

ASSOCIATION
OF AMERICAN
RAILROADS

John T. Gray
Senior Vice President - Policy & Economics

December 5, 2019

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 2020 All-Inclusive Index and Rail Cost Adjustment Factor, filed in Ex Parte No. 290 (Sub-No. 5) (2020-1) *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 2020 results and compares to the previous quarter. Both quarters are shown on a 4Q\2017=100 base.

	<u>2019Q4</u>	<u>2020Q1</u>	<u>% Change</u>
All-Inclusive Index	107.7	106.5	-1.1
Preliminary RCAF	1.077	1.065	-1.1
Forecast Error Adjustment	-0.002	-0.022	
RCAF (Unadjusted)	1.075	1.043	-3.0
Productivity Adjustment Factor	2.3677	2.3705	
RCAF (Adjusted)	0.454	0.440	-3.1
PAF-5	2.5160	2.5190	
RCAF-5	0.427	0.414	-3.0

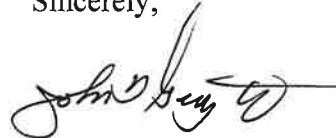
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December 5, 2019

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 hand-delivered 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,

A handwritten signature in black ink, appearing to read "John T. Gray", with a long horizontal flourish extending to the right.

John T. Gray

Attachments

**First Quarter 2020
All-Inclusive Index**

Ex Parte No. 290 (Sub-No. 5) (2020-1)

**Quarterly Rail Cost Adjustment Factor
Surface Transportation Board**

**Policy and Economics Department
Association of American Railroads**

December 5, 2019

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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 2020. 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 2018 (current) and 2017 (previous) weights are shown below. Weights calculated from 2017 data were used for the fourth quarter of 2018 through the third quarter of 2019. Beginning with the fourth quarter of 2019, weights calculated using 2018 data are used. The weight for Fuel increased 3 percentage points, and Materials & Supplies' was up 0.2 percentage points. The weight for Interest stayed the same. The remaining component weights all decreased by 0.3 to 1.8 percentage points.

Weights for RCAF's All-Inclusive Index		
	2018	2017
Labor	33.0 %	34.8 %
Fuel	15.9	12.9
Materials & Supplies	5.1	4.9
Equipment Rents	5.3	5.7
Depreciation	15.0	15.7
Interest	2.1	2.1
Other	23.6	23.9
Total	100.0	100.0

Reweightings 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 2020

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.

	2018 Weights	Forecast		Percent Change
		Previous 2019Q4	Current 2020Q1	
1. Labor	33.0%	443.8	443.7	0.0 %
2. Fuel	15.9%	249.9	250.2	0.1
3. M&S	5.1%	322.9	267.0	-17.3
4. Equipment Rents	5.3%	240.7	240.1	-0.2
5. Depreciation	15.0%	225.1	225.3	0.1
6. Interest	2.1%	57.2	57.2	0.0
7. Other	23.6%	231.7	229.9	-0.8
8. Weighted Average				
a. 1980 = 100		305.1	301.8	
b. 1980 = 100 (linked)		284.8	281.7 ¹	
c. 4Q17 = 100		107.7	106.5 ²	-1.1

¹ Index80 = (Current Index / Previous Index) * the Previous Quarter Linked Index
= (301.8 / 305.1) x 284.8
= 281.7

² To calculate the 4Q17 = 100 index:
Index4Q17 = (Current Linked Index / 4Q17 Basing Factor) * 100
= 281.7 divided by 264.5 times 100
= 106.5

Indexes based on other periods:
4Q12 based index = 281.7 / 297.6 x 100 = 94.7
4Q07 based index = 281.7 / 245.9 x 100 = 114.6
4Q02 based index = 281.7 / 192.1 x 100 = 146.6
4Q97 based index = 281.7 / 173.2 x 100 = 162.6
4Q92 based index = 281.7 / 156.9 x 100 = 179.5

Forecast vs. Actual All-Inclusive Index Third Quarter 2019

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 106.0 is 2.2 index points below the forecast value of 108.2. Therefore, the forecast error adjustment for first quarter 2020 is -2.2 index points.

