

Declaration of Robert Fisher: TFP Accuracy for Performance-based Rate Authority February 3, 2020

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Introduction

This declaration is made by Robert Fisher.

Biographical Information

Robert Fisher was an executive with the U.S. Postal Service (USPS) for 26 years, taking an early retirement in 2009. He started as an industrial engineer with both a Bachelor's and a Master's degree in Industrial Engineering from the University of Wisconsin. He held positions of increasing responsibility in field operations, including Senior Plant Manager and Area executive positions.

At USPS Headquarters he worked with parcel shippers and mailers as the Manager, Service Performance Improvement, initially to implement Parcel Select in operations. He was honored by the Parcel Shippers Association with the George Shannon Award in 2004. In 2008 he began the implementation of the Operations Industrial Engineer (OIE) program. Mr. Fisher was responsible for the creation of numerous performance reporting and operational planning programs. He created the Business Management Guide (BMG) that was used nationally for complement and financial performance planning.

Mr. Fisher has worked in international and domestic postal consulting since 2011. International projects have included operations modernization projects with Russian Post, Canada Post, and Serbian Post. These projects involved postal logistics center design, equipment requirement determination, operational simulation modeling, workroom floor layout and implementation planning.

Mr. Fisher was the lead consultant and principle author of the two papers produced for the Postal Regulatory Commission (PRC) on Total Factor Productivity (TFP) under the project Measuring Postal Service Efficiency in 2017. These papers were incorporated into the RM2017-3 docket as part of the Revised Notice of Proposed Rulemaking as Order 5337.¹

In 2019 he established Fisher Postal Analytics. He has been doing research and development on Postal Service performance measurement metrics using public data.

Purpose of Declaration

The purpose of this declaration is to evaluate the accuracy and validity of TFP as the measurement for the operational efficiency-based requirement of the performance-based rate authority in the RM2017-3 Revised Notice of Proposed Rulemaking (NPRM). This declaration is focused narrowly on TFP as a measurement and does not address the broader issues of the performance-based rate authority proposal.

¹ Northwest Postal Consulting for the Postal Regulatory Commission: Report 1, Adequacy of the Postal Service's TFP Model and Report 2, Postal Service Productivity Measurement: Before and After PAEA Enactment.

Executive Summary

The Postal Regulatory Commission (PRC), under Docket R2017-3, issued a Revised Notice of Proposed Rulemaking (NPRM) as Order 5337. The Performance-based Rate Authority mechanism was revised from the original NPRM. The measurement used for the operational efficiency-based requirement remains Total Factor Productivity (TFP)². This document is intended to answer the question:

Is TFP a valid and accurate measurement for an operational efficiency-based requirement in a performance-based rate authority?

Summary concerns that are identified with TFP demonstrate that TFP is not a valid or accurate operational efficiency-based measurement for performance-based rate authority as currently configured:

1. TFP can have a false positive result due to inappropriate factors and component value issues in its calculation methodology.
2. The TFP result cannot be independently validated and the methodology is not transparent. Adjustments are made to the methodology that result in values different than those using the published formula.
3. TFP includes inputs that are beyond the control of the Postal Service or not reflective of the purpose for the operational efficiency-based rate authority mechanism.

The following specific aspects that support the summary concerns are documented in this declaration:

1. The Composition of Labor Input (CLI) is a not a valid productivity input. CLI would have directly caused a false positive result in 2015.
2. National labor costs of approximately seven (7) billion dollars are not reflected in the Labor Input and Labor Productivity result. The year over year difference in national labor costs are omitted from the Labor Input result. This additional seven billion dollars is included in the weighting between Labor, Materials, and Capital in the calculation of the Total Input. The addition of these seven billion dollars in the weighting calculation causes a higher productivity result.
3. The TFP Labor dollars are overstated by over a billion dollars compared to Cost Segment / National Trial Balance (NTB) costs, increasing the productivity result. This overstatement cannot be explained through the current documentation.

² Order 5337, at 148-150

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4. Some Bureau of Labor Statistics (BLS) metrics used in the Material Index calculations have different source values than those used in TFP, distorting the final Material Index result. Other categories use metrics that are not publicly identified or use non-public data. The impact cannot be determined due to outdated documentation and lack of transparency in the calculation methodology.
5. Workload cannot be validated due to non-public data use. Further, in 2017, the weighting value used for mail volume was shifted from Attributable Cost to Volume Variable Cost. Some workload data in TFP does not match the data values in CRA.

TFP in its current form should not be used for the measurement of the operational efficiency-based requirement in the performance-based rate authority due to these aspects as identified and documented in this declaration.

TFP Accuracy for Rate Authority Determination

TFP is proposed as the measurement for the operational efficiency-based requirement for the performance-based rate authority. This section will evaluate aspects of the TFP methodology that impact the accuracy of TFP results as the operational efficiency-based measurement for rate authority purposes. The concerns documented here are based on results from 2016 through 2018 using public PRC documents. This report uses the TFP Final Results (TFP tables) from FY2018.³

Labor Input

The Labor Input represents approximately seventy five (75) percent of total dollar inputs used in TFP.⁴ The term “value” is also used in TFP to refer to dollars or to dollars adjusted for inflation. There are aspects to the Labor Input components and process methodology that directly change the TFP result. These changes can result in a “false positive” result under the proposed operational efficiency-based requirement. A false positive did occur in 2015 based on a single inappropriate factor. There is credible potential for a future false positive under the operational efficiency-based requirement of the performance-based rate authority.

The Labor Input is derived from the change in workhours over the previous year by employee category, with these workhour changes weighted by the share of cost of each employee category. National Payroll Hours System (NPHS) data is used as the source for the workhour and dollar mix between employee categories.⁵

³ USPS Annual Tables, Excel File: *Table Annual 2018 – 2018 CRA Public*, PRC Daily Listing, July 16, 2019, “As Revised February 11, 2019”.

⁴ Ibid

⁵ “*Formulas for Total Factor Productivity, Labor Productivity, Postal Inflation, and the Aggregate Labor Price Index*”, PRC Filing 68582, June 23, 2010.

Composition of Labor Index

The Composition of Labor Index (CLI) is a factor applied to workhours to adjust for the “employee experience level”. Employee experience level, as measured by years of service, is assumed in TFP to be a key determinant in labor productivity performance. This assumption is flawed on its face, as most of the Postal Service work is not skilled in the professional sense, with no justification that an employee with one (1) year of experience would be more or less productive than an employee with fifteen (15) years of experience.

The CLI factor is examined in detail in the PRC report by Northwest Postal Consulting.⁶ In their report, it is shown that CLI had no substantial impact on the TFP result before 2015. The report did note that the first small but noticeable impact change appeared in 2016, the last year of the analysis.⁷ Since 2015, CLI has been distorting the TFP result at increasing levels. Its inclusion could lead to a false positive result under the proposed performance-based rate based authority. In fact, a false positive result would have occurred had the rate authority mechanism been in place in 2015.

The CLI factors are calculated by measuring the change in the number of employees in five (5) year increments, weighted by their estimated share of salary cost. It is defined in the only official documentation of TFP available.⁸ The CLI factors are provided in the TFP tables⁹. There is no way to validate how CLI is exactly calculated in public data.

The CLI concept is conceptually and fundamentally flawed. The change in the number of employees, grouped by years of experience in five (5) year increments does not have any relationship to productivity. It now leads to distorted productivity results solely based on recent employee demographic shifts.

In the past four years, non-career employees have been converted to career in large numbers¹⁰. At the same time, employees have been retiring or leaving due to early retirement incentives. This demographic shift in the number of employees in the five (5) year increments is assumed to be the cause of the shift in CLI factors. Non-Career employees are not considered in the CLI factors. In simple terms, the workhours of an employee moving from non-career to career are considered more productive under the CLI methodology and current factor values. CLI is significantly distorting the Labor Input and the TFP result. This is the single biggest factor that could cause a false positive under the operational efficiency-based requirement in the performance-based rate authority proposal.

⁶ Northwest Postal Consulting for the Postal Regulatory Commission, Report 1, Adequacy of the Postal Service’s TFP Model, March 27, 2017, at 76-81.

⁷ Ibid, at 76.

⁸ “*Formulas for Total Factor Productivity, Labor Productivity, Postal Inflation, and the Aggregate Labor Price Index*”, PRC Filing 68582, June 23, 2010.

⁹ TFP Annual Tables, As Revised February 11, 2019.

¹⁰ 2019 Report on Form 10-K, at 25: “*During 2019 and 2018, we converted approximately 36,000 and 35,000 employees, respectively, from non-career to career status, as dictated by our operational needs and contractual provisions.*”

Impact of CLI Factor on TFP

This section documents the impact of the CLI factor on the TFP result. A model was developed to replicate the relative portions of TFP calculation methodology.¹¹ This model recalculates the Labor Input Index and TFP results with the CLI factor removed. The CLI factor is a value that is multiplied against the actual workhours to get a CLI adjusted workhour value. The model removes this factor and calculates the Labor Input and TFP using actual workhours.

The first step is to remove CLI from the Labor Input Index calculation. These results are shown in Figure 1. The base year for this analysis is 2011.

Figure 1: Impact on Labor Input of CLI Removal

	Published Labor Input		Labor Input Model		Labor Input with CLI Removed		Impact of CLI Removal on Labor Input	
	Actual Labor Input	%SPLY	Model Labor Input	% Actual	Model Input Without CLI	%SPLY	+/- Actual Index	+/- Actual %SPLY
2011	0.8890		0.8890		0.8890			
2012	0.8618	-3.06%	0.8631	0.15%	0.8611	-3.14%	-0.0007	-0.08
2013	0.8342	-3.21%	0.8310	-0.38%	0.8300	-3.61%	-0.0041	-0.40
2014	0.8165	-2.12%	0.8180	0.19%	0.8102	-2.39%	-0.0063	-0.27
2015	0.8186	0.26%	0.8204	0.21%	0.8194	1.13%	0.0008	0.87
2016	0.8214	0.34%	0.8241	0.33%	0.8373	2.19%	0.0159	1.85
2017	0.8125	-1.08%	0.8143	0.23%	0.8401	0.34%	0.0276	1.42
2018	0.8033	-1.13%	0.8058	0.31%	0.8392	-0.11%	0.0359	1.02

The model result is compared to the actual TFP value to validate the model accuracy. It is not possible to match the TFP results exactly because changes are made to the TFP methodology in some years. For example, in 2014, part-time and full-time employees were combined into a single career employee category for City Carriers. The actual result cannot be duplicated using the documented formulas. It is assumed that in the published result that adjustments were made using data not available in the public file. This is a common occurrence throughout TFP where the published result does not match the defined calculation methodology.

In the Labor Input Index model, the model error is less than 0.4 percent, validating the model's accuracy for this purpose. The difference between the published Labor Input Index and the model results are graphed in Figure 2.

