ASSOCIATION OF AMERICAN RAILROADS

John T. Gray   December 3, 2021
Senior Vice President - Policy & Economics

The Honorable Cynthia T. Brown
Chief, Section of Administration
Office of Proceedings
Surface Transportation Board
395 E Street, SW
Washington, DC 20423-0001

This submission is the AAR forecast of the first quarter 2022 All-Inclusive Index and Rail Cost Adjustment Factor, filed in Ex Parte No. 290 (Sub-No. 5) (2022-1) *Quarterly Rail Cost Adjustment Factor.* The versions of RCAF-related indices covered in this filing are: the All-Inclusive Index (initiated in the second quarter of 1985), the Unadjusted RCAF (produced since October 1982), the Adjusted RCAF (first published in the second quarter of 1989), and the RCAF-5 (created by the STB in its Ex Parte No. 290 (Sub-No. 7) decision served October 3, 1996). The table below summarizes the first quarter 2022 results and compares to the previous quarter. Both quarters are shown on a 4Q\2017=100 base.
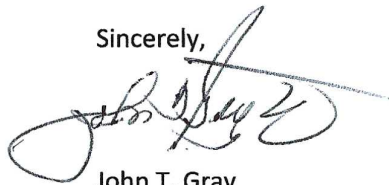
	2021Q4	2022Q1	% Change
All-Inclusive Index	112.7	116.0	2.9
Preliminary RCAF	1.127	1.160	2.9
Forecast Error Adjustment	0.012	-0.006	
RCAF (Unadjusted)	1.139	1.154	1.3
Productivity Adjustment Factor	2.4087	2.4135	
RCAF (Adjusted)	0.473	0.478	1.1
PAF-5	2.5534	2.5585	
RCAF-5	0.446	0.451	1.1

In its October 3, 1996 decision in Ex Parte No. 290 (Sub-No. 7), *Productivity Adjustment - Implementation,* the STB noted its intent to publish, in addition to the RCAF (Unadjusted) and RCAF (Adjusted), an RCAF-5 (i.e., a calculation of the productivity adjusted RCAF values as if the agency had always used a 5-year rolling average to calculate the productivity adjustment). In response to a request by STB staff, the AAR is including a calculation of the RCAF-5 in its quarterly RCAF filing. The AAR and its members, however, do not believe the publication of a third RCAF index is required or permitted by the applicable statute (49 U.S.C. § 10708) and do not endorse its publication.

Our quarterly non-proprietary work papers underlying this submission are e-filed herewith, in accordance with the ICC's order in Ex Parte No. 290 (Sub-No. 2), *Railroad Cost Recovery Procedures,* served February 8, 1990. We have notified Pedro Ramirez, in the STB office handling this proceeding, of our plan to e-file the submission and non-proprietary work papers. A second copy of the submission and non-proprietary work papers, plus selected highly confidential work papers, will be provided to Mr. Ramirez's Data Collection and Auditing Team. All work papers are available for STB inspection. Questions should be directed to me or Tiffany Placker (202 639-2381) of this office.

Sincerely,

John T. Gray

Attachments

First Quarter 2022
All-Inclusive Index

Ex Parte No. 290 (Sub-No. 5) (2022-1)

Quarterly Rail Cost Adjustment Factor
Surface Transportation Board

Policy and Economics Department
Association of American Railroads

December 3, 2021

Table of Contents

Introduction

On January 2, 1985, the Interstate Commerce Commission (ICC) adopted the All-Inclusive Index as the basis for the Rail Cost Adjustment Factor (RCAF). The quarterly projection of railroad costs, as documented herein, employs the All-Inclusive Index as required by the regulations. Also presented in this submission is the RCAF, both Adjusted and Unadjusted, as required by the ICC in its decision in Ex Parte No. 290 (Sub-No. 4), Rail Cost Recovery Procedures - Productivity Adjustment, served March 24, 1989. In addition, the AAR has included the RCAF-5, which was instituted by a Surface Transportation Board decision served October 3, 1996 in Ex Parte No. 290 (Sub-No. 7), *Productivity Adjustment - Implementation* . The AAR and its members do not believe the additional productivity-adjusted index is required or permitted by the applicable statute, and do not endorse its publication.

This quarter's projection of railroad costs is for the first quarter 2022. Each year's first quarter calculation utilizes new health and welfare rates, which are listed in Appendix A on page 5. New payroll tax rates and maximum taxable earnings (Tier I, Tier II, and Unemployment Insurance) also become effective January 1, and are listed in Appendix A on page 4.

Index Weights

In the Ex Parte No. 290 (Sub-No. 2) final rules, issued in April 1981, the Interstate Commerce Commission mandated that the weights of each major cost component be updated annually. These "external" weights are calculated using expense data from Schedules 410 and 210 of the R-1 annual report filed with the Surface Transportation Board by the Class I railroads. The weights are typically updated with the fourth quarter projection.

The 2020 (current) and 2019 (previous) weights are shown below. Weights calculated from 2019 data were used for the fourth quarter of 2020 through the third quarter of 2021. Beginning with the fourth quarter of 2021, weights calculated using 2020 data are used. The component with the biggest change in weight was Fuel, which decreased by 4.5 percentage points. Labor and Materials & Supplies fell by 0.2 and 0.4 percentage points, respectively. Equipment Rents was unchanged. The weight for Depreciation increased 2.6 percentage points, and Other increased by 2.3 percentage points.

Weights for RCAF's All-Inclusive Index		
	2020	**2019**
Labor	32.4 %	32.6 %
Fuel	9.7	14.2
Materials & Supplies	4.5	4.9
Equipment Rents	5.2	5.2
Depreciation	18.5	15.9
Interest	2.7	2.5
Other	27.0	24.7
Total	100.0	100.0

Reweighting of the index is accomplished by calculating both the current quarter (normally the fourth) and prior (normally the third) quarter indexes with the new weights. The relative change between the two quarters is then multiplied times the prior quarter (usually the third) *linked* index. Use of this method ensures that the weight change, by itself, does not cause a change in the level of the All-Inclusive Index.

