> data

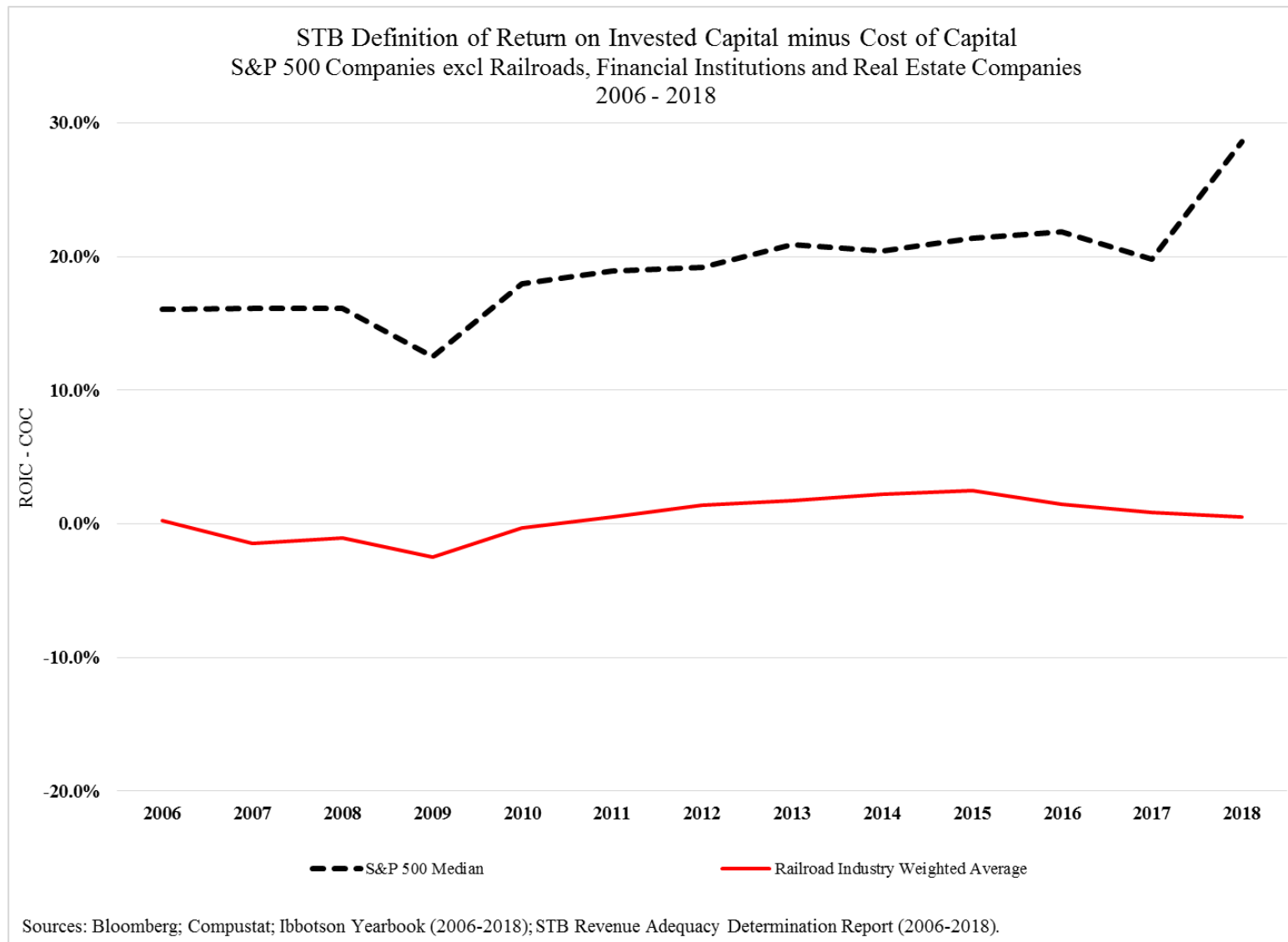
- **Source of data for Cost of Capital (COC)**

- Railroads: STB Annual Cost of Capital Decisions
- S&P 500 Companies: Ibbotson / Duff & Phelps for MSDCF cost of equity, equity beta (for CAPM cost of equity), cost of debt, and industry capital structure

Notes:

1. Compustat is a publicly available comprehensive database of fundamental financial and market information on both active and inactive global companies, indices and industries produced by Standard & Poor's since 1962. Source: <https://www.investopedia.com/terms/c/compustat.asp>