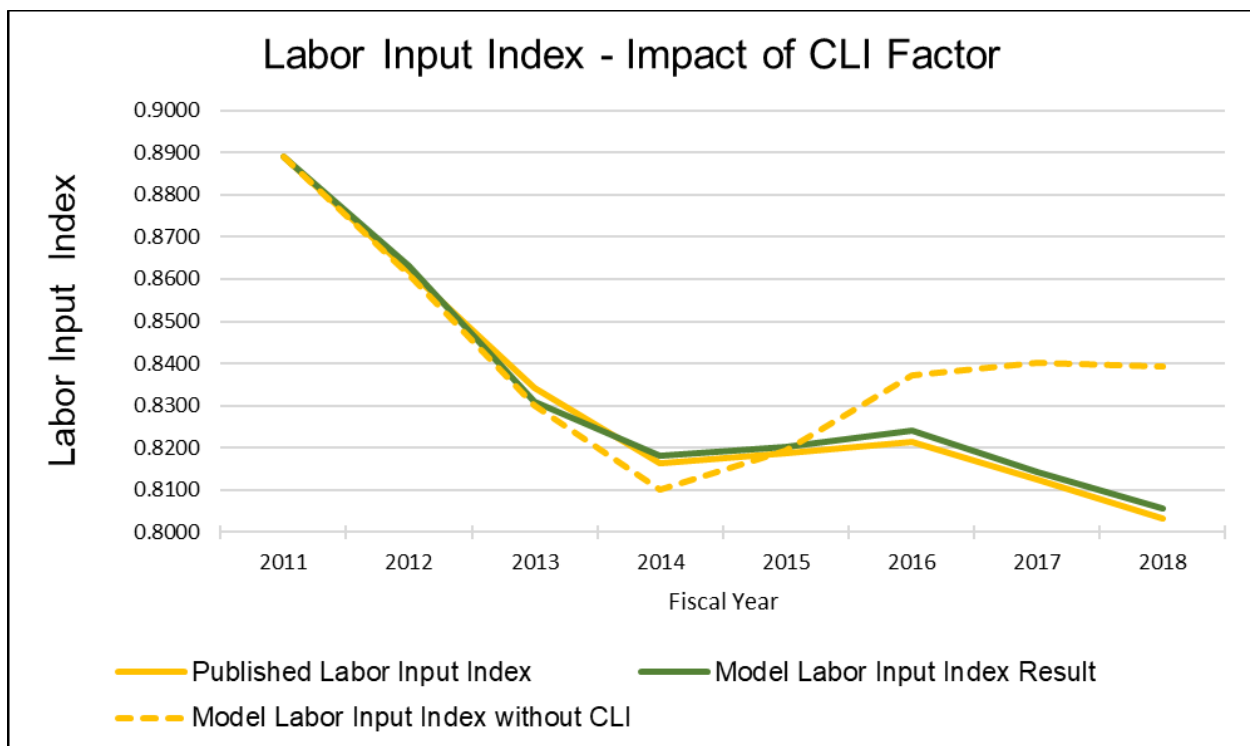
The model shows that when CLI is removed, the Labor Input Index value increases starting in FY 2015. The published Labor Index shows level performance in 2014 through 2016, then sharp declines in 2017 and 2018. The removal of CLI shows the opposite, with sharp increase in Labor Input in 2015 and 2106, then a leveling off in 2017 and 2018.

¹¹ Fisher Labor Model.xlsx contains the model and Figures 1 through Figure 7.

The model demonstrates that CLI causes a lower level of Labor Input in the resource equation, artificially inflating productivity. The impact of removing CLI in 2018 is a change from a decrease in Labor Input of -1.13% to a decrease of only -0.11%, a difference of 1.02 percentage points. Since 2015 Labor Input is higher without the CLI factor. More importantly, the trend directions with CLI removed diverge significantly from actual trend lines.

The general productivity equation is workload (output) divided by input. Labor Productivity is the Workload Index (numerator) divided by the Labor Input (denominator). Figure 3 shows the published Labor Productivity compared to Labor Productivity with CLI removed. Figure 4 graphs the Published Labor Productivity to the Labor Productivity with CLI removed.

Figure 2: Labor Input Index – Actual Labor Input versus Removal of CLI Factor 2011-18



Starting 2015, the impact of CLI removal is significant. Labor Productivity between 2015 and 2018 moves from being positive each year to negative in the range of -0.46 to -1.32 percent. The higher Labor Input value that results from removing the flawed CLI input leads to a lower Labor Productivity, as the Workload numerator is a constant value.

The Postal Service stated in the 2018 Annual Report that “*Labor productivity increased for the ninth year in a row in FY2018. Excluding 2009, labor productivity has increased each year since 1997*”.¹² If CLI is removed, the last positive Labor Productivity was in 2014. It should also be noted that Labor Productivity is higher prior to 2014 with CLI removed.

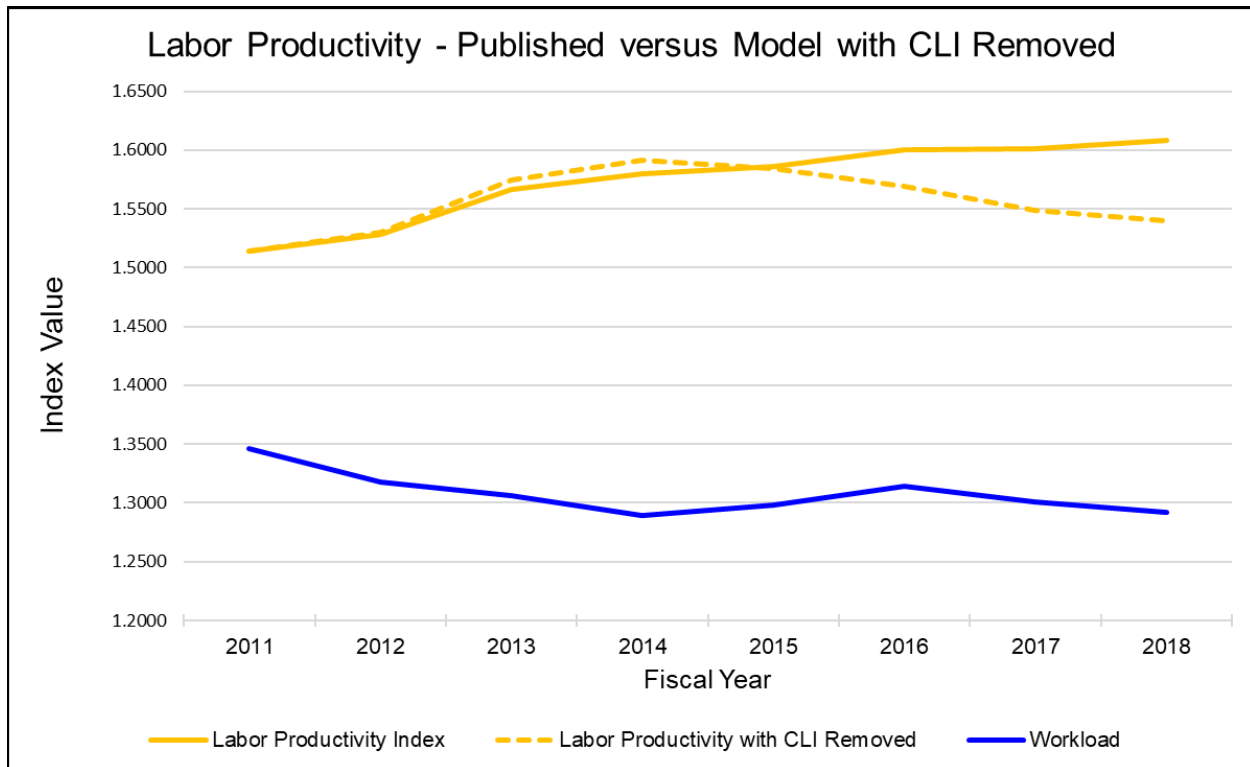
¹² 2018 USPS Annual Report to Congress, at 30. (ACR-FY18-17)

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Figure 3: Impact on Labor Productivity Index of CLI Removal

	Published Labor Productivity				Labor Productivity with CLI Removed			Impact of CLI Removal on Labor Productivity	
	Workload	Actual Labor Input	Actual Labor Productivity	%SPLY	Labor Input without CLI	No-CLI Labor Productivity	%SPLY	+/- Actual Index	+/- Actual %SPLY
2011	1.3462	0.8890	1.5142		0.8890	1.5142			
2012	1.3175	0.8618	1.5287	0.96%	0.8611	1.5299	1.04%	0.0012	0.08
2013	1.3066	0.8342	1.5663	2.46%	0.8300	1.5741	2.89%	0.0078	0.43
2014	1.2896	0.8165	1.5794	0.84%	0.8102	1.5916	1.11%	0.0122	0.27
2015	1.2982	0.8186	1.5858	0.41%	0.8194	1.5844	-0.46%	-0.0015	-0.86
2016	1.3142	0.8214	1.6000	0.89%	0.8373	1.5696	-0.93%	-0.0304	-1.83
2017	1.3012	0.8125	1.6015	0.09%	0.8401	1.5488	-1.32%	-0.0527	-1.42
2018	1.2923	0.8033	1.6087	0.45%	0.8392	1.5399	-0.58%	-0.0688	-1.03

Figure 4: Labor Productivity Index



The Labor Input is combined with Materials and Capital Inputs to create the Total Input used in the TFP productivity equation. Figure 5 shows the comparison of published TFP to TFP with CLI Removed. Figure 6 graphs the impact of the CLI removal on TFP Input and Productivity.

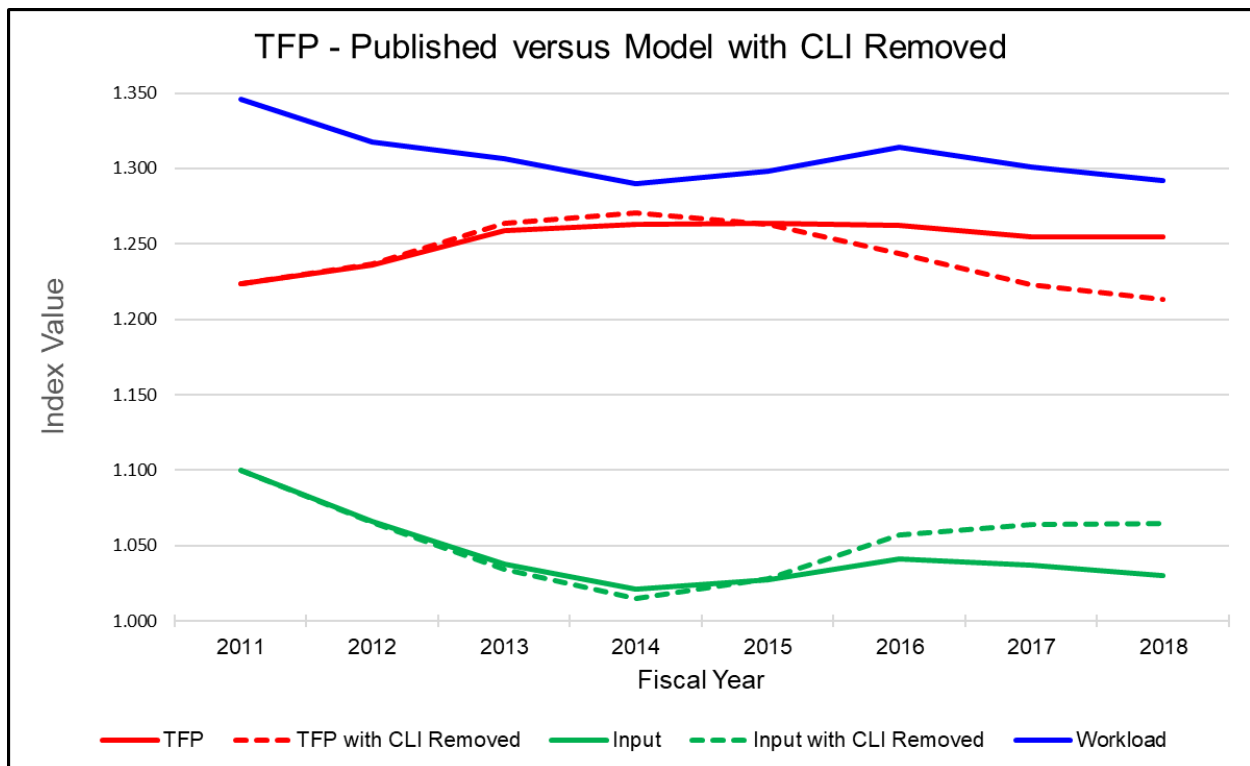
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Figure 5: Impact on TFP Result of CLI Removal

