

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

POSTAL RATE AND FEE CHANGES, 2006

Docket No. R2006-1

RESPONSES OF UNITED STATES POSTAL SERVICE WITNESS  
BRADLEY (USPS-T-17) TO INTERROGATORIES OF  
OFFICE OF CONSUMER ADVOCATE [OCA/USPS-T17-16-24]  
(July 21, 2006)

The United States Postal Service hereby provides the responses of Postal Service witness Michael D. Bradley to the above-listed interrogatories of Office of the Consumer Advocate, filed on July 7, 2006.

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

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

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Response of Postal Service Witness Michael D. Bradley  
To Interrogatories Posed by the OCA

**OCA/USPS-T17-16.** The purpose of this interrogatory is to obtain information concerning the control variable referenced on page 22 of your testimony.

- (a) Is the control variable in the regression the variable “items,” as set forth in Library Reference USPS-LR-L-80? If your answer is affirmative, please explain why you regard the variable as a control variable, also indicating the meaning of the regressor. If your answer to this part of the question is affirmative, please ignore parts (b), (c), and (d) of this interrogatory. If your answer is negative, please answer parts (b), (c) and (d) in this interrogatory.
- (b) Please identify the variable by column in the database, explain its meaning, and show the derivation, definition, or computation of the variable.
- (c) Please show how the variable was used in your regression analysis, referencing the variable and associated computations in the regression(s).
- (d) Please provide the t statistic and other relevant data, as appropriate, associated with regressions using the control variable.

**Response:**

- a. Yes. A control variable is one included in a regression to control for variations in the dependent variable that occur for reasons other than variation in the independent variables of interest. In my update of the supply side variability equation, I was concerned that the existence of more than one item in a transaction could lead to some additional transaction related time (due to the added complexity of having more than one item) that was not caused by any of the products included in the transaction. I thus include the “items” variable to account for the possibility.
- b. Not applicable
- c. Not applicable
- d. Not applicable

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**OCA/USPS-T17-17.** The purpose of this interrogatory is to delineate specifically all of the observations dropped from the econometric analysis.

1. On page 23 of your testimony, at lines 13 and 14, you identify five observations with very large volumes excluded from the regression analysis;
2. On page 23, at lines 17 to 19, you identify a Priority Mail transaction dropped from the regression analysis;
3. On page 24 you identify a stamped envelope transaction at lines 7 to 8 that is dropped from the regression analysis;
4. On page 24, at lines 10 through 12, you identify two transactions dropped from the analysis;
5. On page 25, lines 11 through 13, you identify ten transactions related to passports that are dropped; and
6. On page 25, lines 13 to 19, you identify a number of transactions that were dropped in certain alternative analyses.
  - (a) Please specifically identify the observations dropped; presumably this could be accomplished by using the identifier BasketID if this identifier is unique to each line of data in your spreadsheet. If such is not the case, please use an appropriate method that would uniquely identify data items dropped from your database, wscleanpos.11.3.05.xls.
  - (b) Please identify any other observations dropped from the analysis but not specifically referenced above as having been dropped, and please provide an explanation of why the items were dropped.
  - (c) Please confirm that BKSKTID and BasketID as used in various parts of your testimony and library references are identical. If you do not confirm, please explain in detail.

**Response:**

a. The BasketID identifier is used as requested. Each of the responses below provides an answer to an individual subpart, identified by number, in the question preface.

1.

5232851777
5221161559
5234877334
5239543847
5224524863

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2.

5224808246

3.

5215045263

4.

5198798207
5251962872

5.

5204600699
5228548508
5232851741
5232851729
5253926578
5230299463
5220160205
5204600396
5204600585
5224998539

6.

