

Office of Inspector General | United States Postal Service

RARC Report

What's Driving Postal Transportation Costs?

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Executive Summary

Postal transportation costs have risen about 18 percent over the past 10 years.¹ This happened despite the overall decline of 26 percent of mail volume and the relaxation of First-Class Mail service standards, which was expected to lead to significant savings. According to the Postal Service, the increase in postal transportation costs is being driven by the large growth in parcel volume and higher driver wages. While the Postal Service's explanation may have some merit, it does not fully explain the increase in transportation costs over the past 10 years.

It is true that an increase in parcel volume could put upward pressure on transportation costs. Parcels are larger and heavier than letters and flats. Therefore, a parcel will cost more to transport than a letter or flat traveling the same distance. However, some parcels receive little to no transportation because they are entered into the postal network at the destination post office.² Furthermore, any increase in transportation costs resulting from the growth in parcels will be partially offset by transportation savings stemming from the decline in letters and flats.

It is also true that most costs increase over time due to inflation, and transportation costs likely faced upward pressure due to higher contractor wages caused by the trucker shortage. However, it is unclear how much of the transportation cost increase over the past 10 years was due to these inflationary factors.

As the Postal Service continues to manage its transportation network in response to these changes, it may be helpful to better understand what is truly driving transportation costs. To shed light on this, we estimated how much transportation costs should have been expected to increase over the past 10 years as a result of: (1) the change in volume, encompassing both the decline in letter and flat mail and the increase in parcel volume; and (2) the general increase in transportation-related input costs across the country, including the impact of things such as fuel costs and driver wages. By isolating the impact of these two factors, we can identify transportation costs that are increasing beyond what is expected and thus

Highlights

We wanted to get a better understanding of how much of the increase in transportation costs over the last 10 years was due to: (1) the changing mail volume, including the changing mail mix; and (2) the increase in transportation-related input costs, including fuel prices and driver wages.

Our analysis estimates that 61 percent of the cost increase over the last 10 years was due to the change in mail mix and rising transportation-related input costs.

This leaves 39 percent of the increase, approximately \$418 million, that warrants further explanation.

Our analysis allowed us to identify the area with the largest cost increase unexplained by volume and input costs — contracted highway transportation designed to serve the Postal Service's mail processing centers that sort expedited mail and single-piece letters and flats.

deserve further explanation. This identification is only the first step toward gaining a deeper understanding of transportation costs and may point the way toward actions that could help to contain future costs.

Our analysis found the following:

- The change in transported volume, including the change in the mail mix, likely accounts for 15 percent (\$157 million) of the increase in transportation costs over the last 10 years.

¹ This estimate is from our analysis, which uses a two-year base that compares the average costs from FY 2008 and FY 2009 to the average costs from FY 2016 and FY 2017.

² Parcels dropped at the destination post office make up ████████ percent of all parcels.

- The overall increase in transportation-related input costs, including fuel cost and rising trucker wages, likely accounts for another 46 percent (\$490 million) of the cost increase over the last 10 years.
- This means that 39 percent of the cost increase over the last 10 years, or \$418 million, likely occurred for reasons other than the change in volume and input costs. This does not mean that the 39-percent increases are necessarily reasonable or unreasonable. It simply means that we cannot tell from this analysis. Additional studies may be warranted.
- While these numbers represent the overall changes in transportation costs, the results varied widely by the type of transportation. In fact, some components had costs that either declined during the 10-year period or had a cost increase that was less than expected in response to the change in volume and input costs.

Our analysis allowed us to identify the transportation components with the largest cost increase that cannot be explained solely by volume and transportation-related input costs. This is highway contracted transportation that is designed to serve the Postal Service's mail processing facilities that sort expedited mail and single-piece letters and flats. Some of this increase is likely explained by changes in how transportation was managed as a result of network realignment, including the shift of some Priority Mail from air transportation to ground transportation. However, the magnitude of the increase hints that there may be more going on. Therefore, this may be an area where additional analysis of the decomposition of costs or future audits are warranted. A better understanding of what is driving these costs could help the Postal Service find ways to contain them in the future.

	Ten Year Change FY 2008 – FY 2017*	
	\$ Millions	Percent
Volume and Mail Mix Effect	\$ 157	15%
Transportation-Input Cost Effect	\$ 490	46%
Unexplained (Other)	\$ 418	39%
Total	\$ 1,065	100.0%

*Difference between the average cost in fiscal year (FY) 2008 and FY 2009 and the average cost in FY 2016 and FY 2017.

Observations

Introduction

Over the last decade, domestic transportation costs have been increasing.³ While costs generally increase over time in response to inflationary pressures, there were other factors during the last 10 years that should have put downward pressure on postal transportation costs. First, over the last 10 years mail volume declined by 26 percent, and, holding all else equal, transportation costs would be expected to decline as fewer pieces of mail needed transportation.⁴ Second, during this same time, the Postal Service reduced the First-Class service standards and predicted that this change would result in transportation cost savings.⁵ According to the Postal Service, transportation costs rose in response to the increase in parcel volume and rising truck driver wages.⁶ While the Postal Service's argument may have some merit, it likely does not fully explain the increase in costs.

An increase in parcels may put some upward pressure on transportation costs; however, this increase will be mitigated by the decline in letters and flats and the fact that many parcels are dropped at the destination post office and receive little to no transportation. Furthermore, while most costs increase over time due to inflationary factors — such as the increase in trucker wages due to the driver shortage — it is not obvious how much of the increase in transportation costs was due to this upward cost pressure.

An increase in parcels may put some upward pressure on transportation costs; however, this increase will be mitigated by the decline in letters and flats and the fact that some parcels receive little to no transportation.

To get a better understanding of what is driving transportation costs, we worked with Professor Michael Bradley, an expert in postal economics, to perform a quantitative analysis of transportation costs over the 10-year period from fiscal year (FY) 2008 to FY 2017. This analysis was designed to estimate how much of the increase in transportation costs is due to two things: (1) the change in mail volume, including both the decline in letter and flat mail and the increase in parcels; and (2) the increase in the costs of transportation-related inputs across the country, including cost pressures that arise from things like fuel prices and the increase in wages due to the trucker shortage. By isolating these factors, we can then identify the areas where transportation costs have increased for reasons other than these two factors and, therefore, warrant further examination.

Postal transportation is a complex system comprised of numerous components, each providing transportation to specific types of postal facilities and carrying a different mix of mail products. While overall transportation costs have risen over the past 10 years, the cost trends of the individual transportation components are quite different, with some increasing and others declining over the same time. Therefore, to better understand where costs have increased more or less than expected, we conducted our analysis at the transportation component level. For this reason, some general knowledge about postal transportation is helpful to understand our results.

Overview of Postal Transportation

In FY 2017, the Postal Service's domestic transportation costs totaled \$7.3 billion, making up about 10 percent of the Postal Service's total costs. Postal transportation is composed of an air network and a ground network, with ground transportation making up two-thirds of the Postal Service's total domestic transportation costs in FY 2017 (see Figure 1).

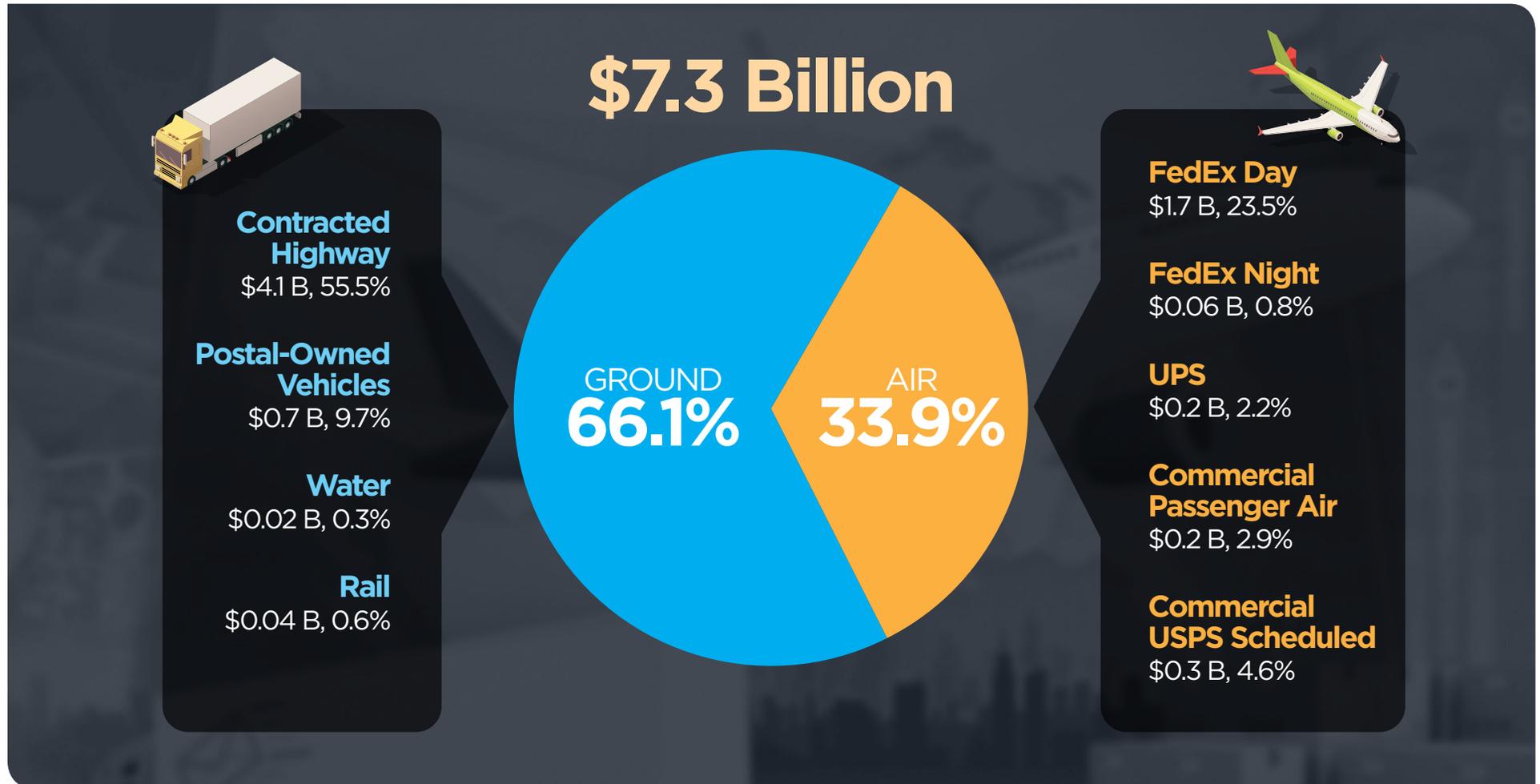
3 For the purpose of this paper, the last decade refers to fiscal year (FY) 2008 to FY 2017. There was a decline in overall transportation costs between FY 2008 and FY 2009, but they have steadily increased since FY 2009. While this paper focuses on the change from FY 2008 to FY 2017, we note that in FY 2018 transportation costs continued to increase. According to the Postal Service, transportation costs increased from FY 2017 to FY 2018 by \$623 million, or 8.6 percent, and the main reasons for this increase were higher air volumes, increasing fuel costs (both jet and diesel), and higher unit costs per mile for third-party contractors. U.S. Postal Service, *2018 Report on Form 10-K*, <https://about.usps.com/who-we-are/financials/10k-reports/fy2018.pdf>, p. 18.

