BEFORE THE
POSTAL REGULATORY COMMISSION
WASHINGTON, D.C. 20268B0001

SIX-DAY TO FIVE DAY STREET DELIVERY
AND RELATED SERVICE CHANGES, 2010

Docket No. N2010-1

RESPONSES OF THE UNITED STATES POSTAL SERVICE WITNESSES
ELMORE-YALCH AND WHITEMAN TO BENCH REQUESTS FOR ESTIMATION OF
VARIANCE ASSOCIATED WITH MARKET RESEARCH
CONDUCTED BY OPINION RESEARCH CORPORATION
(PERCENTAGE CHANGES BY PRODUCT AND SEGMENT)
AND SUBSEQUENT ESTIMATION OF VOLUME CHANGES BY PRODUCT
UNDERTAKEN BY WITNESS WHITEMAN

At the close of witness Elmore-Yalch's July 21, 2010, appearance on the stand

for oral cross examination, Chairman Goldway initiated discussion with Ms. Elmore-

Yalch—later joined by Commissioner Langley—in which interest in variance associated

with Postal Service estimates of percentage changes by product associated with five-

day delivery was discussed. Tr. V\1174-77. Other "homework" discussed on those

pages has already been filed with the Commission. Chairman's Information Request

No. 9, questions 2 and 3, recently made related requests, answers to which needed to

be coordinated with the homework responses.

Witness Elmore-Yalch agreed that variance estimates could be supplied. The

assignment proved more challenging then expected because of complexity in how the

market research results are used by witness Whiteman to arrive at product-specific

percentage change estimates. Development of the responses was repeatedly delayed

by various individuals' summer vacations and other work, especially given the novel

nature of the work and the need for extensive coordination.

Today, responses to both ChIR No. 9, questions 2 and 3, and witness' responses to the original homework assignment are being filed. Witness Whiteman provides separate responses to ChIR No. 9, question 2 and the homework assignment. Witness Elmore-Yalch today provides a response to the homework, while her brief response to ChIR No. 9, question 3, simply refers to the homework response. All of the ChIR No. 9 responses are being filed under separate cover. Attached hereto are the witness Whiteman's and witness Elmore-Yalch's respective responses to the homework assignment.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

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August 26, 2010

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The request is for provision of the margin of error for each product by segment.

The estimate of the percentage change in volume was calculated for each

product by segment on an aggregate basis rather than at the individual

respondent level using the formulas specified in USPS-T-8 (pages 30 to 31

(business forecasts) and 36 to 37 (consumer forecast). We calculated

percentage changes rather than absolute volume changes because of how the

Postal Service planned to use the results, as explained in the parallel response

by witness Whiteman to this bench request. This approach also satisfies the

need for quantitative results to provide a consistent measure of change by

product across all segments while avoiding reliance upon self-reported volume

estimates.

This research design, however, complicates (and delayed) development of

estimates for margin of error both because percent volume change estimates

were calculated at the aggregate rather than individual respondent levels and

because of the nature and distributions of the underlying data. We accordingly

adopted the following approach.

The usual assumptions behind calculation of a confidence interval are that the

distribution is normal (or approximates normal) and there is no major

contamination of the data due to outliers. Under these assumptions, the sample

mean and the sample standard deviations and resulting standard errors of

measure (SEM) are typically used to construct the confidence intervals. This is

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not the case with the Postal Service data resulting from the research conducted

by ORC. Two factors affect the distribution of the data for each product within

each segment:

1. First, the percentage change in volume is computed across all

    respondents in the sample for each product. Hence, even those with zero

    volume for a product are included. For example, a responding business or

    consumer may report volume for Single-Piece First-Class Mail, but zero

    volume for Presort First-Class Mail. In addition, it was hypothesized that

    customers could change their volume for any given product for the

    situations tested. For example, a respondent could report zero volume for

    Priority Mail in the previous 12 months and project volume for Priority Mail

    in the next 12 months. Similarly, a respondent could report a change in

    the use of a product resulting from the move to five-day delivery. For

    example, a respondent could report zero volume for Express Mail in the

    previous 12 months and in the next 12 months. However, as a result of

    the change to five-day delivery the same respondent could report volume

    for Express Mail in the next 12 months based on the change in service.