	2017 Weights	Third Quarter 2019		Amt Difference
		Forecast	Actual	
1. Labor	34.8%	444.7	444.7	
2. Fuel	12.9%	269.0	242.0	
3. M&S	4.9%	273.1	273.1	
4. Equipment Rents ¹	5.7%	238.0	238.9	
5. Depreciation	15.7%	229.5	225.2	
6. Interest	2.1%	62.4	62.4	
7. Other	23.9%	232.2	231.7	
8. Weighted Average				
a. 1980 = 100		309.2	305.0	
b. 1980 = 100 (linked)		286.2	280.4 ²	
c. 4Q17 = 100 ³		108.2	106.0	-2.2

Forecast error \longrightarrow **-2.2 index points**

1	2017 Weights	Third Quarter 2019	
		Forecast	Actual
Car-Hire	60.5%	221.8	222.8
Lease Rentals	39.5%	232.2	231.7
Weighted Average		225.9	226.3
Weighted Average (linked)		238.0	238.9

² Linked actual index = (actual index / previous actual index) x previous linked actual index.
 $280.4 = 305.0 / 306.5 \times 281.8$

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 March 11, 2019, the Surface Transportation Board served a decision which proposed to adopt 0.5 percent as the geometric average productivity change for the five most recent years available. Their five year rolling geometric average calculation added the year 2017 and removed the year 2012. The components of this average annual value are shown on the following table in ratio format – therefore, 1.005 is the same as an increase of 0.5 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			
2013 - 2017			
Year	Output Index (1)	Input Index (2)	Productivity Changes (3)
2013	1.022	1.018	1.003
2014	1.055	1.036	1.018
2015	0.913	0.972	0.939
2016	0.955	0.941	1.015
2017	1.045	0.992	1.053
Average			1.005
Previous Average (2012-2016)			0.996

Calculation of PAF and PAF-5			
For 2013-2017, use fourth root of avg. productivity change = 1.0012			
For 2012-2016, use fourth root of avg. productivity change = 0.9990			
Quarter	Year	PAF	PAF-5
Q1	2019	2.3593	2.5235
Q2	2019	2.3621	2.5210
Q3	2019	2.3649	2.5185
Q4	2019	2.3677	2.5160
Q1	2020	2.3705	2.5190

2012-2016

←

2013-2017

←

Rail Cost Adjustment Factor First Quarter 2020

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 2019Q4	Current 2020Q1	Percent Change
All-Inclusive Index ¹	107.7	106.5	-1.1
Preliminary RCAF ²	1.077	1.065	-1.1
Forecast Error Adjustment ³	<u>-0.002</u>	<u>-0.022</u>	
RCAF (Unadjusted) ⁴	1.075	1.043	-3.0
Productivity Adjustment Factor ⁵	<u>2.3677</u>	<u>2.3705</u>	
RCAF (Adjusted) ⁶	0.454	0.440	-3.1
PAF-5 ⁷	2.5160	2.5190	
RCAF-5 ⁸	0.427	0.414	-3.0

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 2020

The first quarter 2020 Labor Index is 0.02 percent lower than the previous quarter. Because we usually only show one digit after the decimal place, you may see the percentage displayed as 0.0% elsewhere in this filing.

Wage Rate Index

The Wage Rate Index portion of the Labor Index is up 0.4%, as a result of a few non-union wage increases. There were no new labor agreements or national general wage increases this quarter.

Wage Increases: No national agreement wage increases are currently scheduled for the first quarter. Non-union employees were assigned a 3 percent general wage increase in January 2020, following past index procedure. This matches the July 2019 wage increase received by unions that participate in national agreements.

Lump Sums: The first quarter lump sum rate increased 0.4 percent. One amount was fully amortized and removed, but it was replaced by a new amount that was similar to the one removed.

Back Pay: The back pay rate decreased by 12.5 cents (89.3%). One very large amount to account for the National IAM agreement was fully amortized and removed, leaving just three small amounts for other groups.

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 decreased by 0.5 percent.

Labor First Quarter 2020

Supplements Index

The Supplements Index decreased by 0.6 percent. 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. Lower health and welfare rates and a lower unemployment insurance rate caused the decrease this quarter.

Health & Welfare: The Health & Welfare rate is 1.1 percent lower than the previous quarter. Employer premiums (the amount the employer contributes for their employees' insurance) are lower in 2020 for many categories. See pages 4 and 5 of this appendix.

