ASSOCIATION
OF AMERICAN
RAILROADS

John T. Gray   March 5, 2019
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

Dear Ms. Brown:

        This submission is the AAR forecast of the second quarter 2019 All-Inclusive Index and Rail
Cost Adjustment Factor, filed in Ex Parte No. 290 (Sub-No. 5) (2019-2) *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 second quarter 2019 results and compares to the previous quarter. Both
quarters are shown on a 4Q\2017=100 base.

	2019Q1	2019Q2	% Change
All-Inclusive Index	107.1	106.6	-0.5
Preliminary RCAF	1.071	1.066	-0.5
Forecast Error Adjustment	-0.013	-0.003	
RCAF (Unadjusted)	1.058	1.063	0.5
Productivity Adjustment Factor[1]	2.3593	2.3593	
RCAF (Adjusted)	0.448	0.451	0.7
PAF-5[1]	2.5235	2.5235	
RCAF-5	0.419	0.421	0.5

[1] See page 2 of this cover letter, as well as the Introduction and Productivity pages for more information. The PAF
   and PAF-5 for 2019Q2 are equal to 2019Q1 because the Board has not issued new productivity figures.
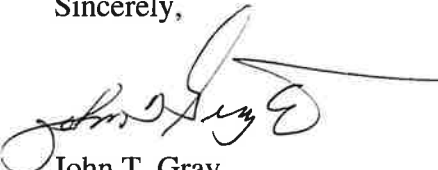
In its October 3, 1996 decision in Ex Parte No. 290 (Sub-No. 7), *Productivity Adjustment - Implementation,* the STB noted its intent to publish, in addition to the RCAF (Unadjusted) and RCAF (Adjusted), an RCAF-5 (i.e., a calculation of the productivity adjusted RCAF values as if the agency had always 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.

Late on March 4, 2019, the Board served a decision regarding the Railroad Cost Recovery Procedures - Productivity Adjustment that states "the Board has not yet issued the productivity change for 2017 and for the 2013-2017 averaging period". The decision directed the AAR to choose a methodology for applying a productivity adjustment to this quarter's filing, and to clearly note what method was chosen. The AAR has chosen to use last year's productivity figures in this March 5 filing; therefore, the productivity figures this second quarter match those that were used in the first quarter of 2019.

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,

John T. Gray

Attachments

**Second Quarter 2019
All-Inclusive Index**

Ex Parte No. 290 (Sub-No. 5) (2019-2)

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

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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 second quarter 2019. Late on March 4, 2019, the Board served a decision regarding the Railroad Cost Recovery Procedures - Productivity Adjustment that states "the Board has not yet issued the productivity change for 2017 and for the 2013-2017 averaging period". The decision directed the AAR to choose a methodology for applying a productivity adjustment to this quarter's filing, and to clearly note what method was chosen. The AAR has chosen to use last year's productivity figures in this March 5 filing; therefore, the productivity figures this second quarter match those that were used in the first quarter 2019.

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 2017 (current) and 2016 (previous) weights are shown below. Weights calculated from 2016 data were used for the fourth quarter of 2017 through the third quarter of 2018. Beginning with the fourth quarter of 2018, weights calculated using 2017 data are used.

The weight for Fuel increased 2.3 percentage points, and Depreciation's was up 0.2 percentage points. The remaining component weights all decreased by 0.1 to 1.0 percentage points. Although expenses were higher in every category except Equipment Rents, Fuel and Depreciation had the highest percentage increases in expenses. Traffic and fuel prices were up in 2017, causing fuel expenses to be 27 percent higher. Depreciation expenses increased 6.2 percent, possibly caused by higher capital expenditures in recent years and spending on positive train control. Labor expenses were up 3.4 percent, but Labor's weight decreased.