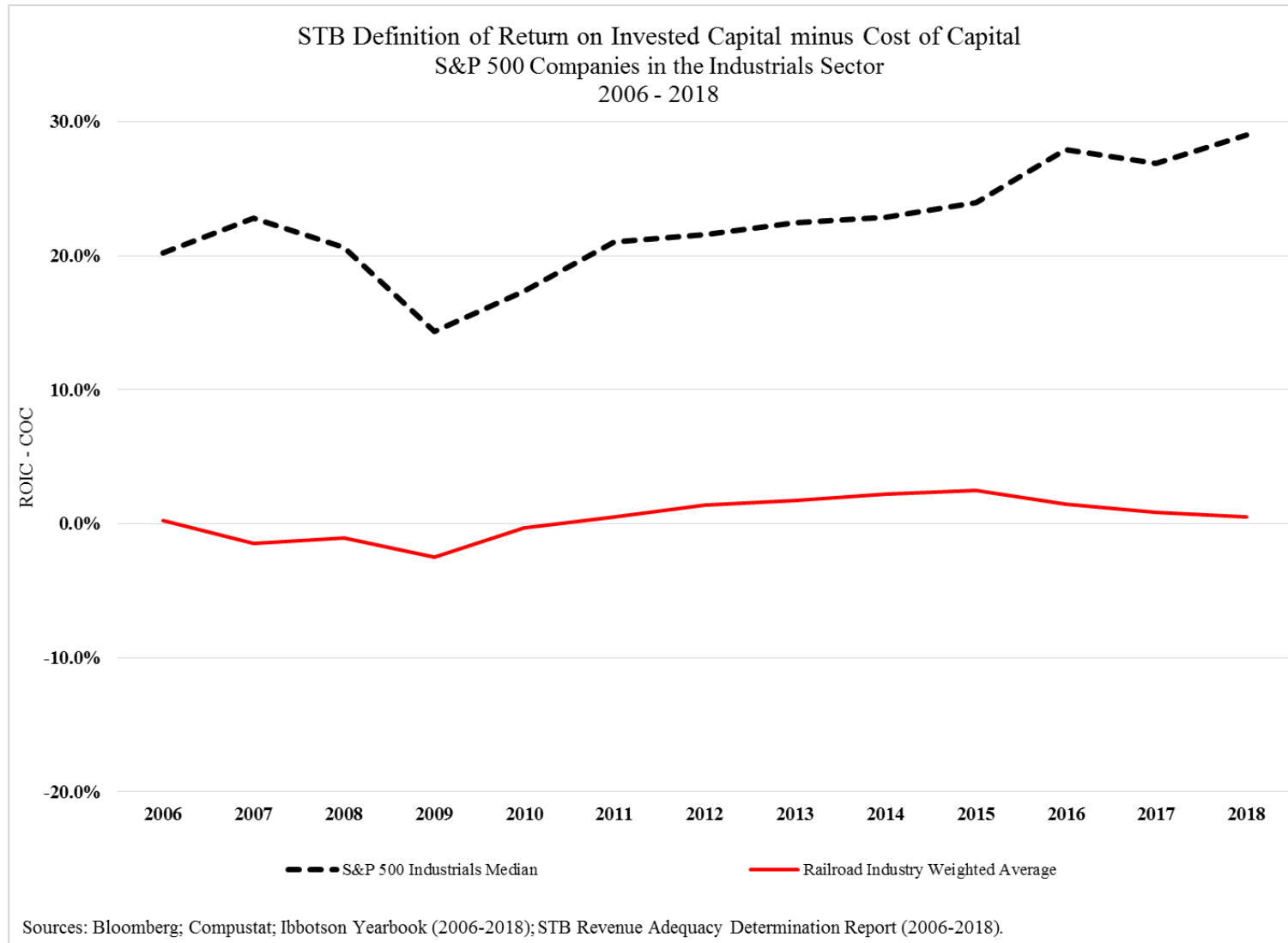
# Railroads' Financial Performance Relative to the S&P 500 Companies



**ROIC Minus COC**  
**2006-2018 Average of Medians:**  
--- 19.23%  
— 0.47%

**On average, 88% of S&P 500  
Companies earned  
ROIC > COC  
(i.e. ROIC-COC > 0)**

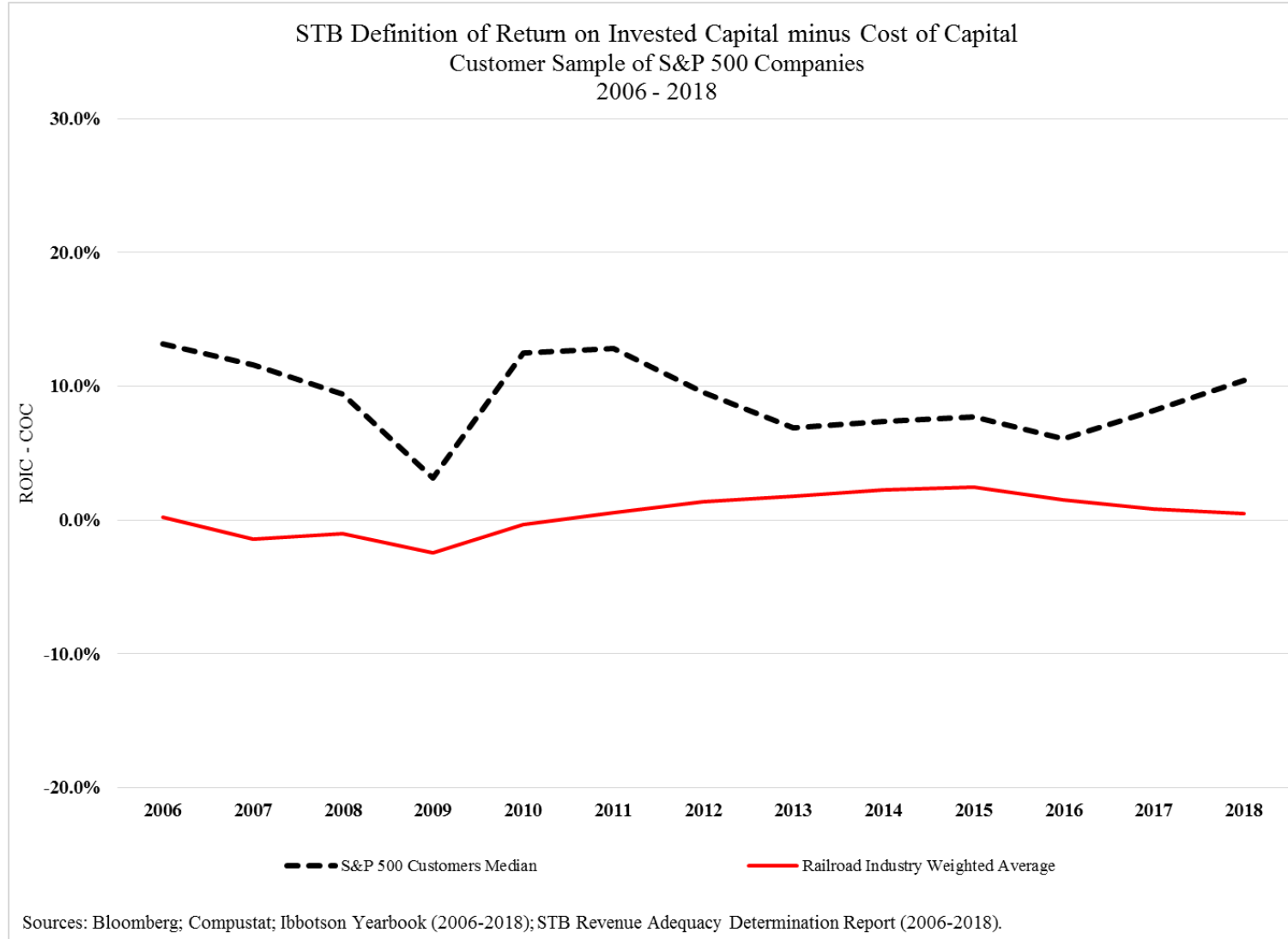
# Railroads' Financial Performance Relative to the Industrials Sector