5200763248
5260112697
5204600684
5232851668
5209254893
5224524901
5224524902
5220160325
5224524927

- b. One other alternative analysis was explored. As explained in footnote 9 on page 24 of my testimony, I also investigated dropping a small number of observations with very small transaction times. Here are the Basket Ids for those observations

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5230299631	5258530467	5215045105
5239543673	5226135292	5215045193
5228829212	5217873364	5219586263
5226135317	5243812478	5250085607
5255577812	5209254990	5200763136
5260112376	5258530478	5196711158
5235402965	5228829197	5213161413
5205967878	5215045169	5224524864
5224807922	5219586229	5200763183
5215045299	5209254934	5226135237
5209254944	5255577804	5230299704
5253926395	5224807851	5215045115
5228829317	5200763013	5243812455
5232851715	5217873403	5202686920

c. Confirmed.

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**OCA/USPS-T17-18.** This interrogatory seeks to develop information on the variables used in your regressions.

- (a) Please confirm that the variable “General Services” in Table 2, page 26, is identical to the variable “Services” referenced in your response to Presiding Officer’s Information Request No. 3, question 9. If your answer is negative, please explain in detail and provide the correct formula for the variable.
- (b) Please turn to page 4 of Library Reference USPS-LR-L-80; please state where and how the variable INQ is used in the regression analysis.
- (c) Please turn to page 4 of Library Reference USPS-LR-L-80; please explain the composition of the transactions included in the variable “other.”
- (d) Please turn to page 5 of Library Reference USPS-LR-L-80. Please state how the variables “regtype,” “posture,” and “multi,” are used in the regression analysis.

**Response :**

- a. Confirmed.
- b. It is not used in the regression analysis.
- c. The composition of the transactions in the “other” variable is unknown as it is a category that captures any transaction that can not be classified as one of the defined transactions. In fact, it is the inability to classify the transaction that leads to the use of the “other” variable.
- d. The variables are not used in the regression analysis.

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**OCA/USPS-T17-19.** This interrogatory focuses on statistical issues associated with the regressions.

- (a) Did you examine whether the data are collinear? Please explain in detail.
- (b) Unlike SAS, EViews does not appear to print out the intercept term for regression equations. Please explain how the intercept(s) can be obtained when equations are generated using EViews. Please be specific as to which EViews files need to be accessed.

**Response:**

- a. I looked for the regular symptoms of multicollinearity such as low t-statistics, and wrong signs accompanied by a high R-squared statistic. Because such symptoms are absent, I did not pursue any further analysis of colinearity.
- b. EViews does indeed print out the estimated intercept term when it is included in the regression equation. It can be identified by the letter "C" (which stands for "constant," a term often used in place of the word "intercept.") For example, please see page 15 of USPS-LR-L-80 in which the intercept (or constant) term has a value of 41.21778.

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**OCA/USPS-T17-20.** The purpose of this interrogatory is to obtain the columns LocID, PeriodID and BasketID for the spreadsheet provided in POIR No. 3, Question 10. Please turn to your response to Question 10 of POIR No. 3. You provided the Excel version of a spreadsheet of the input data (prior to deletion of any observations) used to produce "First Estimation: Calculating Residuals for Analysis". This spreadsheet appears to have been based on the spreadsheet ws-cleanpos.11.3.05, as modified subsequently. Please provide line-by-line entries for LocID, Period ID, and BasketID

**Response:**

The line-by-line entries for Loc ID, Period ID and Basket ID are already provided in the spreadsheet "ws-cleanpos.11.3.05." To incorporate them into spreadsheet "Input data that produced First Estimation.xls," use Excel's "Insert" command to add three blank columns in the spreadsheet columns A, B and C and then copy and paste the line-by-line values from "ws-cleanpos.11.3.05."

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**OCA/USPS-T17-21.** The purpose of this question is to inquire about a possible typographical error for one of the dummy variables.

- (a) Your answer to POIR No.3, question 9, indicates that for D14 the value should be set to 30422. Please confirm that the value should be 30442.
- (b) If you do confirm, does this change any of the regression output? If your answer is affirmative, then please explain in full.

**Response:**

- a. Confirmed.
- b. No. The typographical error occurred in the production of the table in response to POIR No. 3, question 9, not in the estimation of the equation.