Railroad Retirement: The Railroad Retirement rate increased by 1.4 percent. Taxable wages increased slightly, and the maximum taxable earnings for Railroad Retirement's Tier I and Tier II both increased for 2020. Tax rates for employers did not change. Page 4 of this appendix lists tax rates and maximum taxable earnings for 2018 through 2020.

Unemployment Insurance: The Unemployment Insurance rate fell 22.4 cents (69.8%) because of a new unemployment insurance tax rate effective January 1. The weighted average Class I railroad rate for 2020 is 0.99%, compared to 3.38% for 2019. Basic tax rates range from a minimum of 0.65 percent to a maximum of 12 percent. In 2016 through 2019, there was surcharge applied to the minimum, but there is no surcharge in 2020. Page 4 of this appendix lists tax rates and maximum taxable earnings for 2018 through 2020.

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 7.6 cents higher than last quarter.

Labor Index Calculation

As shown in Table A-1 on the next page, the 0.4 percent increase in the Wage Rate Index and the 0.6 percent decrease in the Supplements Index combined to cause the Labor Index to fall 0.02 percent from the previous quarter. The linked first quarter 2020 Labor index is 443.7, which is 0.8 percent higher than one year ago.

Labor First Quarter 2020

Table A-1 Labor Index

	2019Q4	2020Q1	Change	
			Percent	Amount
<u>Base Wage</u> – Straight Time & Pay For Time Not Worked	\$44.153	\$44.456	0.7%	\$0.303
Adjustments:				
Lump Sum	0.544	0.546	0.4%	\$0.002
Back Pay	0.140	0.015	-89.3%	-\$0.125
Other	0.205	0.204	-0.5%	-\$0.001
Total Wages	<u>45.042</u>	<u>45.221</u>	0.4%	\$0.179
Health & Welfare Benefits	8.167	8.078	-1.1%	-\$0.089
RR Retirement & Medicare	9.204	9.330	1.4%	\$0.126
Unemployment Insurance	0.321	0.097	-69.8%	-\$0.224
Other	0.149	0.225	51.0%	\$0.076
Total Supplements	<u>\$17.841</u>	<u>\$17.730</u>	-0.6%	-\$0.111
Total Labor (as info only)	\$62.883	\$62.951		
Wage Index¹	385.5	387.0	0.4%	
Supplements Index²	659.3	655.2	-0.6%	
Total labor Index, 2018 Weights ³	464.9	464.8		
Labor Index (linked)⁴	443.8	443.7	0.0%	

¹ 1980 wage rate \$11.685

² 1980 supplements rate \$2.706

³ 2018 weights: wages, supplements 71.0% 29.0%

⁴ 2020Q1 linked Index = 2019Q4 linked x (2020Q1 / 2019Q4)
= 443.8 x 464.8 / 464.9

Labor
First Quarter 2020

Supplement Comparisons

Health and Welfare Rates

Plan	Railroad Payment Per Employee Per Month				
	2018	2019	2020	Change	
				'18-'19	'19-'20
Group Health & Welfare	\$1,584.71	\$1,607.55	\$1,606.79	1.4%	0.0%
Early Retirement Major Medical	135.96	129.38	114.37	-4.8%	-11.6%
Group Dental	63.67	63.67	63.67	0.0%	0.0%
Group Vision	8.44	8.44	8.44	0.0%	0.0%
Supplemental Sickness					
Maintenance of Way	51.63	44.82	39.94	-13.2%	-10.9%
Shop Crafts	75.48	67.87	61.93	-10.1%	-8.8%
Signalmen	44.34	41.32	38.31	-6.8%	-7.3%
Yardmasters	34.22	45.75	54.00	33.7%	18.0%

Railroad Retirement and Medicare

	Earnings Base			Employer Rate		
	2018	2019	2020	2018	2019	2020
Tier I	\$128,400	\$132,900	\$137,700	6.20%	6.20%	6.20%
Tier II	95,400	98,700	102,300	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		
2018	2019	2020	2018	2019	2020
\$1,560	\$1,605	\$1,655	3.76%	3.38%	0.99%

Labor
First Quarter 2020

NATIONAL RAILWAY LABOR CONFERENCE
EMPLOYEE BENEFITS DEPARTMENT

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November 14, 2019

Ms. Tiffany Placker
Economist
Association of American Railroads
425 Third Street, SW, Suite 1000
Washington, D.C. 20024

Dear Ms. Placker:

The revised employer Payment Rates which are effective January 1, 2020 are as follows:

Table with 2 columns: Description of benefit plan and Payment Rate. Includes items like Railroad Employees National Health & Welfare Plan, National Railway Carriers/United Transportation Union H&W Plan, etc.