**ROIC Minus COC**  
**2006-2018 Average of Medians:**  
--- 22.38%  
— 0.47%

**On average, 95% of Industrials Sector Companies earned ROIC>COC (i.e. ROIC-COC>0)**

# Railroads' Financial Performance Relative to S&P 500 Railroad Customers



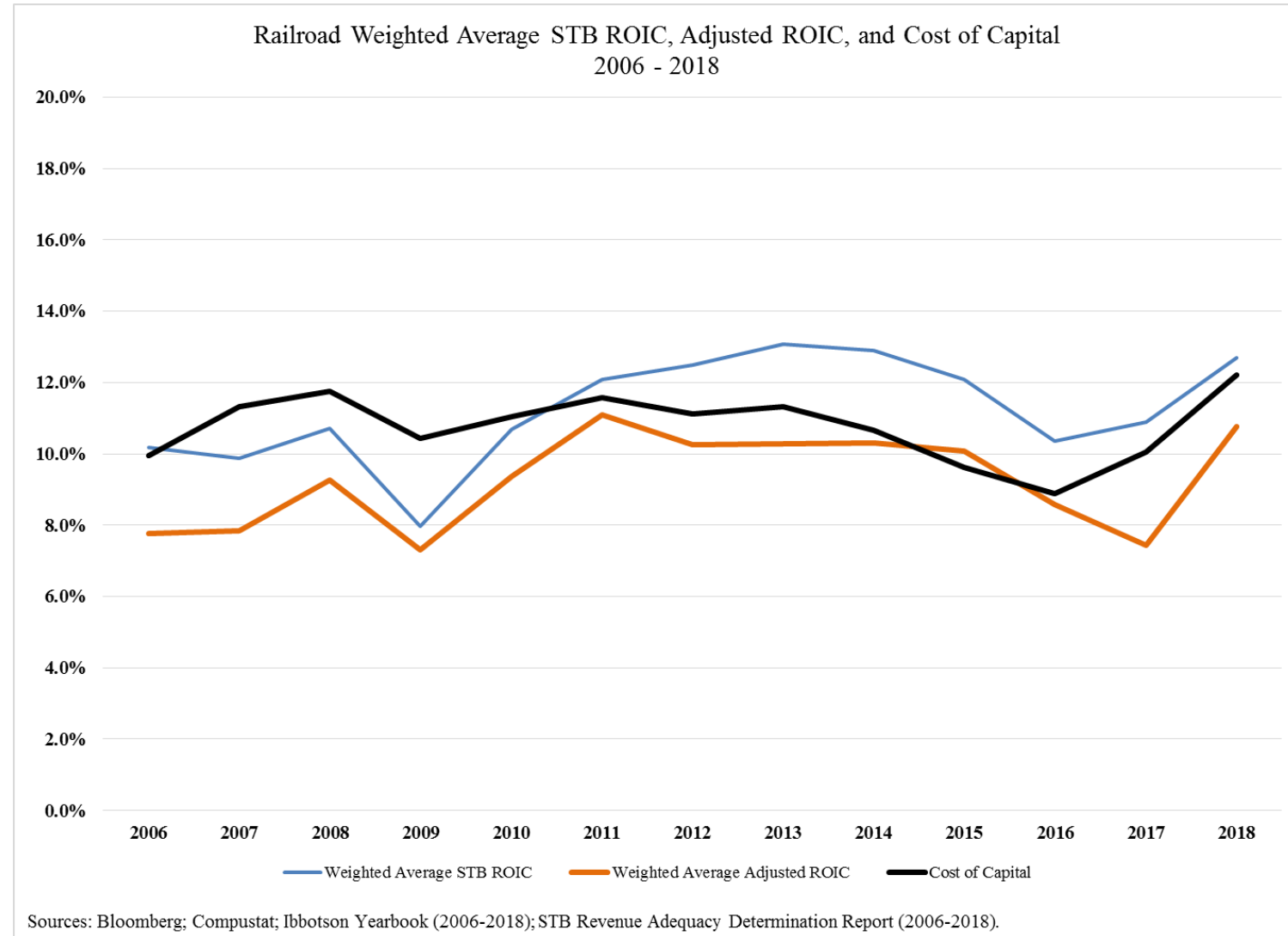
**ROIC Minus COC**  
**2006-2018 Average of Medians:**  
--- 9.14%  
— 0.47%