    As a result, all respondents had a value for every product even if their

    volume was zero.

2. For any product within a given segment, exceptionally high volume may

    be reported by one or more customers, thus implying they may be

    significant outliers within an otherwise normal distribution. This is not to

suggest specific problems with the data. Rather this is a function of the

nature of the business itself and different requirements for mailing or

shipping products. For example, within the National Accounts segment,

the majority of respondents reported an average (as measured by the

median) volume of 39,000 Single-Piece First-Class Mail. Two

respondents, however, reported significant volumes of 14 million and 38

million. Similarly, within the Premier Accounts segment reporting volume

for Standard Bulk Mail, the majority reported sending approximately

148,000 bulk mail pieces in the previous 12 months. Some, however,

reported significantly higher volumes with one company reporting past 12

month volume of more than 113 million pieces.

Because of the non-normal distribution, a robust measure of scale was identified

for use in the calculations of error surrounding the estimates computed by ORC.

A robust measure of scale is a robust statistic that quantifies the statistical

dispersion in a set of quantitative data. Robust measures of scale are used to

complement or replace conventional estimates of scale such as the sample

variance or sample standard deviation. As with other robust statistics, a robust

measure of scale is minimally affected by a small fraction of outliers. The most

commonly used robust measure of scale is the median absolute deviation (MAD).

MAD is the median of the absolute values of the differences between the data

values and the overall median of the data set. Use of the MAD is well

documented.[1] [2] [3]

The Median Absolute Deviations were computed for each product within each

segment using the approach and formulas described by Abu-Shawiesh, et. al.[4]

An estimate of the standard error for each percentage change estimate, by

product within each segment, was computed using a formula developed by the

Census Bureau to compute an initial to final year percent change standard error

for Census' annual American Community Survey (ACS) data.[5] This formula can

be used to compute a standard error for a percentage change in values

computed at an aggregated level.

The table on page 6– Estimate of Standard Error and Confidence Intervals for

Percentage Change in Volume from the Previous 12 Months Resulting from

Change to five-day Delivery – provides:

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[1] Hoaglin, David C.; Frederick Mosteller and John W. Tukey (1983). *Understanding Robust and Exploratory Data Analysis*. John Wiley & Sons. pp. 404–414. ISBN 0-471-09777-2

[2] Venables, W.N.; B.D. Ripley (1999). *Modern Applied Statistics with S-PLUS*. Springer. pp. 128. ISBN 0-387-98825-4.

[3] Irving B. Weiner, Donald K. Freedheim, John A. Schinka, Wayne F. Velicer (2003), *Handbook of Psychology: Research Methods in Psycholog y Volume 2*, John Wiley & Sons. pp. 74 – 76.

[4] Abu-Shawiesh, M.O., F.M. Al-Athari and H.F. Kittani, 2009. Confidence interval for the mean of a contaminated normal distribution. J. Applied Sci., 9: 2835-2840.

[5] http://www.census.gov/acs/www/Downloads/ACS/PercChg.pdf

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QUANTITATIVE MARKET RESEARCH, Tr. V/1174-77

1. The estimates of the standard error resulting from the calculations

   described above for each product within each segment (Column 1)

2. The estimates of the percentage change in volume from the previous 12

   months as a result of the change to five-day delivery (Column 2). These

   estimates are taken from the forecasts provided by ORC as contained in

   USPS-T-8 (pages 32 through 35 (business forecasts) and 37 (consumer

   forecast).

