

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

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POSTAL RATE AND FEE CHANGES, 2000

Docket No. R2000-1

RESPONSE OF UNITED STATES POSTAL SERVICE
WITNESS BOZZO TO INTERROGATORIES OF
THE OFFICE OF THE CONSUMER ADVOCATE
(OCA/USPS-T15-21-43)

The United States Postal Service hereby provides the responses of witness Bozzo to the following interrogatories of the Office of the Consumer Advocate: OCA/USPS-T15-21-43, filed on February 8, 2000.

Each interrogatory is stated verbatim and is followed by the response.
Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

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February 22, 2000

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-21. The Excel workbook file "reg9398.xls" does not have any headings identifying the variables.

- (a) Please provide the headings.**
- (b) There appear to be 19 variables. Is this correct, and is this the number of variables that the program reads?**
- (c) There are a large number of columns in the program. Please identify what is being read in each column.**
- (d) It appears that data may be expressed in thousands or millions. Please define the actual total number of units for each data item.**

OCA/USPS-T-15-21 Response.

- a. An Excel spreadsheet file containing the requested headings has been provided in LR-I-185.**
- b. See the response to POIR No. 1, item 8(a) and (b). I do not know by what accounting you conclude there are nineteen variables in the "reg9398.xls" file.**
- c. I assume you mean there are a large number of columns of data in the spreadsheet read by the TSP programs. See the response to part (a) and LR-I-107 at page 3.**
- d. I assume that by "total number of units for each data item" you mean the units of measure for each variable in the reg9398.xls data file. The units are as follows:**
 - IDNUM: N/A (this is a number identifying each site)**
 - QTR: see LR-I-107 at page 3.**
 - TPF, TPH: thousands of piece handlings.**
 - QICAP: N/A (this is an index number)**
 - All other variables: units.**

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-22. Please refer to USPS-LR-I-107, page 4. Please clarify the procedures for the computations when you state that the fourth quarter piece-handling and hours variables are reweighted to make them comparable with the corresponding values in other quarters. Please describe the reweighting approach in detail.

OCA/USPS-T-15-22 Response.

The relevant data are multiplied by a factor of 0.75 (3/4). See LR-I-107 at page 38, code following the comment heading "Rescales quarter 4 observations..."

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-23. Please refer to USPS-LR-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp."

- (a) Please identify and document any computational steps that are not identified in the commentary. To the degree appropriate, page numbers and position on the page in the Library Reference should be adequate.**
- (b) Which section of the program sets parameter values and creates lists of variable names?**
- (c) Which section of the program reads the data from the Microsoft Excel version 4 workbook file "reg9398.xls"?**
- (d) Which section of the program provides the referenced data transformations? Please denote each transformation in terms of formula(s) and variables used and the resulting computed variable(s).**
- (e) Which section of the program reweights the fourth Postal quarter?**
- (f) Which section of the program calculates the LDC wages and the manual ratios?**
- (g) Which section of the program computes the operation-specific productivity filter bounds set?**
- (h) Please identify the portion of the program that computes the lagged TPF terms.**

OCA/USPS-T-15-23 Response.

- a. The commentary at pages 2-7 of LR-I-107 describes the program's computational steps.**
- b. See LR-I-107 at page 37, code following the comment line "Lists used to read data from Excel file"; LR-I-107 at pages 48-49, code following the comment lines "The**

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

labor demand model specification (used only to indicate correspondence of parameters and variables)."

- c. See LR-I-107 at page 38, code following the comment line "read in data from excel file."
- d. The question does not refer to any specific data transformations. See, however, LR-I-107 at pages 38-39, 42-44, and 51.
- e. See the response to OCA/USPS-T-15-22.
- f. For the LDC wage, see LR-I-107 at pages 38-39, code following the comment line "set up wage variables." For the manual ratios, see LR-I-107 at page 40, formulas for "man" and "manf" variables.
- g. See LR-I-107 at page 40, "set highprod..." and "set lowprod..." statements.
- h. See LR-I-107 at pages 41-42, code following heading "Lagged piece handlings and associated flags."

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-24. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by:tsp." For each logical "loop" in your TSP program "varltr-tpf-by98.tsp," please identify the start and end of the loop and the variable(s) or procedures being effectuated. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-24 Response.

The program contains four loops, each beginning with a "dot" statement and ending with "enddot." The first loop rescales the quarter 4 observations; see the response to OCA/USPS-T-15-22. The second loop begins under the comment line "identifies missing/bad cases of each LDC wage" (see LR-I-107 at page 39) and identifies observations with missing or invalid NWRS data. The third loop is the main loop, beginning under the comment line "Main loop estimates the model..." (see LR-I-107 at page 40) and ending near the end of the program at page 53. The fourth loop, within the main loop, beginning under the comment "Transforms data for FGLS – AR (1) disturbances" (see LR-I-107 at page 51), transforms each regressor to implement the FGLS estimation.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-25. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please identify in your TSP program "varltr-tpf-by98.tsp" the section of the program that selects and computes the regressions. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-25 Response.