4 U.S. Postal Service, *Cost and Revenue Analysis*, FY 2008 and FY 2017, <https://about.usps.com/who-we-are/financials/welcome.htm>.

5 For discussion of whether the Postal Service achieved its expected savings from the operational window change, see U.S. Postal Service Office of Inspector General, *Operational Window Change Savings*, Report No. NO-AR-19-001, October 15, 2018, <https://www.uspsioig.gov/sites/default/files/document-library-files/2018/NO-AR-19-001.pdf>, p. 12.

6 Ibid.

Figure 1: FY 2017 Transportation Costs



Note: Numbers may not add up due to rounding.

Source: OIG analysis of FY17 Cost Segment and Component Report.

Ground transportation consists of: (1) contracted highway transportation, truck transportation supplied by external contractors; (2) postal-owned vehicles, transportation supplied by postal employees using postal-owned trucks; (3) water transportation; and (4) rail transportation.

Contracted highway is by far the largest transportation component, making up 55 percent of domestic transportation costs in FY 2017. Postal-owned vehicles provided 9.7 percent of domestic transportation costs in FY 2017. The Postal Service only uses a minimal amount of rail and water transportation.⁷ Rail transportation is used

⁷ The merits of moving mail via rail transportation are discussed in U.S. Postal Service Office of Inspector General, *Strategic Advantages of Moving Mail by Rail*, Report No. RARC-WP-12-013, July 16, 2012, https://www.uspsoig.gov/sites/default/files/document-library-files/2015/rarc-wp-12-013_0.pdf.

solely for the movement of empty equipment, and a small amount of water transportation is used when necessary. Since the Postal Service only uses small amounts of rail and water, and these components are used for fairly unique purposes, we focused our analysis of ground transportation on contracted highway and postal-owned vehicles.

As shown in Figure 1, in FY 2017, air transportation made up around one-third of domestic transportation costs for the Postal Service. The air network includes contracts with FedEx, UPS, and commercial airlines. The FedEx contract has two parts — one providing transportation at night and one during the day when FedEx planes would otherwise remain empty. As shown in Figure 1, the FedEx day portion is by far the largest component of air transportation, making up 23.5 percent of total domestic transportation costs in FY 2017. The Postal Service also has two types of contracts with commercial airlines. The first category puts mail on existing commercial passenger flights, and the second type provides service to certain geographic areas where the existing flight schedules do not provide adequate coverage, such as Hawaii and Alaska.⁸

Understanding How Mail Moves Through the Postal System

Postal transportation is designed to move different types of mail between the various types of postal facilities within the postal network. While the postal network is a complex system, we provide a simplified explanation of the network to better illustrate how postal transportation is managed.

Overall, there are three main types of mail facilities.⁹ **Post offices** are facilities where mail is entered (at windows or blue collection boxes) and where mail can be picked up by customers (at the window or Post Office Boxes). **Delivery units or carrier stations** are where carriers prepare the mail for delivery. While in most cases these functions occur in the same building, there are some post offices that do not house carrier operations. The reverse is also true. There are some postal facilities that house carrier operations but are not post offices. For the purpose of

Postal transportation is designed to move different types of mail between the various types of postal facilities within the postal network.

While the nomenclature can be confusing, the term SCF is used when a P&DC provides the function of sorting the mail to the destination post offices within its designated 3-digit service area.¹⁰ Most P&DCs provide the functionality of an SCF, but there are some P&DCs that do not sort mail directly to a post office. For the purpose of this paper, we shall refer to both SCFs and P&DCs as SCFs. These types of facilities are responsible for sorting expedited mail like First-Class Mail and Priority Mail. In addition, these facilities are where containerized Marketing Mail and Periodicals are broken down and the individual letters and flats are sorted along with single-piece First-Class Mail letters and flats. These facilities can also be used to transfer containerized mail from one truck to another.

The third main type of postal facility is called a **Network Distribution Center (NDC)**. These facilities primarily process non-expedited parcels, Periodicals, and containerized bulk mail, such as Marketing Mail in trays, bundles, or sacks. In addition to sortation, these facilities are also used to consolidate less-than-full containers and trucks of non-expedited mail.¹¹

To illustrate how mail moves through the postal network, [Figure 2](#) shows a simplified mail processing diagram for end-to-end mail. The top part of the diagram shows how expedited mail, such as First-Class Mail, Priority Mail, and Priority Mail Express, travels through the network. The bottom half illustrates

this paper, we assume that both functions occur in one building, and we use the term “post office” for simplicity.

Sectional Center Facilities (SCFs) or Processing and Distribution Centers (P&DCs) are often referred to as “mail processing facilities.”

⁸ For the first type of contract with commercial airlines, the Postal Service is dependent on the schedules of existing commercial flights. The second type of contract is designed to meet the Postal Service’s specific needs, so the contracts specify the origin, destination, and schedule that are necessary to fulfill those needs.

⁹ While there are additional types of facilities, such as annexes and facilities designed to handle international mail, these are the three main types needed to understand the transportation components.

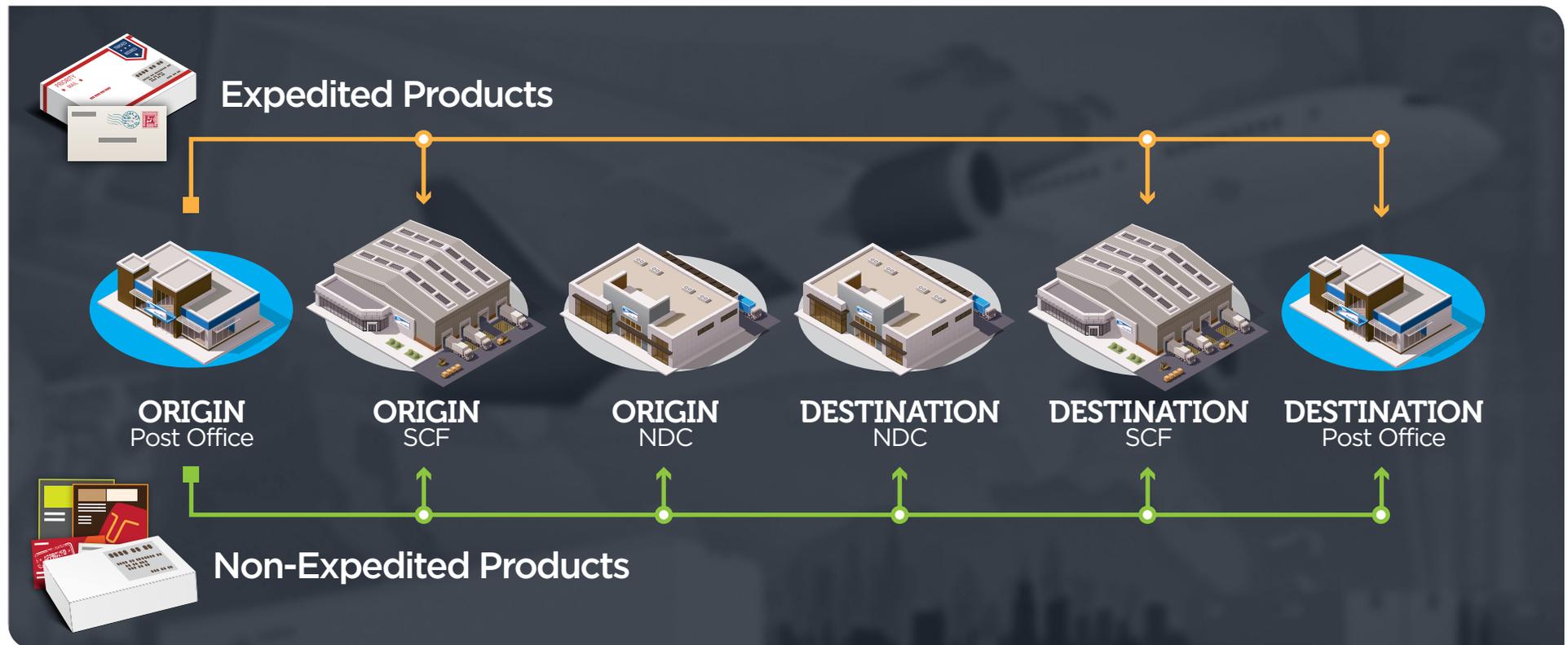
¹⁰ The 3-digit service areas are defined by the first three digits of the ZIP Code. There are also mail processing facilities that provide similar functions but are smaller in scale. These are referred to as processing and distribution facilities. U.S. Postal Service, *Glossary of Postal Terms, Publication 32*, July 2013, <http://about.usps.com/publications/pub32.pdf>, pp. 183 and 201.