Internal weights in the labor and equipment rents components are updated at the same time as the external weights. When these weights are changed, they are also linked using the procedure described above in order to eliminate the effect of the change in weighting.

All-Inclusive Index
First Quarter 2022

The components and values of the current and previous All-Inclusive Indexes are shown below. Details of the construction of each component of the index are contained in the Appendices.

	2020 Weights	Forecast Previous 2021Q4	Forecast Current 2022Q1	Percent Change
1. Labor	32.4%	454.9	469.5	3.2 %
2. Fuel	9.7%	268.8	303.5	12.9
3. M&S	4.5%	288.8	298.2	3.3
4. Equipment Rents	5.2%	248.4	249.9	0.6
5. Depreciation	18.5%	227.9	229.0	0.5
6. Interest	2.7%	51.1	51.1	0.0
7. Other	27.0%	278.1	280.6	0.9
8. Weighted Average				
a. 1980 = 100		318.0	327.5	
b. 1980 = 100 (linked)		298.0	306.9 [1]	
c. 4Q17 = 100		112.7	116.0 [2]	2.9

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[1] Index80 = (Current Index / Previous Index) * the Previous Quarter Linked Index

$$= \quad (327.5 \quad / \quad 318.0) \quad x \quad 298.0$$

$$= \quad 306.9$$

[2] To calculate the 4Q17 = 100 index:

Index4Q17 = (Current Linked Index / 4Q17 Basing Factor) * 100

$$= \quad 306.9 \quad \text{divided by} \quad 264.5 \quad \text{times 100}$$

$$= \quad 116.0$$

Indexes based on other periods:

4Q12 based index = 306.9 / 297.6 x 100 = 103.1
4Q07 based index = 306.9 / 245.9 x 100 = 124.8
4Q02 based index = 306.9 / 192.1 x 100 = 159.8
4Q97 based index = 306.9 / 173.2 x 100 = 177.2
4Q92 based index = 306.9 / 156.9 x 100 = 195.6

Forecast vs. Actual All-Inclusive Index
Third Quarter 2021

Because of data availability, the forecast error adjustment has a two-quarter lag from each filing. As shown below, the third quarter actual index of 110.7 is 0.6 index points below the forecast value of 111.3. Therefore, the forecast error adjustment for first quarter 2022 is -0.6 index points.

	2019 Weights	Third Quarter 2021 Forecast	Third Quarter 2021 Actual	Amt Difference
1. Labor	32.6%	447.9	447.9	
2. Fuel	14.2%	254.5	270.0	
3. M&S	4.9%	277.8	277.8	
4. Equipment Rents[1]	5.2%	250.0	246.2	
5. Depreciation	15.9%	228.0	228.3	
6. Interest	2.5%	55.7	55.7	
7. Other	24.7%	278.7	267.3	
8. Weighted Average				
a. 1980 = 100		315.3	314.5	
b. 1980 = 100 (linked)		294.4	292.8 [2]	
c. 4Q17 = 100[3]		111.3	110.7	-0.6

Forecast error ⟶ **-0.6 index points**

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[1]

	2019 Weights	Third Quarter 2021 Forecast	Third Quarter 2021 Actual
Car-Hire	61.4%	211.2	211.8
Lease Rentals	38.6%	278.7	267.3
Weighted Average		237.3	233.2
Weighted Average (linked)		250.0	246.2

[2] Linked actual index = (actual index / previous actual index) x previous linked actual index.

292.8	=	314.5	/	306.5	x	285.4

[3] The 4Q17 based indexes are 1980 based indexes divided by the 4Q17 basing factor (264.5/100).
Other basing factors are: 4Q12 = 297.6; 4Q07 = 245.9; 4Q02 = 192.1; 4Q97 = 173.2; and 4Q92 = 156.9.

Productivity

On February 19, 2021, the Surface Transportation Board served a decision which proposed to adopt 0.8 percent as the geometric average productivity change for the five most recent years available. Their five year rolling geometric average calculation added the year 2019 and removed the year 2014. The components of this average annual value are shown on the following table in ratio format – therefore, 1.008 is the same as an increase of 0.8 percent. Productivity changes are calculated by multiplying each of the five productivity changes together and taking the result to the one-fifth power. The productivity adjustment factors (PAF) for each quarter are calculated by increasing the previous quarter's PAF by quarterly versions of the annual rate, which are the fourth root of the geometric average annual growth rate. The difference between the PAF and the PAF-5 is the timing of the five-year productivity trend.

Comparison of Output, Input, & Productivity
2015 - 2019

Year	Output Index (1)	Input Index (2)	Productivity Changes (3)
2015	0.913	0.972	0.939
2016	0.955	0.941	1.015
2017	1.045	0.992	1.053
2018	1.032	1.004	1.028
2019	0.968	0.961	1.007
Average			**1.008**
Previous Average (2014-2018)			1.010

Calculation of PAF and PAF-5

For 2015-2019, use fourth root of avg. productivity change = 1.0020
For 2014-2018, use fourth root of avg. productivity change = 1.0025

Quarter	Year	PAF	PAF-5	
Q1	2021	2.3943	2.5343	2014-2018
Q2	2021	2.3991	2.5406	
Q3	2021	2.4039	2.5470	2015-2019
Q4	2021	2.4087	2.5534	
Q1	2022	2.4135	2.5585	

Rail Cost Adjustment Factor
First Quarter 2022

Four RCAF values are presented in this filing. Two are not modified for productivity (Preliminary RCAF and RCAF Unadjusted), and two incorporate a productivity calculation (RCAF Adjusted and RCAF-5). The All-Inclusive Index and all four RCAF values, plus the percent change for each, are shown below. Note that beginning with the 2018Q1 index, the All-Inclusive Index was rebased to a 2017Q4=100 basis as required in the applicable statute.

