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

POSTAL RATE AND FEE CHANGES, 1997 | Docket No. R97–1

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS BARON TO INTERROGATORIES OF THE NEWSPAPER ASSOCIATION OF AMERICA (NAA/USPS–T17—9–16) AND REVISED ANSWERS TO NAA/USPS-T17-4 AND -8

The United States Postal Service hereby provides responses of witness Baron to the following interrogatories of the Newspaper Association of America: NAA/USPS–T17—9–16, filed on September 12, 1997. Also included are revised answers to NAA/USPS-T17-4 and -8, originally filed on August 19, 1997.

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

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

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September 26, 1997

Response of Witness Baron to Interrogatories of the Newspaper Association of America (NAA)
Revised September 26, 1997

NAA/USPS-T17-4. *Please refer to Equations (1) and (3) on pages 7 and 8 of your* direct evidence.

a. Please confirm that the dependent variable, load time, in each of these equations is equal to the total load time at a particular stop, including both fixed time activities (i.e., related to the "stops effect") and the time directly related to loading and collecting mail. If you cannot confirm, please explain what measure of load time was used in each of these equations.

RESPONSE:

a. Partially confirmed. The dependent variable, load time, does equal the total load time at a particular stop. However, observe first that the load-time variable as defined for purposes of the regression equations does exclude fixed-time at a stop. This load-time variable equals the sum of three components: "mail preparation time," "load time," and "customer attend time." The exact definitions of these three components are presented on page 39 of the Load Time Variability Test, Industrial Engineer Test Package (August 1985), which was filed as USPS LR-E-4 in Docket No. R87-1. (These definitions are attached). Note, in particular, the definition of mail preparation time. This activity is the **handling** of mail pieces, bundles, containers, or other mail-related equipment. As such, the mail preparation time interval is necessarily dependent on the volume of mail being loaded or collected. It will increase or decrease as volume increases or decreases. Thus, as defined, mail preparation time does not include the pre-loading prep time encompassed by fixed-time at a stop, since the latter, by definition, is completely **independent** of total volume loaded or collected at a stop.

Nevertheless, despite these definitions, it is clear that the data collectors who recorded the actual observations of load time during the 1985 load-time tests made no effort to explicitly exclude fixed-time per stop from their measures of carrier time. Thus, some portion of each 1985 recording of load time certainly measures the fixed-time component. Note, however, that this fixed-time portion must be very small. It cannot exceed the minimum carrier time expended at a one-letter stop - an amount of time I estimate as approximately one second.

Response of Witness Baron to Interrogatories of the Newspaper Association of America (NAA)
Revised September 26, 1997

NAA/USPS-T17-8. Please refer to line 15 on page 36 and lines 1-15 on page 37 of your direct evidence.

b. Please explain what work a carrier performs to prepare for loading receptacles and collecting at a new multidelivery actual stop.

RESPONSE:

b. This work is the activity of preparing to handle mail pieces, mail bundles, or mail-related equipment and to then place the mail into receptacles or collect mail from receptacles. This work occurs immediately after the carrier reaches the stop, and just prior to the initiation of the first loading activity at the stop. Note that the time required to do this work - what the Postal Rate Commission at paragraph 3125 of its R90-1 Decision calls coverage-related load time, and what my testimony calls fixed time per stop - is independent not only of the total volume delivered to the stop. It is also independent of the number of deliveries that get mail at that stop.

Response of Witness Baron to Interrogatories of the Newspaper Association of America, Questions 9-16, Docket No. R97-1

NAA/USPS-T17-9. Please refer to your response to NAA/USPS-T17-1, part (a).

a. What, if any, statistical tests did you apply to determine the sample size of one-letter stops necessary to accurately estimate minimum load times? Please provide a complete description of these tests.

b. Is the lowest 20th percentile sample you employ to derive these estimates the smallest sample one can use to generate "reliable" estimates? If so, please explain your response in detail. If no, please indicate the smallest sample that can be used to generate a "reliable" estimate and please explain how you derived this figure.