	Published Total Factor Productivity (TFP)				TFP with CLI Removed			Impact of CLI Removal on TFP Productivity	
	Workload	Actual Input	Actual TFP	%SPLY	Input Index without CLI	No-CLI TFP	%SPLY	+/- Actual Index	+/- Actual %SPLY
2011	1.3462	1.1000	1.2238		1.1000	1.2238			
2012	1.3175	1.0661	1.2358	0.98%	1.0654	1.2365	1.04%	0.0008	0.06
2013	1.3066	1.0379	1.2588	1.87%	1.0340	1.2636	2.19%	0.0047	0.32
2014	1.2896	1.0209	1.2632	0.35%	1.0150	1.2706	0.55%	0.0074	0.21
2015	1.2982	1.0271	1.2640	0.06%	1.0278	1.2630	-0.59%	-0.0009	-0.65
2016	1.3142	1.0414	1.2619	-0.16%	1.0568	1.2435	-1.54%	-0.0184	-1.38
2017	1.3012	1.0370	1.2548	-0.57%	1.0639	1.2231	-1.64%	-0.0317	-1.08
2018	1.2923	1.0300	1.2546	-0.01%	1.0649	1.2135	-0.79%	-0.0412	-0.78

Starting in 2015, the removal of CLI results in a significantly lower TFP result. In fact, in 2015, a false positive condition is created relative to the proposed operational efficiency-based requirement for the performance-based rate authority.

Figure 6: Impact of CLI Removal on TFP Productivity Result



In 2018, TFP was slightly negative at -0.01% to SPLY. The removal of CLI results in a TFP decline to -0.79% to SPLY, a reduction of -0.78 percentage points. The 2018 Final TFP, at three decimals, is "0.000", from an actual value of "-0.000112". However, there is no "negative zero" in rounding in Excel.

The rule under §3010.201 states “...requires that the Postal Service’s TFP for the measured fiscal year must exceed the previous fiscal year in order to meet the operational efficiency-base requirement”.¹³ In 2018, any rounding rule would not have resulting in an “exceeds” condition and met the operational efficiency-based requirement. However, it would be possible that a slightly positive result could be rounded up to meet the “exceeds” condition. In this hypothetical situation, only a slight negative impact from CLI could result in a false positive. This came very close to happening in 2018.

Note that the published TFP tables use an econometric “growth rate” formula using logarithms rather than the percent SPLY formula used in virtually every other report.¹⁴ This is explained in a later section. This method might also lead to a false positive when there are close results.

The CLI factor could clearly result in a false positive result in the operational efficiency-based requirement and result in granting the performance-based rate authority. A false positive would have happened in 2015. A false positive could happen in the future. The CLI factor is a flawed metric to use to adjust workhours, distorting productivity results. Worse, it could lead to a false positive result for performance-based rate authority purposes.

Base Wage Rate versus CLI

One argument that could be made in favor of CLI is that it represents the employee’s position in the salary step pay scale. The salary step scale takes approximately 13 years to reach the top level, depending on the labor craft. In NPHS, the straight-time wage rate, before any taxes or benefits, represents the composite result of all employee’s position in the rate scales. This “base wage rate” can be used to examine the impact of wage levels over time.

Figure 7 graphs the NPHS Base Wage Rate, indexed to 2011¹⁵. It shows that starting in 2017, the base wage rate (blue line) has been increasing. This is the directly opposite of CLI, where composite CLI has been decreasing since 2014 (red line). The CLI reduction results in lower adjusted workhours and leads to inflated productivity results.

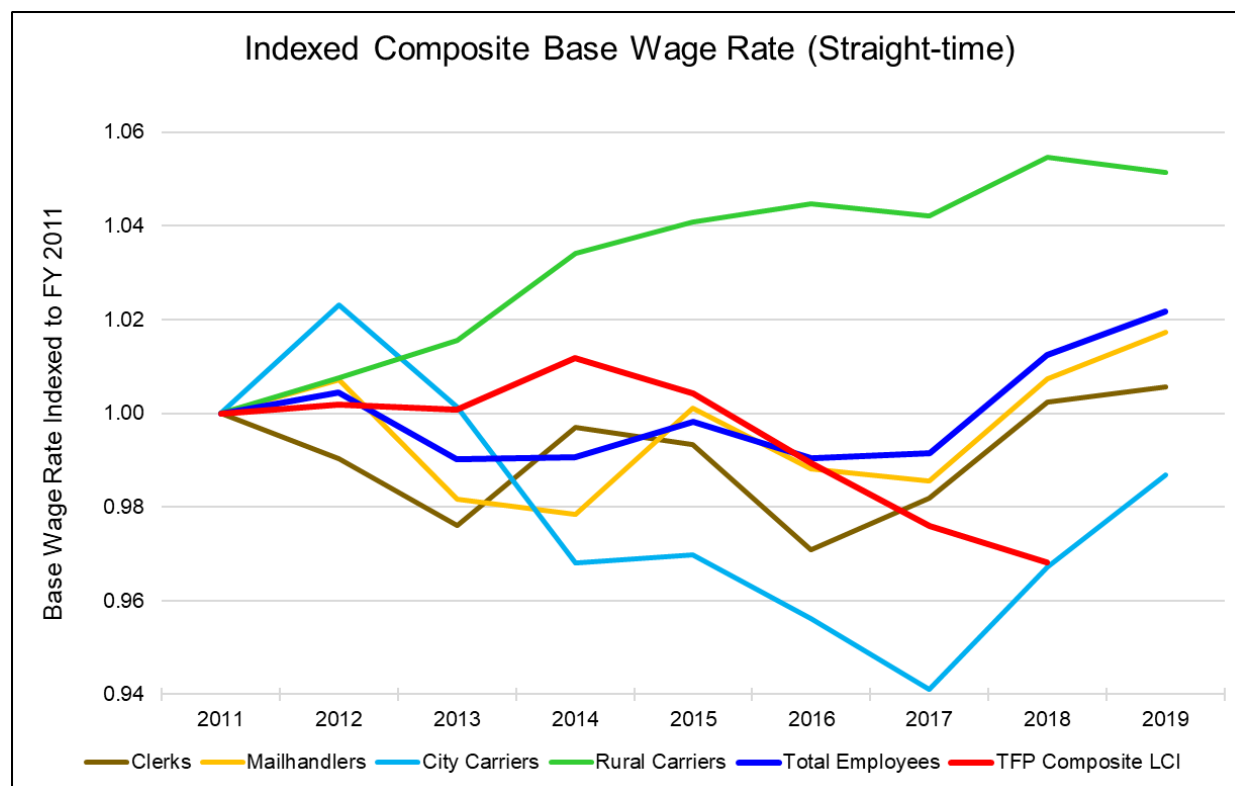
The results also show the net impact of the large scale replacement of career workhours with lower cost non-career workhours and the lowering of the bottom step on the composite rate for each employee craft between 2013 and 2015. The impact of increasing the share of non-career employees leveled off starting in 2016. Collective Bargaining agreements in recent years have generally resulted in increases in the base wage rate and adding lower starting base steps.

¹³ Order 5337 at 150

¹⁴ Growth rate is calculated using logarithms. In Excel, growth rate is LN(current year/previous year).

¹⁵ Base Wage Rate is from NPHS data files 2011-2018, Line Numbers 01, 03, & 09.

Figure 7 – Composite Base Wage Rate Trends by Employee Craft



National Labor Costs Not Reflected in Labor Input and Labor Productivity

TFP did not directly include \$7.3 billion dollars in national personnel cost in 2018.

The methodology to calculate the Labor Index uses the employee percentage mix from the payroll salaries and benefits from NPHS to calculate the Labor Index. These national costs are reallocated to a new total Labor cost using the NPHS (salaries and benefits) percentage mix as a distribution key.¹⁶

The underlying math negates the impact of this \$7.3 billion dollars of national cost on the Labor Index itself. The Labor Index is the change in workhours at the employee category level, weighted using the percentage share of dollars for that category. The share of dollars by employee category is calculated in NPHS using salaries and benefits. Using this mix to calculate a new dollar value, adding in the \$7.3 billion dollars, does not change the relative percentage share used in the weighting of the Labor Index formula. An example of this calculation is included in the Labor Model.¹⁷

¹⁶ "Formulas for Total Factor Productivity, Labor Productivity, Postal Inflation, and the Aggregate Labor Price Index", PRC Filing 68582, June 23, 2010.

¹⁷ Excel file: Fisher Labor Model, worksheet Mix Impact.

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Simply stated, the Labor Index weighting is solely based on the Salaries and Benefits percentage mix from NPHS. Adding in National labor costs of \$7.3 billion has no impact on the Labor Index value. These National labor costs are effectively omitted from the Labor Index result.

The only role these nation labor costs have is on the relative weighting between Materials, Capital, and Labor in calculating the Total Input used in TFP. Capital, Materials, and Labor Index results are combined by the percentage share of dollars in the Total Input index calculation. The impact depends on the relative value of each component's index and the change in cost share.

In addition to these national labor dollars not being directly incorporated into TFP, the actual dollars (value) used in TFP cannot be validated against the Total Cost in the Cost Segments / National Trial Balance (NTB) based reports. TFP Labor in 2018 is overstated by \$1.065 billion dollars of cost, i.e., dollars that cannot be reconciled to the Cost Segments Reconciliation to Financial Statements Report¹⁸. This overstatement of Labor dollars further impacts the TFP result by changing the weighting between Capital, Materials, and Labor.

The validation process of TFP dollars versus the Cost Segment dollars, and the overstated value described above, will be quantified through the following set of tables.

Figure 8 summarizes the main components in the comparison of the Cost Segments to TFP for FY 2018. It segregates the Salary & Benefit costs from National Costs. It shows the difference of \$1.065 billion dollars between TFP Labor and validated Cost Segment Total Labor cost. The non-labor costs in the Cost Segments total are segregated into Materials, Capital Expense, and costs "Not in TFP". The "Not in TFP" costs are those that are not considered inputs from a productivity perspective and not listed in the TFP documentation of account numbers.