	Previous 2021Q4	Current 2022Q1	Percent Change
All-Inclusive Index[1]	112.7	116.0	2.9
Preliminary RCAF[2]	1.127	1.160	2.9
Forecast Error Adjustment[3]	0.012	-0.006	
RCAF (Unadjusted)[4]	1.139	1.154	1.3
Productivity Adjustment Factor[5]	2.4087	2.4135	
RCAF (Adjusted)[6]	0.473	0.478	1.1
PAF-5[7]	2.5534	2.5585	
RCAF-5[8]	0.446	0.451	1.1

[1] See All-Inclusive Index on page 3.

[2] All-Inclusive Index divided by the All-Inclusive Index in the base period (100.0).

[3] The current figure is from Forecast vs. Actual All-Inclusive Index in this filing (page 4). The previous quarter figure is shown in a similar section of the previous quarter's filing.

[4] Preliminary RCAF plus the forecast error adjustment.

[5] See Productivity on page 5.

[6] RCAF (Unadjusted) divided by the Productivity Adjustment Factor (PAF).

[7] See Productivity on page 5.

[8] RCAF (Unadjusted) divided by the PAF-5.

Appendixes

Labor
First Quarter 2022

The first quarter 2022 Labor Index is 3.2 percent higher than the previous quarter. Increases within the Supplements portion of the index are responsible for this quarter's higher Labor Index.

Wage Rate Index

The Wage Rate Index portion of the Labor Index decreased by 0.1%.

Wage Increases: There are no national wage increases currently scheduled for the first quarter. There were a few increases for independent groups that ultimately rounded to zero and did not have an impact on the wage rate index.

Lump Sums: The first quarter lump sum rate fell 2.1%. One amount was fully amortized and removed, and it was replaced by one new similar amount.

Back Pay: The back pay rate fell from $0.019 to zero. One amount has now been fully amortized and removed from the rate, and there is one extremely small amount remaining that rounds to zero.

Other: In wages, "Other" contains the amortization of incentive compensation payments (similar to lump sums) that one railroad makes each year to its dispatchers, yardmasters, and locomotive engineers. The first quarter rate is unchanged from the prior quarter.

Labor
First Quarter 2022

Supplements Index

The Supplements Index increased 7.5 percent this quarter. Health and Welfare premiums, payroll tax rates, maximum taxable earnings, and the rate for unemployment insurance, are all typically adjusted once per year, effective on January 1. All of the components of the supplements index increased in the first quarter.

Health & Welfare: The Health & Welfare rate increased 8.4 percent. Employer premiums (the amount the employer contributes for their employees' insurance) are higher in 2022. See pages 4 and 5 of this appendix for details.

Railroad Retirement: The Railroad Retirement rate increased 0.8 percent. Taxable wages fell slightly, and the maximum taxable earnings for Railroad Retirement's Tier I and Tier II both increased for 2022. Tax rates for employers did not change. Page 4 of this appendix lists tax rates and maximum taxable earnings for 2020 through 2022.

Unemployment Insurance: The Unemployment Insurance rate increased 102.4%, or 60.7 cents, because of a new unemployment insurance tax rate effective January 1. The weighted average Class I railroad rate for 2022 is 11.23%, compared to 5.69% for 2021. Basic tax rates can range from a minimum of 0.65 percent to a maximum of 12.5 percent. There was also a surcharge of 3.5 percent applied to the rate for 2022. Page 4 of this appendix lists tax rates for 2020 through 2022.

Other: The "Other" category is a reflection of all other fringe benefits, and currently contains known employer contributions to employee 401(k) accounts and employer contributions to employee stock plans that are recorded as fringe benefits. The first quarter rate is 3.8 percent higher than last quarter.

Labor Index Calculation

As shown in Table A-1 on the next page, the 0.1 percent decrease in the Wage Rate Index and the 7.5 percent increase in the Supplements Index combined to cause the Labor Index to be 3.2 percent higher than the previous quarter. The linked first quarter 2022 Labor index is 469.5, which is 4.6 percent higher than one year ago.

Labor
First Quarter 2022

Table A-1 Labor Index

	2021Q4	2022Q1	Change	
			Percent	Amount
Base Wage – Straight Time				
& Pay For Time Not Worked	$44.665	$44.665	0.0%	$0.000
Adjustments:				
Lump Sum	0.142	0.139	-2.1%	-$0.003
Back Pay	0.019	0.000	-100.0%	-$0.019
Other	0.118	0.118	0.0%	$0.000
Total Wages	44.944	44.922	0.0%	-$0.022
Health & Welfare Benefits	8.876	9.623	8.4%	$0.747
RR Retirement & Medicare	9.315	9.385	0.8%	$0.070
Unemployment Insurance	0.593	1.200	102.4%	$0.607
Other	0.183	0.190	3.8%	$0.007
Total Supplements	$18.967	$20.398	7.5%	$1.431
Total Labor (as info only)	$63.911	$65.320		
Wage Index[1]	384.6	384.4	-0.1%	
Supplements Index[2]	700.9	753.8	7.5%	
Total labor Index, 2020 Weights[3]	477.3	492.6		
Labor Index (linked)[4]	**454.9**	**469.5**	3.2%	

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[1] 1980 wage rate $11.685

[2] 1980 supplements rate $2.706

[3] 2020 weights: wages, supplements   70.7%   29.3%

[4] 2022Q1 linked Index = 2021Q4 linked x (2022Q1 / 2021Q4)