**On average, 81% of S&P 500  
Railroad Customer Companies  
earned ROIC>COC  
(i.e. ROIC-COC>0)**

# Potential Adjustments to the STB's ROIC Measure

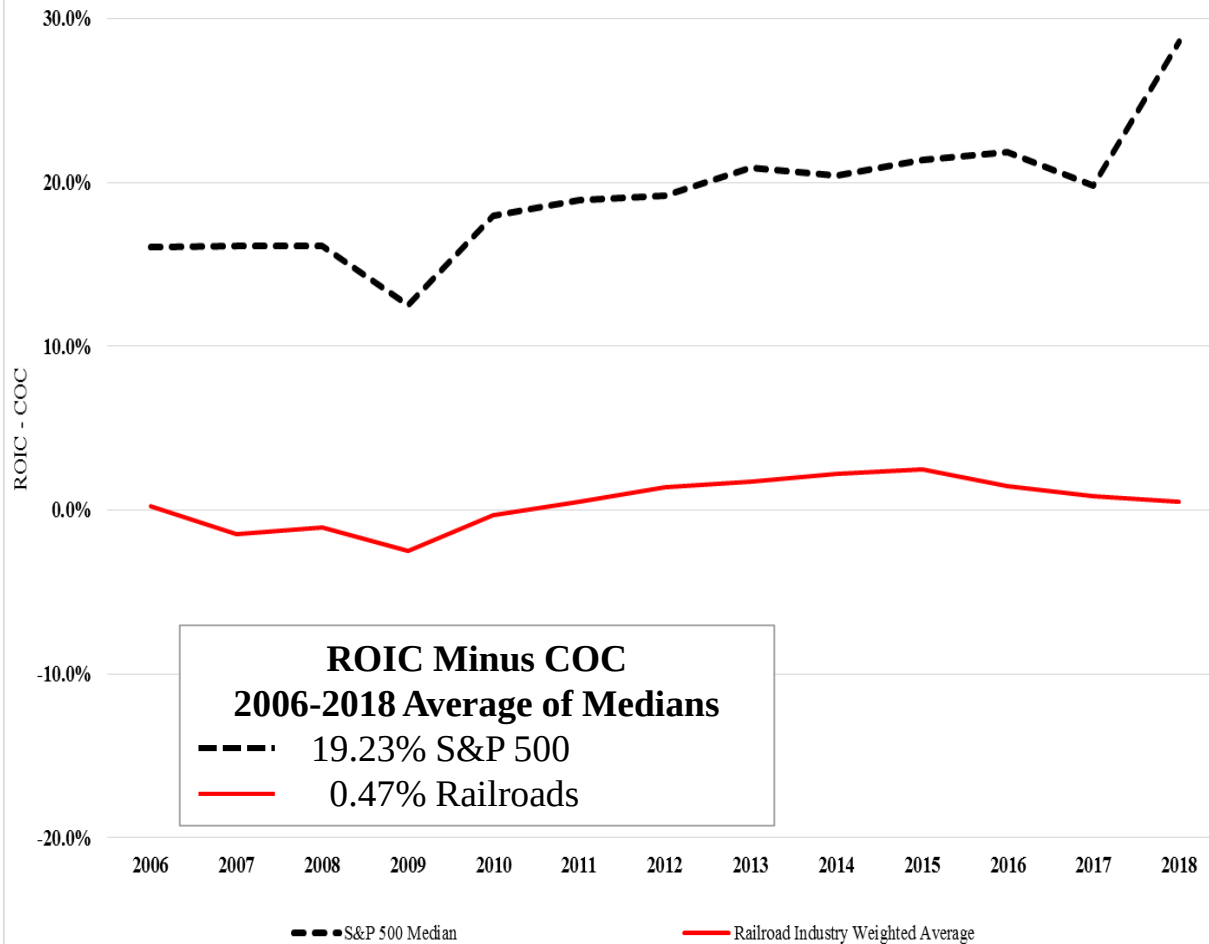
- Economic rates of return (profitability) are determined by the magnitude, timing, and riskiness of cash flows, not accounting profits
- The STB's definition of ROIC currently includes certain adjustments that are inconsistent with these determinants of economic rates of return (profitability)
  - Measuring income (ROIC numerator) using accounting income tax expense (provision) rather than current income tax expense (which excludes the deferred income tax component of income tax expense and avoids the 2017 issue of deferred income tax revaluations). I propose using the current income tax expense in the ROIC numerator.
  - Measuring the investment base (ROIC denominator) by deducting deferred income tax liabilities (the investment base should be measured net of economic depreciation [Hotelling (1925)] and IRS accelerated depreciation rules do not measure economic depreciation). I propose adding back the deferred income tax liabilities in the ROIC denominator.
- I also propose one other adjustment to the STB's ROIC denominator (investment base calculation) – the inclusion of non-goodwill intangible assets because these are operating assets used to generate revenues. While railroads do not have significant non-goodwill intangible assets, many other companies do, and including them in the ROIC denominator improves the comparability.

# Comparison of Railroad Weighted Average STB ROIC, Weighted Average Adjusted ROIC, and Cost of Capital



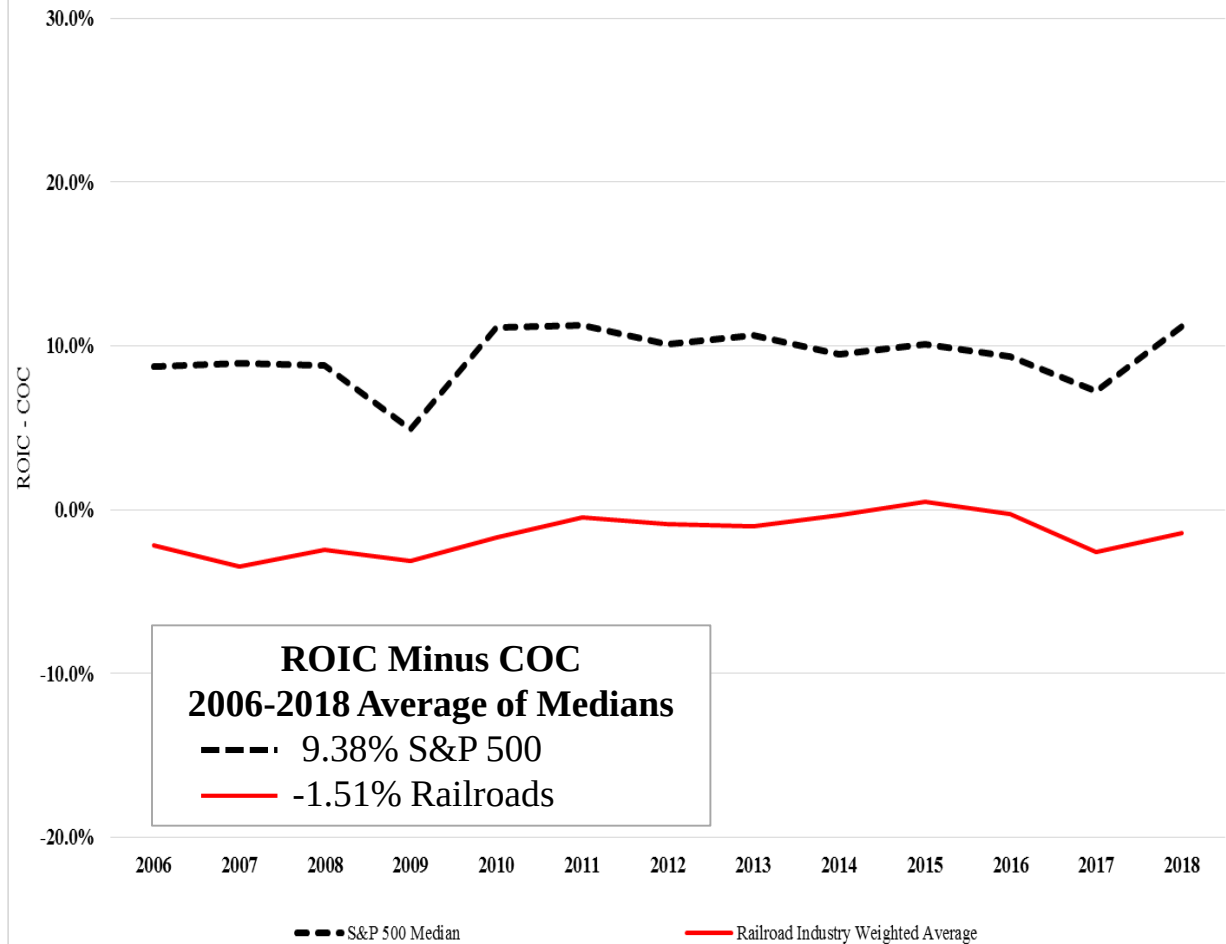
# Railroads' Financial Performance Relative to the S&P 500 Companies