Figure 8: TFP Value (Dollars) Compared to CRA Total Cost for FY 2018

Comparison of CRA Total Cost to TFP - FY 2018				
Cost Category	TFP Value	Cost Seg / NTB	+/- TFP to Costs	% TFP to Costs
Salaries & Benefits		49,789.7		
National Labor Costs		7,256.3		
Labor Total	58,111.7	57,046.0	1,065.8	1.9%
Materials	15,096.7	15,096.7	0.0	0.0%
Capital Expense	1,136.9	1,121.4	15.5	1.4%
Not In TFP, Not Input		1,431.9	-1,431.9	
Total Cost Allocation Model	74,345.3	74,696.0	-350.6	-0.5%
Total Cost in Cost Segments		74,696.0		
Model to Cost Segments		0.0		

¹⁸ FY 2018 Quarter 4 YTD Cost Segments & Components Reconciliation to Financial Statements and Account Reallocations, Redacted Version, ACR USPS-2018-5.

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Figure 9: Personnel Compensation Costs by Cost Segment and TFP Labor & Material Categories

Comparison of Cost Segments / NTB to TFP - FY 2018														Account Level data used to calculate TFP categories based on existing documentation from 2010	
Cost Segment	Code	CRA Line Description	Cost Segment / NTB Labor				Cost Segment Labor Total	TFP Materials				Cost Segment Validation		TFP Labor Category	
			Salaries	Benefits	Employee Relations	Labor Other		Account Not Listed	Uniforms	Relocation	Household Goods	Travel	Personnel Cost Report		+/- Report
01	01A	Postmasters	1,162,578	428,841			1,591,420	99	624	429	19,142	1,611,714	0.4	Postmasters	
01	01B	Postmaster Relief	19,327	2,065			21,392				684	22,076		Postmasters	
02	02A	Supervisors	2,129,472	713,956			2,843,428	72	1,070	4,131	17,670	2,866,369		Supervisors	
02	02B	Professional & Technical	397,413	136,015			533,428	5	116	104	5,535	539,188		Prof, Admin, Tech	
03	03A	Clerks	8,400,036	2,637,120			11,037,156	8,008			12,969	11,058,133		Clerks	
03	03B	Mail Handlers	2,724,376	819,091			3,543,468	1,652			71	3,545,190		Mailhandlers	
04	04A	Clerks CAG K	293,975	86,101			380,076				3,975	384,051		Clerks	
06	06A	City Carriers	12,444,624	3,939,732			16,384,356	63,099			8,827	16,456,282		City Carriers	
08	08A	Vehicle Service Drivers	568,957	187,537			756,495	3,212			143	759,849		VS Drivers	
10	10A	Rural Carriers	5,714,890	1,800,095			7,514,985				9,829	7,524,814		Rural Carriers	
11	11A	Building Maintenance	924,719	323,606			1,248,325	812	39	3	2,507	1,251,685		Maintenance	
11	11B	Oper Equip Maint	1,117,398	372,570			1,489,968	1,066	40	30	6,223	1,497,326		Maintenance	
11	11C	Bldg & Plant Maint	280,723	93,852			374,575	207	1	5	1,134	375,921		Maintenance	
12	12A	Motor Vehicle Service	395,040	141,886			536,926	356	33		275	537,590		Vehicle Service	
13	13B	Purchasing FSU	12,160	4,122			16,282	0	7	9	134	16,433		Other Personnel	
13	13C	Facilities Field Office	13,360	4,247			17,608		6		353	17,966		Other Personnel	
16	16A	Material Distribution	7,495	2,598			10,093				104	10,197		Other Personnel	
18	18A	Field Service Units	180,006	61,404			241,410		28	88	1,765			Other Personnel	
18	18B	Headquarters	458,865	128,340			587,205	6	470	321	17,183			Other Personnel	
18	18C	Area Administration	88,381	28,440			116,820		207	114	4,551			Other Personnel	
18	18D	Security Force	39,239	13,661			52,900	202			385			Other Personnel	
18	18E	Inspection Service / OIG	340,790	146,818			487,608		236	471	12,443			Other Personnel	
18		Cost Segment 18	1,107,281	378,662			1,485,943	208	941	994	36,327	1,524,413	0.0	Other Personnel	
19	19A	MTSC	2,732	1,026			3,758		6	11	317	4,093		Other Personnel	
		Personnel Compensation Costs	37,716,557	12,073,123			49,789,680	78,796	2,883	5,715	126,216	50,003,291	0.9		

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Figure 9 validates the Personnel Compensation from the Cost Segments Reconciliation to Financial Statements Report¹⁹ to the TFP categories²⁰. The Personnel Compensation report contains both TFP Labor and Materials categories. The Labor shown on this report is effectively the Salaries and Benefits from NPBS, reset to the Cost Segment dollar values using the NPBS dollar mix.

This table validates that all Salary and Benefit costs in TFP categories match the Cost Segment totals.

Figure 10 shows the national level categories that are included in TFP Labor. The categories used are Salaries, Benefits, Employee Relations, and Other. These are defined in PRC 2010 TFP document.²¹ Since 2010, new account numbers have been activated. These are shown as "Account Not Listed" and assigned to the appropriate cost category.

These National labor costs total \$7.256 billion dollars. These costs include the Non-Controllable costs as defined in Postal Service financial reports. This total reflects all Labor related costs in the Cost Segment / NTB accounts.

As a separate issue, an argument could be made that Non-Controllable costs should be excluded from an operational efficiency-based measurement for rate authority purposes.

Figure 10: National Labor Costs by Documented TFP Categories.

Cost Segment	Code	CRA Line Description	Cost Segment / NTB Labor				Cost Segment Labor Total	
			Salaries	Benefits	Employee Relations	Labor Other		Account Not Listed
13	13D	Awards & Arbitrations			250,250			250,250
18	18F	Unemployment Comp		32,896				32,896
18	18G	Holiday Leave Adjustment				28,809		28,809
18	18H	Health Benefits - WC		2,266				2,266
18	18J	Retiree Life Insurance		13,537				13,537
18	18K	Miscellaneous Personnel	-6,181	276	2,349		-45,265	-48,821
18	18R	Life Insurance Annuity		0				0
18	18M	Annual Leave Liability				93,836		93,836
18	18P	Retirement FERS/CSRS				1,439,941	958,480	2,398,421
18	18Q	Workers Compensation		4,374				4,374
18	18R	APP Contra Offset		0				0
18	18S	Retiree Health Benefits		4,480,704				4,480,704
National Costs Total			-6,181	4,534,052	252,598	1,562,585	913,215	7,256,270
Total Labor			37,710,376	16,607,175	252,598	1,562,585	913,215	57,045,950

¹⁹ FY 2018 Quarter 4 YTD Cost Segments & Components Reconciliation to Financial Statements and Account Reallocations, Redacted Version, ACR USPS-2018-5.

²⁰ "Formulas for Total Factor Productivity, Labor Productivity, Postal Inflation, and the Aggregate Labor Price Index", PRC Filing 68582, June 23, 2010, Appendix B1, NCTB Accounts Included in Total Value of Labor Input.

²¹ "Formulas for Total Factor Productivity, Labor Productivity, Postal Inflation, and the Aggregate Labor Price Index", PRC Filing 68582, June 23, 2010

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Figure 11 shows the comparison of the Cost Segments by TFP Category with the Actual TFP values. The TFP methodology uses the NPHS dollar percentage profile to redistribute the national costs to the employee categories.

This chart shows that TFP has a total of \$58,111 million dollars, while the Cost Segment Labor has a total of \$57,045 million dollars. TFP has \$1,065 million MORE than the documented Cost Segment value.

Figure 11: TFP Labor Comparison to Cost Segments Labor

TFP Category	CS / NTB	TFP Labor	TFP +/- CS	% CS
Postmasters	1,612,812	1,888,734	275,922	17.1%
Supervisors	2,843,428	3,402,069	558,641	19.6%
Clerks	11,417,232	13,378,811	1,961,580	17.2%
Mailhandlers	3,543,468	4,148,837	605,370	17.1%
City Carriers	16,384,356	19,159,434	2,775,078	16.9%
VS Drivers	756,495	887,057	130,563	17.3%
Rural Carriers	7,514,985	8,796,223	1,281,237	17.0%
Maintenance	3,112,868	3,638,833	525,965	16.9%
Vehicle Service	536,926	628,929	92,004	17.1%
Prof, Admin, Tech	533,428	625,152	91,725	17.2%
Other Personnel	1,533,684	1,557,629	23,945	1.6%
Salaries & Benefits	49,789,680			
National Costs	7,256,270		-7,256,270	
Total Labor	57,045,950	58,111,709	1,065,759	1.9%

As the following tables will show, all dollars in the Cost Segments are validated to designated categories, demonstrating that TFP Total Labor dollars are inflated by over a billion dollars. This difference cannot be explained from the existing documentation. The reason for the higher value is not known. It does call into question the accuracy of the TFP calculation process.

This overstatement of TFP Labor dollars is independent of the Labor Input and Labor Productivity values. The only impact of this additional billion dollars will be on the relative weighting between Labor, Materials and Capital in determining the Total Input Index.

There is also a discrepancy with the Other Personnel category, as its difference with the Cost Segments is not in the same range as the other categories. Other Personnel differs from TFP by 1.6%, while all other employee categories differ in the 17 to 20 percent range. There appears to be a discrepancy in what is used in the NPHS mix calculation in TFP. This cannot be validated from available data.

TFP Accuracy for Performance-based Rate Authority Purposes

Figure 12 shows that the TFP Materials categories can be almost completely validated against the Cost Segments accounts. The largest difference of \$12.5 million in Rail is related to a discrepancy for a credit that is identified as Rail transportation yet is attributed to the Miscellaneous category in TFP. The bottom line total of 15.6 billion matches the Cost Segment total dollars.

This table shows that Labor dollar overage cannot be attributed to any difference in Material dollars.

Figure 12: TFP Material Categories to CSR Accounts

Category	TFP Material Category Name	Published TFP Materials	TFP Assignment	Not Listed, Assumed	Total CS / NTB	TFP +/- CS/NTB
M-01	Relocation Costs	2.9	2.9		2.9	0.0
M-02	Household Goods	5.7	5.7		5.7	0.0
M-03	Uniforms	78.2	78.2		78.2	0.0
M-04	Travel	180.0	179.9	0.0	179.8	0.1
M-05	Supplies	1091.0	1,091.0		1,091.0	0.0
M-06	Building Services	242.6	242.6		242.6	0.0
M-07	Professional Services	1074.3	1,069.0	2.6	1,071.6	2.7
M-08	Computer Services	562.9	562.9		562.9	0.0
M-10	Vehicle Supplies	822.0	822.0		822.0	0.0
M-11	Air Domestic Network	2217.0	2,217.0		2,217.0	0.0
M-12	Air International	274.9	274.9		274.9	0.0
M-13	Air Domestic Contract	675.6	675.6	0.0	675.6	0.0
M-14	Highway	4247.0	4,107.0	140.0	4,247.0	0.0
M-15	Rail Transport	31.7	19.2		19.2	12.5
M-16	Water Transport	25.3	25.3		25.3	0.0
M-17	Oil		15.5			
M-18	Gas		52.5			
M-19	Other Fuel		6.3			
	Heating Fuel	74.2	74.2		74.2	0.0
M-20	Electricity		482.7			
M-21	Water & Sewer		88.6			
	Utilities	571.3	571.3		571.3	0.0
M-22	Telephone	133.2	133.2		133.2	0.0
M-23	Research & Development	53.2	53.2		53.2	0.0
M-24	Building Improvements	219.3	219.3		219.3	0.0
M-25	Vehicle Maintenance	820.3	820.3		820.3	0.0
M-26	Maintenance	173.1	173.1		173.1	0.0
M-09	Misc Services & Freight		764.4			
M-27	Miscellaneous Judgements		146.7			
M-28	Miscellaneous		3.4			
	Total Miscellaneous	899.3	914.6		914.6	-15.3
M-29	Vehicle Rent	132.9	132.9	0.0	132.9	0.0
M-30	Terminal Settlements	488.9	488.9		488.9	0.0
	Total Materials	15,096.7	14,954.3	142.5	15,096.7	0.0

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Figure 13 shows the Capital Expense categories for Building Rent and Postal Equipment that come from expense dollars in the Cost Segments. There are minor differences totaling \$15.5 million dollars, representing a 1.2% discrepancy.