Weights for RCAF's All-Inclusive Index		
	2017	**2016**
Labor	35.0 %	35.6 %
Fuel	13.0	10.7
Materials & Supplies	4.9	5.0
Equipment Rents	5.2	5.9
Depreciation	15.8	15.6
Interest	2.1	2.2
Other	24.0	25.0
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
Second Quarter 2019

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.

| | | Forecast | | |
| | 2017 | Previous | Current | Percent |
	Weights	2019Q1	2019Q2	Change
1. Labor	35.0%	440.3	439.7	-0.1 %
2. Fuel	13.0%	256.8	259.2	0.9
3. M&S	4.9%	268.3	267.6	-0.3
4. Equipment Rents	5.2%	236.7	237.5	0.3
5. Depreciation	15.8%	226.1	223.1	-1.3
6. Interest	2.1%	62.4	62.4	0.0
7. Other	24.0%	235.8	231.8	-1.7
8. Weighted Average				
a. 1980 = 100		306.6	305.2	
b. 1980 = 100 (linked)		283.3	282.0 [1]	
c. 4Q17 = 100		107.1	106.6 [2]	-0.5

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

$$= \quad (305.2 \quad / \quad 306.6) \quad x \quad 283.3$$

$$= \quad 282.0$$

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

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

$$= \quad 282.0 \quad \text{divided by} \quad 264.5 \quad \text{times 100}$$

$$= \quad 106.6$$

Indexes based on other periods:
4Q12 based index = 282.0 / 297.6 x 100 = 94.8
4Q07 based index = 282.0 / 245.9 x 100 = 114.7
4Q02 based index = 282.0 / 192.1 x 100 = 146.8
4Q97 based index = 282.0 / 173.2 x 100 = 162.8
4Q92 based index = 282.0 / 156.9 x 100 = 179.7

Forecast vs. Actual All-Inclusive Index
Fourth Quarter 2018

Because of data availability, the forecast error adjustment has a two-quarter lag from each filing. As shown below, the fourth quarter actual index of 107.8 is 0.3 index points below the forecast value of 108.1. Therefore, the forecast error adjustment for second quarter 2019 is -0.3 index points.

	2017 Weights	Fourth Quarter 2018 Forecast	Fourth Quarter 2018 Actual	Amt Difference
1. Labor	35.0%	439.2	439.2	
2. Fuel	13.0%	283.9	297.4	
3. M&S	4.9%	269.8	269.8	
4. Equipment Rents[1]	5.2%	236.4	235.9	
5. Depreciation	15.8%	223.8	225.1	
6. Interest	2.1%	62.4	62.4	
7. Other	24.0%	235.5	233.3	
8. Weighted Average				
a. 1980 = 100		309.3	310.7	
b. 1980 = 100 (linked)		285.8	285.2 [2]	
c. 4Q17 = 100[3]		108.1	107.8	-0.3

Forecast error ⟶ -0.3 index points

Notes: New weights have been utilized. The standard linking procedure has been used to eliminate any changes to indexes that would be caused by updating weights. The Q3 unlinked weighted averages for the All-Inclusive Indexes (forecast and actual) and for Equipment Rents (forecast and actual) were recalculated using the new (2017) weights.

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[1]

	2017 Weights	Fourth Quarter 2018 Forecast	Fourth Quarter 2018 Actual
Car-Hire	61.5%	216.9	217.1
Lease Rentals	38.5%	235.5	233.3
Weighted Average		224.1	223.3
Weighted Average (linked)		236.4	235.9

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

$$285.2 \quad = \quad 310.7 \quad / \quad 305.2 \quad \times \quad 280.2$$

[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

Late on March 4, 2019, the Board served a decision regarding the Railroad Cost Recovery Procedures - Productivity Adjustment that states "the Board has not yet issued the productivity change for 2017 and for the 2013-2017 averaging period". The decision directed the AAR to choose a methodology for applying a productivity adjustment to this quarter's filing, and to clearly note what method was chosen. The AAR has chosen to use last year's productivity figures in this March 5 filing; therefore, the productivity figures this second quarter match those that were used in the first quarter of 2019.

