

BEFORE THE  
POSTAL RATE COMMISSION  
WASHINGTON, D.C. 20268-0001

POSTAL RATE AND FEE CHANGES, 2006

Docket No. R2006-1

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS BRADLEY  
TO INTERROGATORIES OF THE OCA (OCA/USPS-T14-1 - 7)  
(June 23, 2006)

The United States Postal Service hereby provides the response of witness Bradley to the following interrogatories of the OCA, filed on June 9, 2006: OCA/USPS-T14-1 – 7. Question 8, filed with the same set, involves a request for a large amount of DOIS data, on which the OCA and the Postal Service have been working informally for some time. The question has been redirected to the Postal Service, and the data will be furnished as soon as they become available.

Each interrogatory is stated verbatim and is followed by the response.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

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June 23, 2006

**Response of Postal Service Witness Michael D. Bradley  
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OCA/USPS-T14-1. The purpose of this interrogatory is to understand whether any mail shapes other than letters are in the DPSL variable in your study; the DPSL variable subsequently becomes a part of your "letter" variable. Accordingly, we wish to determine whether any other type of mail is being included in the "letter" variable. In your SAS programs in R2005-1 for the estimation of City Carrier Costs you define letters as "let=cl+dpsl"; that is, letters are the total of delivery point sequenced mail and cased letters "cl", where "cl=cal+cnl," indicating that cased letters are the sum of cased automated letters and cased non-automated letters.

- (a) Does the DPS mail contain any shape of mail other than letters? If your answer is affirmative, please explain.
- (b) Do cased automated letters contain any shapes other than letters? If your answer is affirmative, please explain.
- (c) Do cased non-automated letters contain shapes other than letters? If your answer is affirmative, please explain.

**Response:**

- a. No, it is a measure of letter mail.
- b. No, it is a measure of letter mail.
- c. No, it is a measure of letter mail.

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OCA/USPS-T14-2. The purpose of this interrogatory is to identify a possible change to the SAS code in the carrier cost programs. The change would primarily affect the regression coefficients for the density variables. In the SAS programs there is a section denoted as follows:

```
*****.  
** Create Zip Code - Day Data Set for Estimation****.  
*****.  
proc means noprint; by zip date;  
var delt let cf seq spr cv blk dp units water land;  
output out=poolr sum = delt let cf seq spr scv blk dp units water land  
mean = adelt alet acf aseq aspr acv ablk adp aunits awater aland n=nrts;
```

This is followed in the next section by two lines that create the density variable:

```
sqm=land;  
dens=dp/sqm;
```

The potential problems are highlighted in bold. In aggregating to the zip code level a number of variables are created (e.g., units, water, and land) that are the SUM over all routes in the zip code. Since **water** and **land** are constants for all routes within a zip code it does not appear that they should be summed. Instead one should take the mean—which is what is done in creating the variables (**awater aland**). Accordingly, in creating the “dens” variable the division should be a division by **ALAND** and not by **LAND**. This will result in a larger value for the “dens” variable and smaller regression coefficients for the density variable. Although it does not appear that there will be a major impact on the computed elasticities, this appears to be a change that should be made to the program. Please confirm the above analysis. If you do not confirm, please explain your disagreement in detail.

**Response:**

Not confirmed. While it is certainly true that “land” is a constant within a ZIP CODE over a two week period, it is not true that the number of routes included in each ZIP CODE observation is constant. As the number of included routes varies, so does the number of delivery points. I did not have information about the square miles associated with the included and excluded routes. Thus, I used a crude method to attempt to account for the variation in number of routes included. If you look at the above code, you will see

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the phrase “n=nrts.” This implies that that the number of underlying observations included in each ZIP CODE – day is the number of routes. By summing the “land” variable over the underlying observations, I thus weighted the “land” variable by the number of routes included in that ZIP CODE -- day observation. This provides a rough variation in the land variable as the number of reported routes varied.

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OCA/USPS-T14-3. The purpose of this interrogatory is to complete the collection of the various versions of witness Bradley's Carrier Cost programs in order to analyze differences among programs. In your testimony in R2005-1 on carrier cost volume variability you provided a number of SAS programs for the estimation of volume variability—for example in OCA/USPS T14-30; OCA/USPS T14-37; as an Attachment to Response to POIR no 6, item 5; and in your response to POIR No. 9, Question 7. Please indicate which SAS program generates the variabilities which you propound as correct. If your answer is that none of the programs are applicable, please provide a working copy of the program which generates the variabilities which you propound as correct as well as a program log.

**Response:**

The recommended variabilities were estimated in a SAS program entitled, "ESTIMATING DELIVERY EQUATIONS.SAS" which were presented in Library Reference USPS-LR-K-81 in Docket No. R2005-1.

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OCA/USPS-T14-4. The purpose of this interrogatory is to obtain a version of the Carrier Cost program in order to analyze differences among various program versions. Please provide the SAS program used to generate the variabilities for regular delivery reported in OCA/USPS-T14-30 (Docket No. R2005-1).