It also shows those accounts that are not in TFP as inputs, grouped into five categories: Depreciation; Gains, Losses, Damages; Interest Expense; Military Credit; and Contingency Provisions. The total dollars for these Not in TFP, Not Input accounts total \$1.4 billion dollars.

Figure 13: TFP Capital Expense and Categories Not in TFP in Cost Segments

Category	TFP Material Category Name	Published TFP Dollars	TFP Account Assignment	Not Listed, Assumed	Total Cost Segments	TFP +/- Cost Segments
TFP Capital Expense						
C-BR	Capital - Building Rent	1034.6	1,099.2	-71.6	1,027.64	7.0
C-PE	Capital - Postal Equipment	102.2	93.8		93.78	8.4
Total TFP Capital (Expense)		1,136.9	1,193.0	-71.6	1,121.4	15.5
Categories / Accounts Not In TFP (Labor, Materials or Capital), Not Considered Input						
	Depreciation			1,668.6	1,668.55	-1,668.6
	Gains, Losses, Damages			20.2	20.21	-20.2
	Interest Expense			250.6	250.62	-250.6
	Military Credit			-158.4	-158.38	158.4
	Contingencies Provision			-349.1	-349.13	349.1
Total Not in TFP				1,431.9	1,431.9	-1,431.9

These tables show that all accounts in the Cost Segments Total dollars can be validated and accounted for in a cross-walk to TFP values. The conclusion of this analysis is that TFP Labor dollars are overstated by over a billion dollars in 2018. Since all dollars are accounted for in the Cost Segment total, the billion dollar overage cannot be explained. This discrepancy occurs in previous years, not just 2018. This is a primary example of the potential for a false positive caused by TFP data discrepancies and lack of transparency in the TFP methodology.

Impact of Different Labor Totals on TFP

The previous section identified that there are three different Labor Cost values involved in TFP:

1. **Salaries & Benefits:** This represents direct employee costs. NPHS is used for the workhour and dollar profiles for calculating the Labor Input and Labor Productivity indexes.
2. **Cost Segment Labor:** This is the total labor cost from the NTB account level. It is the Salaries & Benefits at the employee level and national costs that cannot be attributed at the employee level.
3. **TFP Labor Value:** This comes from TFP and is overstated from the Cost Segment labor total.

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The differences between these three labor dollar totals have no impact on the Labor Input and Labor Productivity. The Labor Input Index and Labor Productivity are based on the change in workhours and the relative share of cost by employee category. The NPHS percentage mix is the source of the Labor Input Index result.

The dollar value does impact the final TFP result as it affects the percentage share of value (cost). The share of value is used to weight the Material, Capital, and Labor Input indexes in the calculation of the Total Input Index value. This section will calculate the impact of the different weighting on TFP for FY 2018 for the three labor cost alternatives.

Figure 14 shows the Labor dollar totals for the three labor cost alternatives for 2017 and 2018. Note that in 2017 the TFP Labor dollar overage was \$1.36 billion dollars, even higher than in 2018. It should also be noted that total labor costs were greater in 2018 than in 2017 for all three categories.

Figure 14: Labor Costs – Impact of Different Totals on TFP

Labor Costs for Use in TFP Result Comparison				
Cost Category	TFP Value	Cost Segment	+/- TFP to Costs	% TFP to Costs
2017				
Salaries & Benefits		48,606		
Employe Relations / National		6,711		
Labor Total	56,677	55,317	1,360	2.5%
2018				
Salaries & Benefits		49,790		
Employe Relations / National		7,256		
Labor Total	58,112	57,046	1,066	1.9%

Figure 15 shows the dollar values for the three scenarios for Labor, with Materials and Capital values, with the resulting Total Input dollars.

Figure 15: TFP Labor Value Scenarios with Material & Capital Value Constant

Year	Source of Labor Cost	Value (Dollars)						
		Labor	+/- TFP Labor	+/- 2018 to 2017	% to S&B Cost	Capital	Materials	Total Input
2017	S&B Cost	48,606				3,482	14,235	66,324
	Labor Cost	55,317	6,711		13.8%	3,482	14,235	73,034
	Published	56,677	8,071		16.6%	3,482	14,235	74,394
2018	S&B Cost	49,790		1,183		3,545	15,097	68,432
	Labor Cost	57,046	7,256	1,729	14.6%	3,545	15,097	75,688
	Published	58,112	8,322	1,435	16.7%	3,545	15,097	76,754

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Figure 16 shows the percentage of value (cost) for each scenario. These are the numerical values used directly in the TFP calculation to weight the Capital, Materials, and Labor Input index results to get the Total Input. TFP uses the average of the two years in the weighting formula.

Figure 16: Percentage Share of Total Dollars used in TFP Input Weighting

Year	Source of Labor Cost	Percent Share of Value (Dollars)			
		Capital	Materials	Labor	Total
2017	S&B Cost	5.3%	21.5%	73.3%	100.0%
	Labor Cost	4.8%	19.5%	75.7%	100.0%
	Published	4.7%	19.1%	76.2%	100.0%
2018	S&B Cost	5.2%	22.1%	72.8%	100.0%
	Labor Cost	4.7%	19.9%	75.4%	100.0%
	Published	4.6%	19.7%	75.7%	100.0%

Figure 17 shows the result of the Total Input calculation and the difference to the TFP result from using the higher dollar values. As the higher dollar values of Total Labor cost and TFP dollars are used, the Total Input value decreases. This is due to the relationship between the Input Index values of Materials, Capital, and Labor.

The net impact is that adding MORE dollars (7 to 8 billion) to Labor for weighting results in a LOWER TFP Input value. This is counter-intuitive where adding more dollars leads to lower Total Input.

Figure 17: TFP Input Quantity Results for the Labor Weighting Scenarios

Year	Source of Labor Cost	Input Quantity					+/- to S&B Base
		Labor	Capital	Materials	Input	% to 2017	
2017	S&B Cost	6,534	1,384	2,934	10,040		
	Labor Cost	6,534	1,384	2,934	10,040		
	Published	6,534	1,384	2,934	10,040		
2018	S&B Cost	6,460	1,362	2,974	9,977	-0.620%	
	Labor Cost	6,460	1,362	2,974	9,972	-0.669%	-0.048%
	Published	6,460	1,362	2,974	9,972	-0.676%	-0.056%

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Figure 18 shows the final impact on TFP from using the higher dollar values. The lower Input values result in a HIGHER TFP productivity. The calculated impact shows that adding \$8.3 billion dollars in Labor cost increases TFP by 0.06%. This increase could be difference in achieving or not achieving the operational efficiency-based requirement of the performance-based rate authority.

Figure 18: TFP Results for Different Labor Dollar Values

Year	Source of Labor Cost	TFP Calculation Results				
		Workload	Input	TFP	% to 2017	+/- to S&B Base
2018	S&B Cost	1.2923	1.0306	1.2539		
	Labor Cost	1.2923	1.0301	1.2545	0.061%	0.049%
	Final Actual	1.2923	1.0300	1.2546	0.070%	0.056%
Lower Input means higher productivity Adding national labor dollars leads to a higher TFP result						

The underlying, yet important, issue is that the actual national Labor costs of approximately seven (7) billion dollars a year are not measured for change against the previous year in TFP. The only impact of this additional seven (7) billion dollars in actual cost in the current methodology is to have the Postal Service appear more productive due to the relative cost weighting in the calculation methodology.

Materials

The Material component generally reflects non-personnel costs. Non-personnel accounts were grouped into “materials” categories when TFP was created in the 1980’s.²² There has been some consolidation and adjustments of categories over the years.

The dollars from NTB accounts are indexed using metrics from the BLS and National Income and Product Accounts (NIPA) or using specific postal-derived metrics. The individual category indexes are combined using their share of dollar cost to calculate the Materials Input Index.

There are validity concerns with the Materials Input Index that could impact the operational efficiency-based requirement result and performance-based rate authority outcome.

²² “Formulas for Total Factor Productivity, Labor Productivity, Postal Inflation, and the Aggregate Labor Price Index”, PRC Filing 68582, June 23, 2010, Appendix C1, Mapping of NCTB Accounts to Materials Input Categories

Metric Visibility & Applicability

The metrics used for each Material category are identified in the TFP documentation from 2010.²³ These are summarized in Figure 19.²⁴ The following issues relate to the visibility and applicability of the index metrics:

1. The categories have been adjusted over the years with no documentation, including the application of undocumented adjustment factors. It is not known what metric is currently being used for some categories. For example, the indexes listed for the Telephone category were discontinued by the BLS in 2018. It is not known what metric replaced them in TFP.
2. The categories Vehicle Maintenance and Vehicle Supplies use the same composite index. The indexes for Motor Fuel and Vehicle Maintenance and Repair are averaged together for the combined metric. This does not reflect that in NTB accounts fuel and maintenance costs are separated and do not have equal weight. Since the index values are averaged rather than weighted for the actual dollar share, the index distorts the true relationships.
3. Utilities and Heating Fuels are Materials categories. Multiple indexes are used for each of these categories. Utilities uses two metrics: Electricity, and Water and Sewer. Heating Fuels uses three metrics: Oil, Gas, and Other Fuels. It is not known how the price index is calculated for these two categories – if it is simply averaged or prorated for the NTB dollar values.
4. For transportation, FedEx and UPS specific metrics are developed with non-public data rather than using existing BLS air freight transportation metrics. There is no way to validate this metric with available public data.
5. Some metrics are indexed using a metric that does not relate to the category. For example, Miscellaneous Judgements was indexed against Gross Domestic Product in NIPA. The BLS or NIPA metric used should relate to the category being measure or at least use the general CPI-U benchmark.
6. Three (3) miscellaneous categories were merged into a single category in 2016. These categories used NIPA metrics instead of BLS metrics. It is not known what metric is used for this consolidated miscellaneous category.

These issues should be transparent in an operational efficiency-based measurement for performance-based rate authority. These issues clearly would distort the Materials result, but the impact cannot be quantified with public data or the existing documentation.