The regressions are computed with the "panel" statements. See LR-I-107, page 49 (estimates the models without the autocorrelation adjustment) and page 51 (estimates the models with the autocorrelation adjustment.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-26. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please identify in your TSP program "varltr-tpf-by98.tsp" the section that identifies all usable observations. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-26 Response.

See LR-I-107 at page 40, code following the comment line "selects 'all usable' observations..." and at page 41, code following the comment line "flags observations with missing/invalid wage data."

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-27. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please identify in your TSP program "varltr-tpf-by98.tsp" all filters. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-27 Response

See LR-I-107, pages 41-42, code following the comment lines "threshold check,"

"productivity check," and "minimum observations check."

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-28. Please refer to USPS-LR-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please identify in your TSP program "varltr-tpf-by98.tsp" the portion of the program involving calculation of the lagged TPF terms and the lagging of the variables. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-28 Response.

See the response to OCA/USPS-T-15-23(h).

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-29. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please identify in your TSP program "varltr-tpf-by98.tsp" the portion of the program that makes a final check for the eight observations, which need to be consecutive. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-29 Response.

See the response to OCA/USPS-T-15-27. Note that the statement of the interrogatory is incorrect: the eight observations need *not* be consecutive. See USPS-T-15 at page 113, lines 5-6.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-30. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varitr-tpf-by.tsp." Please identify in your TSP program "varitr-tpf-by98.tsp" the portion of the program that transforms variables into their natural logarithms for the application of the transcendental logarithmic functional form. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-30 Response.

See LR-I-107 at pages 42-43, code following the comment line "log levels and their squares."

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-31. Please refer to USPS-LR-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please identify in your TSP program "varltr-tpf-by98.tsp" the portion of the program that effectuates the calculations of the 19 elasticities reported. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-31 Response.

See LR-I-107 at pages 49-50, code following comment line "Elasticities w/r.t. piece handlings..." for the elasticities based on the regressions without the autocorrelation adjustment; LR-I-107 at pages 51-52, code following the comment line "Elasticities w/r.t TPH..." for the elasticities based on the regressions with the autocorrelation adjustment.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-32. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please identify in your TSP program "varltr-tpf-by98.tsp" the portion of the program that defines each elasticity function, including the elasticity. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-32 Response.

See LR-I-107, pages 45-47, code following the comment line "Formulas for various elasticity calculations."

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-33. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please identify the portion of the program that estimates the variability model using the TSP panel command, assuming the disturbances have a scalar covariance matrix. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-33 Response.

See the response to OCA/USPS-T-15-25.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-34. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please delineate the part of the program where the fixed-effects residuals and slope parameters are extracted for further processing. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-34 Response.

See LR-I-107 at page 49, code following the comment line "Extracts fixed-effects residuals for autocorrelation coefficient"; LR-I-107 at page 51, "unmake" and "mat" statements.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-35. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please identify the part of the program for the calculation of the Baltagi-Li estimate. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-35 Response.

See LR-I-107 at pages 50-51, code following the comment lines "Computes the disturbance autocorrelation coefficient (rhoest);" and "the Durbin-Watson statistic (dwstat)."

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-36. Please refer to USPS-LR-107, pages 37 through 53. These pages present your TSP program "varltr-tpf-by.tsp." Please identify the part of the program for the calculation of the Bhargava-Franzini-Narendranathan estimates of the panel Durbin-Watson statistic, produced from the residuals. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-36 Response.

See the response to OCA/USPS-T-15-35.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-37. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varitr-tpf-by.tsp." Please identify the portion of the program where the data are transformed so that a feasible Generalized Least Squares (FGLS) version of the model may be estimated. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-37 Response.

See the response to OCA/USPS-T-15-24.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-38. Please refer to USPS-LR-I-107, pages 37 through 53. These pages present your TSP program "varitr-tpf-by.tsp." Please identify the portion of the program where the elasticities and their standard errors from the FGLS model are then calculated and evaluated. To the degree appropriate, page numbers and position on the page in the Library Reference will suffice.

OCA/USPS-T-15-38 Response.

See the response to OCA/USPS-T-15-31.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-39. Please refer to page 7 of USPS-LR-I-107 wherein you indicate that you assumed the existence of first-order autocorrelated disturbances in your calculations.

- (a) What would be the characteristics of the economic process that would be necessary for this assumption to be a reasonable assumption?**
- (b) Please state the necessary and sufficient conditions for the [sic] homotheticity.**
- (c) Please state how your conclusions would have varied if you had not assumed homotheticity.**

OCA/USPS-T-15-39 Response.