These numbers are derived from a decision served February 8, 2018, which proposed to adopt -0.4 percent as the geometric average productivity change for the five most recent years available. Their five year rolling geometric average calculation added the year 2016 and removed the year 2011. The components of this average annual value are shown on the following table in ratio format – therefore, 0.996 is the same as a decrease of 0.4 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
2012 - 2016

Year	Output Index (1)	Input Index (2)	Productivity Changes (3)
2012	1.007	0.999	1.008
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
Average			**0.996**
Previous Average (2011-2015)			0.994

Calculation of PAF and PAF-5

For 2012-2016, use fourth root of avg. productivity change = 0.9990
For 2011-2015, use fourth root of avg. productivity change = 0.9985

Quarter	Year	PAF	PAF-5	
Q1	2018	2.3689	2.5374	2011-2015
Q2	2018	2.3665	2.5336	
Q3	2018	2.3641	2.5298	2012-2016
Q4	2018	2.3617	2.5260	
Q1	2019	2.3593	2.5235	

Rail Cost Adjustment Factor
Second Quarter 2019

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). Because new productivity figures have not been issued yet (see Introduction and Productivity pages), the AAR is using the same Productivity Adjustment Factor and PAF-5 as were used in the prior quarter (2019Q1). 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 2019Q1	Current 2019Q2	Percent Change
All-Inclusive Index[1]	107.1	106.6	-0.5
Preliminary RCAF[2]	1.071	1.066	-0.5
Forecast Error Adjustment[3]	-0.013	-0.003	
RCAF (Unadjusted)[4]	1.058	1.063	0.5
Productivity Adjustment Factor[5]	2.3593	2.3593	
RCAF (Adjusted)[6]	0.448	0.451	0.7
PAF-5[7]	2.5235	2.5235	
RCAF-5[8]	0.419	0.421	0.5

[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
Second Quarter 2019

The second quarter 2019 Labor Index decreased very slightly by 0.1 percent from the previous quarter.

Wage Rate Index

The Wage Rate Index portion of the Labor Index is lower by 0.1 percent. This was caused by a decrease in the amount of back pay.

Wage Increases: There are no national, independent, or non-union wage increases scheduled for the second quarter 2019.

Lump Sums: The second quarter lump sum rate is up by 14 cents. Five amounts (one quarterly and four annual) were fully amortized and removed, but they were replaced by four new amounts (one quarterly and three annual). Two of the new annual bonuses were bigger than the previous year, which caused the increase this quarter.

Back Pay: The back pay rate decreased 18.9 cents, or 24%. Five amounts were fully amortized and removed, while only one small new amount was added.

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. This rate is unchanged from the previous quarter.

Labor
Second Quarter 2019

Supplements Index

The Supplements Index decreased 0.2 percent. This was due mostly to a lower amount for fringe benefits.

Health & Welfare: The Health & Welfare rate is unchanged from the previous quarter.

Railroad Retirement: The Railroad Retirement rate decreased 0.8 cents, or 0.1 percent due to slightly lower taxable wages.

Unemployment Insurance: The Unemployment Insurance rate is unchanged from the previous quarter.

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 second quarter rate is 2.2 cents lower 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 0.2 percent decrease in the Supplements Index combined to cause the Labor Index to fall 0.1 percent from the previous quarter. The linked second quarter 2019 Labor index is 439.7, which is 4.1 percent higher than one year ago.

Labor
Second Quarter 2019

Table A-1 Labor Index

	2019Q1	2019Q2	Change Percent	Amount
<u>Base Wage</u> – Straight Time & Pay For Time Not Worked	$42.813	$42.813	0.0%	$0.000
Adjustments:				
Lump Sum	0.399	0.539	35.1%	$0.140
Back Pay	0.773	0.584	-24.5%	-$0.189
Other	0.182	0.182	0.0%	$0.000
Total Wages	44.167	44.118	-0.1%	-$0.049
Health & Welfare Benefits	8.302	8.302	0.0%	$0.000
RR Retirement & Medicare	9.124	9.116	-0.1%	-$0.008
Unemployment Insurance	0.333	0.333	0.0%	$0.000
Other	0.234	0.212	-9.4%	-$0.022
Total Supplements	$17.993	$17.963	-0.2%	-$0.030
Total Labor (as info only)	$62.160	$62.081		
Wage Index[1]	378.0	377.6	-0.1%	
Supplements Index[2]	664.9	663.8	-0.2%	
Total labor Index, 2017 Weights[3]	465.5	464.9		
Labor Index (linked)[4]	**440.3**	**439.7**	-0.1%	