²³ “Formulas for Total Factor Productivity, Labor Productivity, Postal Inflation, and the Aggregate Labor Price Index”, PRC Filing 68582, June 23, 2010, Appendix C2 Price Indexes Used for Materials Input

²⁴ Figures 19 through Figure 21 in Appendix Excel file: Fisher Figures 19-25.xlsx

Unknown Adjustment Factors in Published Material Price

In the TFP Tables, the Price value represents the metric used to convert the actual dollars into the quantity value used in the calculation methodology. TFP Price values cannot be validated against the BLS data values due to unknown adjustment factors. Each category has a percentage difference unique to that category when comparing the Price value to its calculated value. These results are shown in Figure 20 for 2017 and 2018.

This price difference between the published value and the calculated value is not explained. It is assumed to be the result of some previous adjustment process. The impact on the Material results of this factor cannot be validated without expanded research. It does create transparency concerns, as the published Price does not match the defined calculation process.

Material Price Indexes Different than BLS Data

The Material Price Index can be validated against BLS metric by comparing the change over the previous year. The ratio relationship should be identical if the TFP metric is using the BLS metric as identified in the existing documentation. This analysis was done for 2017 and 2018, with the results presented in Figure 21.

The results show that the TFP Material results are based on values different than the BLS metric values. These differences are shaded light yellow in Figure 21. These results can be grouped as follows:

1. Some Materials category price change shows no difference from the BLS metric, validating that category result for these years.
2. Some Materials category price change shows no difference in one year, but a difference in the other year. This indicates that something occurred in the TFP process to differ from the BLS metric result. This would distort the TFP result for unknown reasons.
3. Some TFP metrics do not match in either year. This would distort the TFP result for unknown reasons.

The results of the Material Index cannot be validated in part due to these known differences between the published price change in TFP and the BLS metric. The results also cannot be validated because the exact calculation method or necessary data for USPS derived metrics are not available. The actual impact on Material Index or the TFP result cannot be calculated.

The analysis demonstrates that the Material Index cannot be validated, and by extension, could lead to a false positive in the operational efficiency-based requirement.

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Figure 19: Material and Capital Expense Index Metrics

TFP - Materials / Capital Expense - Metric Index Table					
Category	Materials Input Category	Price Index from Appendix 2	BLS Category	BLS Category Description	Status in TFP / Comment
M-01	Relocation Costs	PCU481111481111P CWUR0000SEHB02	Scheduled passenger air transportation Other lodging away from home including hotels and motels in U.S. city average, urban wage earners and clerical workers	Primary services Other lodging away from home including hotels and motels	Averaged
M-02	Transportation of Household Effects	PCU484121484121P	General freight trucking, long-distance TL	Primary services	
M-03	Uniforms and Work Clothes	CUUR0000SAA	Apparel in U.S. city average, all urban consumers	Apparel	
M-04	Travel	PCU481111481111P CWUR0000SEHB02	Scheduled passenger air transportation Other lodging away from home including hotels and motels in U.S. city average, urban wage earners and clerical workers	Primary services Other lodging away from home including hotels and motels	Averaged
M-05	Supplies	WPUSOP2622	Discontinued by BLS	Discontinued by BLS	Discontinued by BLS
M-07	Professional Services	PCU5413--5413--	Architectural, engineering and related services	Architectural, engineering and related services	
M-08	Contractual Computer Services	PCU518210518210P	Data processing, hosting and related services	Primary services	
M-12	International Linehaul	EIUIS231	SERVICES OUTBOUND INDEXES	Outbound Air Freight	
M-13	Air Transportation Domestic Contract	PCU4811124811122	Scheduled freight air transportation	Scheduled mail air transportation services	
M-14	Highway Transportation	PCU484121484121P	General freight trucking, long-distance TL	Primary services	
M-15	Rail Transportation	PCU482111482111P	Line-haul railroads	Primary services	
M-16	Water Transportation	PCU483---483---	Water transportation	Water transportation	
M-17	Oil	WPU0573	Fuels and related products and power	Light fuel oils	
M-18	Gas	CUUR0000SEHF02	Utility (piped) gas service in U.S. city average, all urban consumers	Utility (piped) gas service	
M-19	Other Fuel	WPU051	Fuels and related products and power	Coal	
M17-19	Consolidated Oil, Gas, & Fuel				
M-20	Electricity	WPU0542	Fuels and related products and power	Commercial electric power	
M-21	Water and Sewer	CUUR0000SEHG01	Water and sewerage maintenance in U.S. city average, urban	Water and sewerage maintenance	
M-22	Telephone	PCU517110517110112 PCU51711051711022	Wired telecommunications carriers Wired telecommunications carriers	Business and other local telephone service Business switched toll and other toll service	Discontinued by BLS Discontinued by BLS
M-24	Expensed Building Improvements	CWUR0000SEHP04	Repair of household items in U.S. city average, urban wage earners and clerical workers	Repair of household items	
M-06	Contractual Building Services	PCU561720561720P	Janitorial services	Primary services	
M-10	Vehicle Supplies	CWUR0000SETD CUUR0000SETB	Motor vehicle maintenance and repair, urban wage earners and clerical workers Motor fuel in U.S. city average, all urban consumers	Motor vehicle maintenance and repair Motor fuel	Averaged with no consideration of actual ratio of fuel to maintenance & repair costs. Same metric used for both Vehicle Supplies & Vehicle Maintenance
M-25	Vehicle Maintenance	CWUR0000SETD CUUR0000SETB	Motor vehicle maintenance and repair, urban wage earners and clerical workers Motor fuel in U.S. city average, all urban consumers	Motor vehicle maintenance and repair Motor fuel	
M-26	Maintenance	PCU561720561720P	Janitorial services	Primary services	
M-23	Research and Development	PCU541330541330	Engineering services	Engineering services	
M-09	Miscellaneous Services and Freight Cost	NIPA Table 3.10.4, line 44	Price Indexes for Government Consumption Expenditures and General Government Gross Output	Gross output of general government - Services	Governments services, not non-government BLS metrics
M-27	Miscellaneous Judgments	NIPA Table 1.1.4, line 1	Price Indexes for Gross Domestic Product	Gross domestic product	Judgements compared to GDP?
M-28	Miscellaneous	NIPA Table 3.9.4, line 16	Gross Investment	Line 16 - Federal - Research & Development	Miscellaneous compared to R&D Prices???
M-31	Consolidation of M09, M-27, & M-28	Unknown - Not documented			Metric not know
M-11	Air Domestic Network	USPS Specific calculation			
M-29	Vehicle Rent	USPS Specific calculation			
M-30	Terminal Settlements	USPS Specific calculation			
C-BR	Capital - Building Rent	CUUR0000SEHA			
C-PE	Capital - Postal Equipment	USPS Specific calculation			

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Figure 20: TFP Materials Categories – Validation of Quantity Calculation / Undefined Adjustment Factors

TFP - Materials																
Category	Category Name	Metric	Materials Metric	TFP Source Data for Materials									Validation of Quantity = Value / Price			
				Value			Price			Quantity			Quantity Calculated		% Published	
				2016	2017	2018	2016	2017	2018	2016	2017	2018	2017	2018	2017	2018
M-01	Relocation Costs	BLS	Calculated from 2 metrics	2.7	2.8	2.9	10.478	10.621	10.809	0.2	0.3	0.3	0.3	0.3	5.46%	5.46%
M-02	Household Goods	BLS	PCU484121484121P	4.5	4.0	5.7	3.662	3.678	3.927	1.3	1.1	1.5	1.1	1.5	-4.22%	-4.22%
M-03	Uniforms	BLS	CUUR0000SAA	75.1	78.0	78.2	2.258	2.259	2.254	32.9	34.1	34.3	34.5	34.7	1.15%	1.15%
M-04	Travel	BLS	Calculated from 2 metrics	132.6	144.3	180.0	10.478	10.621	10.809	12.7	13.6	16.7	13.6	16.7	-0.02%	-0.02%
M-05	Supplies	BLS	WPUSOP2622	1062.0	1089.5	1091.0	4.913	4.979	5.099	216.1	218.7	213.8	218.8	213.9	0.05%	0.05%
M-07	Professional Services	BLS	PCU5413--5413--	1029.7	1190.7	1074.3	5.870	5.995	6.104	174.8	197.9	175.4	198.6	176.0	0.37%	0.37%
M-08	Computer Services	BLS	PCU518210518210P	534.7	589.2	562.9	5.877	5.886	5.904	90.4	99.5	94.8	100.1	95.3	0.59%	0.59%
M-11	Air Domestic Network	USPS		1890.7	1858.5	2217.0	2.469	2.575	2.716	776.4	731.8	827.5				
M-13	Air Domestic Contract	BLS	PCU4811124811122	578.0	622.7	675.6	4.534	4.526	4.537	127.8	138.0	149.3	137.6	148.9	-0.27%	-0.27%
M-12	International Line Haul	BLS	EIUIS231	266.1	247.0	274.9	2.381	2.340	2.391	111.5	105.3	114.7	105.5	115.0	0.20%	0.20%
M-30	Terminal Settlements	USPS		504.6	513.5	488.9	1.429	1.703	1.817	353.1	301.5	269.1				
M-14	Highway	BLS	PCU484121484121P	3790.3	4013.9	4247.0	3.662	3.678	3.927	1034.6	1091.0	1081.2	1091.5	1081.6	0.04%	0.04%
M-15	Rail Transport	BLS	PCU482111482111P	42.0	41.5	31.7	2.905	2.983	3.137	14.5	13.9	10.1	13.9	10.1	-0.29%	-0.29%
M-16	Water Transport	BLS	PCU483--483--	24.4	28.2	25.3	5.550	5.465	5.619	4.6	5.3	4.7	5.2	4.5	-3.29%	-3.29%
M-17	Oil	BLS	WPU0573													
M-18	Gas	BLS	CUUR0000SEHF02													
M17-18	Other Fuel	BLS	WPU051													
M-19	Heating Fuels	BLS		51.0	61.8	74.2	8.439	9.441	10.189	6.0	6.5	7.3	6.5	7.3	0.27%	0.27%
M-20	Electricity	BLS	WPU0542													
M-21	Water & Sewer	BLS	CUUR0000SEHG01													
M20-21	Utilities	BLS		531.9	518.9	571.3	6.381	6.543	6.624	83.4	79.3	86.3	79.3	86.2	-0.04%	-0.04%
M-22	Telephone	BLS	Calculated from 2 metrics	122.5	135.4	133.2	0.959	0.951	1.010	122.7	136.8	126.6	142.4	131.9	4.12%	4.12%
M-24	Building Improvements	BLS	CWUR0000SEHP04	249.3	218.5	219.3	5.898	6.090	6.508	40.7	34.6	32.5	35.9	33.7	3.75%	3.75%
M-06	Building Services	BLS	PCU561720561720P	203.4	216.2	242.6	6.976	7.032	7.061	29.1	30.7	34.3	30.7	34.4	0.04%	0.04%
M-10	Vehicle Supplies	BLS	Calculated from 2 metrics	686.5	732.0	822.0	7.647	8.140	8.848	90.5	90.6	93.6	89.9	92.9	-1%	-0.78%
M-25	Vehicle Maintenance	BLS	Calculated from 2 metrics	747.4	781.2	820.3	7.647	8.140	8.848	98.2	96.4	93.1	96.0	92.7	-0.45%	-0.45%
M-29	Vehicle Rent	USPS		68.0	95.3	132.9	2.628	2.689	2.715	26.5	36.2	50.0	35.4	49.0	-2.15%	-2.15%
M-26	Maintenance	BLS	PCU561720561720P	151.9	168.2	173.1	6.976	7.032	7.061	21.7	23.8	24.4	23.9	24.5	0.51%	0.51%
M-23	Research & Development	BLS	PCU541330541330	29.4	73.3	53.2	9.467	9.665	9.919	3.5	8.6	6.1	7.6	5.4	-11.55%	-11.55%
M-09	Misc Services & Freight	NIPA														
M-27	Miscellaneous Judgements	NIPA														
M-28	Miscellaneous	NIPA														
M27-29	Miscellaneous Consolidated	NIPA		844.9	810.6	899.3	1.009	1.030	1.055	837.1	787.0	852.5	787.0	852.5	0.00%	0.00%