                        =   454.9   x 492.6 / 477.3

Labor
First Quarter 2022

Supplement Comparisons

Health and Welfare Rates

| | Railroad Payment Per Employee Per Month | | | | |
| | | | | Change | |
Plan	2020	2021	2022	'20-'21	'21-'22
Group Health & Welfare	$1,606.79	$1,697.55	$1,856.96	5.6%	9.4%
Early Retirement Major Medical	114.37	116.94	84.14	2.2%	-28.0%
Group Dental	63.67	63.67	75.01	0.0%	17.8%
Group Vision	8.44	8.51	8.51	0.8%	0.0%
Supplemental Sickness					
Maintenance of Way	39.94	39.94	48.22	0.0%	20.7%
Shop Crafts	61.93	87.74	98.52	41.7%	12.3%
Signalmen	38.31	45.05	62.17	17.6%	38.0%
Yardmasters	54.00	60.48	74.61	12.0%	23.4%

Railroad Retirement and Medicare

| | Earnings Base | | | | Employer Rate | | |
	2020	2021	2022		2020	2021	2022
Tier I	$137,700	$142,800	$147,000		6.20%	6.20%	6.20%
Tier II	102,300	106,200	109,200		13.10%	13.10%	13.10%
Medicare	no limit	no limit	no limit		1.45%	1.45%	1.45%

Unemployment Insurance

| Monthly Taxable Earnings Base | | | | Weighted Avg. Class I Rate | | |
2020	2021	2022		2020	2021	2022
$1,655	$1,710	$1,755		0.99%	5.69%	11.23%

Association of American Railroads

Labor
First Quarter 2022

NATIONAL RAILWAY LABOR CONFERENCE
EMPLOYEE BENEFITS DEPARTMENT
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David B. Marcus
Director Employee Benefits
(571) 336-7596
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Eureka Norment
National Health Plan Manager
(571) 336-7629
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November 17, 2021

Ms. Tiffany Placker (tplacker@aar.org)
Economist
Association of American Railroads
425 Third Street, SW, Suite 1000
Washington, D.C. 20024

Dear Ms. Placker:

The revised employer monthly Payment Rates which are effective January 1, 2022 are as follows:

Railroad Employees National Health & Welfare Plan & National Railway Carriers/United Transportation Union H&W Plan Non-Hospital Road	$ 1,856.96
Railroad Employees National Early Retirement Major Medical Benefit Plan Non-Hospital Road	$ 84.14
Aetna - National Dental Plan	$ 75.01
Aetna - Supplemental Sickness Plans ShopCrafts	$ 98.52
Signalmen	$ 62.17
Maintenance of Way	$ 48.22
Trustmark - Supplemental Sickness Plans Yardmasters	$ 74.61
EyeMed - National Vision Plan	$ 8.51

If you have any questions or need clarification, please contact me.

Very truly yours,

Eureka Norment

cc: Deena Beshir, AAR (dbeshir@aar.org)

Fuel
First Quarter 2022

The forecast for fuel is based on: (1) a survey of railroad fuel purchasing officers concerning current price and volume levels, (2) expectations of railroad purchasing officers based on their own forecast models and discussions with their major suppliers, and (3) a consensus of petroleum industry experts and general business publications. Fuel purchases are assumed to remain in inventory for 30 days before the fuel is consumed (and therefore expensed). Therefore, prices *paid* in the first month of each quarter are for fuel *expensed* in the second (or middle) month of the quarter, and the middle month expensed is used to represent each quarter.

The average locomotive diesel fuel price hit a low point in May 2020, but has been steadily rising since then. While average prices for locomotive diesel fuel are available only through October 2021, data through four weeks of November are available for related fuel types. According to the Energy Information Administration, the daily spot price as of November 22nd for Ultra-Low-Sulfur Diesel Fuel* is an average of 5.5 percent lower than the average for October. The chart below (on left) shows the AAR's Monthly Locomotive Diesel Fuel Price Index through October 2021. The second chart (on right) shows recent spot prices for Ultra-Low-Sulfur No. 2 Diesel Fuel as reported by the Energy Information Administration.
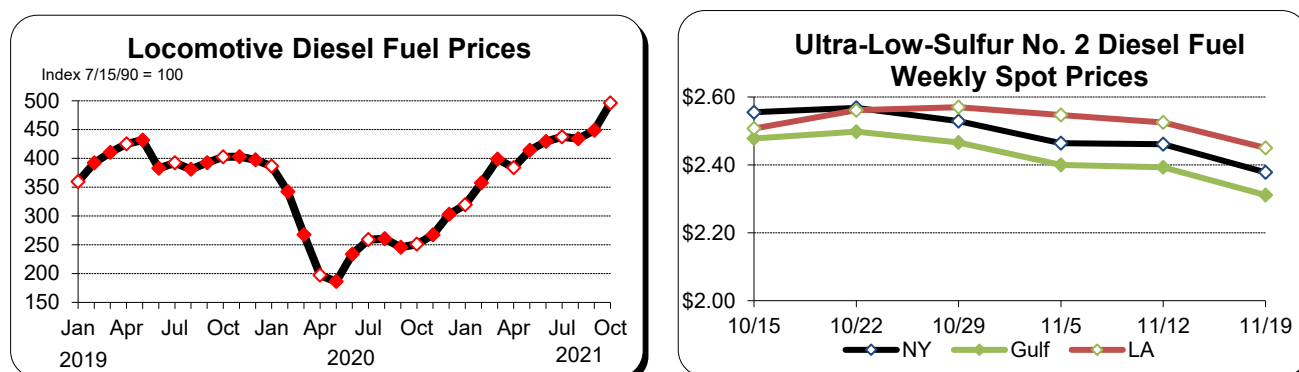
Using information from the EIA, prices towards the end of November are lower than prices that actually occured in October. Railroads that responded to the AAR's forecast survey expect prices to decrease by January (Q1) compared to prices that actually occurred for October (Q4). The first quarter 2022 forecast is 12.9 percent higher than the previous quarter forecast, but 0.9 percent lower than the prior quarter actual.

|	
Forecast Fuel Index (1980 = 100)	303.5
Change from previous quarter forecast	12.9%
Change from previous quarter actual	-0.9%

* Heating oil, Ultra-Low-Sulfur No. 2 Diesel Fuel, and locomotive diesel fuel are part of a group of closely related products, commonly labeled as distillates, that differ mostly by their sulfur content. Because of these similarities, these fuels are produced together and have similar pricing trends.