¹¹ These facilities were formerly referred to as Bulk Mail Centers (BMCs). *Ibid.*, p. 143.

the mail flow for non-expedited mail such as Marketing Mail, Periodicals, and non-expedited parcels.¹² As can be seen in Figure 2, various types of transportation are needed to move the mail through the postal network. Transportation is needed between the SCFs and their respective post offices, as well as between the SCFs themselves. Furthermore, transportation is needed between the individual NDCs, as well as between the NDCs and the SCFs they serve.

Figure 2: End-to-End Diagram of Postal Network

Simplified Diagram of How End-to-End Mail Travels Through the Postal Network



Source: OIG analysis.

In reality, the flow of mail is much more complicated. Some mail originates and destines within the same service area, and this mail would have a much more limited mail flow. For example, a First-Class Mail letter that is entered at a post office within the same service area as its destination may only travel from the originating post office to an SCF for sortation, and then from the SCF to the destination post office. In addition, mail can be entered along various parts of the network. While some

¹² Examples of non-expedited parcels include Standard Post, Parcel Select, Media Mail, and Bound Printed Matter.

is entered as shown in the diagram and traverses a long way in the network, other mail is entered closer to its destination, such as at the destination NDC, destination SCF, or even at the destination post office. Moreover, in some cases mail travels through several mail processing facilities — either for additional sortation or for the purpose of consolidating mail into containers — before it reaches its destination.¹³ These things do not change the types of transportation needed, but they do add to the complexity of managing postal transportation. The location where mail is entered and how far it travels will affect the need for transportation capacity on the various transportation legs.

Understanding How Postal Transportation Serves the Postal Network

Ground transportation is designed to move non-expedited mail, as well as expedited mail when it can do so and still get the expedited mail to its destination in time to meet its service requirements. As mentioned above, our paper focuses on the two largest components of ground transportation, contracted highway and postal-owned vehicles.

Contracted highway transportation is designed around meeting the needs of the two types of sorting facilities — SCFs and NDCs. The first type of contracted highway transportation is used to provide service either: (1) between different SCFs; or (2) between an individual SCF and the post offices within its service area. This part of the purchased highway transportation network is designed to move expedited mail like First-Class Mail, Priority Mail, and Priority Mail Express. Therefore, while it is also used to transport non-expedited mail, the arrival and departure schedules are designed to ensure that the expedited mail reaches its destination within its service standards. Adherence to these more demanding service standards may result in trucks leaving facilities at a predesignated time regardless of how full the truck is at the moment of departure.

The names of the transportation components within this category describe the relationship of the facilities they serve.

- **Inter-SCF transportation** is transportation between SCFs. The length of these routes can vary substantially depending on the distance between facilities.¹⁴
- **Intra-SCF transportation** provides transportation between SCFs and the post offices within their service areas. There is also some intra-SCF transportation that is used to deliver mail to customers.

Figure 3 illustrates where along the network inter-SCF and intra-SCF transportation provide links between postal facilities.

The second type of highway transportation serves NDCs and their service areas. Since it provides transportation to the NDCs, it primarily carries Periodicals, Marketing Mail, and non-expedited parcels. The names of the components within this type of transportation have similar naming conventions to the SCF-related transportation.

- **Inter-NDC transportation** refers to the transportation between NDCs. Since NDCs are spread out across the country, these routes can be quite long.¹⁵
- **Intra-NDC transportation** provides transportation between NDCs and the SCFs they serve.

Figure 4 shows the simplified diagram illustrating where inter-NDC and intra-NDC transportation is used to move mail between postal facilities.

Ground transportation also includes postal-owned vehicle transportation, which is supplied using postal employees and postal-owned trucks. This type of transportation covers mostly short distances, with most trips being less than 50 miles. Postal-owned vehicles move mail between nearby mail processing facilities, to and from airports, and to post offices, as well as occasionally pick up mail from mailers' plants.¹⁶

¹³ When and where that occurs is beyond the scope of this paper.

¹⁴ Inter-SCF is composed of three subcomponents. The average length of the routes covered by these three subcomponents ranges from 90 to 525 miles.

¹⁵ The average length is about 825 miles.

¹⁶ The postal-owned vehicle cost component also captures some costs associated with using postal employees to "spot" or stage trailers at mail processing facilities. This means the drivers help move trucks as needed to and from the docks for loading and unloading.

Figure 3: Inter-SCF and Intra-SCF Transportation

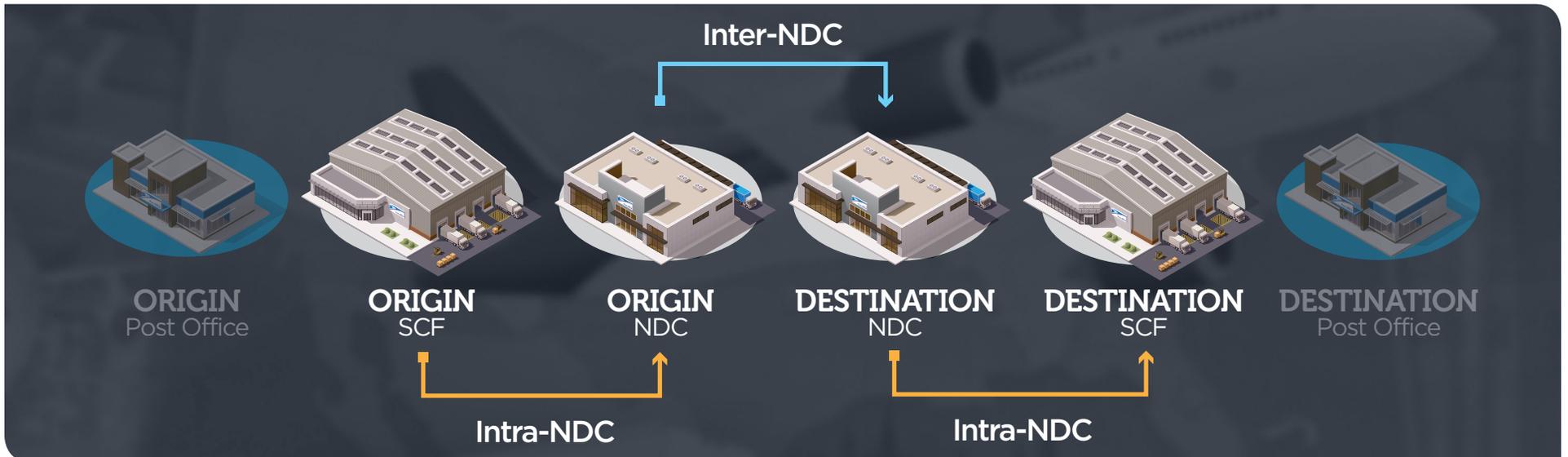
Simplified Diagram of Inter-SCF and Intra-SCF Transportation



Source: OIG analysis.