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[1] 1980 wage rate $11.685

[2] 1980 supplements rate $2.706

[3] 2017 weights: wages, supplements   69.5%   30.5%

[4] 2019Q2 linked Index = 2019Q1 linked x (2019Q2 / 2019Q1)

                   =   440.3   x   464.9 /   465.5

Fuel
Second Quarter 2019

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 trending upward since June 2017, and reached a peak in October 2018, before falling for the next three months. While average prices for locomotive diesel fuel are available only through January 2019, data through four weeks of February are available for related fuel types. According to the Energy Information Administration, the daily spot price as of February 25 for Ultra-Low-Sulfur Diesel Fuel* is about 7.6 percent higher than the average for January. The chart below (on left) shows the AAR's Monthly Locomotive Diesel Fuel Price Index from October 2017 through January 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.
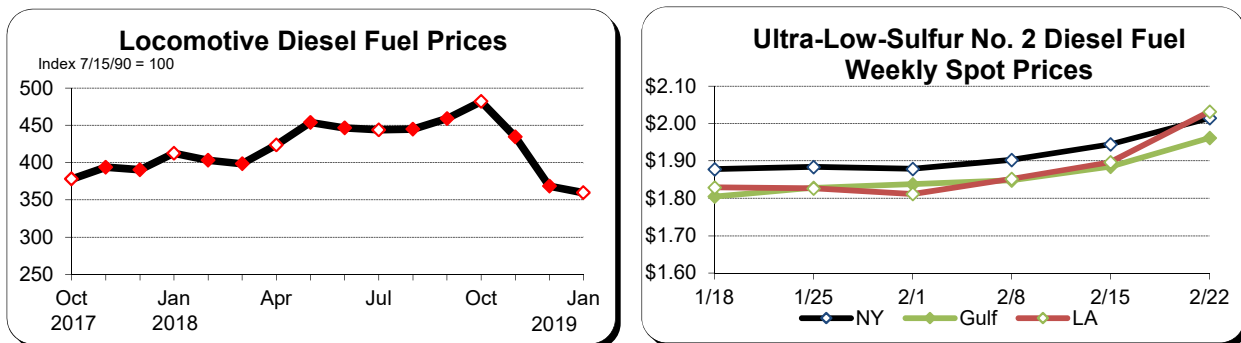
In its *This Week in Petroleum* report released February 27, the U.S. Energy Information Administration said that U.S. average regular gasoline and diesel fuel prices have increased about 7 cents since the prior week. Railroads that responded to the forecast survey expect price increases by April (Q2) compared to prices that actually occurred for January (Q1). The second quarter 2019 forecast is 0.9 percent higher than the previous quarter forecast.

Forecast Fuel Index (1980 = 100)	259.2
Change from previous quarter forecast	0.9%
Change from previous quarter actual	16.2%