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

Very truly yours,

[Handwritten signature of Susan E. Parks]

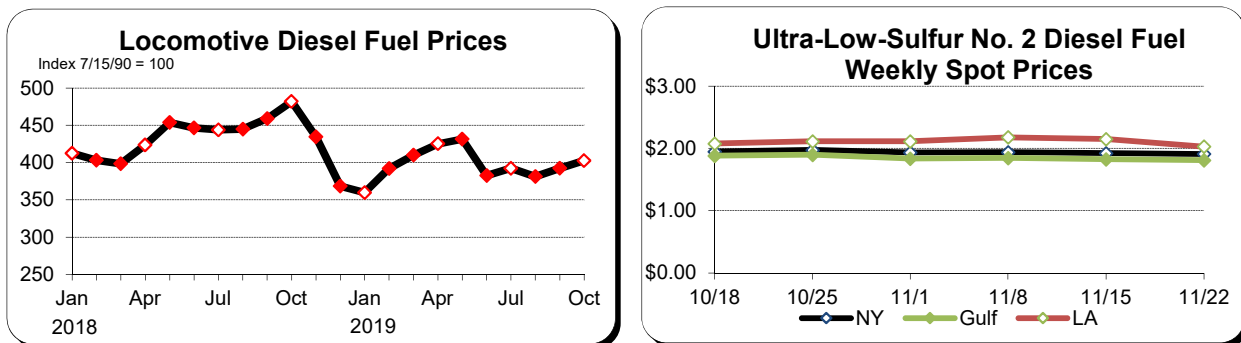
Susan E. Parks

cc: Glen Williams
Clyde Crimmel

Fuel First Quarter 2020

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 has been rising slightly from August through October. While average prices for locomotive diesel fuel are available only through October 2019, 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 25 for Ultra-Low-Sulfur Diesel Fuel* is about 2.1 percent lower than the average for October. The chart below (on left) shows the AAR's Monthly Locomotive Diesel Fuel Price Index from January 2018 through October 2019. 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 declined slightly in November from October. Railroads that responded to the AAR's forecast survey expect a very small increase by January (Q1) compared to prices that actually occurred for October (Q4). The first quarter 2020 forecast is 0.1 percent higher than the previous quarter forecast, and 0.7% higher than the prior quarter actual.