Figure 4: Inter-NDC and Intra-NDC Transportation

Simplified Diagram of Inter-NDC and Intra-NDC Transportation



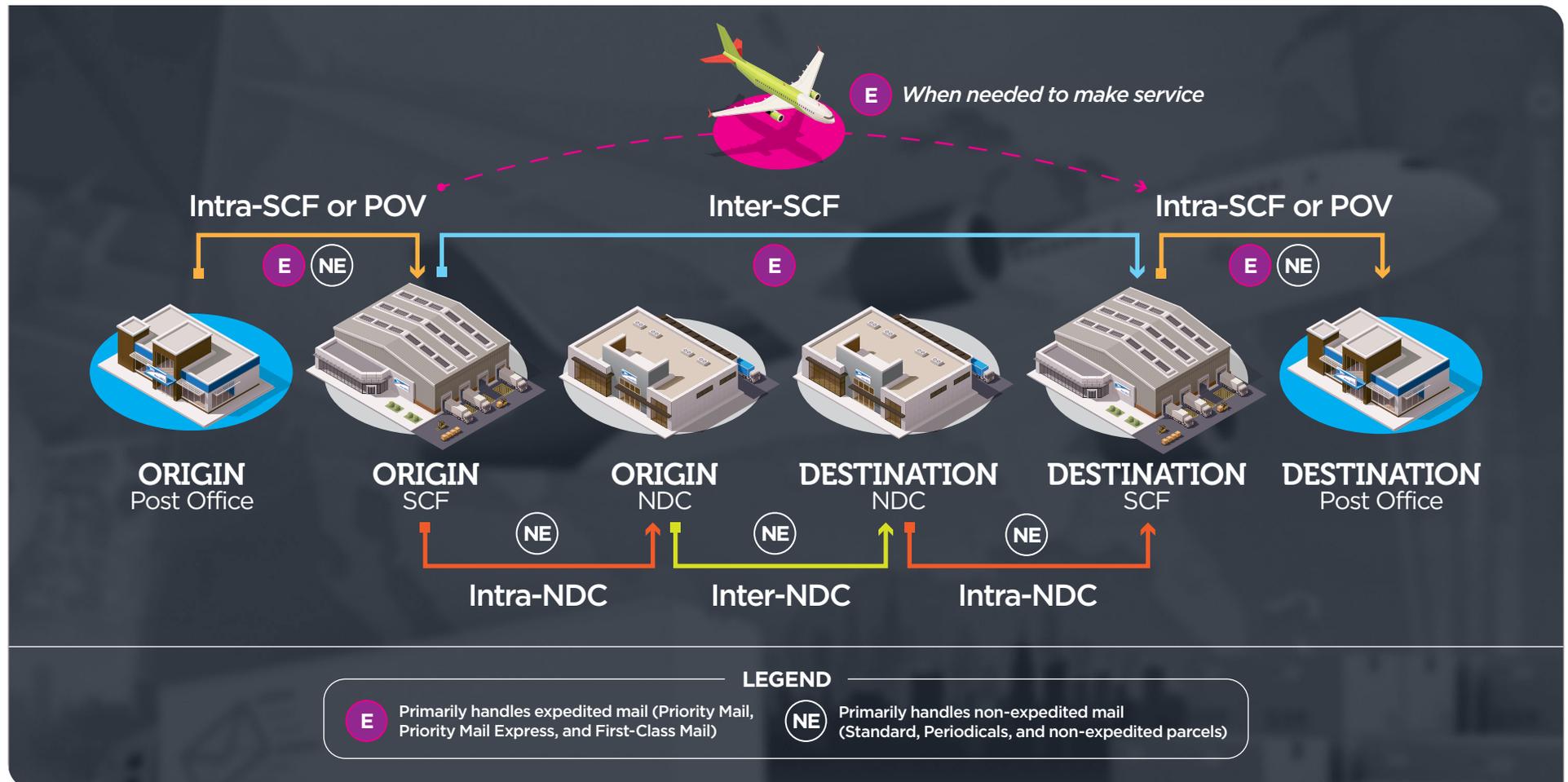
Source: OIG analysis.

Air transportation is generally used to move mail that has expedited service requirements, such as First-Class Mail, Priority Mail, and Priority Mail Express, when ground transportation may not be quick enough to ensure this mail will meet its service requirements. In addition, air transportation provides service to hard-to-reach areas, such as transportation within Alaska and to and within Hawaii.

Figure 5 shows the simplified diagram, this time illustrating how mail travels through the postal network, with the addition of showing what type of mail is the *primary* type of mail served by the transportation components.

Figure 5: Overview of Postal Transportation

Simplified Diagram of How Mail Uses Postal Transportation



Source: OIG analysis.

The Relationship Between Mail Volume and Postal Transportation Costs

In general, one might expect transportation costs to decrease as the overall number of pieces of mail declines. However, as we discuss below, the relationship between volume and transportation costs is a bit more complicated.

Not All Mail Receives the Same Amount of Transportation

When considering the impact of a volume change on costs, it is important to note that not all mail receives the same amount of transportation. In general, the longer the distance a mailpiece travels, the more transportation costs it incurs. As such, a mailpiece traveling from one coast to the other will incur more transportation costs than a similar mailpiece traveling only from Washington, DC, to New York City.

For some products, such as destination-entered Parcel Select, the Postal Service provides rate incentives to induce mailers to enter the mail close to its destination. The closer the mail is entered to its destination, the less it needs to be transported, and therefore the lower transportation costs it incurs. Some mail is even entered at the destination post office, where it would be expected to receive little to no transportation at all.¹⁷ Holding all else equal, a shift toward more mail that needs to be transported only a short distance should result in lower transportation costs. This is especially relevant as parcel growth includes many parcels that are dropped close to their destination.

It's Really About Size and Weight

Changes in the sheer *number* of mailpieces transported is not the sole or even primary driver of transportation costs — what really matters is the *size* and *weight* of the mailpieces. For example, since ground transportation is based on the space taken up in a truck, the main driver of costs for all ground components discussed in this paper is cubic feet or cubic foot miles.¹⁸ In addition, the larger part of air transportation costs, those costs associated with the FedEx day contract, is also based on cubic feet. The remaining air contracts are based on pounds.

While changes in cubic feet and weight can correspond to changes in the overall number of mailpieces, this relationship does not always hold, especially when there is a change in mail mix. As the volume of parcels grows and the volume of letters declines, the average size and weight of a piece of mail increases. For example, a single five-pound Priority Mail parcel weighs about the same as 80 one-ounce First-Class Mail letters.¹⁹ The same concept holds for cubic feet, as one parcel could take up the same amount of cubic foot space as a tray or sack of letters. Therefore, as parcels replace letters and flats on transportation, the change in the number of transported mailpieces alone is not an accurate indicator of how much transportation costs should change. Furthermore, since most of the transportation costs are based on cubic feet, a shift from smaller to larger parcels will also increase transportation costs, even if the overall average weight of the parcel does not change.

Costs Do Not Move in Lockstep with Volume

A decrease in mail volume, especially insofar as it translates into a fall in cubic feet or weight, should clearly result in lower costs, other things being equal. However, there is generally no expectation that costs change in direct proportion to a change in volume. An exception is air

As parcels replace letters and flats on transportation, the change in the number of mailpieces transported alone is not an accurate indicator of how much transportation costs should change.

While the Postal Service can adjust routes and change the number of trucks along a route, there may be some trips that cannot be eliminated without putting the network in jeopardy.

¹⁷ It may receive some transportation as there is a subcomponent of the intra-SCF transportation component that is used to deliver mail to the customer. For this one subcomponent, this mail will incur costs that fall in the Postal Service's transportation components. But most of the mail dropped at the destination post office will incur only delivery costs.

¹⁸ U.S. Postal Service, *Summary Description of Costs by Segments and Components*, FY 2009, p. 14-6.

¹⁹ Five pounds equals 80 ounces (5 x 16 ounces = 80).

transportation, where costs will increase in direct proportion to volume, since the Postal Service pays for the amount of mail it gives the contractor.²⁰

However, the story is different when it comes to ground transportation. There may be limitations to how much the Postal Service can vary its ground transportation in response to changes in volume. Some short-term, small fluctuations in volume may not result in any change to overall transportation costs. For example, on any given day, a truck might need to leave a postal facility during a specified time frame and cannot wait to be filled up completely. If there were a small increase in volume along this route, this might simply result in filling the truck up more. The opposite might also hold true — a small, short-term decline in volume along an existing route might simply result in a less-full truck.

However, over a longer period the Postal Service can better align its planned transportation capacity to accommodate volume shifts, arranging for more (or fewer) trucks or trips by the same truck. That being said, there still may be some limits to the Postal Service's flexibility. For example, in order to meet service standards, trucks must leave and arrive at postal facilities during certain windows of time, and these times must be aligned with mail processing operating windows. A late arrival of a truck can lead to significant delays later in the mail processing and transportation flow. While the Postal Service can adjust routes and change the number of trucks along a route, there may be some trips that cannot be eliminated without putting the network in jeopardy. Hence, over any given period, there will be trips (or trucks) that can be eliminated and some that cannot.

The Postal Service measures how much ground transportation costs vary on average with volume over a longer time period, and the measure ranges from around 50 to 80 percent.²¹ To give an example of what this measure means, a

50-percent measure means that if volume declines by 10 percent, costs would only decline by half that amount.²²

How Much of the Increase in Transportation Costs was Due to Changes in Volume and Rising Input Costs?

In this section, we discuss the results of our decomposition of transportation costs. For this analysis, we focus on the eight main transportation cost components.²³ Note that this analysis estimates the change using a “two-year base.” This means that instead of looking at the actual change that occurred between FY 2008 and FY 2017, we looked at the change that occurred between the average cost in FY 2008 and FY 2009 and the average cost in FY 2016 and FY 2017. This was done to avoid any anomalies that might have occurred in a single year at either the beginning or end of the 10-year timeframe.²⁴ For a more detailed technical explanation of this assumption and the rest of the analysis, please see [Appendix A](#).

This analysis takes each of the transportation components and decomposes the change in costs into three parts:

- **The cost change expected to occur as a result of the change in transported volume.** This estimate takes into consideration the change in mail mix in addition to the overall change in volume.²⁵ This is done by separately estimating volume growth for each of the relevant product groups.²⁶ For example, Parcel Select is adjusted to remove parcels that are dropped at a destination post office, as changes in the removed volume will have a minimal impact on transportation costs.²⁷ This estimate will not include any cost changes associated with the Postal Service making a change to what transportation it uses for its products. For example, it will not include the change in cost associated with shifting mail from air to ground transportation.

20 There are minimum requirements on the FedEx and UPS contracts, but it is our understanding that these requirements are met most of the time.

21 These are the variabilities for contracted highway transportation and postal-owned vehicles. U.S. Postal Service, “Library Reference USPS-FY17-32, FY 2017 CRA “B” Workpapers (Public Version),” Postal Regulatory Commission Docket No. ACR2017, <https://www.prc.gov/dockets/doclist/ACR2017/Library-References?page=2>. Data are found in spreadsheet CS14-Public-FY17.xlsx.