Association of American Railroads

Materials & Supplies
First Quarter 2022

The first quarter 2022 Materials & Supplies Index increased 3.3 percent from the previous quarter. Prices increased for the Miscellaneous Products category.

2022Q1	Materials & Supplies Index =	298.2
2021Q4	Materials & Supplies Index =	288.8
	Difference	9.4 basis points
		or
		3.3 %

M&S Forecast History
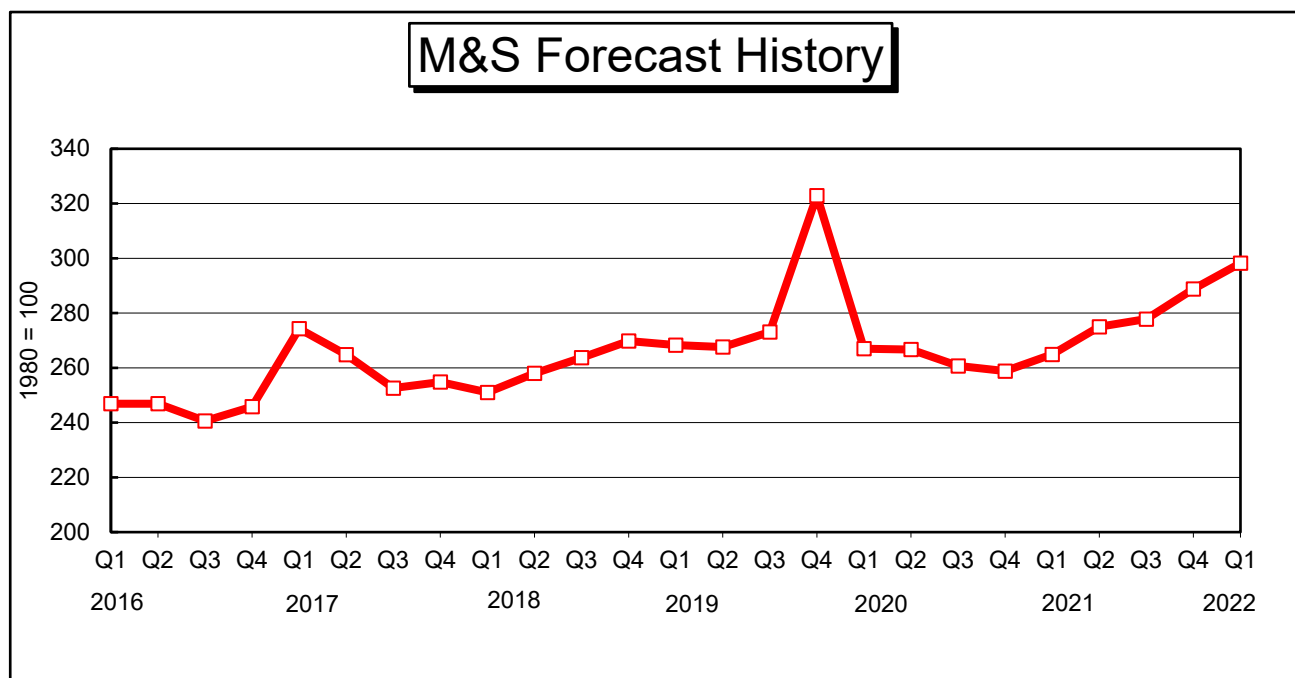
Equipment Rents
First Quarter 2022

The Equipment Rents Index consists of two components – car hire and lease rentals. The methodologies used to create these two components, and the final Equipment Rents Index, are explained below.

Car Hire

The car hire component is indexed using data from the Car Hire Accounting Rate Master (CHARM) file. Car hire rates for the forecast quarter are estimated based on data for active freight cars using the most recent data available. For the first quarter, December 1 of the previous year is typically used. For the second, third and fourth quarters; March 1, June 1, and September 1 are usually used, respectively. Using data retrieved from the latest CHARM file, an average rate per car is developed. Next, those average rates are grouped into four car type categories to create an overall summary of car hire rates. The summary rates are then compared from quarter to quarter, and weighted, to determine the Car Hire Index.

Lease Rentals

The lease rentals portion of the Equipment Rents Index uses the Producer Price Index for Industrial Commodities less Fuel and Related Products and Power (PPI-LF). The Commission adopted this surrogate in its decision served March 13, 1987. The AAR uses six years of historical data to derive its forecast for the PPI-LF. The forecast is used not only for lease rentals, but also for the "Other" component of the All-Inclusive Index. Appendix G discusses the forecast in more detail.

Equipment Rents Index Calculation

The table below calculates the Equipment Rents Index. The first quarter Car Hire portion of the Index rose 0.4 percent because of higher average rates for privately owned cars. A 0.9 percent increase in the projected PPI-LF (See Appendix G) used as a proxy for Lease Rentals, combined with the 0.4 percent increase for Car Hire, caused the Equipment Rents Index to rise 0.6 percent.

