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Response to UPS' Surreply

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On May 16, 2022, United Parcel Service, Inc. (UPS) filed a surreply which, among other things, discussed the method proposed by the Postal Service in its reply comments to adjust the city carrier street time variabilities for relative volume changes.[1] With its filing, UPS confirms the consensus that has emerged in this docket that the application of the estimated top-down correlated random effects model is the appropriate model for estimating street time variabilities. In previous filings, both UPS and the Public Representative voiced support for the correlated random effects model, and in its most recent filing, UPS again argues for its application in calculating the street time variabilities.[2]

In addition, UPS now voices general support for the Postal Service's proposed method for adjusting city carrier street-time variabilities for relative volume shifts, and the only issue left is a minor technical point in the calculation of those variabilities.[3]

> UPS sees no reason, however, to postpone consideration of the variability adjustment mechanism to a separate rulemaking proceeding. Because the modification is a clear improvement, UPS urges that it be adopted now. There is, however, one technical inconsistency in the Postal Service's calculations that UPS believes should be addressed.

[1] *See*, United Parcel Service, Inc.'s Proposed Sur-Reply Comments Regarding Proposal One, (UPS Surreply), Docket No. RM2022-3, May 16, 2022 at 1.

[2] *See*, Public Representative Comments (PR Comments), Docket No. RM2022-3, March 28, 2022 at 35, Initial Comments of United Parcel Service, Inc. Regarding Proposal One, (UPS Comments), Docket No. RM2002-3, March 28, 2002 at 21, and UPS Surreply at 2.

[3] *See*, UPS Surreply at 2.

Even there, the differences are quite small, as Table 1 demonstrates. The FY 2021 variabilities proposed by the Postal Service (in its reply comments) and by UPS (in its surreply) differ, on average, by only 0.0017.

Table 1: FY 2021 City Carrier Street Time Variabilities Proposed by the Postal Service and UPS

Mail Type	Postal Service	UPS	Difference
DPS	0.0723	0.0757	0.0034
Cased	0.0123	0.0129	0.0006
Sequenced	0.0083	0.0087	0.0004
FSS	0.0042	0.0044	0.0002
In-Receptacle Parcels	0.0443	0.0464	0.0021
Deviation Parcels / Accountables	0.0979	0.1025	0.0046
Collection	0.0111	0.0117	0.0005

Source: UPS-LR-RM2022-3_2, Adjusted Variabilities.xlsx, at Tab Outputs

The small difference highlights the general agreement on the method. The Postal Service and UPS both agree that the ZIP Code means should not be used in calculating the marginal times for the various types of delivered and collected mail, and UPS concurs that there is a mathematical relationship between changes in relative volumes and changes in those ZIP Code means.[4] That mathematical, or mechanical relationship, as UPS calls it, ensures that the ZIP Code means change when the relative volumes change. In other words, if the relative volumes are different in 2021, the ZIP Code means are also different in 2021.

[4] *Id*.

The difference of opinion thus arises when considering the denominator of the variability expression, which is the street hours predicted at the adjusted mean volumes. When calculating the predicted street hours for 2019, for use in the variability formula, UPS and the Postal Service both include the 2019 ZIP Code averages in the top-down equation. But when calculating the predicted street hours for 2021, UPS proposes inserting the 2019 ZIP Code averages in place of the 2021 ZIP Code averages. As the ZIP Code averages are different in 2021, such a substitution requires a compelling motivation, so it is reasonable to evaluate the justification put forth by UPS. Its full justification is repeated below:[5]

> Mechanically, while volume changes in future years also affect ZIP Code average volume levels, the unobserved ZIP Code effects are by definition time-invariant and *should not be updated*. Doing so would also be inconsistent with the Postal Service position that the γ coefficients do not have a causal effect on street time. (Emphasis in original; footnotes omitted).

A fair reading of that justification reveals two arguments. The first argument is that the 2021 ZIP Code means should be replaced with the 2019 means because they are time-invariant. The second argument is that their inclusion would be inconsistent with an assertion that they do not have a causal effect on street time. Let's consider each of these arguments.

First, consider the meaning and relevance of time-invariance. In the context of estimating an econometric model, time-invariance is the characteristic of a variable to retain the same value for all time periods within the estimation data set. It does not

[5] *See*, UPS Surreply at 2-3.

mean that variable must retain the same value for all periods of calendar time. For example, within a given year, the rural/urban status of a ZIP Code does not change. But population growth could alter that status over, say, a ten-year period.

Clearly, the ZIP Code mean volumes do not change within the year of data used to estimate the correlated random effects model, but that does not mean that they necessarily must be the same in subsequent years. In addition, this argument conflates relative volume changes with time changes. It is true that the empirical concern discussed here arises from changing relative volumes through time, but the actual calculation of the adjusted variabilities revolves around computing them after relative volume changes, whatever the reason for that change. For example, one could use the correlated random effects model to answer the hypothetical question, what would happen to the variabilities if letter volume grew three percent while parcel volumes fell by two percent? That calculation does not involve the passage of time, but, instead, involves the changing of relative volumes. The relevant point is that when relative volumes are changed, the ZIP Code means are also changed, and that response should be included in the calculation of predicted street time.

UPS' second argument is premised on the claim that including the 2021 ZIP Code means in the equation predicting 2021 street time costs would be inconsistent with an assertion that their associated coefficients do not have a causal effect on street time. This argument is a bit more subtle, and evaluating its validity depends upon proper understanding the role the estimated coefficients on the ZIP Code means in the correlated random effects model. One of the strengths of that model is that it allows street time to be influenced both by volume and by non-volume variables. Some of those non-volume variables are observed and some are not. As explained by UPS, the

coefficients on the ZIP Code means do not capture the response of street hours to changes in volume, and that is why they are not included in the calculation of marginal times or in the numerator of the variability formula. But the coefficients do capture the response of street time to non-volume effects which are correlated with volume, and that correlation can be useful in getting an accurate prediction of the street time occurring after the relative volume shifts. Recall that the elasticity formula is given by a volume shape's marginal time multiplied by its mean volume, divided by predicted street time at the relevant volumes. Accurate calculation of the variability depends upon, in part, an accurate prediction of the street time occurring at the volume levels being used to calculate that variability. To the extent non-volume effects change when volumes change, the response of street time to those non-volume effects is part of what determines the total street time occurring in that new volume environment. Including that response thus provides a more accurate prediction of the street time associated with the new volume mix. While it may only be a correlation, it is a correlation that helps improve the prediction of overall street time.

The distinction between these effects may be subtle, but it is important. The coefficients on the volume terms in the correlated random effects model capture the response of street hours to changes in volume, and are rightly included in both the numerator (through the marginal times) and the denominator (through predicted street hours) of the variability expression. The coefficients on the ZIP Code means do not capture the response of street time to volume, but do capture the response of non-volume effects that are correlated with volume. As such, they should not be included in the numerator of the variability expression as they do not affect the marginal times, but they should be included in the denominator of the variability expression because their inclusion improves the accuracy of the predicted street time. My recommendation therefore continues to be to employ the variability adjustment procedure as presented and described in my report that

accompanied the Postal Service's reply comments. That corresponds to applying the variabilities displayed in the "Postal Service" column in Table 1 above.