22 This phenomenon is similar to other aspects of the postal network. For instance, a reduction in delivered volume indicates the direction of the change in delivery costs, but the magnitude of the cost reduction will be inhibited by the lost scale advantages as volume falls. The story is essentially the same in the transportation component.

23 We did not include FedEx night in our quantitative analysis because it is a relatively small component, and the necessary detailed data to perform this analysis were not available. In addition, we did not include the various commercial air contracts that serve small geographic areas due to their relatively small size and the complexity of dealing with the small, individual components (for example, Hawaii and Alaska).

24 For example, total domestic transportation costs were much higher in FY 2008 than in FY 2009. If we did not use a two-year base, the actual cost increase over the last 10 years would be understated.

25 The analysis also takes into consideration the variabilities that were discussed above. See [Appendix A](#) for a complete discussion.

26 In some cases, this was a “product” as defined by the Postal Service. Other times it was a group of products or a subgroup of products. For a more detailed description, see [Appendix A](#).

27 Since there were numerous changes to the product lines over the last 10 years, the first step of this analysis is to redefine the products to reflect what they would have been in FY 2008. For a more detailed explanation, see [Appendix A](#).

- The cost change expected to occur due to the change in the relevant transportation-related input costs.** To calculate this estimate, we employ the most relevant transportation-related producer price index (PPI) for each individual cost component.²⁸ This allows us to estimate how much costs *should have* changed in response to the inflationary cost pressures in the transportation market, including things such as changing fuel prices and increases in driver wages.²⁹
- The residual costs, which represent the change in costs that cannot be explained by the changes in volume and transportation-related inputs.** These are calculated simply as the actual cost change minus the expected cost changes resulting from shifts in volume and transportation-related input costs. A negative residual represents an area where the change in costs is lower than expected. A positive residual represents an area where something happened to raise the costs beyond what is expected. The latter are areas that may be of concern and most worthy of further study.

Table 1 displays the results of our analysis. Overall, the total nominal costs for the eight transportation components included in our analysis increased by 18 percent — \$1 billion over the last 10 years. Of the total change in costs, almost 15 percent of this increase, or \$157 million, is expected in response to the change in mail volume, including both the decline in letters and flats and the increase in parcels. While this result might seem counterintuitive given that overall volume declined, it is being driven by the growth of parcel products. In addition, a little over 46 percent of the increase in costs, or \$490 million, can be expected to have occurred as a result of the overall increase in transportation-related input costs. This leaves 39 percent of the cost change, or \$418 million, that needs additional explanation and thus warrants further study.

Looking at the analysis for each of the eight individual components shows that there are large differences in where these unexplained costs occurred. As can be seen in Table 1, while some components had a relatively large residual — indicating areas that most warrant further explanation and study — others had a negative residual. We discuss the analysis of the components in more detail below.

²⁸ For intra-SCF and postal-owned vehicles, we used the producer price index (PPI) for local general freight trucking. For intra-NDC, inter-NDC, and inter-SCF, we used the long-distance truckload general freight trucking PPI. Finally, for all the air contracts, we used the scheduled freight air transportation PPI.

²⁹ Since producer price indexes reflect a multitude of different factors, in some cases the changes in factors counteract each other. For example, an increase in prices due to trucker wages could be partially offset by a decline in fuel costs.

Table 1: Decomposition of Transportation Cost Changes FY 2008 to FY 2017

	Change from FY 2008 to FY 2017 (2-Year Base) \$ Millions*			
	Actual % Change	Volume Effect % Change	Input Cost Effect % Change	Residual % Change
Air Transportation				
Commercial Air	\$25.3 15.4%	(\$34.8) (21.2%)	\$29.2 17.8%	\$30.9 18.8%
FedEx Day Turn	\$236.7 15.7%	\$193.3 12.9%	\$267.1 17.8%	(\$223.8) (14.9%)
UPS	\$81.1 114.3%	(\$14.1) (19.9%)	\$12.6 17.8%	\$82.7 116.4%
Highway Transportation				
Inter-SCF <i>Transportation between mail processing facilities</i>	\$434.2 45.0%	(\$41.3) (4.3%)	\$77.2 8.0%	\$398.4 41.3%
Intra-SCF <i>Transportation between mail processing facilities and their post offices</i>	\$324.3 22.8%	\$73.1 5.1%	\$22.4 1.6%	\$228.8 16.1%
Inter-NDC <i>Transportation between NDCs</i>	(\$26.4) (6.9%)	(\$75.6) (19.8%)	\$30.6 8.0%	\$18.7 4.9%
Intra-NDC <i>Transportation between NDCs and facilities in their service area</i>	(\$66.3) (18.2%)	(\$32.4) (8.9%)	\$29.2 8.0%	(\$63.1) (17.3%)
Postal-Owned Vehicles	\$56.1 4.1%	\$88.5 6.4%	\$21.7 1.6%	(\$54.1) (3.9%)
Total	\$1,065.0 18.1%	\$156.5 2.7%	\$490.0 8.3%	\$418.5 7.1%
Percent of Cost Change		14.7%	46.0%	39.3%

*Numbers in parenthesis in table represent negative numbers.

Source: OIG analysis.

Ground Transportation

What the Analysis Tells Us

Since the mix of mail varies by transportation component, the impact of volume changes differs among components. For the ground components that provide local transportation — intra-SCF and postal-owned vehicles — costs were expected to increase in response to the change in mail and parcel volume. Specifically, the expected increase occurs due to the growth in ground parcels and Priority Mail.³⁰ This result occurs because a fairly large portion of ground parcels is still entered upstream from the destination post office and, therefore, receives local transportation. For these two transportation cost components, the cost increase from parcel growth was not offset by the decline in letters and flats.

Perhaps intra-NDC is an area where there are some lessons learned on how the Postal Service managed transportation in response to a volume decline.

On the other hand, for the longer distance ground transportation — inter-SCF, inter-NDC, and intra-NDC — we would expect a cost decrease in response to the volume change. For inter-SCF, this decrease was driven by the decline in First-Class Mail. For both types of NDC transportation, the decrease was driven by the decline in non-expedited parcels that were not entered at a destination postal facility.³¹ While there has been a growth in parcels overall, there has been a decline in end-to-end non-expedited parcels.³²

The predicted impact of the transportation-related input costs also varies by component, depending on what type of freight transportation the component most closely resembles. The largest predicted increase due to the change in

transportation-related input costs is for the long-distance categories — inter-SCF, intra-NDC, and inter-NDC. This increase likely reflects an increase in wages due to the nationwide trucker shortage.³³

What Else Happened?

There are two components in ground transportation where the residual category is negative — postal-owned vehicles and intra-NDC transportation. These represent areas where costs declined more than expected due to the change in volume and transportation-related input costs. During the 10-year period we analyzed, the Postal Service started using more contracted transportation for work that was previously done by postal employees. This likely explains part of the decline in costs in postal-owned vehicles. However, a postal union was able to negotiate the return of some of this work to Postal Service employees.³⁴

The negative residual cost for intra-NDC possibly reflects the reduction in the number of mail processing plants, as it is possible that with fewer SCFs, the Postal Service needed less transportation between the NDCs and SCFs.³⁵ In fact, in the 10-year period in our analysis, contracted miles in the intra-NDC component declined by 35 percent. Perhaps this is also an area where the Postal Service can look for lessons learned in efficiently managing the volume decline and apply these lessons to other components.

The two areas that most warrant further study involve the transportation managed around the SCFs. Both inter-SCF and intra-SCF transportation had a relatively large positive residual — accounting for almost 41 percent of the cost increase for inter-SCF transportation and 16 percent for

The two areas that most warrant further study involve the transportation managed around SCFs.

³⁰ Professor Bradley's analysis as described in [Appendix A](#).

³¹ Ibid.

³² These include parcels that used to travel as Parcel Post, as well as Bound Printed Matter and Media Mail.

³³ "Drivers Wanted: Why the Trucking Shortage is Costing You," *Fortune*, August 1, 2018, <http://fortune.com/2018/08/01/drivers-wanted-trucking-shortage/>.

³⁴ American Postal Workers Union, "New Contractual Agreements in the MVS Craft," <http://www.apwu.org/news/deptdiv-news-article/new-contractual-agreements-mvs-craft>.

³⁵ The Postal Service announced its plan to align its network in 2011. The purpose of network realignment was to align the Postal Service's network processing capacity with its declining mail volume through equipment and plant consolidations and operational changes. The first phase of the network realignment involved consolidating 141 mail processing facilities. U.S. Postal Service Office of Inspector General, *Mail Processing and Transportation Operational Changes*, Report No. NO-AR-16-009, <https://www.uspsaig.gov/sites/default/files/document-library-files/2016/NO-AR-16-009.pdf>, p. 7. The Postal Service initially said that network realignment overall led to transportation savings in ground transportation. U.S. Postal Service, "Direct Testimony Of Cheryl D. Martin On Behalf Of The United States Postal Service (USPS-T-6)," Postal Regulatory Commission Docket No. N2012-1, https://www.prc.gov/docs/78/78323/USPS-T-6_Martin_testimony.pdf, p. 9.

intra-SCF. This means that we need to consider what else could have caused these costs to rise, beyond the changes in volume and transportation-related input costs.