	2020 Weight	2021Q4	2022Q1	Percent Change
Car Hire	64.7%	209.1	209.9	0.4 %
Lease Rentals	35.3%	278.1	280.6	0.9
Weighted Average		233.5	234.9	0.6
Weighted Average (Linked)		248.4	249.9	0.6

Association of American Railroads

Depreciation
First Quarter 2022

The Producer Price Index for Railroad Equipment (PPI-RE) is used to index depreciation expense. The PPI-RE is forecast using an ARIMA (Auto-Regressive Integrated Moving Average) process where a statistical package picks the model that best fits the historical data set (see next page), and that model is then used for the forecast. The historical data set contains 6 years of monthly data (a sample size of 72), where the most recent available data point is the first month of the quarter prior to the forecast quarter. For a first quarter forecast, the most recent month of data available would be for October of the prior year. For a second quarter forecast, January would normally be the most recent period available. April and July would be the most recent months available for third and fourth quarter forecasts, respectively. The output from the forecast model is shown on page 2 of this appendix on a 1982=100 basis. The figure forecast by the model is 0.5% higher than the previous quarter's forecast.

Forecast of Depreciation Index (1982=100)	207.0
Forecast of Depreciation Index (1980=100)	229.0
Change from previous quarter forecast	0.5% = 0.48%
Change from actual first month of previous quarter	-0.1% = -0.13%
Change from same quarter of prior year (actual)	0.9%

PPI-RE Forecast 2022Q1
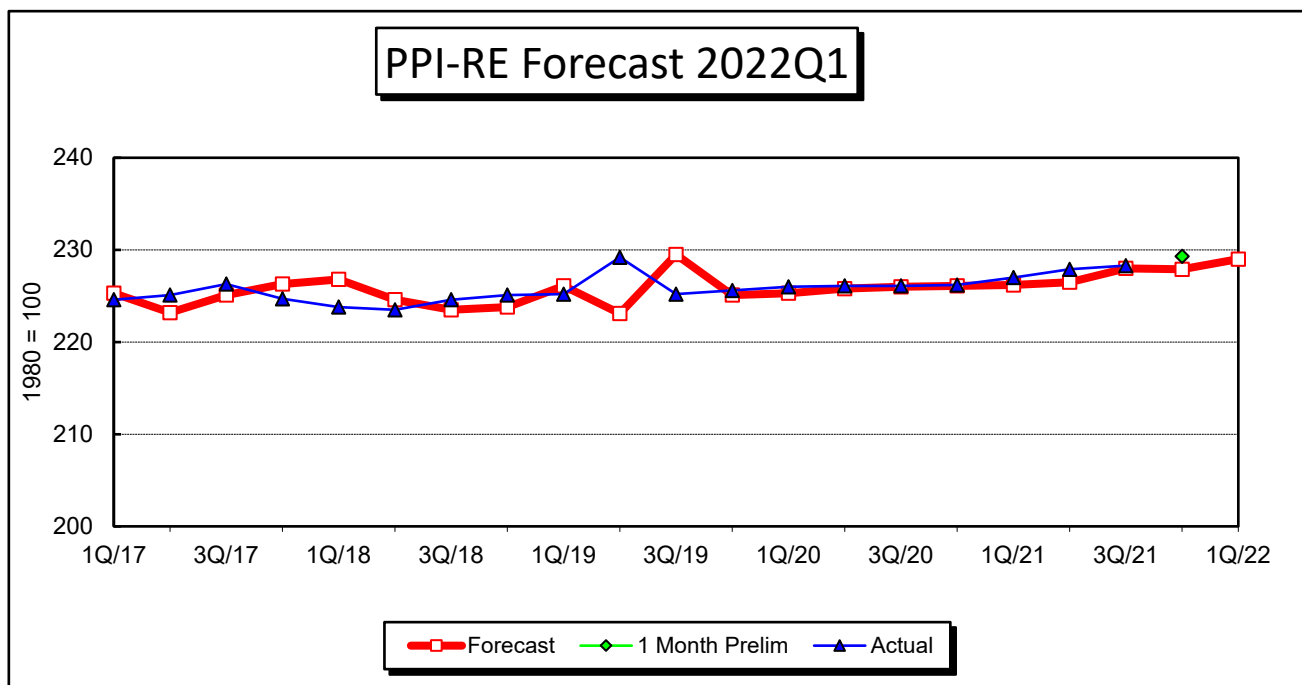
Depreciation
First Quarter 2022

PPI RAILROAD EQUIPMENT

Expert Analysis

Using rule-based logic I have narrowed down the choice to exponential smoothing or Box-Jenkins.
I will perform an out-of-sample test to select between these two approaches.

The cumulative MAD for Exponential smoothing was 1.08 and for Box-Jenkins was 2.39.
The rolling out-of-sample test used a maximum horizon of 12 and generated 78 forecasts for each method.

Based on the lower MAD, I will use Exponential Smoothing.

Model Details

Expert selection
Exponential smoothing: No trend, Additive seasonality
NA(0.547, 0.264)

Component	Smoothing Wgt		Final Value
Level	0.5468		206.8
Seasonal	0.2645		
Seasonal Indexes			
Jan - Mar	-0.2305	0.1319	0.4736
Apr - Jun	-0.09635	-0.1165	-0.006407
Jul - Sep	0.1495	0.4345	-0.01824
Oct - Dec	0.1042	-0.4596	-0.3661

Within-Sample Statistics

Sample size	72	No. parameters	2
Mean	203.75	Std. deviation	1.4
R-square	0.65	Adj. R-square	0.64
Durbin-Watson	1.73	Ljung-Box(18)	20.9 P=0.71
Forecast error	0.84	BIC	0.88
MAPE	0.27	SMAPE	0.27
RMSE	0.83	MAD	0.56
MAD/Mean Ratio	0		

Actual Values for the Most Recent 6 Periods:

Actual	
2021-May	206
2021-Jun	206.1
2021-Jul	206.3
2021-Aug	206.4
2021-Sep	206.4
2021-Oct	207.3

Forecasted Values

2.5 Lower	Forecast	97.5 Upper	
Date	**2.5 Lower**	**Forecast**	**97.5 Upper**
2021-Nov	204.658	206.385	208.112
2021-Dec	204.51	206.478	208.447
2022-Jan	204.431	206.614	208.797
2022-Feb	204.598	206.976	209.355
2022-Mar	204.759	207.318	209.877
QTR AVG	204.596	206.969	209.343

Association of American Railroads

Interest
First Quarter 2022

The Interstate Commerce Commission, in its decision served February 28, 1989, revised the All-Inclusive Index methodology to include a specific interest component, which is to track changes in the average interest rate from year to year. The interest rate is essentially the embedded cost of debt, i.e., total interest expense divided by average total long term debt.