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* 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.
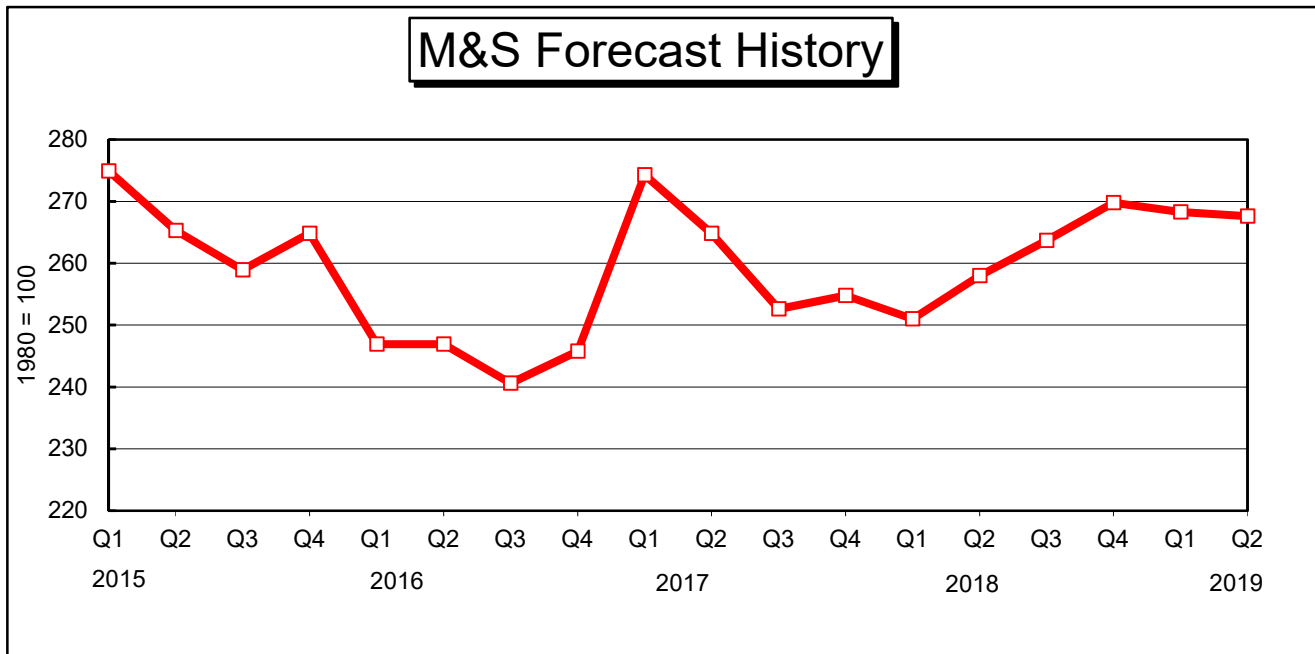
Materials & Supplies
Second Quarter 2019

The second quarter 2019 Materials & Supplies Index is down 0.3 percent from the previous quarter. Prices decreased for Metal Products and Miscellaneous Products.

2019Q2 Materials & Supplies Index = 267.6
2019Q1 Materials & Supplies Index = 268.3

    Difference   -0.7 basis points
             or
           -0.3 %

M&S Forecast History

Equipment Rents
Second Quarter 2019

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 second quarter Car Hire portion of the Index rose 1.8 percent because of higher rates for tank cars and auto racks. The projected PPI-LF (See Appendix G) used as a proxy for Lease Rentals, fell 1.7 percent. Combined, these changes caused the Equipment Rents Index to rise 0.3 percent.

	2017 Weight	2019Q1	2019Q2	Percent Change
Car Hire	61.5%	217.2	221.1	1.8 %
Lease Rentals	38.5%	235.8	231.8	-1.7
Weighted Average		224.4	225.2	0.4
Weighted Average (Linked)		236.7	237.5	0.3

Depreciation
Second Quarter 2019

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 a 1.3 percent decrease from the previous quarter's forecast.

Forecast of Depreciation Index (1982=100)	201.7
Forecast of Depreciation Index (1980=100)	223.1
Change from previous quarter forecast	-1.3%
Change from actual first month of previous quarter	0.1% = 0.13%
Change from same quarter of prior year (actual)	-0.2%