RESPONSE:

a. It is not clear what is meant by "statistical tests." For purposes of my answer, I will assume that this term refers to a formal statistical procedure that uses available data to estimate a population statistic (such as a population mean or population proportion). This procedure then estimates the standard error of the sampling distribution of all possible sample estimates of that statistic. A typical objective is the assurance that the 90, 95 or 99 percent confidence interval around the one sample estimate that is actually calculated will bracket the true population value, and that the upper and lower bounds of this interval will not exceed a certain threshold level. Finally, the required sample size is calculated as the minimum size necessary to yield a standard error that is low enough to produce this desired confidence interval.

Based on this assumption, the answer is that I did not perform such a test. The reason is that a key premise of the statistical procedure just described does not hold for my analysis. This premise is the assumption that the available sample data really qualify in the first place as true observations for the variable being analyzed.

In my analysis, the variable being analyzed is fixed-time at stop. The first objective of a formal statistical analysis would be to estimate the population mean value of this fixed-time at stop for the population of all stops of a given stop type.[1] The available sample that one might use to estimate this population mean would be the 1985 test observations of carrier times at one-letter stops. One might be tempted to view these times as true values for fixed-time at stop, and then calculate the average of these times, or the average of a sub-sample (such as the lowest 20th percentile). This average might then be viewed as an estimate of the population mean fixed-time at stop. Finally, one might conceivably attempt to determine the minimum sample size required to produce a standard error for the time estimate that is low enough to ensure that the confidence interval around this estimate would satisfy a threshold requirement.

In fact, however, none of the 1985 carrier times recorded at one-letter stops are true observations of fixed-time at stop. They are, at best, upper-bound proxies for the true, unobserved fixed-time at stop. Indeed, the highest values among these one-letter carrier times aren't even very useful as proxies. Only the lowest values are. Thus, the average of the sample or sub-sample of one-letter carrier times can only qualify as a "statistically" valid estimate of the population mean of total fixed time **plus** load time at all one-letter stops. It cannot be viewed as a statistically valid estimate of the population mean of **just** the fixed-time component.

In summary, the key requirement of the formal statistical procedure for determining minimum sample size required to achieve a specified confidence interval is not met. The values of the available sample are not values for what needs to be estimated. Common sense and professional judgment must be used to determine the minimum number of observations for estimating what is really unobserved - the amount of time spent prior to when loading begins.

[1] Another problem with the formal statistical approach is that it is difficult to even conceptualize a population "mean" fixed-time at stop. Fixed-time at stop is supposed to be the same at all stops. Indeed, how else could it be fixed? The statistical approach, however, assumes that within the population of all stops, a range of **different** values for fixed-time at stop is clustered around a population mean. If fixed-time at stop is truly fixed, where do these differences in value come from?

b. Please see my response to part (a) above, and to UPS/USPS-T17-4, parts (a) through (d). There is no way to test whether a smaller sample would have been sufficient. The assumptions required to perform a "scientific" calculation of required sample size do not hold.

NAA/USPS-T17-10. Please refer to your response to NAA/USPS-T17-2, part (a).

a. Please confirm that a reasonable "lower bound" of fixed time per stop would be less than the related figures you describe in your testimony as being "upper bound" estimates. If you cannot confirm, please explain your response fully.

b. If part (a) is confirmed, please provide a specific value for the lower bound of the fixed time per stop for SDR, MDR, and BAM stops.

c. Please explain in detail the methods you used to derive the values presented in part (b) above.

RESPONSE:

a. Confirmed. Observe, however, that even the upper bound estimates equal only about 1 second. So any discrepancy between these estimates and the unobserved true values must be less than 1 second. Thus, the discrepancy falls within the range of ordinary measurement and rounding error.

b. There are no data available to measure the lower bound. The only available data are the1985 test observations at one-letter stops. These can only be used to estimate the upper bound.

c. Not applicable.

NAA/USPS-T17-11. Please refer to your response to NAA/USPS-T17-4, part (e).

a. Do the load-time values in the 1985 test data set used to estimate the load-time regressions include load times for one-letter stops? If no, please explain.

b. If part (a) is affirmative, please confirm that you employ a sample of these one-letter stops (i.e., the lowest 20th percentile) to derive your estimates of fixed time per stop. If you cannot confirm, please explain your response.