3. The lower and upper bounds (Columns 3 and 4, respectively) of these

   estimates are based on the standard error. The lower bound is computed

   by subtracting two standard errors from the forecasted estimate. Similarly,

   the upper bound is computed by adding two standard errors to the

   forecasted estimate. Thus it is possible to say that if the Postal Service

   were to repeat this research using the same procedures and under the

   same conditions present when the original research was conducted, the

   Postal Service can be 95 percent confident that the results would fall

   within the ranges presented in this table. It is important to note that these

   represent estimates of the error resulting from sampling.

RESPONSE OF WITNESS ELMORE-YALCH TO BENCH REQUEST FOR VARIANCE ESTIMATES ASSOCIATED WITH QUANTITATIVE MARKET RESEARCH, Tr. V/1174-77

Table 1: Estimate of Standard Error and Confidence Intervals for Percentage Change in

Volume from the Previous 12 Months Resulting from Change to 5-Day Delivery

Segment	Product	Standard Error of Estimate * (1)	Estimate ** (2)	Lower Bound of Estimate *** (3)	Upper Bound of Estimate *** (4)
National Accounts (n = 59)	Single Piece FCM (2, b) -- MEAN	0.46%	-1.2%	-2.05%	-0.26%
	Pre-Sort FCM (3, c) -- MEAN	0.13%	-1.1%	-1.35%	-0.84%
	Regular Standard/Bulk Mail (4, d) -- MEAN	0.09%	-0.4%	-0.60%	-0.24%
	Non-Profit Standard/Bulk Mail (5, e) -- MEAN	276.13%	4.7%	-536.51%	545.90%
	Priority Mail (6, f) -- MEAN	0.30%	-7.2%	-7.74%	-6.57%
	Express Mail (7, g) -- MEAN	0.08%	-1.2%	-1.34%	-1.01%
	Regular Periodical Mail (10, j) -- MEAN	1.28%	0.0%	-2.51%	2.51%
	Non-Profit Periodical Mail (11, k) -- MEAN	66.86%	0.0%	-131.04%	131.04%
Premier Accounts (n = 630)	Single Piece FCM (2, b) -- MEAN	0.62%	1.5%	0.31%	2.76%
	Pre-Sort FCM (3, c) -- MEAN	0.50%	-0.3%	-1.31%	0.64%
	Regular Standard/Bulk Mail (4, d) -- MEAN	1.91%	0.8%	-2.93%	4.57%
	Non-Profit Standard/Bulk Mail (5, e) -- MEAN	9.82%	-4.4%	-23.68%	14.79%
	Priority Mail (6, f) -- MEAN	1.51%	-0.7%	-3.69%	2.23%
	Express Mail (7, g) -- MEAN	0.61%	-1.3%	-2.54%	-0.16%
	Regular Periodical Mail (10, j) -- MEAN	16.79%	-0.7%	-33.64%	32.18%
	Non-Profit Periodical Mail (11, k) -- MEAN	26.05%	2.2%	-48.84%	53.27%
Preferred Accounts (n = 738)	Single Piece FCM (2, b) -- MEAN	0.88%	-1.0%	-2.70%	0.88%
	Pre-Sort FCM (3, c) -- MEAN	4.29%	-0.5%	-8.94%	4.32%
	Regular Standard/Bulk Mail (4, d) -- MEAN	2.00%	-0.5%	-4.44%	2.01%
	Non-Profit Standard/Bulk Mail (5, e) -- MEAN	4.04%	0.9%	-7.02%	4.06%
	Priority Mail (6, f) -- MEAN	2.61%	-3.1%	-8.20%	2.62%
	Express Mail (7, g) -- MEAN	3.44%	-7.0%	-13.76%	3.46%
	Regular Periodical Mail (10, j) -- MEAN	13.03%	-1.0%	-26.51%	13.21%
	Non-Profit Periodical Mail (11, k) -- MEAN	6.40%	0.1%	-12.46%	6.47%
Small Businesses (n = 725)	Single Piece FCM (2, b) -- MEAN	0.67%	-2.0%	-3.29%	-0.65%
	Priority Mail (6, f) -- MEAN	1.09%	0.0%	-2.16%	2.10%
	Express Mail (7, g) -- MEAN	5.54%	-7.9%	-18.80%	2.93%
Consumers (n = 636)	Single Piece FCM (2, b) -- MEAN	2.78%	-1.9%	-7.40%	3.50%
	Priority Mail (6, f) -- MEAN	6.38%	16.0%	3.54%	28.55%
	Express Mail (7, g) -- MEAN	16.07%	10.1%	-21.36%	41.62%
	Parcel Post (7, g) -- MEAN	23.16%	-14.0%	-59.40%	31.40%