STB Definition of Return on Invested Capital minus Cost of Capital  
S&P 500 Companies excl Railroads, Financial Institutions and Real Estate Companies  
2006 - 2018



Sources: Bloomberg; Compustat; Ibbotson Yearbook (2006-2018); STB Revenue Adequacy Determination Report (2006-2018).

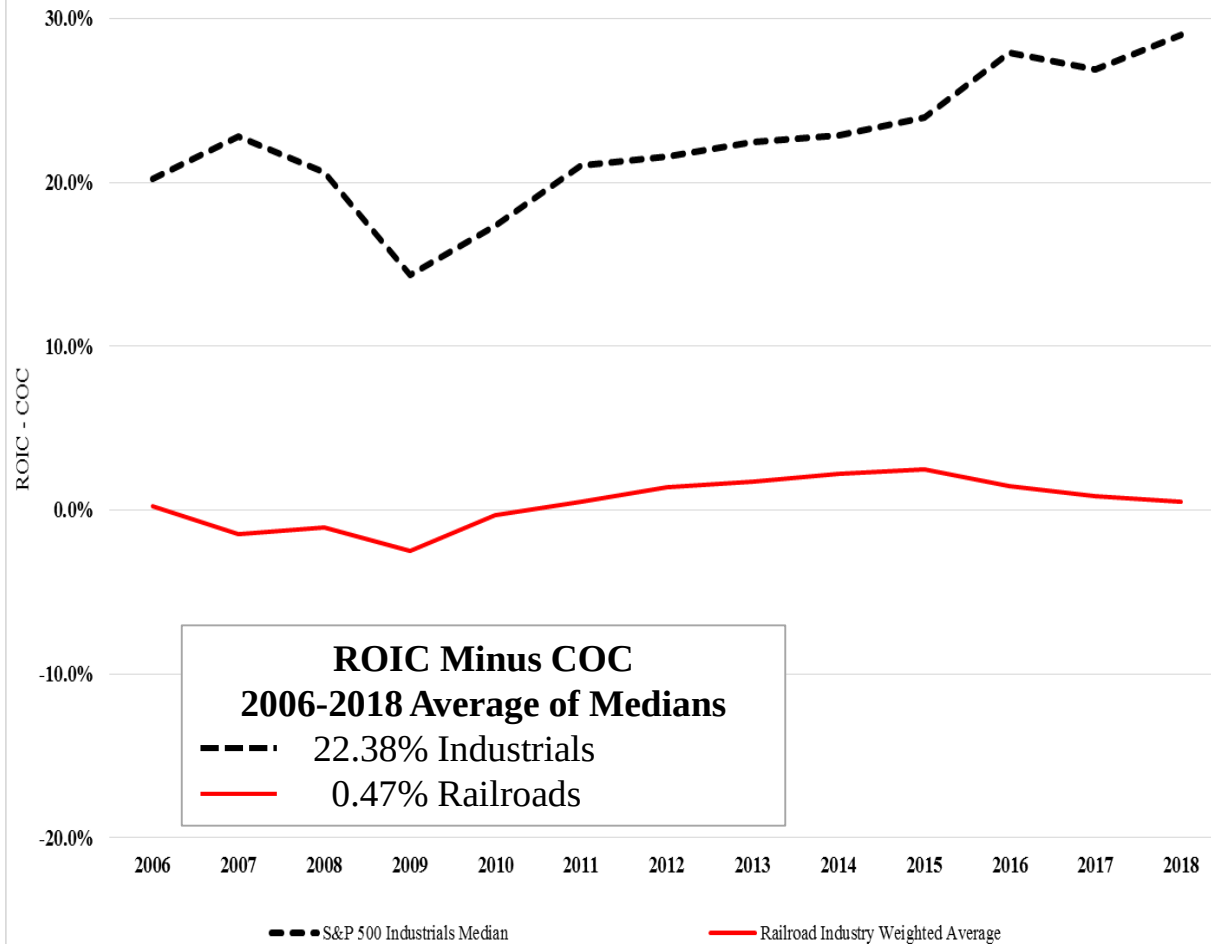
Adjusted STB Definition of Return on Invested Capital minus Cost of Capital  
S&P 500 Companies Excluding Railroads, Financial Institutions and Real Estate Companies  
2006 - 2018



Sources: Bloomberg; Compustat; Ibbotson Yearbook (2006-2018); STB Revenue Adequacy Determination Report (2006-2018).