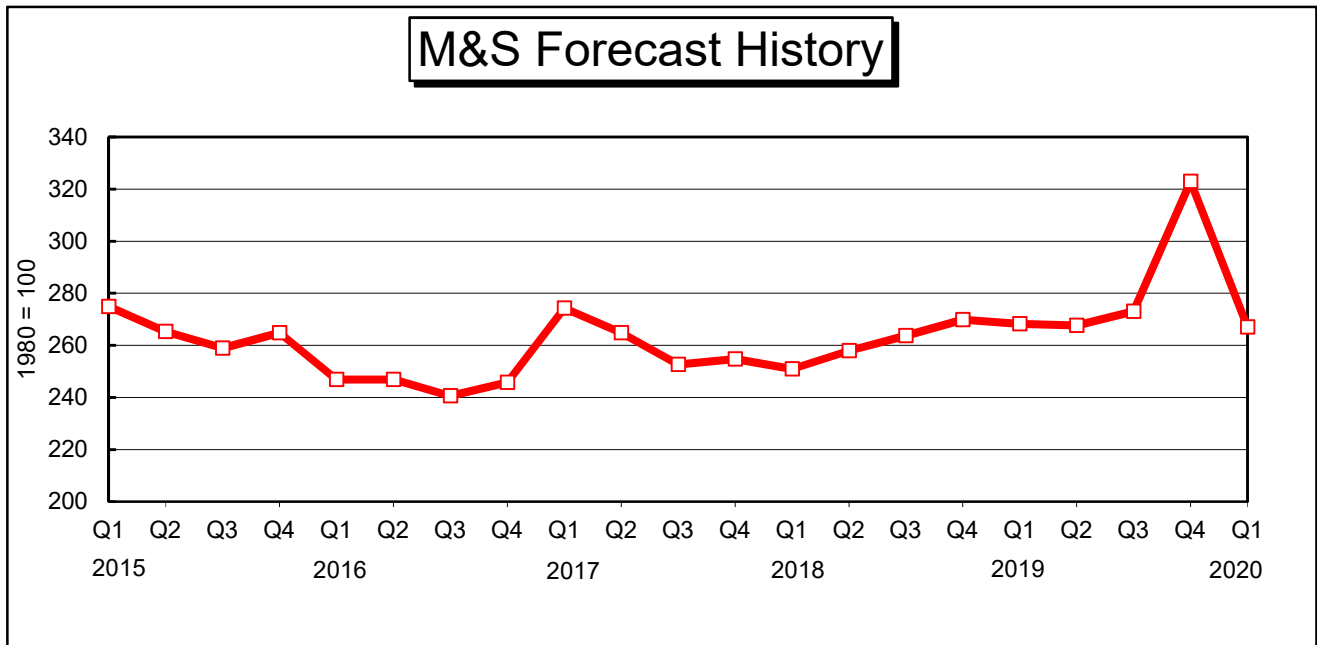
Forecast Fuel Index (1980 = 100)	250.2
Change from previous quarter forecast	0.1%
Change from previous quarter actual	0.7%

* 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.

Materials & Supplies First Quarter 2020

The first quarter 2020 Materials & Supplies Index fell 17.3 percent from the previous quarter. Prices increased for Forest Products but decreased for Miscellaneous Products. It was noted in the prior quarter's STB decision on the 2019Q4 RCAF that there was a large increase in the Materials and Supplies Index due to an increase in ballast prices. In that case, the AAR reviewed the matter and confirmed that proper procedures were followed. Because that was a one-time anomaly, the effect of the increase last quarter has been reversed, leading to a large decrease this quarter.

2020Q1 Materials & Supplies Index =	267.0
2019Q4 Materials & Supplies Index =	322.9
Difference	-55.9 basis points
	or
	-17.3 %



Equipment Rents First Quarter 2020

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

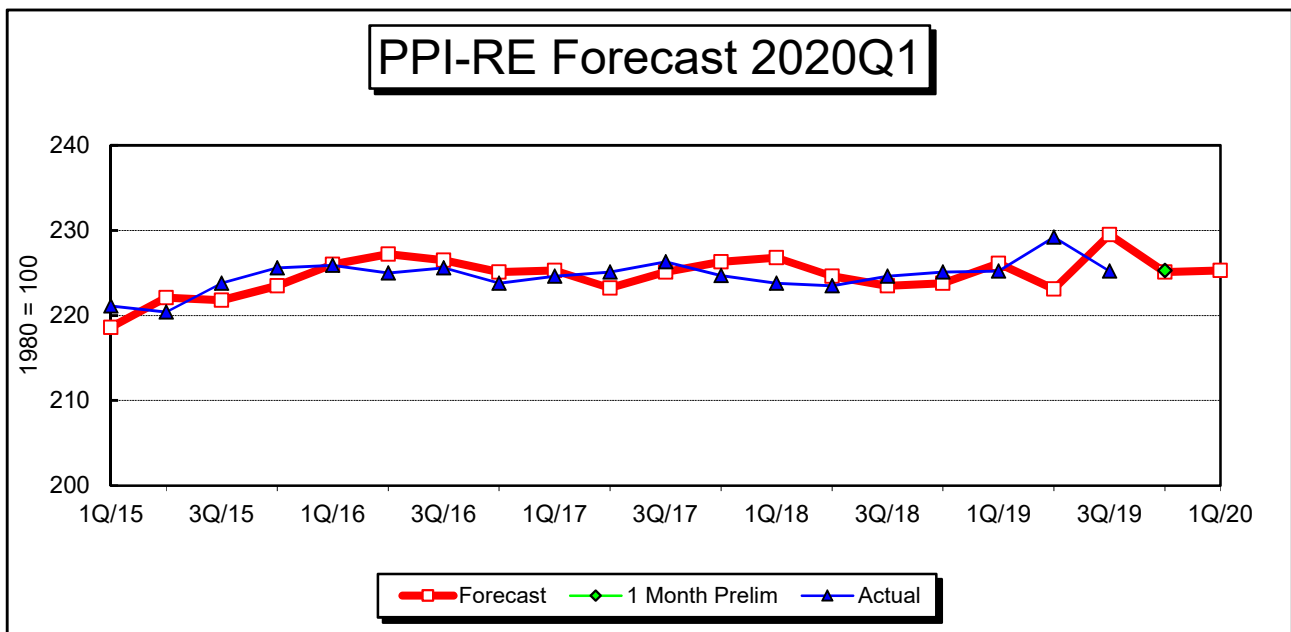
The table below shows the results of the Equipment Rents Index calculation. The first quarter Car Hire portion of the Index rose 0.04 percent (rounds to zero). The projected PPI-LF (See Appendix G) used as a proxy for Lease Rentals, fell 0.8 percent. Combined, these changes caused the Equipment Rents Index to fall 0.2 percent.