The interest rate is calculated for the most recent year and used until the next year's figures are finalized. The source data are from a summary of the annual reports (Form R-1) submitted by each of the Class I railroads. Although the data set is received at the end of March, it is not used until the September filing. This enables data to be entered into a database and reviewed – and any revisions made, if necessary, before the data are used in the Index. The current Interest Index is based on 2020 data, and was updated in the Q4 filing submitted on September 3, 2021. The Interest Index based on 2020 decreased from 55.7 in 2019 to 51.1 in 2020, and is the lowest in recent history.

The R-1 source for interest expense is Schedule 210, column b. The lines currently used are listed below. The source for average total debt is Schedule 200. The sums of data from columns b and c (ending and beginning balances) are combined and divided by 2 to compute an average balance. The line numbers listed below account for the line number changes effective beginning with the 2016 annual report.

Interest Expense (Schedule 210)

Line
42	Total Fixed Charges
44	Contingent Interest

less
22	Release of Premium on Funded Debt

Average Total Debt (Schedule 200)

Line
29	Current Liabilities, Loans and Notes Payable
38	Equipment Obligations and Other Long Term Debt Due Within One Year
40	Non-Current Liabilities: Funded Debt Unmatured
41	Non-Current Liabilities: Equipment Obligations
42	Non-Current Liabilities: Capitalized Lease Obligatons
43	Non-Current Liabilities: Debt in Default
44	Non-Current Liabilities: Accounts Payable: Affiliated Companies
45	Non-Current Liabilities:Unamortized Debt Premium

|		
2020	Interest Rate	4.01%
1980	Interest Rate	7.85%
2022Q1	**Interest Index**	**51.1**
2021Q4	Interest Index	51.1
	Percent Change	0.0%

Other Expenses
First Quarter 2022

The Producer Price Index for Industrial Commodities less Fuels and Related Products and Power (PPI-LF) is used to index purchased services, casualties and insurance, loss and damage, taxes (other than income and payroll), general and administrative expenses, and lease rentals. These expenses, when grouped together, are usually called "Other" expenses.

Like the PPI-RE, the PPI-LF is forecast using an ARIMA process on 6 years of monthly data (a sample size of 72) with the most recent available monthly data being the first month of the quarter prior to the forecast quarter. For a first quarter forecast, the most recent month of data available would be for October of the prior year. For a second quarter forecast, January would normally be the most recent month available. April and July would be the most recent months available for third and fourth quarter forecasts, respectively. The output from the forecast model is shown on page 2 of this appendix for 1982=100. The figure forecast by the model is 0.9 percent higher than the prior quarter forecast.

Forecast of Other Expense Index (1982=100)	250.3
Forecast of Other Expense Index (1980=100)	280.6
Change from previous quarter forecast	0.9%
Change from actual first month of previous quarter	3.2%
Change from same quarter of prior year (actual)	14.7%
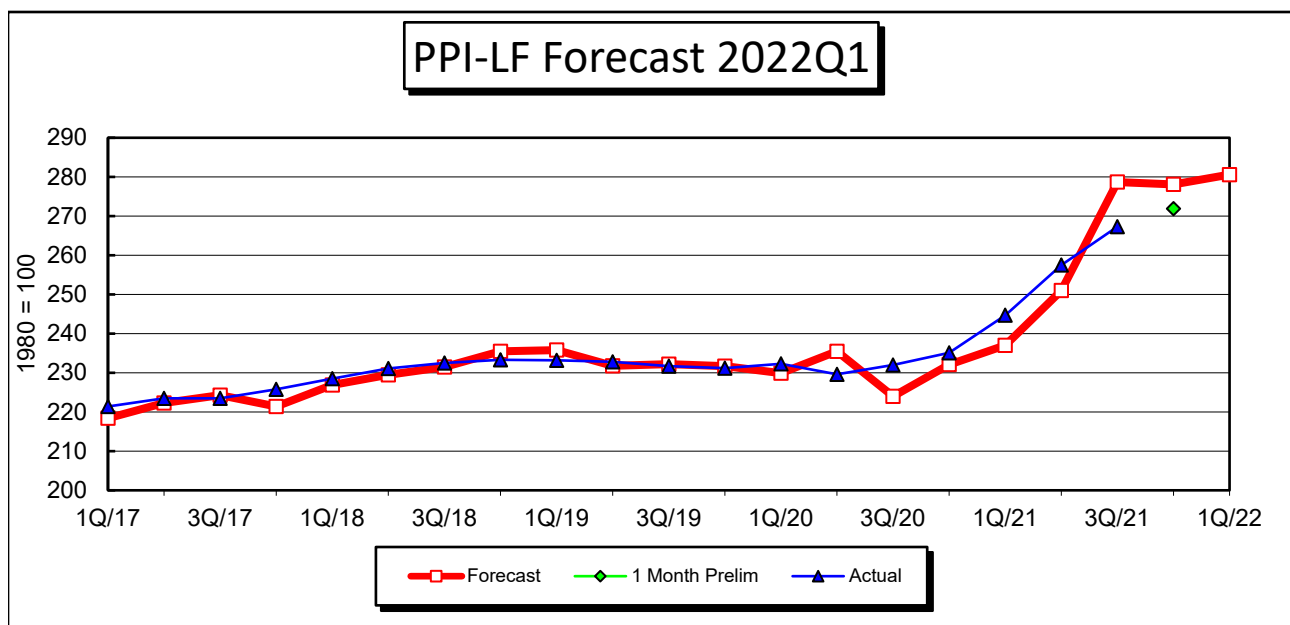
Other Expenses
First Quarter 2022

**PPI INDUSTRIAL COMMODITIES LESS FUEL
AND RELATED PRODUCTS AND POWER**

Expert Analysis

Using rule-based logic I have narrowed down the choice to exponential smoothing or Box-Jenkins.
I will perform an out-of-sample test to select between these two approaches.