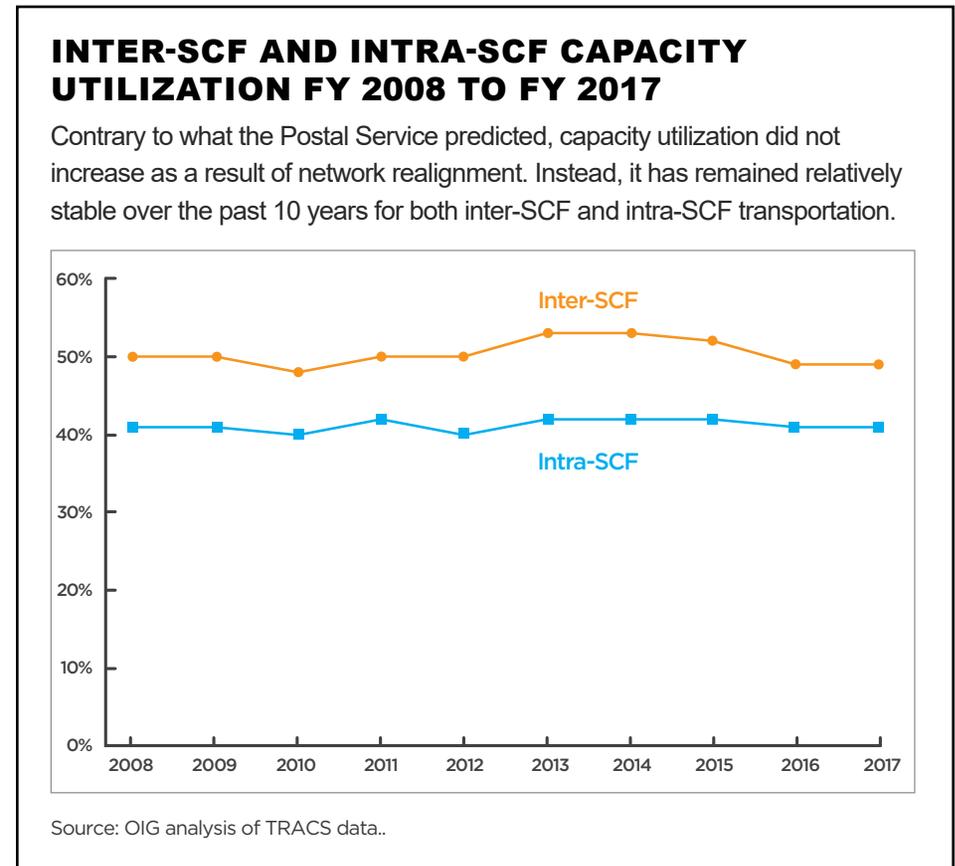
Taking a closer look at these two SCF-related transportation components, both had relatively stable capacity utilizations over the 10-year period. As shown in Figure 6, while there has been some fluctuation in the average capacity utilization from year to year, the fluctuations have been relatively small — no more than a 6-percent change. Furthermore, for both components the overall capacity utilization has returned to its starting point over the 10-year period. This contrasts with what the Postal Service predicted would happen in response to the relaxation of First-Class Mail service standards and network realignment. It expected capacity utilization to increase, at least for inter-SCF transportation, as the reduction in service standards should have given trucks more time to fill up with mail before they had to be sent to the next postal facility.³⁶ In a discussion with Postal Service management, they stated that capacity utilization may not have declined as much as expected because, in some instances, letter and flat mail has different critical departure times than parcels. In these instances, the Postal Service cannot combine both types of mail on one leg of transportation, and instead will need two separate trucks.

Given this stability, and the fact that our analysis already accounts for the rising cost of trucker wages, this might mean one or two things are happening. One, the Postal Service has increased the number of transportation miles within the SCF components — by either increasing the number of trucks or the miles traveled by each truck. Two, there is something specific about postal transportation that is driving the costs up by more than the average transportation costs across the country.

Using postal data, we were able to gain some insight into what was driving these costs. For inter-SCF, the large residual is likely caused by a 22-percent increase in the number of contracted miles during the 10-year period in our analysis. This

increase is a recent phenomenon, with miles increasing by 42 percent over the last five years (FY 2013 to FY 2017).³⁷ According to the Postal Service, some of this growth may be explained by the need to add more trucks after the network realignment in 2012.

Figure 6: Capacity Utilization



³⁶ In her testimony, Cheryl Martin stated that capacity utilization should increase for inter-SCF transportation. While she expected transportation savings for intra-SCF transportation, she did not explicitly state if this would be due to increased capacity utilization. See U.S. Postal Service, "Direct Testimony Of Cheryl D. Martin On Behalf Of The United States Postal Service (USPS-T-6)," Postal Regulatory Commission Docket No. N2012-1, https://www.prc.gov/docs/78/78323/USPS-T-6_Martin_testimony.pdf, pp. 9, 12, and 14.

³⁷ Miles in the inter-SCF component declined 5 percent from FY 2017 to FY 2018.

On the other hand, intra-SCF had only a 4-percent increase in miles over the 10-year period but had a larger than expected increase in the cost per mile.³⁸ In discussions with postal management, they stated that the PPI used in the OIG's model may not fully represent the significant cost increases actually experienced for local highway transportation.

The Postal Service has maintained that part of the increase in ground transportation costs was due to the changes to the operating window and service standards, as well as the resulting move of some Priority Mail from air to ground.³⁹ However, given the magnitude of the unexplained cost increase and the stable utilization rates, there may be an opportunity for the Postal Service to look for ways to better manage these transportation components to lower costs in the future.

The Postal Service has already begun to take a close look at these costs through two programs, but it is not yet clear whether either program has been or will be successful. The goal of the first initiative, Highway Contract Route (HCR) Optimization (formerly called Zero Base HCR) is to identify transportation with low utilization rates and to reduce duplicative trips.⁴⁰ However, a recent OIG audit found that the cost savings from this program are questionable, and it likely did not result in any cost savings in FY 2017.⁴¹ Postal management informed us that this program is still ongoing.

In addition, the Postal Service has started to roll out Dynamic Routing Optimization (DRO), a new system to manage its contracted highway and postal-owned vehicle transportation. Under DRO, the Postal Service will plan its transportation routes each week to align with forecasted mail volume. The OIG has not yet assessed the effectiveness of this program.⁴²

Air Transportation

What the Analysis Tells Us

Both UPS and commercial air had costs that would have been expected to decline as a result of a change in volume, while FedEx Day was expected to increase. This is being driven by the fact that historically the majority of mail on both UPS and commercial air was First-Class Mail (which has declined), and the majority of mail on FedEx Day Turn was Priority Mail (which has increased). Our analysis predicts that the overall change in transportation-related input costs for air transportation accounts for almost 18 percent of the cost change over the last 10 years.

What Else Happened?

Costs did not increase as much as expected due to volume and transportation-related input costs for the FedEx Day Turn contract. The opposite was found for the UPS and commercial air contracts — costs increased more than expected. There are two things that could help explain these results. First, as mentioned above, some Priority Mail was moved from air to ground transportation. Second, the Postal Service said that it attempts to manage its air transportation to optimize its use. According to Postal Service management, part of Postal Service's past reliance on FedEx was due to the security requirements inherent with commercial airline flights. However, they said that as the Transportation Security Administration has expanded its screening operations in certain geographic locations, the Postal Service has been able to move more Priority Mail to lower-cost commercial flights.

38 Postal management stated that some of the increase that may not be captured in the OIG's analysis is due to the growth in parcel volume, which has resulted in more transportation needed to pick up parcels from large e-commerce companies. This is due both to the overall increase in parcel volume and the addition of delivering parcels on Sundays.

39 U.S. Postal Service Office of Inspector General, *Fuel Consumption and Cost Risk Mitigation*, Report No. NL-AR-17-004, <https://www.uspsoig.gov/sites/default/files/document-library-files/2017/NL-AR-17-004.pdf>, p. 9. The network realignment also caused some First-Class Mail to shift from ground to air, as the change in operating windows allow for less time for First-Class Mail with a three-day service standard to be transported between facilities. U.S. Postal Service Office of Inspector General, *Mail Processing Transportation and Operational Changes*, Report No. NO-AR-16-009, <https://www.uspsoig.gov/sites/default/files/document-library-files/2016/NO-AR-16-009.pdf>, p. 22. However, it appears that the shift of Priority Mail from air to ground more than offset the shift of First-Class Mail from ground to air.

40 U.S. Postal Service Office of Inspector General, *Management and Oversight of Highway Contract Routes*, September 30, 2016, Report No. NL-AR-16-006, <https://www.uspsoig.gov/sites/default/files/document-library-files/2016/NL-AR-16-006.pdf>, p. 10.

41 U.S. Postal Service Office of Inspector General, *Highway Contract Route Optimization Initiative Savings Calculation Methodology and Accuracy*, Report No. NL-AR-19-002, January 30, 2019, <https://www.uspsoig.gov/sites/default/files/document-library-files/2018/NL-AR-19-002.pdf>.

42 In a meeting with Postal Service management, they acknowledged that DRO is behind schedule, but stated that they expect the program to meet its predicted savings.

Conclusion

As overall mail volume has continued to decline, and transportation costs have continued to increase, it is critical to understand that there is much more to the story than a simple comparison of those two trendlines. Parcel volume has been rapidly growing, which could have a significant impact on transportation costs, including where and what type of transportation is needed in response to where the growth in parcels continues to occur. While expedited parcels will need more expensive transportation, parcels that are entered into the postal network close to their destination will need little to no transportation. In addition, many factors affecting the transportation and shipping industries at large will continue to have an impact on postal transportation costs.