	2018	2019Q4	2020Q1	Percent Change
Car Hire	59.1%	226.7	226.8	0.0 %
Lease Rentals	40.9%	231.7	229.9	-0.8
Weighted Average		228.7	228.1	-0.3
Weighted Average (Linked)		240.7	240.1	-0.2

Depreciation First Quarter 2020

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 0.1% higher than the previous quarter's forecast, but is equal to the previous quarter's actual.

Forecast of Depreciation Index (1982=100)	203.7
Forecast of Depreciation Index (1980=100)	225.3
Change from previous quarter forecast	0.1%
Change from actual first month of previous quarter	0.0% = 0.00%
Change from same quarter of prior year (actual)	0.0%



Depreciation First Quarter 2020

PPI RAILROAD EQUIPMENT

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 1.53 and for Box-Jenkins was 1.48. 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 Box-Jenkins.

Model Details

Expert selection

Box-Jenkins
ARIMA(0, 1, 0)

Within-Sample Statistics

Sample size	72	No. parameters	0
Mean	201.78	Std. deviation	2.52
R-square	0.83	Adj. R-square	0.84
Durbin-Watson	2.45	Ljung-Box(18)	21.7 P=0.75
Forecast error	1.02	BIC	1.02
MAPE	0.34	SMAPE	0.34
RMSE	1.02	MAD	0.68
MAD/Mean Ratio	0		

Actual Values for the Most Recent 6 Periods:

Actual

2019-May	203.4
2019-Jun	203.4
2019-Jul	203.5
2019-Aug	203.5
2019-Sep	203.7
2019-Oct	203.7

Forecasted Values

Date	2.5 Lower	Forecast	97.5 Upper
2019-Nov	201.685	203.700	205.715
2019-Dec	200.850	203.700	206.550
2020-Jan	200.210	203.700	207.190
2020-Feb	199.670	203.700	207.730
2020-Mar	199.194	203.700	208.206
QTR AVG	199.691	203.700	207.709

Interest First Quarter 2020

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 2018 data, and was updated in the Q4 filing submitted on September 5, 2019. The Interest Index based on 2018 decreased to 57.2 from 62.4 in 2017, and is the lowest in recent history. It is close to the 2015 level, which reached 57.5.

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 Obligations
43	Non-Current Liabilities: Debt in Default
44	Non-Current Liabilities: Accounts Payable: Affiliated Companies
45	Non-Current Liabilities: Unamortized Debt Premium