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**OCA/USPS-T17-22.** The recommended model, presented on page 8 of Library Reference USPS-LR-L-80, includes 27 dummy variables. It appears that all of the dummy variables are used in the regression. When one uses dummy variables, the inclusion of the entire set of dummy variables in the regression equation can result in the output message that the model is not of full rank and that the least squares solutions are not unique. Please explain how you are able to use all of the dummy variables in the model and obtain a model of full rank.

**Response:**

The statement posed in the question is not quite accurate. The error message referred to occurs when one column of the X matrix can be described as an exact linear transformation of another column or set of columns. In such an instance, the X matrix has less than full rank. This condition does not occur, however, unless all dummy variables and an intercept term are included. For example, consider a data set that has three observations and three dummy variables. The columns of the X matrix dealing with the dummy variables would look like:

1	0	0
0	1	0
0	0	1

This matrix is, of course, invertible and has an inverse equal to 1. There is no problem with rank. On the other hand suppose that all three dummy variables and the intercept are included in the equation. Then the relevant columns of the X matrix are given by:

1	1	0	0
1	0	1	0
1	0	0	1

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Clearly the first column is equal to the sum of the next three columns. An exact linear dependence is formed and the matrix cannot be inverted.

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**OCA/USPS-T17-23.** The calculation of  $b(0)$  is presented in the Excel Spreadsheet "Calculating Variabilities\_49292.xls". Computation of the term  $b(0)$  involves the summation across the values of the regressors for the 27 dummy variables.

- (a) In view of full rank issues associated with the over-inclusion of dummy variables, should there be 27 or 26 dummy variables? Please explain in detail.
- (b) Would the equation from which you obtained the values used for the dummy variables have an intercept term other than the intercepts for the dummy variables? If so, what are the intercept terms?
- (c) Is it correct that any general intercept term for the equation would not enter the calculation? Please explain.

**Response:**

- a. As explained in my response to OCA/USPS-T17-22, there are no issues associated with the "over-inclusion" of dummy variables. Thus, the correct number of dummy variable coefficients to include in the calculation is 27.
- b. No.
- c. Yes.

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**OCA/USPS-T17-24.** Your recommended model is on page 7 of Library Reference USPS-LR-L-80. OCA has rerun the model in SAS based on the information in your testimony and library references. The attached program, output, and log summarize the work. (See Attachment, OCA/USPS-T17-24) As recognized in your response in OCA/USPS-T17-1(a), EViews does not provide programs, program logs, or computer inputs. There is, accordingly, no certainty that the SAS model is an exact representation of the model in the library reference.

(a) The EViews output appears to have no intercept term. Is this correct? If an intercept term is in a workfile in the model, please explain where the intercept term can be found. Alternatively, please explain the absence of an intercept term in the equation, including an explanation of how you avoided having an intercept.

(b) The SAS model has an intercept. Has the SAS model incorrectly reproduced the EViews model? Please explain.

(c) Assuming that the EViews output has no intercept term, how should the SAS model have been structured, particularly as regards to an intercept?

(d) The SAS model does not reproduce the EViews results, although it appears to have been run under the same conditions as the EViews program. Please review the Attachment to this interrogatory and identify any reasons that the EViews results are not reproduced. Please explain your answer.

**Response:**

- a. Yes. An intercept should not be used (in fact can not be used) in a regression analysis in which there is a dummy variable for each post office. Inclusion of the intercept along with a complete set of dummy variables would lead to an X matrix of less than full rank. Instead, you could think of the regression having an intercept for each post office.
- b. The form of the SAS model is correct but because of problems earlier in the program, it has not correctly reproduced the results.
- c. One should use the "NOINT" option in the SAS REG Procedure (in the model statement) to exclude an intercept from the analysis.

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- d. A review of the program reveals two problems. First the "CREDIT" variable is not constructed correctly (it should also include tender type = 23) and the program seems to have had problems accurately reading in the data. Correcting these two problems will lead to a replication of the EViews results.