As the Postal Service continues to manage its transportation network in response to these changes, it may be helpful to better understand what is truly driving transportation costs. Our analysis attempts to shed light on this by estimating how much of the 10-year change in transportation costs is expected in response to the change in mail volume, including the growth in parcels, and the change in transportation-related input costs. By doing so, we can isolate where costs have risen more than expected. This identification is the first step toward gaining a deeper understanding of transportation costs and may point the way toward actions that could help to contain future costs. This is especially relevant for transportation components with the greatest relative cost increases not explained by changes in volume or input costs — namely, inter-SCF and intra-SCF transportation. This is an area where further decomposition of costs or future audit work might be warranted in order to determine why cost increases are higher than expected.

Appendices

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Appendix A: Description of 10-Year Analysis of Transportation Costs

This appendix describes Professor Bradley’s analysis of the change in transportation costs over the last 10 years. The purpose of this analysis was to decompose the actual change in costs into three factors: (1) the change in volume, including the change in mail mix; (2) the change in the transportation-related input costs; and (3) the residual that represents areas where additional explanation or study are needed. For example, if the analysis found that for a given transportation component 85 percent of the increase in transportation costs were due to volume and transportation-related input cost changes, this would leave a residual 15 percent of transportation cost changes which merits further inspection.

The analysis looked at how much costs have changed over a 10-year period, from fiscal years (FY) 2008 to 2017. The analysis uses a “two-year base” method to avoid the results being skewed by any abnormal or temporary changes in one year at the beginning or end of our selected 10-year period. Under this method, the average costs for FY 2008 and FY 2009 are compared against the average costs for FY 2016 and FY 2017. The percentage difference between those two averages therefore provides the change in the transportation costs over the full 10-year period.

The analysis was done for each of the eight main transportation components separately (components are listed in [Table 2](#) below) to gain a better understanding of where transportation costs are increasing more — or less — than expected based on the volume and transportation-related input cost changes. This breakdown into components was necessary because the change in mail volume and transportation-related input costs will have different effects on the individual components. Decomposing the cost changes of the individual components allows us to identify which transportation components are the most problematic in terms of unexplained costs.

Step 1: Calculate the Expected Change in Costs in Response to the Change in Volume (Including Change in Mail Mix) Over the 10-Year Period

This step takes into consideration the different growth rates (including declines) of individual products over the 10-year period. Looking at individual product growth rates was necessary because not all mail affects transportation costs in the same way. For example, holding all else equal, mail that is larger and heavier costs more to transport than mail that is smaller and lighter. Therefore, an increase in larger and heavier mail will have a substantially greater effect on transportation costs than a similar increase in smaller, lighter mail. This is especially important given the continued growth in the volume of parcels, which tends to be larger and heavier than letters and flats. In addition, holding all else equal, mail that is entered into the mail stream further away from its destination will incur more transportation, and therefore more transportation costs, than mail that is entered closer to its destination. This is relevant because a portion of the growth in parcel volume is dropped close to its destination.

Step 1a: For Each of the Eight Transportation Components, Estimate the Percent of Costs That Are Used by Each Mail Product

This step uses postal data to estimate the proportion of each product in each of the eight transportation components for the beginning of the 10-year period.⁴³ [Table 2](#) displays these data. These data represent the average share of each product during FY 2008.

⁴³ Professor Bradley used data from the CRA B Workpapers, CS/14.

Table 2: Products' Share of Transportation Components' Costs

	First-Class Mail	Marketing Mail	Periodicals	Parcel Post	Market Dominant Package Services	First-Class Packages	Priority Mail	Parcel Select
Inter-SCF Highway	41.9%	9.1%	7.9%	2.3%	2.1%	Confidential	Confidential	Confidential
Intra-SCF Highway	24.2%	21.6%	10.0%	6.7%	5.2%	Confidential	Confidential	Confidential
Inter-NDC Highway	7.8%	28.4%	9.3%	29.7%	14.7%	Confidential	Confidential	Confidential
Intra-NDC Highway	7.8%	30.1%	6.4%	22.5%	16.3%	Confidential	Confidential	Confidential
Commercial Air	81.0%	2.3%	1.9%	0.1%	0.3%	Confidential	Confidential	Confidential
FedEx Day	21.0%	0.9%	0.7%	0.6%	0.6%	Confidential	Confidential	Confidential
UPS	79.9%	2.5%	1.8%	0.1%	0.3%	Confidential	Confidential	Confidential
Postal-Owned Vehicles	24.9%	21.3%	10.3%	6.6%	5.5%	Confidential	Confidential	Confidential

Source: Professor Bradley's analytical memos to OIG.

Step 1b: Construct Relevant Product Volume Series for the 10-Year Period

Since there have been significant changes in product lines between FY 2008 and FY 2017, the next step was to construct consistent product groupings over the 10-year period.⁴⁴ A simple example is how we handled Parcel Post. Most of the volume that was market dominant Parcel Post in FY 2008 was transferred to the competitive products category and renamed Standard Post in FY 2013.⁴⁵ It was then renamed again in FY 2017 to its current name, Retail Ground.⁴⁶ To account for these changes, we created a volume series from FY 2008 to FY 2017 for combined Parcel Post that aggregates the volumes from Parcel Post, Standard Post, and Retail Ground across the 10-year period.

44 The source of the detailed volume data was the Postal Service's billing determinants. The billing determinants are filed each quarter by the Postal Service and show detailed volume and revenue information below the product level.

45 Postal Regulatory Commission, Order No. 1411, *Order Conditionally Granting Request to Transfer Parcel Post to the Competitive Product List*, Docket No. MC2012-13, July 19, 2012, www.prc.gov/docs/83/83756/Order_No_1411.pdf and Order No. 1536, *Order Approving Changes in Rates of General Applicability for Competitive Products*, Docket No. CP2013-3, November 8, 2012, https://www.prc.gov/docs/85/85608/Order_1536.pdf.

46 U.S. Postal Service, "Notice and Order Concerning Change in Rates of General Applicability for Competitive Products," Postal Regulatory Commission Docket No. CP2016-9, October 19, 2015, <https://www.prc.gov/docs/93/93584/Order%20No.%202767.pdf>, p.3.

Another example of why this step was necessary is how we handled Parcel Select. While all of Parcel Select is dropshipped (entered at a specific postal facility in order to receive a dropship discount), the portion of Parcel Select that is dropped at the destination post office will have little to no impact on transportation costs. Therefore, we created a volume series that captures Parcel Select that does not include the volume that is dropped at the destination post office.

Step 1c: Estimate Growth Rates for Each Product

The next step was to use the volume series constructed in step 1b to calculate the growth rates for each product over the 10-year time frame. As mentioned above, the growth rate is measured using a two-year base. In other words, it is

the change in volume between the average product volume in FY 2008 and FY 2009 and the average product volume in FY 2016 and FY 2017. Table 3 below shows the calculation for Periodicals.

Table 3: Growth Rate for Periodicals Using a Two-Year Base

	Actual Volume	2-Year Average
FY 2008	8.6 B	8.3 B
FY 2009	8.0 B	
FY 2016	5.6 B	5.5 B
FY 2017	5.3 B	

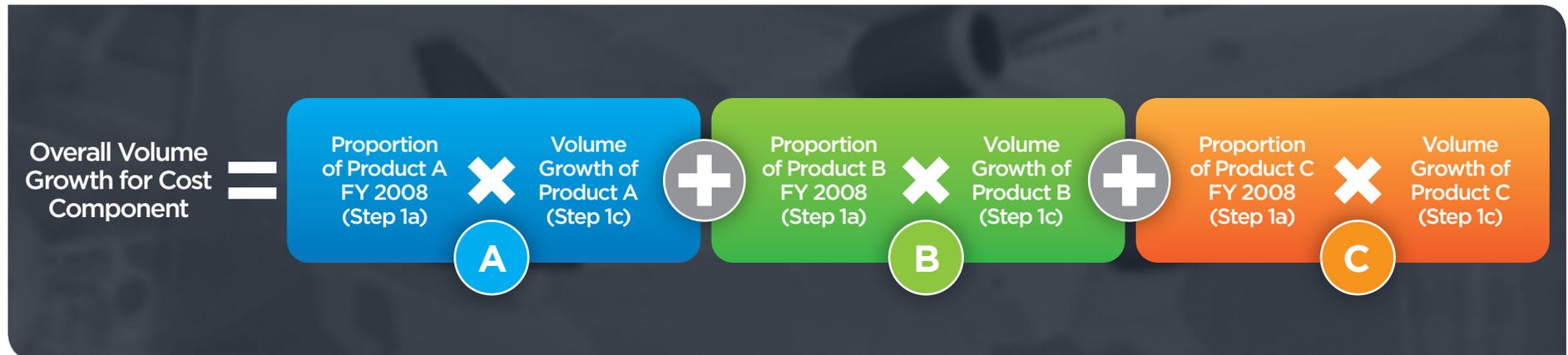
$$\text{Growth Rate} = (5.5 - 8.3) / 8.3 = -34\%$$

Source: OIG analysis.

Step 1d: Calculate the Overall Volume Growth Rate for Each of the Eight Transportation Components

This step combines the information from steps 1a and 1c to calculate an estimate of volume growth for each of the eight transportation components.⁴⁷ This was calculated using the following methodology. The proportion of each product within a cost component (from step 1a) is multiplied by the growth rate from this product (from step 1c). The overall volume growth for each cost component is the sum of all the calculations for each product within the component. Figure 7 shows an example of how the equation would work for a theoretical cost component with three products.

Figure 7: Example Equation for Overall Volume Growth of a Cost Component



Source: OIG Analysis.

⁴⁷ While we refer to this calculation as the volume growth in the transportation component, it reflects the estimated growth in the relevant cost driver — either pounds or cubic feet. This is the relevant estimate of “volume” for transportation costs.