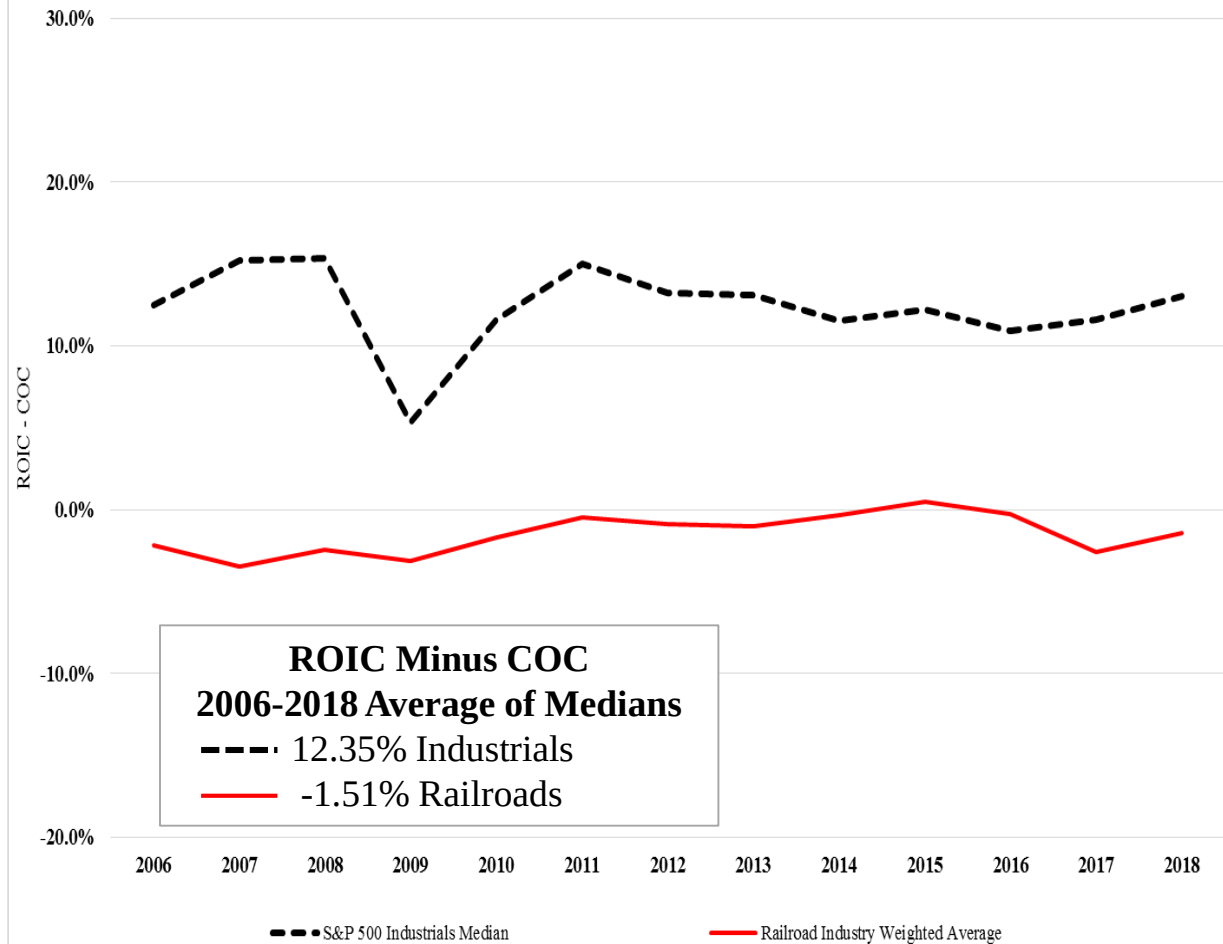
# Railroads' Financial Performance Relative to the S&P 500 Industrials Sector

STB Definition of Return on Invested Capital minus Cost of Capital  
S&P 500 Companies in the Industrials Sector  
2006 - 2018



Sources: Bloomberg; Compustat; Ibbotson Yearbook (2006-2018); STB Revenue Adequacy Determination Report (2006-2018).

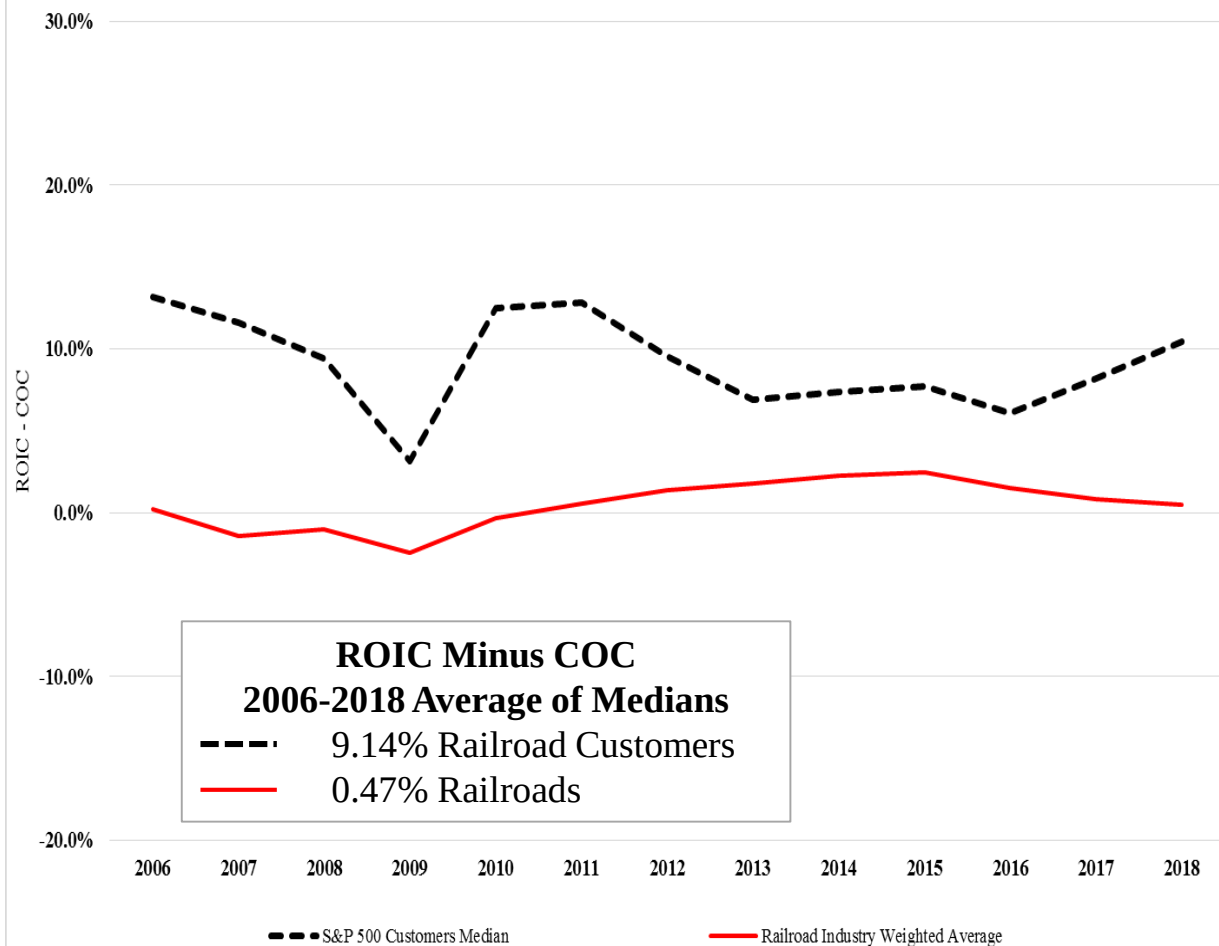
Adjusted STB Definition of Return on Invested Capital minus Cost of Capital  
S&P 500 Companies in the Industrials Sector  
2006 - 2018



Sources: Bloomberg; Compustat; Ibbotson Yearbook (2006-2018); STB Revenue Adequacy Determination Report (2006-2018).