TFP Accuracy for Performance-based Rate Authority Purposes

Figure 21: Validation of Material BLS Index Results

TFP - Materials			Validation of TFP Change in Price to Documented BLS Metric Values								
Category	Category Name	Metric	BLS Metric Results			Comparison of Change in BLS to TFP Metric					
			2016	2017	2018	BLS Metric		TFP Price		Diff BLS to TFP	
						2017	2018	2017	2018	2017	2018
M-01	Relocation Costs	BLS	316.8	321.0	328.1	1.0130	1.0220	1.0140	1.0180	-0.099%	0.393%
M-02	Household Goods	BLS	139.8	140.4	150.2	1.0040	1.0690	1.0040	1.0680	0.000%	0.094%
M-03	Uniforms	BLS	126.0	126.0	125.7	1.0000	0.9980	1.0000	0.9980	0.000%	0.000%
M-04	Travel	BLS	330.2	334.6	342.0	1.0130	1.0220	1.0140	1.0180	-0.099%	0.393%
M-05	Supplies	BLS	Obsolete BLS Index					1.0140	1.0240		
M-07	Professional Services	BLS	158.6	161.9	165.8	1.0210	1.0240	1.0210	1.0180	0.000%	0.589%
M-08	Computer Services	BLS	106.1	106.3	106.6	1.0020	1.0030	1.0020	1.0030	0.000%	0.000%
M-11	Air Domestic Network	USPS									
M-13	Air Domestic Contract	BLS	150.6	150.4	150.7	0.9980	1.0030	0.9980	1.0030	0.000%	0.000%
M-12	International Line Haul	BLS	141.0	139.1	142.1	0.9860	1.0220	0.9830	1.0220	0.305%	0.000%
M-30	Terminal Settlements	USPS									
M-14	Highway	BLS	139.8	140.4	150.2	1.0040	1.0690	1.0040	1.0680	0.000%	0.094%
M-15	Rail Transport	BLS	195.5	200.8	211.1	1.0270	1.0520	1.0270	1.0520	0.000%	0.000%
M-16	Water Transport	BLS	132.6	130.6	134.3	0.9850	1.0280	0.9850	1.0280	0.000%	0.000%
M-17	Oil	BLS	137.3	163.5	226.6						
M-18	Gas	BLS	158.2	171.8	173.9						
M17-18	Other Fuel	BLS	189.3	194.7	198.3						
M-19	Heating Fuels	BLS	Method not Defined					1.1190	1.0790		
M-20	Electricity	BLS									
M-21	Water & Sewer	BLS									
M20-21	Utilities	BLS	Method not Defined					1.0250	1.0120		
M-22	Telephone	BLS	Obsolete BLS Indexes					0.9910	1.0620		
M-24	Building Improvements	BLS	232.4	245.0	258.7	1.0540	1.0560	1.0330	1.0690	2.033%	-1.216%
M-06	Building Services	BLS	142.6	143.7	144.3	1.0080	1.0040	1.0080	1.0040	0.000%	0.000%
M-10	Vehicle Supplies	BLS	253.8	270.2	293.4	1.0640	1.0860	1.0640	1.0870	0.000%	-0.092%
M-25	Vehicle Maintenance	BLS	253.8	270.2	293.4	1.0640	1.0860	1.0640	1.0870	0.000%	-0.092%
M-29	Vehicle Rent	USPS									
M-26	Maintenance	BLS	142.6	143.7	144.3	1.0080	1.0040	1.0080	1.0040	0.000%	0.000%
M-23	Research & Development	BLS	162.4	165.8	170.2	1.0210	1.0270	1.0210	1.0260	0.000%	0.097%
M-09	Misc Services & Freight	NIPA									
M-27	Miscellaneous Judgements	NIPA	Consolidated in 2016								
M-28	Miscellaneous	NIPA									
M27-29	Miscellaneous Consolidated	NIPA	NewMetric not Defined					1.0210	1.0240		

Capital

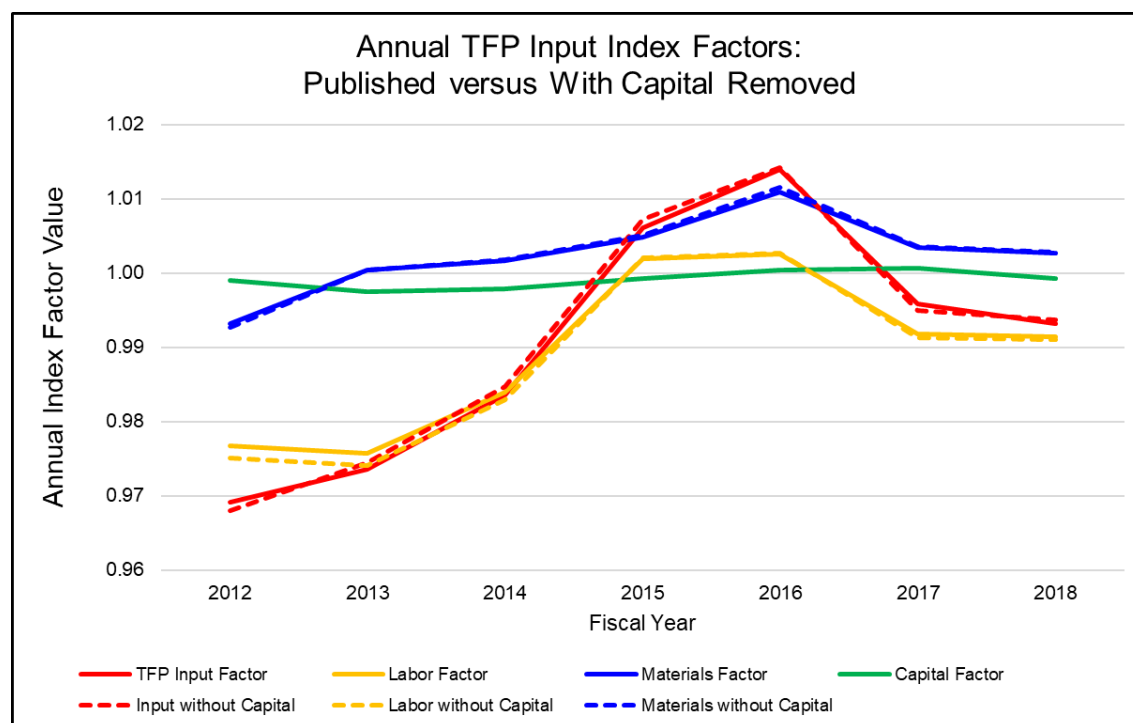
TFP as a “total factor” concept includes the cost of Capital to provide a complete picture of the resources, or input, used. The calculation of the Capital Index for TFP is complex and cannot be independently validated. The value of owned capital is computed as the “imputed rental value” for seven asset classes.²⁵ The Capital component is in some sense more of an academic approach to quantifying the resource value brought to the Postal Service.

The role of capital and the relationship to annual performance is covered in detail in Order 5337. As a general observation, there are concerns about the inclusion of Capital in the operational efficiency-based requirement.

Figure 22 shows that the TFP Input Index would not be substantively changed if the Capital Index was removed. In this scenario, the annual factors used to calculate Total Input are based on Materials and Labor, excluding Capital. The individual Index values for Materials and Labor do not change, only the weighting between them changes in the annual factor calculation. Capital’s share of total TFP value has been less than five (5) percent in recent years, leading to a factor value that has a small impact on the Total Input. This is quantified through the analysis resulting in Figure 22.

If one of the three main components of TFP (i.e., Capital) can be removed with no substantive change to the TFP result, it calls into question the underlying theory of the measurement.

Figure 22: Impact on Input of Capital Removal



²⁵“Formulas for Total Factor Productivity, Labor Productivity, Postal Inflation, and the Aggregate Labor Price Index”, PRC Filing 68582, June 23, 2010.

Workload

There are aspects that can impact the Workload result that are relevant to the operational efficiency-based requirement for performance-based rate authority. These are the weighting of deliveries to output, use of non-public data, and the weighting factor used in weighted mail volume. These are explained in the following sections.

Workload Weighting Factor – Output versus Deliveries

The Workload used in the numerator for TFP is the composite of the Output and Network indexes. Output is the composite of the Weighted Mail Volume and Miscellaneous Output. Network is the number of deliveries, excluding PO Boxes. The weighting factor used in combining the Output and Network indexes is a key input to the TFP result. The implications of this input factor are reviewed in detail in the NWPC reports²⁶.

The operational efficiency-based rate authority result would likely hinge on the value used to weight the Output to the Network indexes. There is no “right” answer for the appropriate value of this factor. The NWPC reports propose a methodology that would use the Other Cost of delivery cost segments to determine the weighting factor for each year.²⁷ The value used to weight, in a general sense, deliveries to mail volume, directly impacts the TFP result. The value of this critical factor was changed in 2016 with no public notice.

Use of Non-Public Data

It is not possible to validate the Workload result due to the use of non-public data. The non-public data is used for very detailed mail categories within TFP. There are nineteen (19) mail categories with non-public data.²⁸ International mail is segregated into detailed categories in the Output calculations. The non-public data precludes any ability to replicate or model the calculations used for TFP results.

The methodology used to adjust for changes in shifts of mail categories between Market Dominant and Competitive cannot be validated. For example, when First Class Parcels moved to Competitive, it is not known how this was reflected in the Weighted Mail Volume determination. This could be relevant to the final TFP result, as the following section demonstrates there are differences between CRA and TFP values in the public data.

²⁶ Northwest Postal Consulting for the Postal Regulatory Commission, Report 1, Adequacy of the Postal Service’s TFP Model, March 27, 2017, at 72-76.

²⁷ Northwest Postal Consulting for the Postal Regulatory Commission, Report 2, Postal Service Productivity Measurement: Before and After PAEA Enactment, March 27, 2017, at 34-35.

²⁸ ACD USPS 2015-18, Public Cost and Revenue Analysis and USPS Annual Tables, *Table Annual 2018 – 2018 CRA Public*.

CRA Differences with TFP

The Cost and Revenue Analysis (CRA) report is the source of the Attributable Cost used to weight the change in mail class volume in the Weighted Mail Volume index. Figure 23 compares First Class Single Piece Letters and Marketing Mail High Density and Saturation Flats and Parcels to demonstrate discrepancies between CRA and TFP²⁹.