Figure 8 illustrates how this calculation was performed for intra-SCF transportation. While actual data cannot be shown due to commercial sensitivity, this figure helps illuminate how we factored in the changes in product lines. For example, both Parcel Post and First-Class Mail packages have growth rates that reflect the combined volume series. In addition, as discussed above, we used the growth rate for non-destination delivery unit (DDU) Parcel Select (Parcel Select not dropped at the destination post office), since parcels dropped at the destination post office receive little to no transportation.

Figure 8: Calculation of Intra-SCF Overall Volume Growth Rate



Source: Professor Bradley's analytical memos to OIG.

Table 4 shows the estimated overall volume growth rates for each of the eight transportation components.

Table 4: Overall Volume Growth Rates (Two-Year Base)

Component	Overall Volume Growth Rates (Two-Year Base)
Inter-SCF Highway	-5.9%
Intra-SCF Highway	10.3%
Inter-NDC Highway	-24.7%
Intra-NDC Highway	-11.9%
Postal-Owned Vehicles	10.6%
Commercial Air	-21.2%
FedEx Day Turn	12.9%
UPS	-19.9%

Source: Professor Bradley's analytical memos to OIG.

Step 1: Estimate the Expected Change in Cost in Response to the Change in Volume

The final step in estimating the expected effect of volume changes on transportation costs was to account for the variability, which is a measure of the amount by which costs vary with volume.⁴⁸ For example, if a transportation cost component has a variability of 100, costs would rise or fall in direct proportion with volume. On the other hand, if a transportation cost component has a variability of 80 percent, then a 10-percent increase in volume would only be expected to increase costs by 8 percent.

The variabilities differ by transportation cost component. For air transportation, the variabilities are 100 percent, as the Postal Service only pays for the transportation capacity it uses. For ground transportation, the variabilities range

⁴⁸ The variabilities are estimated by the Postal Service and approved by the Postal Regulatory Commission.

from nearly 50 percent to a little over 80 percent. The variabilities are multiplied by the overall volume growth rates to calculate the expected change in costs in response to a change in volume. The results are shown in Table 5.

Table 5: Expected Change in Costs in Response to Volume Change

Component	Overall Volume Growth Rates (Two-Year Base) [1]	Volume Variability [2]	Expected Change in Costs in Response to Volume Change [3] = [1] x [2]
Inter-SCF Highway	-5.9%	73.2%	-4.3%
Intra-SCF Highway	10.3%	49.7%	5.1%
Inter-NDC Highway	-24.7%	80.3%	-19.8%
Intra-NDC Highway	-11.9%	74.8%	-8.9%
Postal-Owned Vehicles	10.6%	60.4%	6.4%
Commercial Air	-21.2%	100.0%	-21.2%
FedEx Day Turn	12.9%	100.0%	12.9%
UPS	-19.9%	100.0%	-19.9%

Source: Professor Bradley's analytical memos to OIG.

Step 2: Calculation of the Growth in Transportation-Related Input Costs

Step 2 is the calculation of the growth in transportation-related input costs over the 10-year period of our analysis. Since the vast majority of transportation is purchased from third-party companies, the Postal Service's transportation costs reflect the prices that providers charge. To best capture how these prices will change, along with the broader cost movements in other inputs like labor, we use the relevant producer price indexes (PPIs) for transportation as our measures

of Postal Service input costs. This method allows us to capture how much costs should have changed in response to cost pressures in the transportation market, including factors such as fluctuations in fuel prices and the increasing wages of long-haul truck drivers. Table 6 displays the PPIs we used for each transportation component.

Table 6: Producer Price Indexes Used in Analysis

Producer Price Index Name	PPI Change Over 10 Years (2-Year Base)	Associated Transportation Component
General Freight Trucking - Local	1.6%	Intra-SCF Postal-Owned Vehicles
General Freight Trucking - Long-Distance Truckload (TL)	8.0%	Intra-NDC Inter-NDC Inter-SCF
Scheduled Freight Air Transportation	17.8%	FedEx Day UPS Commercial Air

Source: Professor Bradley's analytical memos to OIG.

Since both intra-SCF and postal-owned vehicles are primarily short-haul, local transportation, we use the PPI for local freight transportation to reflect the change in input costs. For the longer-haul transportation, inter-SCF, inter-NDC, and intra-

NDC, we use the PPI for “general freight trucking, long-distance truckload” to estimate the change in input costs for these two transportation components. For all air transportation components, we used the PPI for scheduled air freight.

Step 3: Decomposing the Total Impact of Changes in Volume and Transportation-Related Input Costs on Transportation Costs

The final part of the analysis was to subtract the results from steps 1 and 2 above from the actual change in costs over the last 10 years. The leftover amount of each cost change — or “residual” — represents changes that cannot be explained by changes in volume and transportation-related input costs.

Table 7 shows this decomposition. Column 1 shows the actual change that occurred in each transportation component between FY 2008 and FY 2017 (using a two-year base). Column 2 displays the expected change in costs in response to the volume change — this includes both the percentages as calculated in Table 5 above and the corresponding dollar value.

Column 3 shows the expected change in costs in response to the overall change in transportation-related input costs, as calculated in Table 6 above (both the percentage and corresponding volumes are shown). Column 4 displays the sum of columns 2 and 3. It represents the total effect of volume and transportation-related input costs on each of the transportation components' costs.

Column 5 represents the residual, the portion of the total change in each transportation component that cannot be explained by the changes in volume and transportation-related input costs. It was calculated by subtracting column 4 from column 1.

Table 7: Decomposition of Cost Changes Over 10-Year Period from FY2008 – FY2017 (\$ Millions and Percent Change)*

Component	Actual Change [1]	Change Due to Volume [2]	Change Due to Input Costs [3]	Change Due to Volume and Input Costs [4]	Residual [5]=[1]-[4]
Inter-SCF Highway	\$434.2 45.0%	(\$41.3) (4.3%)	\$77.2 8.0%	\$35.9 3.7%	\$398.4 41.3%
Intra-SCF Highway	\$324.3 22.8%	\$73.1 5.1%	\$22.4 1.6%	\$95.5 6.7%	\$228.8 16.1%
Inter-NDC Highway	(\$26.4) (6.9%)	(\$75.6) (19.8%)	\$30.6 8.0%	(\$45.0) (11.8%)	\$18.7 4.9%
Intra-NDC Highway	(\$66.3) (18.2%)	(\$32.4) (8.9%)	\$29.2 8.0%	(\$3.2) (0.9%)	(\$63.1) (17.3%)
Postal-owned Vehicle	\$56.1 4.1%	\$88.5 6.4%	\$21.7 1.6%	\$110.2 8.0%	(\$54.1) (3.9%)
Commercial Air	\$25.3 15.4%	(\$34.8) (21.2%)	\$29.2 17.8%	(\$5.6) (3.4%)	\$30.9 18.8%
FedEx Day Turn	\$236.7 15.7%	\$193.3 12.9%	\$267.1 17.8%	\$460.4 30.6%	(\$223.8) (14.9%)
UPS	\$81.1 114.3%	(\$14.1) (19.9%)	\$12.6 17.8%	(\$1.5) (2.2%)	82.7 116.4%

Source: Professor Bradley's analytical memos to OIG.

*Numbers in parenthesis represent negative numbers.

Appendix B: Management's Comments



March 11, 2019

AMANDA MARTINEZ
RARC Central, Risk Analysis Research Center

SUBJECT: Final Review Draft – Analysis of Transportation Costs
(Project Number 2018RARC008)

Thank you for providing the United States Postal Service with an opportunity to review and comment on the subject draft white paper on "What is Driving Postal Transportation Costs."

In general, the paper provides little additional information to adequately assign the actual drivers of additional transportation costs. While factors such as additional parcel growth, fuel increases and transportation rates were discussed in the paper, each one was only discussed at a very high level. There was insufficient analysis performed to determine the actual impact of these factors. In addition, factors such as our efforts to move mail from air to surface were not addressed sufficiently and have been a significant contributing factor to the changes in transportation costs.

The increase in package volume has been a contributing factor of transportation changes even with the reduction of letters and flats, as one Priority Mail package takes up the same amount of cubic feet as hundreds of letters and flats. The study was not performed at a level sufficient to estimate the additional capacity requirements due to this difference in cubic feet to move the packages end to end through our network versus the reduced capacity requirements needed for the letters and flats that have declined. Letter and flat volumes can drop significantly without any impact on the cubic feet needed for letter trays, flat tubs, or rolling stock on the truck; a half-full container takes up the same amount of space as a full container. In addition to the transporting of packages, there has been a significant increase in package volume pick-up with Postal resources that were not necessarily in place for letters and flats.

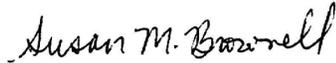
One aspect overlooked in this white paper was the movement of a significant portion of Priority Mail from Los Angeles, Texas, Florida and New York from the air network to the surface network.

These moves alone added over \$100M to the cost of surface transportation, while reducing the cost of air transportation. In addition, over the last two years the Postal Service has moved lanes to surface where air capacity is constrained, enlarging the operating window in order to keep this mail service responsive. These shifts have added over \$12M a year.

In conclusion, this white paper does not perform the analysis necessary to ascertain the true drivers of the additional costs beyond a cursory review of parcel growth, fuel costs and supplier rate increases. By ignoring the factors identified above, the amount of unexplained transportation cost identified appears to be inflated.



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We conducted work for this white paper in accordance with the Council of the Inspectors General on Integrity and Efficiency's Quality Standards for Inspection and Evaluation (January 2012).