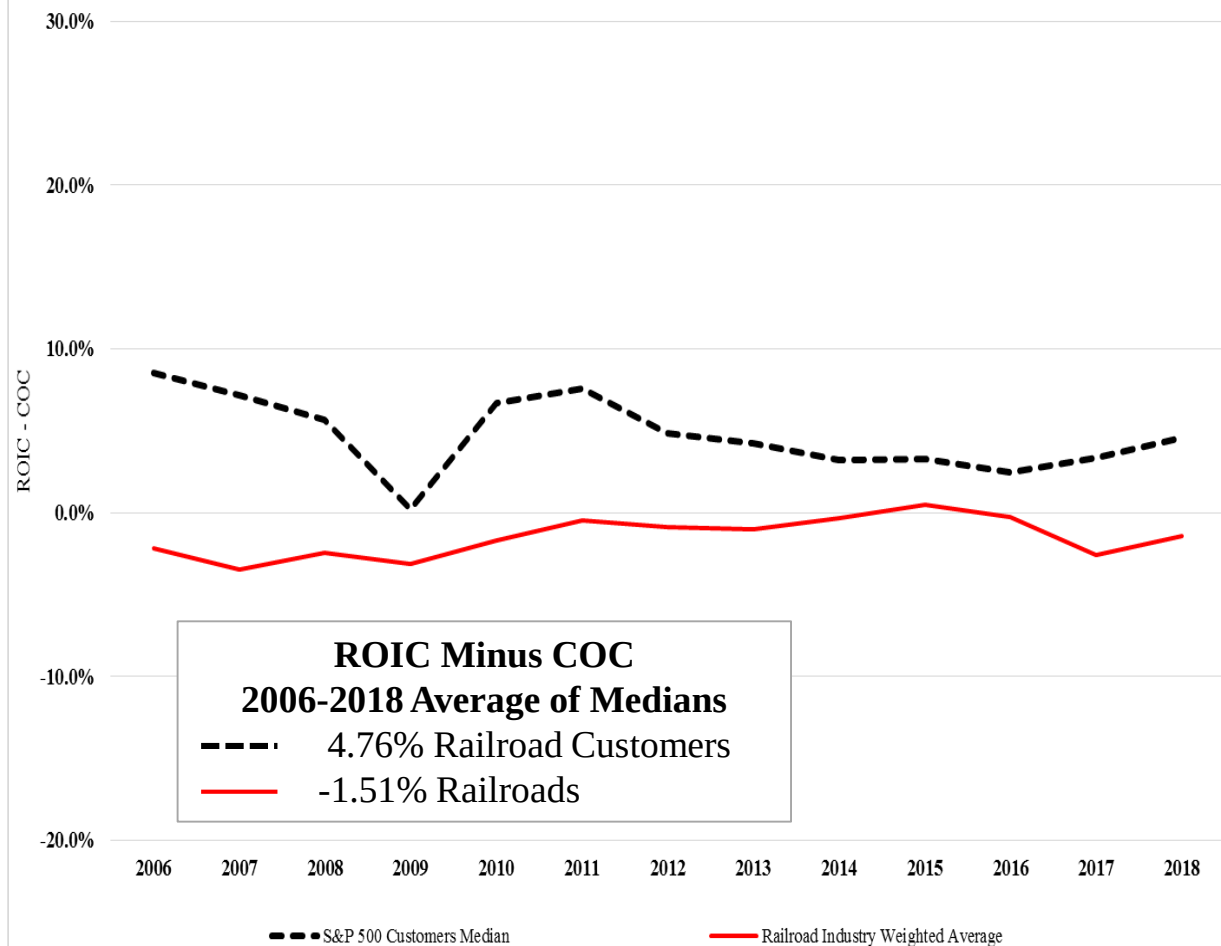
# Railroads' Financial Performance Relative to S&P 500 Railroad Customers

STB Definition of Return on Invested Capital minus Cost of Capital  
Customer Sample of S&P 500 Companies  
2006 - 2018



Sources: Bloomberg; Compustat; Ibbotson Yearbook (2006-2018); STB Revenue Adequacy Determination Report (2006-2018).

Adjusted STB Definition of Return on Invested Capital minus Cost of Capital  
Customer Sample of S&P 500 Companies  
2006 - 2018



Sources: Bloomberg; Compustat; Ibbotson Yearbook (2006-2018); STB Revenue Adequacy Determination Report (2006-2018).

# Conclusions

## Lessons From The Analysis

- No reason why  $ROIC > COC$  is a trigger for additional regulatory interference because many firms in the marketplace have  $ROIC > COC$
- Railroad industry is at the low end of the distribution of accounting measures of “revenue adequacy,” providing no reason for STB concern that a change in regulatory framework is necessary to protect shippers
- No evidence that railroad relative performance has improved over the past 13 years in a way that would suggest profitability has become excessive
- The STB must recognize that, irrespective of railroads’ measured and benchmarked revenue adequacy, rate of return regulation is a blunt instrument that will distort railroads’ investment and operational decisions and is likely to worsen rather than improve competition and market outcomes