*   Standard error of estimate is computed based on the Median Absolute Deviation (MAD)

** Estimate from forecasts; adjusted percentage change in volume resulting from change to 5-Day delivery based on previous 12 months

*** Lower and upper bounds for the % change estimated were calculated for a 95 percent confidence level as follows:

Lower Bound = %chg - 1.96* se(% change)

Upper Bound = %chg + 1.96* se(% change)

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RESPONSE OF WITNESS WHITEMAN TO BENCH REQUEST FOR
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Based on the market research conducted by Opinion Research Corporation, I estimated volume changes that would have occurred in FY 2009 had five-day delivery been implemented at the start of that year. These estimates are not a forecast of future volumes in a five-day delivery environment. They are estimates of the change in volume in FY 2009, if five-day delivery had been implemented in that year.

The objective of the market research was to produce projectable percentage changes in volume by segment and product. The research was not designed to produce projectable volume estimates. It was not possible to produce a projectable estimate of change in volume for each segment and product. As witness Elmore-Yalch explains in her response to the bench request, respondents to the quantitative market research provided an estimate of volume change for the business they manage. In almost every instance for National and Premier accounts and for many Preferred accounts, no one person has responsibility or knowledge for an entire organization's mail volume. As a result, there is no way to know what percentage of their organization's volume any one respondent would represent. Hence, there is no way to project their volume to their organization's volume as reported in CBCIS. Using a percentage change in volume allowed me to project that percentage change in volume by segment and product, since the respondents' estimates of volume change can be considered representative of each segment.

The estimates also incorporate expert assumptions and judgments. One necessary assumption was that CBCIS volumes for National, Premier and Preferred accounts could serve as a useful proxy for RPW reported volumes, with percentage change estimates developed for the former also applicable to the latter. Other necessary judgments were that percentage volume changes found for First-Class Mail and Priority Mail could also be applied to First-Class Mail flats and parcels, and that volumes sent by consumers and small businesses could serve as baselines for percentage change estimates applicable to what was actually sent.

Use of such judgment was perfectly appropriate given the purpose of the research and practical limits that derive from the exceptionally complex markets that various mail products serve for respective customer segments. Postal officials and contractors were unable to discern a reasonable alternative for estimating the volume, revenue and contribution impacts that five-day delivery would trigger.

As reflected in witness Elmore-Yalch's response to this same bench information request, estimates of standard error and confidence intervals for the calculated percentage volume changes by product and segment have been constructed using published, authoritative procedures. These estimates could be applied to FY 2009 RPW volumes if one wishes to evaluate them in terms of actual volume, since the premise of this market research was implementation of five-day

delivery at the start of FY2009. As reflected in my direct testimony, the estimated

change in volume, revenue and contribution is conservative.

Witness Elmore-Yalch has provided me estimates of the standard error

surrounding the percentage change in volume that is likely to occur had five-day

delivery been implemented by the start of FY 2009 These standard errors were

applied to provide an estimate of the upper and lower bounds of the percentage

change in volume for each product within each segment. These same estimates

of the upper and lower bounds can be applied to the estimates for change in

volume and revenue that could result from implementation of five-day. The

variance estimates derived using this methodology appear in the Table 1 that

appears at the bottom of witness Elmore-Yalch's response to this bench request.