RESPONSE:

a. Yes.

b. Confirmed.

NAA/USPS-T17-12. Please refer to your response to NAA/USPS-T17-3, part (b).

a. Please explain why you are relying on 1985 data. Are there no more recent data that can be used to estimate load-time regressions? If no, why not?

b. Please confirm whether carrier activities have changed since 1985. If yes, explain how.

c. Please confirm whether carrier efficiency has increased since 1985. If yes, how has efficiency increased? If not, why not?

RESPONSE:

a. There are no more recent data that can be used. My understanding is that the Postal Service has decided that the potential benefits of a new load-time test in terms of resulting improvements in variability estimates have not yet justified the expenditure of limited resources.

b. Confirmed. Carrier load-time activities have changed, for example, as a result of the additional bundles of mail that many carriers must now carry in order to keep delivery point sequenced (DPS) mail separated from non-DPS mail. (DPS mail is mail that arrives at the delivery unit having already been sorted in delivery point sequence by mailers, or by upstream postal facilities).

c. I am unaware of any data that could be used to measure the relative productivities of loading operations in 1985 compared with loading productivities in more recent time periods. It is true that the estimated load-time volume variabilities are less than 100 percent for all three stop types - SDR, MDR, and BAM. Moreover, this result implies that, all else held constant, as volume has increased from 1985 to the present, productivities should also have increased. However, this increase could also have been offset by other developments (for example, the increase in DPS mail) that have reduced loading productivities at all volume levels.

NAA/USPS-T17-13. Please refer to your response to NAA/USPS-T17-5, part (d).

a. Please provide a complete definition of the term "residual institutional costs."

b. Please indicate whether the term "residual institutional costs" has been used previously in the rate setting context and please explain how and when this term was used.

c. Please define "variable" costs and explain whether your definition is consistent with standard economic terminology.

d. According to standard economic theory, are these "residual institutional costs" fixed or variable in nature? Please explain your response.

e. Assuming that volume falls substantially, would the "residual institutional costs" as you describe them in your response still equal $333,866 thousand? If yes, please explain why these costs will remain fixed. If not, explain why not, and discuss the likely magnitude of the change in these costs.

f. Assuming that volume falls to one piece, would the "residual institutional costs" as you describe them in your response still equal $333,866 thousand? If yes, please explain why these costs do not vary with large changes in volume. If no, please explain why not and describe how these costs will change with changes in volume.

RESPONSE:

a. In this context, residual institutional cost equals accrued load-time cost minus volume-variable load time cost, where volume-variable load-time cost equals the product of the aggregate elasticity of load-time with respect to volume and accrued cost.

b. I do not know whether it has or not. To me, the question is irrelevant. I use the word residual only because common sense indicates it is the correct word to define the excess of one number over another number.

c. Variable costs are the costs of labor, capital, material and other inputs whose level of use depends on the amount of volume being loaded. Thus, variable costs are costs that fall to zero when volume falls to zero. I view this definition as being consistent with standard economic terminology.

NAA/USPS-T17-13. Please refer to your response to NAA/USPS-T17-5, part (d).

a. Please provide a complete definition of the term "residual institutional costs."

b. Please indicate whether the term "residual institutional costs" has been used previously in the rate setting context and please explain how and when this term was used.

c. Please define "variable" costs and explain whether your definition is consistent with standard economic terminology.

d. According to standard economic theory, are these "residual institutional costs" fixed or variable in nature? Please explain your response.

e. Assuming that volume falls substantially, would the "residual institutional costs" as you describe them in your response still equal $333,866 thousand? If yes, please explain why these costs will remain fixed. If not, explain why not, and discuss the likely magnitude of the change in these costs.

f. Assuming that volume falls to one piece, would the "residual institutional costs" as you describe them in your response still equal $333,866 thousand? If yes, please explain why these costs do not vary with large changes in volume. If no, please explain why not and describe how these costs will change with changes in volume.