PPI-RE Forecast 2019Q2

Legend: ■ Forecast   ◆ 1 Month Prelim   ▲ Actual
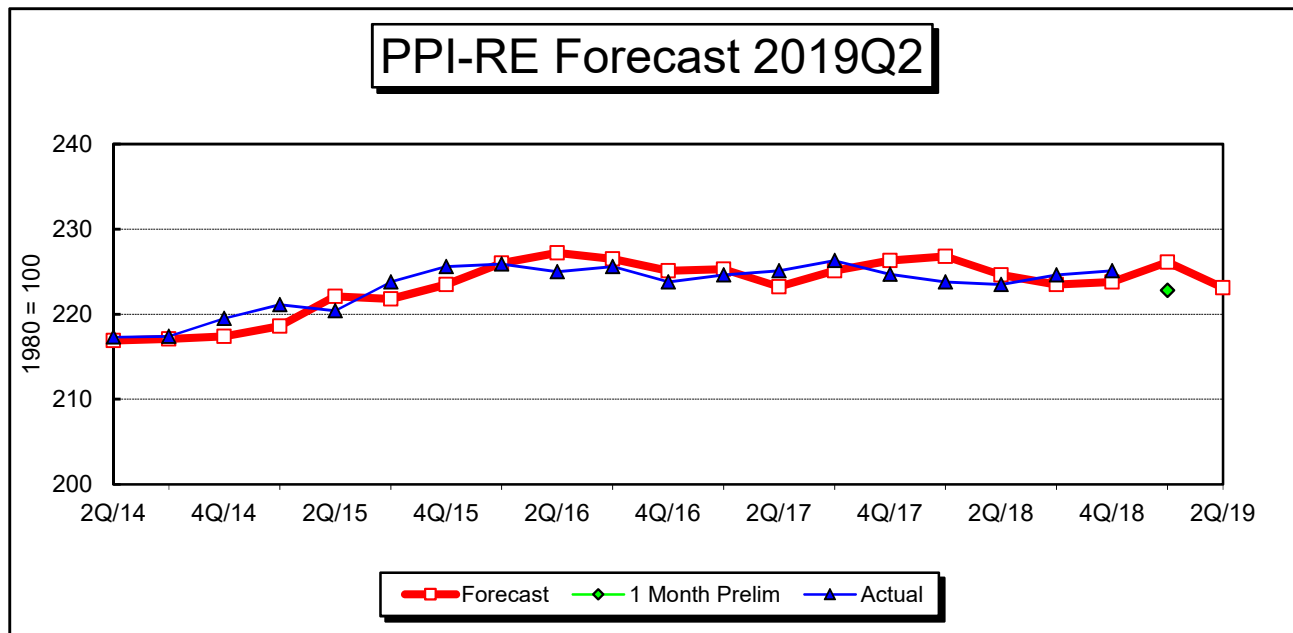
Depreciation
Second Quarter 2019

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 1.42 and for Box-Jenkins was 1.40.
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, 1)

Term	Coefficient	Std. Error	t-Statistic	Significance
b[1]	0.3341	0.1149	2.908	0.9951

Within-Sample Statistics

Sample size	72	No. parameters	1
Mean	200.84	Std. deviation	3.17
R-square	0.89	Adj. R-square	0.89
Durbin-Watson	1.98	Ljung-Box(18)	8.6 P=0.03
Forecast error	1.07	BIC	1.09
MAPE	0.38	SMAPE	0.38
RMSE	1.06	MAD	0.77
MAD/Mean Ratio	0		

Actual Values for the Most Recent 6 Periods:

Actual	
2018-Aug	204.1
2018-Sep	201.1
2018-Oct	204.6
2018-Nov	204.6
2018-Dec	201.3
2019-Jan	201.4

Forecasted Values

Date	2.5 Lower	Forecast	97.5 Upper
2019-Feb	199.611	201.703	203.795
2019-Mar	199.189	201.703	204.217
2019-Apr	198.829	201.703	204.577
2019-May	198.509	201.703	204.897
2019-Jun	198.219	201.703	205.187
QTR AVG	198.519	201.703	204.887

Interest
Second Quarter 2019

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 2017 data, and was updated in the Q4 filing submitted on September 5, 2018. The Interest Index based on 2017 increased slightly from 2016's all-time low. Interest rates for 10- and 30-year U.S. Treasury Bonds, and Corporate AAA bonds, also increased from 2016 to 2017. Changes in the mix of maturities for the debt portfolio can also cause changes in the railroad average.

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

2017	Interest Rate	4.90%
1980	Interest Rate	7.85%
2019Q2	**Interest Index**	**62.4**
2019Q1	Interest Index	62.4
	Percent Change	0.0%

Other Expenses
Second Quarter 2019

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 1.7 percent lower than the prior quarter forecast.