The cumulative MAD for Exponential smoothing was 7.09 and for Box-Jenkins was 10.97.
The rolling out-of-sample test used a maximum horizon of 12 and generated 78 forecasts for each method.

Based on the lower MAD, I will use Exponential Smoothing.

Model Details

Expert selection
Multiplicative Winters: Linear trend, Multiplicative seasonality
LM(0.947, 1.000, 1.000)
Confidence limits proportional to indexes

Component	Smoothing Wgt		Final Value
Level	0.9467		242.4
Trend	1		1.957
Seasonal	0.9995		
Seasonal Indexes			
Jan - Mar	1.001	0.9993	1
Apr - Jun	0.9995	0.9997	1
Jul - Sep	0.9997	1	0.9994
Oct - Dec	1	1.001	1

Within-Sample Statistics

Sample size	72	No. parameters	3
Mean	206.3	Std. deviation	11.65
R-square	1	Adj. R-square	1
Durbin-Watson	1.63	Ljung-Box(18)	19.2 P=0.62
Forecast error	0.58	BIC	0.62
MAPE	0.19	SMAPE	0.19
RMSE	0.56	MAD	0.4
MAD/Mean Ratio	0		

Actual Values for the Most Recent 6 Periods:

Actual	
2021-May	230.5
2021-Jun	234.0
2021-Jul	236.4
2021-Aug	238.4
2021-Sep	240.3
2021-Oct	242.5

Forecasted Values

Date	2.5 Lower	Forecast	97.5 Upper
2021-Nov	243.309	244.516	245.723
2021-Dec	243.746	246.33	248.915
2022-Jan	245.048	248.497	251.947
2022-Feb	245.92	250.058	254.195
2022-Mar	247.49	252.215	256.940
QTR AVG	246.153	250.257	254.361

Railroad and Union Abbreviations
First Quarter 2022

Railroads

BLE	Bessemer & Lake Erie Railroad (Part of CN's Grand Trunk Corp.)
BNSF	BNSF Railway Company
CC	Chicago, Central & Pacific (Part of CN's Grand Trunk Corp. Sometimes noted as CC&P.)
CN	Canadian National Railway (Commonly known as CN, owns Grand Trunk Corporation.)
CNGT	AAR's abbreviation for Grand Trunk Corporation (Almost all of CN's U.S. operations.)
CP	Canadian Pacific (Also noted as CPR. Owns the U.S. Class I railroad Soo Line.)
CPSL	AAR's abbreviation for Soo Line Corporation (CP's U.S. operations including SOO, D&H, and DME.)
CSX	CSX Transportation
D&H	Delaware & Hudson (Part of Canadian Pacific's U.S. operations, included beginning 2011Q4.)
DME	Dakota, Minnesota & Eastern (Part of Canadian Pacific's U.S. operations, included beginning 2011Q4.)
CMQ	Central Maine & Quebec (Part of Canadian Pacific's U.S. operations, included beginning 2021Q4.)
GTW	Grand Trunk Western Railroad (Part of CN's Grand Trunk Corp.)
IC	Illinois Central Railroad (Part of CN's Grand Trunk Corp.)
KCS	Kansas City Southern Railway
NS	Norfolk Southern Combined Railroad Subsidiaries (a.k.a. Norfolk Southern Railway or NS Rail)
SOO	Soo Line Railroad (The largest part of Canadian Pacific's U.S. operations.)
UP	Union Pacific Railroad
WC	Wisconsin Central and subsidiaries (Part of CN's Grand Trunk Corp.)

Major Unions Involved with Railroads

ATDA	American Train Dispatchers Association
BLET	Brotherhood of Locomotive Engineers and Trainmen Div. of the International Brotherhood of Teamsters
BMWED	Brotherhood of Maintenance of Way Employees Division of the International Brotherhood of Teamsters
BRS	Brotherhood of Railroad Signalmen
IAM	International Association of Machinists and Aerospace Workers
IBBM	International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers & Helpers
IBEW	International Brotherhood of Electrical Workers
NCFO	National Conference of Firemen and Oilers
SMART-TD	International Association of Sheet Metal, Air, Rail, and Transportation Workers - Transportation Division*
SMART-MD	International Association of Sheet Metal, Air, Rail, and Transportation Workers - Mechanical Division**
TCU	Transportation Communication International Union
TCU-Carmen	Brotherhood of Railway Carmen Division of the Transportation Communications International Union

Predecessor Unions (Some AAR databases use these old abbreviations.)

BLE	Brotherhood of Locomotive Engineers (predecessor to BLET)
BMWE	Brotherhood of Maintenance of Way Employees (predecessor to BMWED)
BRC	Brotherhood of Railway Carmen (predecessor to TCU-Carmen)
IBFO	International Brotherhood of Firemen and Oilers (predecessor to NCFO)
SMW	Sheet Metal Workers' International Association (see SMART-MD)
UTU	United Transportation Union (merged into SMART)
UTU-YMD	United Transportation Union Yardmaster Department (see SMART-TD)

* Represents employees formerly represented by the UTU (conductors and brakemen) and also has a
   separate yardmasters department.

** Represents employees formerly represented by the SMW (steel workers)

Association of American Railroads