**Response:**

The only difference between the SAS program referred to in the question and “ESTIMATING DELIVERY EQUATIONS.SAS” which the OCA already has is the following code which corrects for possible date errors:

```
data lfvoll; set lfvoll;

if date = '1-Jun' then date='06/01/2002';
if date = '3-Jun' then date='06/03/2002';
if date = '4-Jun' then date='06/04/2002';
if date = '5-Jun' then date='06/05/2002';
if date = '6-Jun' then date='06/06/2002';
if date = '7-Jun' then date='06/07/2002';
if date = '8-Jun' then date='06/08/2002';
if date = '10-Jun' then date='06/10/2002';
if date = '11-Jun' then date='06/11/2002';
if date = '12-Jun' then date='06/12/2002';
if date = '13-Jun' then date='06/13/2002';
if date = '14-Jun' then date='06/14/2002';

if date = '5/18/200' then date='5/18/2002';
if date = '5/20/200' then date='5/20/2002';
if date = '5/21/200' then date='5/21/2002';
if date = '5/22/200' then date='5/22/2002';
if date = '5/23/200' then date='5/23/2002';
if date = '5/24/200' then date='5/24/2002';
if date = '5/25/200' then date='5/25/2002';
if date = '5/28/200' then date='5/28/2002';
if date = '5/29/200' then date='5/29/2002';
if date = '5/30/200' then date='5/30/2002';
```

This code should be inserted immediately after the letter/flat volume data is read into the program.

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OCA/USPS-T14-5. The purpose of this interrogatory is to obtain additional documentation for the F test in order that the conclusions can be traced and verified. Please turn to your response to POIR No. 9, Question 10 (Docket No. R2005-1).. Please provide the following:

- (a) A copy of the SAS program, with copies of the logs and outputs for the two equations used.
- (b) The values for both of the R squares.
- (c) The value of J.
- (d) The value of K.
- (e) The value of n.

**Response:**

a. The SAS program was provided in Library Reference USPS-LR-K-81 in Docket No. R2005-1. It is entitled: "ESTIMATING DELIVERY EQUATIONS.SAS" The calculation of the F test just takes values from those results (given below) and plugs them into the formula.

b. - e.

J	21
N	1545
K	35
R <sup>2</sup> Restricted	0.8183
R <sup>2</sup> Unrestricted	0.8520

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OCA/USPS-T14-6. The purpose of this interrogatory is to obtain additional information on the choice of full quadratic and restricted quadratic approaches in the analysis of City Carrier Costs. It appears that the reason you used the restricted quadratic form instead of the unrestricted quadratic form in your carrier cost analysis was your initial obtaining of a negative coefficient for one of the regressors. If you had not obtained a negative coefficient, then you would have had to choose between the restricted and the full quadratic equations on some other basis.

- (a) What would have been the appropriate criteria for choosing between the two different equations? Please provide references to the literature and/or textbooks as appropriate, as well as your explanations.
- (b) Does the elimination of some but not all of the cross product terms from the full quadratic case introduce bias to the regressors, and if so how would one test for bias and/or determine whether the biased equation was preferable to other possible results? Please provide references to the literature as appropriate.
- (c) Did you or have you performed any analysis related to the above issues? If so, please provide the analyses.

**Response:**

- a. The selection of functional form can be complex and subtle and depends upon a number of factors, not the least of which is the use to which the equation will be used and the presence or absence of prior or extra-sample information. For example, if the equation is to be used for forecasting, then a forecasting accuracy metric (like mean squared forecast error) may be used as the basis for selecting the functional form. In addition, previous work on similar equations or foreknowledge about conditions on certain parameters can also inform the specification search. In the instant case, in which the goal is estimating variabilities for a number of shape vectors, I think the appropriate criteria are a combination of statistical properties and the ability of the equation to estimate useful and sensible variabilities. A nice discussion of the issues associated with

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determining a specification is provided by William Greene in Econometric Analysis, Macmillan Publishing Company, 1993 at 244-253.

- b. It depends on the relationship between the omitted variables and the retained variables and between the omitted variables and the dependent variable. For example, consider a simple two-variable case. Let the true regression be given by :

$$y_k = \gamma_1 x_{1k} + \gamma_2 x_{2k} + \varepsilon_k .$$

Suppose, however, that one estimates an alternative model:

$$y_k = \tilde{\gamma}_1 x_{1k} + \tilde{\varepsilon}_k .$$

The formula for the regression coefficient is given by:

$$\hat{\tilde{\gamma}}_1 = \frac{\sum x_{1k} y_k}{\sum x_{1k}^2} .$$

Substituting the definition of  $y_k$  from the first equation yields:

$$\hat{\tilde{\gamma}}_1 = \frac{\gamma_1 \sum x_{1k}^2 + \gamma_2 \sum x_{1k} x_{2k} + \sum x_{1k} \varepsilon_k}{\sum x_{1k}^2} .$$

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Taking the expected value yields:

$$E[\hat{\gamma}_1] = \gamma_1 + \gamma_2 \frac{\sum x_{1k} x_{2k}}{\sum x_{1k}^2}.$$

Bias is defined by an expected value of a parameter being different from the “true” value. In this case, the bias is measured by the second term. Note the value of that term depends upon  $\gamma_2$  -- a measure of the relationship between the omitted variable and the dependent variable and the covariance between  $x_1$  and  $x_2$ .

The biased equation can be preferred to the unbiased equation, either on the basis of extra sample information or on the basis of improved precision of the estimate. A biased estimate may be preferred to an unbiased estimate if it has a reduce variance relative to the unbiased estimate. If the choice is to be made on this basis, one can apply the mean square error test. For a discussion of this test please see William Green, Econometric Analysis, Macmillan Publishing Company, 1993 at 249.

- c. Please see my response to Question 9, POIR 9, in Docket No. R2005-1.

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OCA/USPS-T14-7. The purpose of this interrogatory is to obtain additional documentation for the Jacque-Bera statistic in your answer to POIR No. 9, Question 8 (Docket No. R2005-1). Do you have any SAS programs other than those previously filed in support of your answer to the POIR?

**Response:**

No.

## CERTIFICATE OF SERVICE

I hereby certify that I have this date served the foregoing document in accordance with Section 12 of the Rules of Practice and Procedure.

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