Forecast of Other Expense Index (1982=100)	206.8
Forecast of Other Expense Index (1980=100)	231.8
Change from previous quarter forecast	-1.7%
Change from actual first month of previous quarter	-0.4%
Change from same quarter of prior year (actual)	0.3%
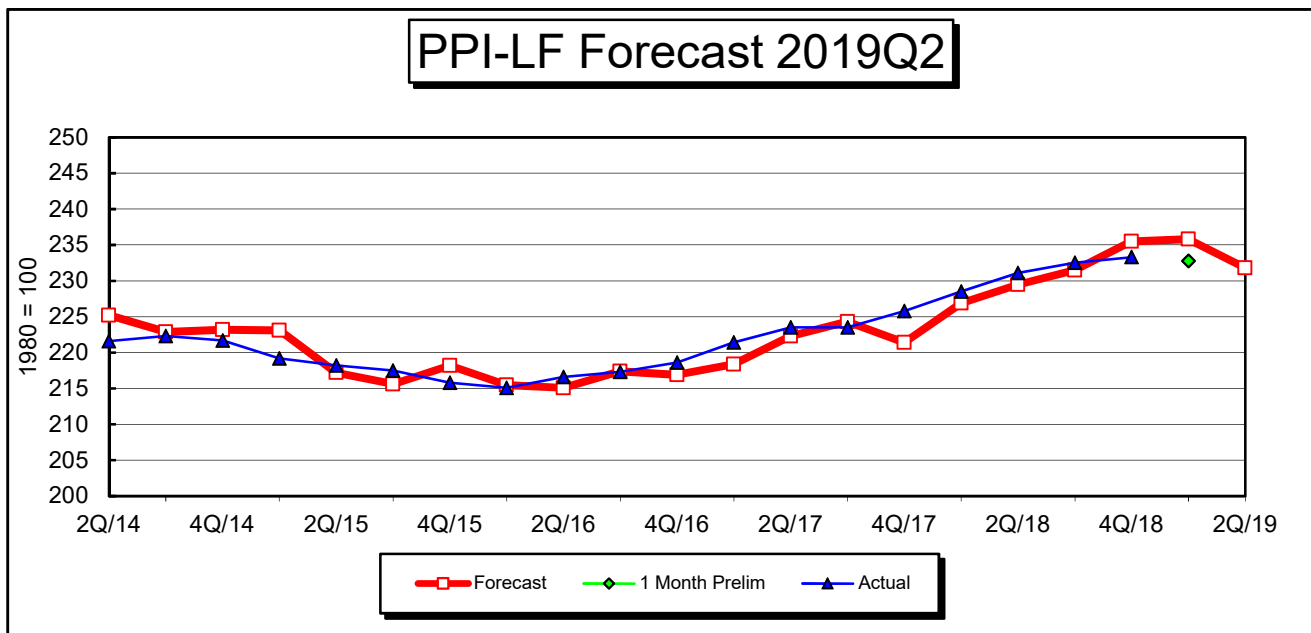
Other Expenses
Second Quarter 2019

**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 2.02 and for Box-Jenkins was 2.08.
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.

Expert selection
Multiplicative Winters: Linear trend, Multiplicative seasonality
LM(0.930, 0.826, 0.996)
Confidence limits proportional to indexes

Component	Smoothing Wgt		Final Value
Level	0.9304		207.5
Trend	0.8261		-0.1718
Seasonal	0.9965		
Seasonal Indexes			
Jan - Mar	1.001	0.9999	0.9997
Apr - Jun	0.9998	0.9996	0.9998
Jul - Sep	0.9997	1	0.9995
Oct - Dec	1.001	1.001	0.9998

Within-Sample Statistics

Sample size	72	No. parameters	3
Mean	197.99	Std. deviation	4.68
R-square	0.99	Adj. R-square	0.99
Durbin-Watson	1.79	Ljung-Box(18)	22.4 P=0.79
Forecast error	0.37	BIC	0.4
MAPE	0.15	SMAPE	0.15
RMSE	0.37	MAD	0.3
MAD/Mean Ratio	0		

Actual Values for the Most Recent 6 Periods:

Date	Actual
2018-Aug	207.6
2018-Sep	207.9
2018-Oct	208.3
2018-Nov	208.3
2018-Dec	207.6
2019-Jan	207.7

Forecasted Values

Date	2.5 Lower	Forecast	97.5 Upper
2019-Feb	206.561	207.345	208.129
2019-Mar	205.575	207.12	208.665
2019-Apr	204.932	206.972	209.012
2019-May	204.323	206.759	209.195
2019-Jun	203.863	206.639	209.415
QTR AVG	204.373	206.790	209.207

Association of American Railroads

Railroad and Union Abbreviations
Second Quarter 2019

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)