RESPONSE:

a. In this context, residual institutional cost equals accrued load-time cost minus volume-variable load time cost, where volume-variable load-time cost equals the product of the aggregate elasticity of load-time with respect to volume and accrued cost.

b. I do not know whether it has or not. To me, the question is irrelevant. I use the word residual only because common sense indicates it is the correct word to define the excess of one number over another number.

c. Variable costs are the costs of labor, capital, material and other inputs whose level of use depends on the amount of volume being loaded. Thus, variable costs are costs that fall to zero when volume falls to zero. I view this definition as being consistent with standard economic terminology.

d. They are variable. They fall to zero when volume falls to zero. This is why they are poor measures of fixed-time at stop, which is supposed to be independent of volume.

e. No, these costs would be lower. Obviously, if volume were to fall to a much lower level and remain there, total costs would be lower. The reduction in costs to this new lower level would obviously be a reduction in variable costs, some of which is residual institutional cost. The magnitude of the reduction would depend upon the magnitude of the volume loss.

f. First, I assume that the volume referred to in this question is aggregate annual system-wide volume delivered to all SDR stops, as this is the volume to which the $333,866 thousand corresponds. If this volume falls to one piece, then residual institutional cost would fall substantially. Residual institutional cost is accrued cost minus the product of accrued cost and the aggregate elasticity of load time. If volume equals only one piece, both accrued cost and the product of accrued cost and the aggregate load-time elasticity would be very small, as would the excess of the former over the latter.

NAA/USPS-T17-14. Please refer to your response to NAA/USPS-T17-3, part (b).

a. Aside from the fact that the estimates of α in the MDR and BAM regressions are both negative, are there additional reasons why these estimates should not be interpreted as valid measures of fixed-time per stop? Please list and explain all these reasons.

b. Do the negative estimate of α in the MDR and BAM regressions indicate that the incorrect functional form was used to estimate the equations? Please explain your response fully.

c. If the regression coefficient α was used to estimate fixed-time per stop at SDR stops, what would be the resulting fixed-time per stop? How does this estimate compare to your estimate of fixed-time per stop based upon the lowest 20th percentile of one-letter stops for SDR stops?

RESPONSE:

a. It is true that in a strict mathematical sense, α predicts carrier time at zero volumes and deliveries, which is fixed-time per stop. To be precise, it does so in the MDR equation only when it is first assumed that the dummy variables, MR2, MR7, and MR8 all equal zero, and in the BAM equation when it is assumed that MR6, MR8, CT1 and CT3 all equal zero. If for example, MR7 in the MDR equation equals 1 (indicating that the receptacle type is NDCBU), then the combination of α plus the coefficient for MR7 provides the predicted MDR carrier time at zero volumes and deliveries.

In practice, the MDR and BAM regression estimates of α are nevertheless invalid measures of fixed-time at stop, not only because they are negative, but because they are derived from data sets that contain no actual observations of carrier time at zero volumes and deliveries. Thus, the α estimates apply to regions of data outside the ranges of data used to produce those estimates.

b. No. The intercept is added to each load-time equation not to provide an empirically valid measure of carrier time at zero volumes and deliveries (i.e., fixed-time per stop), but to improve the fit of the OLS estimation of the entire equation, and to ensure that estimates of the slope coefficients are unbiased. This objective is achieved regardless of whether the estimate of the intercept coefficient is negative.

c. The fixed-time per stop would be 1.115 seconds. This is slightly higher than the 1.052 seconds that I estimate for fixed-time per stop based on the lowest 20th percentile of one-letter SDR stops. Observe also that for this estimate of α to be viewed as a fixed-time per SDR stop, the dummy variables MR1-MR5, MR7-MR10, and CT1, CT3, CT4, and CT6 must also be assumed to equal zero.

NAA/USPS-T17-15. Please refer to your response to NAA/USPS-T17-8, part (b). Please confirm the correct paragraph reference in R90-1 for "coverage-related load time."

RESPONSE:

The reference should have been to paragraph 3125 in the R90-1 Decision.

DECLARATION

I, Donald M. Baron, declare under penalty of perjury that the foregoing answers are true and correct, to the best of my knowledge, information, and belief.

Donald M. Baron

Dated: 9/26/97

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.

Richard T. Cooper

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September 26, 1997