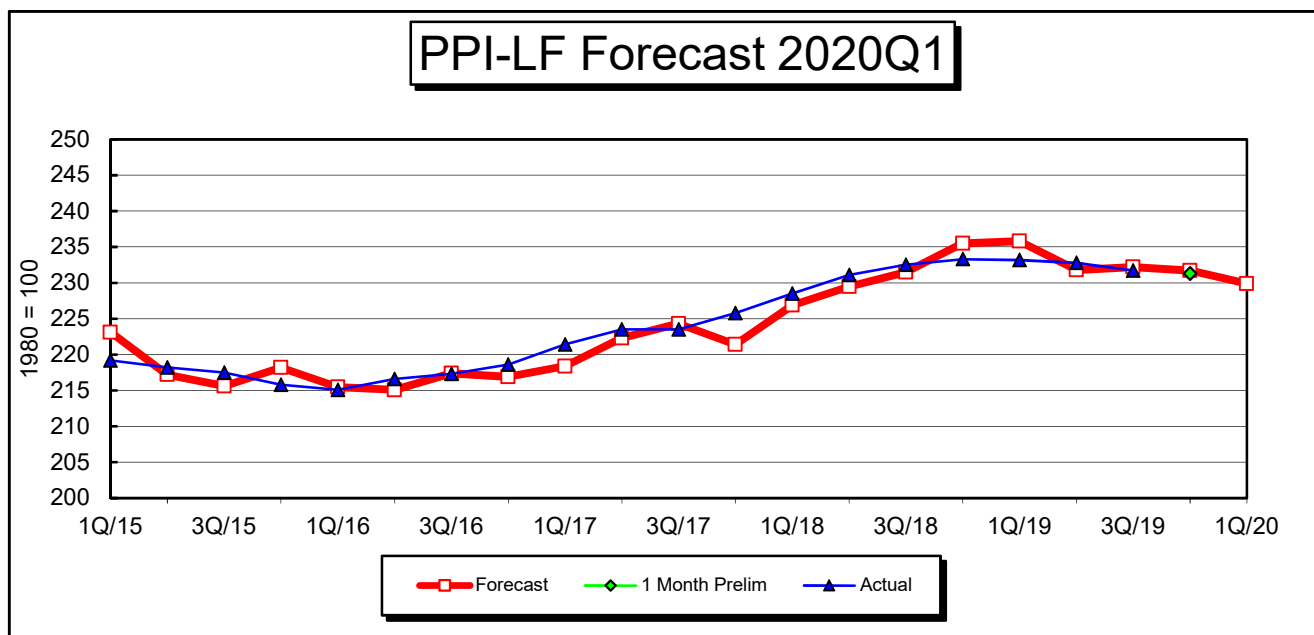
2018	Interest Rate	4.49%
1980	Interest Rate	7.85%
2020Q1	Interest Index	57.2
2019Q4	Interest Index	57.2
	Percent Change	0.0%

Other Expenses First Quarter 2020

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 0.8 percent lower than the prior quarter forecast.

Forecast of Other Expense Index (1982=100)	205.1
Forecast of Other Expense Index (1980=100)	229.9
Change from previous quarter forecast	-0.8%
Change from actual first month of previous quarter	-0.6%
Change from same quarter of prior year (actual)	-1.4%



Other Expenses

First Quarter 2020

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

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 1.78 and for Box-Jenkins was 1.94.
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(0.912, 0.653, 1.000)**

Confidence limits proportional to indexes

Component	Smoothing Wgt		Final Value
Level	0.9124		206.1
Trend	0.6531		-0.2637
Seasonal	0.9999		
Seasonal Indexes			
Jan - Mar	1.001	1	0.9998
Apr - Jun	0.9996	0.9995	0.9996
Jul - Sep	1	1	0.9994
Oct - Dec	1.001	1	0.9995

Within-Sample Statistics

Sample size	72	No. parameters	3
Mean	199.48	Std. deviation	5.52
R-square	0.99	Adj. R-square	0.99
Durbin-Watson	1.62	Ljung-Box(18)	26.6 P=0.91
Forecast error	0.42	BIC	0.45
MAPE	0.17	SMAPE	0.17
RMSE	0.41	MAD	0.34
MAD/Mean Ratio	0		

Actual Values for the Most Recent 6 Periods:

Date	Actual
2019-May	207.7
2019-Jun	207.1
2019-Jul	207.3
2019-Aug	206.8
2019-Sep	206.1
2019-Oct	206.3

Forecasted Values

Date	2.5 Lower	Forecast	97.5 Upper
2019-Nov	205.019	205.894	206.769
2019-Dec	203.865	205.447	207.03
2020-Jan	203.439	205.499	207.559
2020-Feb	202.608	205.054	207.501
2020-Mar	201.945	204.724	207.504
QTR AVG	202.664	205.092	207.521

Railroad and Union Abbreviations

First Quarter 2020

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.)
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)