# Appendix

# Railroads' Financial Performance Relative to the S&P 500: 2006 – 2018

## STB Definition of Return on Invested Capital Minus Cost of Capital

### Excerpt From Written Testimony Table 1

#### S&P 500 Companies Excluding Railroads, Financial Institutions and Real Estate Companies

| Number of Observations, Median, and % Positive ROIC minus COC Over 2006-2018 Period |               |               |               |               |
|-------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|
|                                                                                     | Lowest        | Highest       | Median        | Average       |
| Number of Observations in Sample                                                    | 368           | 405           | 395           | 391           |
| Median ROIC minus COC                                                               | 13%           | 29%           | 19%           | 19%           |
| % with ROIC minus COC > 0.0%                                                        | 73%           | 91%           | 89%           | 88%           |
| Railroad Percentile in the Distribution of ROIC minus COC                           |               |               |               |               |
| Industry Weighted Average ROIC                                                      | 9 percentile  | 21 percentile | 12 percentile | 14 percentile |
| BNSF Railway                                                                        | 9 percentile  | 23 percentile | 15 percentile | 15 percentile |
| CSX Corporation                                                                     | 6 percentile  | 20 percentile | 10 percentile | 11 percentile |
| Grand Trunk Corporation                                                             | 3 percentile  | 16 percentile | 10 percentile | 10 percentile |
| Kansas City Southern                                                                | 4 percentile  | 18 percentile | 8 percentile  | 9 percentile  |
| Norfolk Southern Corporation                                                        | 10 percentile | 24 percentile | 13 percentile | 15 percentile |
| Soo Line Corporation                                                                | 2 percentile  | 26 percentile | 12 percentile | 12 percentile |
| Union Pacific Corporation                                                           | 8 percentile  | 30 percentile | 22 percentile | 19 percentile |

# Railroads' Financial Performance Relative to the S&P 500: 2006 – 2018

## Adjusted STB Definition of Return on Invested Capital Minus Cost of Capital

### Excerpt From Written Testimony Table 2

#### S&P 500 Companies Excluding Railroads, Financial Institutions and Real Estate Companies

| Number of Observations, Median, and % Positive ROIC minus COC Over 2006-2018 Period |              |               |               |               |
|-------------------------------------------------------------------------------------|--------------|---------------|---------------|---------------|
|                                                                                     | Lowest       | Highest       | Median        | Average       |
| Number of Observations in Sample                                                    | 393          | 415           | 409           | 407           |
| Median Adjusted ROIC minus COC                                                      | 5%           | 11%           | 9%            | 9%            |
| % with ROIC minus COC > 0.0%                                                        | 68%          | 87%           | 84%           | 83%           |
| Railroad Percentile in the Distribution of Adjusted ROIC minus COC                  |              |               |               |               |
| Industry Weighted Average ROIC                                                      | 9 percentile | 22 percentile | 13 percentile | 13 percentile |
| BNSF Railway                                                                        | 8 percentile | 24 percentile | 13 percentile | 14 percentile |
| CSX Corporation                                                                     | 6 percentile | 20 percentile | 10 percentile | 11 percentile |
| Grand Trunk Corporation                                                             | 4 percentile | 15 percentile | 9 percentile  | 10 percentile |
| Kansas City Southern                                                                | 5 percentile | 20 percentile | 11 percentile | 11 percentile |
| Norfolk Southern Corporation                                                        | 7 percentile | 21 percentile | 11 percentile | 12 percentile |
| Soo Line Corporation                                                                | 1 percentile | 34 percentile | 13 percentile | 14 percentile |
| Union Pacific Corporation                                                           | 8 percentile | 30 percentile | 17 percentile | 18 percentile |

# Railroads' Financial Performance Relative to the S&P 500: 2006 – 2018

## STB Definition of ROIC-COC (Table 1) and Adjusted STB Definition of ROIC-COC (Table 2)

### Excerpt From Written Testimony Table 1

S&P 500 Companies Excluding Railroads, Financial Institutions and Real Estate Companies

| Number of Observations, Median, and % Positive ROIC minus COC Over 2006-2018 Period |        |         |        |         |
|-------------------------------------------------------------------------------------|--------|---------|--------|---------|
|                                                                                     | Lowest | Highest | Median | Average |
| Number of Observations in Sample                                                    | 368    | 405     | 395    | 391     |
| Median ROIC minus COC                                                               | 13%    | 29%     | 19%    | 19%     |
| % with ROIC minus COC > 0.0%                                                        | 73%    | 91%     | 89%    | 88%     |

#### Railroad Percentile in the Distribution of ROIC minus COC

|                                |               |               |               |               |
|--------------------------------|---------------|---------------|---------------|---------------|
| Industry Weighted Average ROIC | 9 percentile  | 21 percentile | 12 percentile | 14 percentile |
| BNSF Railway                   | 9 percentile  | 23 percentile | 15 percentile | 15 percentile |
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| Norfolk Southern Corporation   | 10 percentile | 24 percentile | 13 percentile | 15 percentile |
| Soo Line Corporation           | 2 percentile  | 26 percentile | 12 percentile | 12 percentile |
| Union Pacific Corporation      | 8 percentile  | 30 percentile | 22 percentile | 19 percentile |

### Excerpt From Written Testimony Table 2

S&P 500 Companies Excluding Railroads, Financial Institutions and Real Estate Companies

| Number of Observations, Median, and % Positive ROIC minus COC Over 2006-2018 Period |        |         |        |         |
|-------------------------------------------------------------------------------------|--------|---------|--------|---------|
|                                                                                     | Lowest | Highest | Median | Average |
| Number of Observations in Sample                                                    | 393    | 415     | 409    | 407     |
| Median Adjusted ROIC minus COC                                                      | 5%     | 11%     | 9%     | 9%      |
| % with ROIC minus COC > 0.0%                                                        | 68%    | 87%     | 84%    | 83%     |

#### Railroad Percentile in the Distribution of Adjusted ROIC minus COC

|                                |              |               |               |               |
|--------------------------------|--------------|---------------|---------------|---------------|
| Industry Weighted Average ROIC | 9 percentile | 22 percentile | 13 percentile | 13 percentile |
| BNSF Railway                   | 8 percentile | 24 percentile | 13 percentile | 14 percentile |
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| Union Pacific Corporation      | 8 percentile | 30 percentile | 17 percentile | 18 percentile |

## Railroad Companies (and Abbreviations)

- **CSX:** CSX Corporation (NasdaqGS: CSX)
- **KSU:** Kansas City Southern (NYSE: KSU)
- **NSC:** Norfolk Southern Corporation (NYSE: NSC)
- **UNP:** Union Pacific Corporation (NYSE: UNP)
- **GTC:** Grand Trunk Corporation (U.S. properties of Canadian National Railway, CN)
- **BNSF:** BNSF Railway
- **SLC:** Soo Line Corporation (U.S. properties of Canadian Pacific Railway, CP)