1. Attributable Cost was used for weighting in TFP through 2016. When changes were made to CRA in 2017, instead of using the Attributable Total, TFP now uses the Volume Variable Cost. This is shown in Figure 23. There is no documentation as to why the Volume Variable Cost value is used instead of the more inclusive Attributable Cost value.

This change would distort the Output Index result in 2017 by changing the weighting value used in index calculation methodology. In effect, 2017 would no longer be equally weighted with 2016 due to the lower values of Volume Variable Cost in 2017 versus the higher Attributable Cost values of 2016.

2. TFP uses the category “High Density and Saturation Flats and Parcels” as one of five components of the Marketing Mail weighted mail volume index. However, the TFP value is higher than the CRA value for this mail class. TFP appears to include some portion of Standard Mail NSAs and Every Door Direct Mail Retail. It is not known how the TFP value is derived from these mail classes.
3. Figure 24 shows the piece volumes from CRA and TFP for the same mail classes as in Figure 23.³⁰ It shows that for First Class Single Piece Letters the mail volume does not match. While the difference is not large or even necessarily significant, the fact that the values are even different is a concern.

Figure 23: Comparison of CRA to TFP for Selected Mail Classes

Comparison of CRA to TFP - Selected Mail Classes										
Mail Classes and Products	2015			2016			2017		2018	
	B	C	F	B	C	F	B	C	B	C
	Attributable Cost	Volume Variable Cost	Product Specific Cost	Attributable Cost	Volume Variable Cost	Product Specific Cost	Attributable Cost	Volume Variable Cost	Attributable Cost	Volume Variable Cost
CRA: First Class Single-Piece Letters	5,304.2	5,282.8	21.4	5,321.7	5,301.0	20.7	5,318.1	5,111.9	5,217.1	5,022.3
TFP: Apportioned Cost Single Piece Letters	5,304.2			5,321.7				5,111.9		5,022.3
Difference between CRA and TFP	0.0			0.0				0.0		0.0
CRA: High Density and Saturation Flats and Parcels	1,175.7	1,174.3	1.4	1,190.1	1,188.0	2.1	1,259.8	1,237.1	1,399.7	1,372.6
TFP: Apportioned Cost HD & Saturation Flats & Parcels	1,232.3			1,250.8				1,289.6		1,424.3
Difference between CRA and TFP	56.6			60.7				52.5		51.6
CRA: Standard Mail NSAs	45.7	45.7	0.0	49.2	49.2	0.0	41.0	41.0	13.6	13.6
CRA: Every Door Direct Mail Retail	51.5	51.5	0.0	54.1	54.0	0.1	50.0	49.8	47.5	47.2

²⁹ ACD USPS 2015-18, Public Cost and Revenue Analysis and USPS Annual Tables, *Table Annual 2018 – 2018 CRA Public*.

³⁰ *ibid*.

Figure 24: Comparison of Piece Volumes: CRA to TFP

Comparison of Piece Volume: CRA to TFP - Selected Mail Classes				
Piece Volume	2015	2016	2017	2018
CRA: First Class Single-Piece Letters	19,737	18,910	17,832	16,830
TFP: Single Piece Letters	19,772	18,928	17,908	16,832
Difference between CRA and TFP	35	17	76	2
CRA: High Density and Saturation Flats and Parcels	11,232	11,047	11,231	11,592
TFP: HD & Saturation Flats & Parcels	12,109	11,911	12,010	12,334
Difference between CRA and TFP	877	864	779	741
CRA: Standard Mail NSAs	226	228	195	68
CRA: Every Door Direct Mail Retail	833	810	758	713

Methodology Transparency

TFP results are not transparent and cannot be independently validated. The TFP tables are a complex set of Excel worksheet tabs with values only, no formulas. This section describes specific aspects to the transparency and calculation validity concerns.

Adjustments when Methodology Changes

Adjustments are made to the structure and factors with no public input or acknowledgement. Values change in the tables to from one year to the next with no explanation. There is no way to know what adjustments might have been made in any year to the methodology or results. Non-public data is used in the Output calculations. Simply stated, the TFP result cannot be independently validated. The metric used for the operational efficiency-based requirement for the performance-base rate authority should be publicly transparent and independently validated.

TFP Results – Preliminary versus Final

TFP results are published in two steps. Preliminary TFP is published in December as part of the Annual Report. This Preliminary TFP uses the previous year's Attributable Cost per Piece to estimate the weighting factors used for the mail volume index. It also uses preliminary Bureau of Labor Statistics (BLS) metric for the last three months of the Fiscal Year. Once the ACR results are released for the current year and the BLS index values are updated in February, a Final TFP is calculated.

TFP Accuracy for Performance-based Rate Authority Purposes

TFP results are published by the PRC after being requested as a Chairman’s Information Request (CHIR) in the ACR docket. In FY2018, the Preliminary TFP result was positive and would have granted the performance rate authority. The Final TFP was negative or zero, depending on the rounding rules in place.³¹ The Final TFP results are not published on a fixed schedule. In fact, the TFP Final Tables file was not provided to the PRC through the Daily Listings until July 16, 2019. The use of TFP as the operational efficiency-based requirement measurement would have to ensure the final values of input are used in the results determination.

Growth Rate versus Percent Change

The published TFP tables use the term “Growth Rate” to measure the change from the previous year. This is assumed to be the econometric method using the logarithm based formula.³² Virtually all other Postal Service reports calculate the change from the previous year using the standard percentage change formula. This distinction and exact formula used will need to be defined in any metric definitions.

In reviewing this issue, it appears that the published TFP results cannot be validated against either formula methodology. Figure 25 demonstrates this discrepancy in calculation results.

Figure 25: Comparison of Formula Results for Change over Previous Year

Year	Index Result			Growth Rates (%)			Change Calculation Formula
	Workload	Input	TFP	Workload	Input	TFP	
2017	1.301202	1.037000	1.254776				
2018	1.292260	1.029989	1.254635	-0.6895489	-0.6783533	-0.0111956	Published Value
				-0.6895456	-0.6783490	-0.0111980	Calculated as Logarithm
				-0.6871737%	-0.6760534%	-0.0111974%	Calculated as Percent Change

Historical Role of TFP

TFP is generally considered a valid and widely accepted measure of performance. The NWPC reports documented the methodology through 2016. However, the NWPC reports did not evaluate the accuracy of the data used in the TFP calculations. The proposal to use TFP as the measurement for the operational efficiency-based requirement for performance-based rate authority requires a closer evaluation of TFP. TFP is the only current metric functionally available for this use.

The use of TFP as a general productivity measure versus as an operational efficiency-based requirement measurement for rate authority purposes is a matter of precision. More specifically, it is a matter of a false positive result where rate authority is granted but would not have been granted had specific inputs or methodology processes been different.

³¹ TFP Tables November 21, 2018, FY2018 TFP Growth Rate +0.059; TFP Tables February 15, 2019, FY2018 TFP Growth Rate -0.011.

³² Growth Rate is calculated using the Excel formula: $LN(\text{current year} / \text{previous year}) * 100$. Figure 25 in Appendix Excel file: Fisher Figures 19-25.xlsx

TFP Accuracy for Performance-based Rate Authority Purposes

As the 2018 results show, even minor discrepancies could be relevant. If TFP is used only for a couple of paragraphs in the Annual Report, the precision of the current methodology had been sufficient for that purpose up until recent CLI shifts.

The analysis shows that TFP should not be used for the operational efficiency-based requirement measurement for rate authority purposes. The following key TFP methodology and process issues were documented and quantified:

1. The CLI factor significantly alters the TFP result. It alone can make the difference in a false positive determination. This is a condition that only became apparent in the past several years. The concept underlying CLI is flawed, as years of experience is not a measure of relative productivity of a workhour input.
2. The CLI factor could make a difference even when TFP shows a large productivity increase. For example, if TFP was a positive one (1.0) percent, the operational efficiency-based requirement would be met. If taking out CLI showed a negative result, i.e., over one (1.0) percent impact, a false positive condition would be created. This range of difference is demonstrated in Figure 5.
3. The national labor costs of approximately seven (7) billion dollars are not reflected in TFP for year over year change. Instead, the only role of this seven billion dollars is in the weighting between Materials, Capital, and Labor. In fact, the addition of this seven billion dollars in cost results a higher TFP productivity, a counter intuitive result. These costs include the non-controllable costs as defined in financial reporting.
4. The data used in TFP cannot be validated against the NTB / Cost Segment values. The Materials index values cannot be validated against the BLS metric values. Non-public data precludes validation of the Workload Index. Values are substituted as shown by the shift from Attributable Cost to Volume Variable Cost in weighting Output in 2017. These data discrepancies could result in a false positive result.
5. The TFP methodology is not transparent and the result cannot be validated by stakeholders. The methodology is changed from year to year as specific elements are consolidated or changed due to normal business process adjustments. The process for methodology changes or structural adjustment is not known.

The metric used must be accurate at a precision level to prevent a false positive result and transparent to all stakeholders. The current TFP measure does not meet either of these requirements.

Productivity Measurement Role in Rate Regulation

This purpose of this declaration is to answer the question:

Is TFP a valid and accurate measurement for an operational efficiency-based requirement in a performance-based rate authority?

It documents that TFP is not a valid and accurate measurement for this purpose.

The role of productivity measurement in the rate regulation process is an underlying question related to the analysis presented here. A valid and accurate productivity measurement can provide insight into the rate regulatory process.

The TFP index calculation methodology is a useful approach to combining the different components of productivity and comparing the different elements. A productivity measure should be based on cost accounts that are within management control. A determination would have to be made at the account level if it should be included in the metric. The Cost Segments structure, as based in the National Trial Balance (NTB) accounts, can be a good source for cost data. Every account should be identified for its assigned category or role in the productivity metric.

The productivity metric should be transparent and able to be publicly validated. A productivity measure should use only public data. Redacted accounts can be calculated as a “redacted sub-total” within each Cost Segment without identifying the underlying account level detail. The methodology should be calculated in Excel, with all files available through the PRC.

There should be monthly and quarterly reports through the year to measure and monitor performance. Input (costs) should be calculated on a monthly basis. Volume and productivity calculations should be done on a quarterly basis, as they are reliant on RPW.

The reports provided should provide insight into the operational segments. The productivity metric should incorporate a detailed reporting structure that identifies the role and relative impact of each major category on the result. For example, the growth in Rural Carrier cost should be quantified relative to total labor costs and impact on total productivity.

Productivity should be a key component in the review of Postal Service performance. It is not included in any meaningful way in current processes. Financial performance should be put into the context of productivity performance. TFP clearly cannot support productivity measurement in any role in the regulatory process in its current form.

Appendix

The following Excel files are provided in support of this declaration:

1. **Fisher Labor Mode.xlsx**: Contains the Labor and TFP models, Figures 1-7, and the Mix Impact example.
2. **Fisher TFP Cost Segment Validation.xlsx**: Contains Figures 8-18 and their calculations.
3. **Fisher Figures 19-25.xlsx**: Contains Figures 19-21 for materials, Figure 22 for the capital graph, Figure 23-24 for Output, and Figure 25 for growth rate.

All data is from public sources obtained through the PRC website.