Please note that I *demonstrate* the presence of serial correlation of the regression disturbances empirically, rather than assume it as the question asserts. See USPS-T-15 at pages 119-120 ("Autocorrelation coefficient" lines of Table 6 and Table 7).

- a. I assume the antecedent of "this assumption" is autocorrelation of the regression disturbances. Autocorrelated disturbances imply that "shocks" to the process being estimated (i.e., the disturbances) have effects that exhibit a degree of persistence over time, though the mean effect is zero. The residuals in models of economic processes involving a time dimension are generally assumed to be autocorrelated, at least until proven otherwise. For example, Greene states that "it is reasonable to model most time series data as having some serial correlation." See William H. Greene, *Econometric Analysis* (Macmillan, 1990) at page 429.**
- b. A homothetic function is a monotonic transform of a homogeneous function. That is, a function $h(x)$ is homothetic if it can be written as $g(f(x))$, where g is monotonic (i.e., $z_1 \geq z_2 \Rightarrow g(z_1) \geq g(z_2)$) and f is homogeneous (i.e., $f(tx) = t^d f(x)$, where d is**

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the degree of homogeneity). See Hal R. Varian, *Microeconomic Analysis*, Second Edition, (W.W. Norton, 1984), p. 330.

- c. My conclusions about the presence of autocorrelation in the regression disturbances are independent of homotheticity.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-40. Please refer to page 21 of your testimony, line 21, in which you state, "Therefore, I believe the updated sample selection criteria are not 'excessive'." Do you have a statistical test to substantiate this statement?

OCA/USPS-T-15-40 Response.

See the response to OCA/USPS-T-15-7.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-41. Please refer to page 7, footnote 5 of USPS-LR-I-107. Please delineate the section(s) of the program that also produce pooled, between, and random-effects estimates, including commands for printout, statistical tests, and all other relevant econometric information.

OCA/USPS-T-15-41 Response.

The "panel" commands automatically produce the pooled, between, and random-effects estimates as well as the specification test statistics reported in USPS-T-15 at page 124.

See also the responses to OCA/USPS-T-15-1(a) and OCA/USPS-T-15-25.

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-42. Please refer to page 15 of USPS-LR-I-107. You state that the Christensen Associates' proprietary Economic Programming Language (EPL) software was used to perform certain computations.

- (a) Please provide appropriate documentation for the EPL software and for the computations which you performed using the EPC [sic] software.**

- (b) Has this software been independently tested and peer reviewed for accuracy and completeness? If so, please provide the documentation.**

OCA/USPS-T-15-42 Response.

- a. The EPL reference manual will be provided as LR-I-187.**

- b. EPL has not been independently tested in the sense of the studies cited in the response to OCA/USPS-T-15-1(b). The terms "accuracy" and "completeness" are too vague for me to determine the extent to which other potentially relevant testing of EPL might apply. Note also that EPL was used only in the process of preparing data for the "reg9398.xls" data set. All statistical analysis was performed using TSP.**

**Response of United States Postal Service Witness Bozzo
To Interrogatories of the Office of the Consumer Advocate**

OCA/USPS-T-15-43. You appear to have used an index of capital intensity in your regressions. In order to have computed the index it would appear that you would have had the following information by site for each function: original acquisition cost of the equipment, average years of equipment life, and year of equipment acquisition,

- (a) Please provide this information by equipment type; in the event that any of the dollars relate to space, please state them separately.**
- (b) Please indicate why you chose to use an index number instead of a depreciated, undepreciated, or other dollar measure of equipment.**
- (c) Do you maintain that two sites with equal quantity indices for facility capital employ the same amount of capital?**

OCA/USPS-T-15-43 Response.

- a. See the response to MPA/USPS-T-15-6.**
- b. At a basic level, an index number is simply a (scalar) numerical representation of data intended to facilitate comparisons. A dollar value of the plant's capital would be, generically, a type of index number. Furthermore, I make use of (dollar) valuations of capital in developing the capital index. See the response to MPA/USPS-T-15-6 and LR-I-107 at pages 27-28 and 32. Therefore, I do not see a relevant distinction.**
- c. Not necessarily. I would expect two sites employing the same amount of capital to have the same value of the capital quantity index. However, I would only maintain that two sites with equal capital quantity indexes employ *equivalent* amounts of capital.**

DECLARATION

I, A. Thomas Bozzo, declare under penalty of perjury that the foregoing answers are true and correct, to the best of my knowledge, information, and belief.

A. Thomas Bozzo

Dated: 2/22/00

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon all participants of record in this proceeding in accordance with section 12 of the Rules of Practice.



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