UNITED STATES OF AMERICA
Before The
POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268-0001

Postal Rate and Fee Changes) Docket No. R2000-1

ANSWERS OF THE OFFICE OF THE CONSUMER ADVOCATE
TO INTERROGATORIES OF THE UNITED STATES POSTAL SERVICE
WITNESS: MARK EWEN (USPS/OCA-T5-10-16)
(June 28, 2000)

The Office of the Consumer Advocate hereby submits the answers of Mark Ewen to interrogatories USPS/OCA-T5-10-16, dated June 14, 2000. Each interrogatory is stated verbatim and is followed by the response.

Respectfully submitted,

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USPS/OCA-T5-10. In challenging witness Baron's concept of fixed time at a stop, the Commission's Docket No. R97-1 Recommended Decision argued that this concept "is not required to allow the effect of stop coverage to be measured by a regression of non-elemental load time on system-level stops coverage" (page 177, paragraph 3279).

(a) Please confirm that the "non-elemental load time" that the Commission is referring to in this quotation is coverage-related load time. If you do not confirm, please state your complete understanding of the Commission's definition of "non-elemental load time" in this quotation.

(b) Please confirm that the Commission has defined "coverage-related load time" as the excess (or residual) of total accrued load time over elemental load time. If you do not confirm, please state your complete understanding of the Commission's definition of coverage-related load time.

(c) Please state whether you are aware of any regression analysis that estimates equations that define the residual of total accrued load time over elemental load time as functions of system-level stops coverage and/or any other explanatory variables. If you are aware of any such regression analyses, please provide all documentation of such analyses, and answer the following with respect to each:

1) Who performed the analysis?
2) When was the analysis conducted and what data does it use?
3) What are the dependent and independent variables of the regression equations, what are the regression coefficient-t-statistics, R-squares, and any other diagnostic statistics (e.g. F-Tests), and what elasticities, marginal load times, or marginal costs do these regressions produce?
4) Is the dependent variable in these equations a measure of the residual of total accrued load time over elemental load time?

RESPONSE TO USPS/OCA-T5-10:

(a) Confirmed, presuming that the Commission is referring to the portion of total accrued load time that is not elemental load-time.

(b) Confirmed.

(c) I am not aware of a regression equation that explicitly measures coverage-related load-time as a function of system-level stops coverage and/or any other explanatory variables.

USPS/OCA-T5-11. In referring to witness Baron's argument that the residual defined as total accrued load time minus elemental load time is institutional cost, the Docket No. R97-1 Decision states the following (at page 176, paragraph 3276):

> He [witness Baron] argues that once elemental load time is deducted from accrued load time, the residue should be considered an institutional cost. He does not consider it relevant that the residue can be shown to vary in proportion to system-level stop coverage.

a. Do you agree that the residual load time—that is, the excess of total accrued load time over elemental load time—"can be shown to vary in proportion to system-level stop coverage?" Please explain fully.

b. If your answer to part (a) is in the affirmative, are your aware of any existing empirical or other analyses that suggest that that residual load time "varies in proportion to system-level stop coverage." If your answer is yes, please describe fully each such analysis, and provide all documentation of each. Include in your descriptions answers to the following:

   1) Who did the analysis?
   2) When was the analysis conducted and what data does it use?
   3) How does the analysis define "system-level stop coverage?
   4) If the analysis included regression equations, what are the dependent and independent variables of these equations, what are the regression coefficients, t-statistics, R-squares, and any other diagnostic statistics (e.g. F-Tests), and what elasticities, marginal load times, or marginal costs do these regressions produce?
   5) Is the dependent variable in these equations a measure of the residual of total accrued load time?

c. If your answer to part (a) is in the affirmative, but you have no knowledge of any existing regression or other analyses that show that residual load time (total accrued load time minus elemental load time) varies in proportion to system-level stop coverage, please specify what type of study you believe could be conducted to show that residual load time varies in proportion to system-level stop coverage.

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RESPONSE TO USPS/OCA-T5-11:

(a) Yes. For example, total system load-time varies in response to variations in total system volume. The variation in total system load-time manifests itself in two ways, by causing variation in load times at a stop, and/or by causing variation in the number of stops covered. Since the elemental load time analysis assesses the extent to which load time varies with respect to volume at a stop, it follows that the variation in load time caused by the number of stops covered is embedded in the "residue."

(b) As I stated in response to USPS/OCA-T5-10(c), I am not aware of an empirical analysis that explicitly measures how residual load time varies in response to system-level stop coverage; however, the qualitative analysis described in (a) suggests that residual load time should vary in response to system-level stop coverage. The Commission has concluded that this variation is similar to the elasticity of stops with respect to volume. See, for example, PRC Op. R97-1, ¶ 3268.

(c) I have not proposed the development of such a study as part of my testimony, since it is not needed to implement the Commission's approach for attributing total accrued load time costs. I agree with the Commission, however, that the issue of attributing multiple subclass stop access and coverage-related load-time merits further study. See, for example, PRC Op. R94-1, ¶ 3152.

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USPS/OCA-T5-12. Please refer to page 177, paragraph 3279 of the Commission's Docket No. R97-1 Recommended Decision, where the Commission describes witness Crowder's "mathematical derivation of the established model of system-level load time variability" as a "clear and comprehensive explication of the established load time analysis."

a. At the beginning of the presentation of her model of "system-wide load time," witness Crowder's Docket No. R97-1 Testimony defines system-wide coverage-related load time as "non-elemental load time which includes the fixed time incurred as a result of the need to make a load, e,g., fixed time to open and close the satchel and mail box." Ms. Crowder also states in this reference that "like access time," coverage-related load time 'is variable to the same extent as stops coverage is considered variable." (Docket No. R97-I, JP-NOI-1, page 10 lines 24-26 through page 11 lines 1-2).

   (1) Do you agree with Ms. Crowder that coverage-related load time includes fixed time? If you agree, please explain fully in what sense you believe this included fixed time is "fixed." Do you believe, for example, that this fixed time is fixed with respect to volume and volume mix? If not, in what sense is it fixed?

   (2) Do you agree that Ms. Crowder's system-wide load time model, which contains the definition of system-wide coverage-related load time as time that includes fixed time, is a "clear and comprehensive explication of the established load time analysis?" Please explain fully.

   (3) Do you believe that coverage-related load time is variable to the same extent that accrued access time is variable? Please explain fully.

b. Have you evaluated Ms. Crowder's "mathematical derivation of the established model of system-level load time variability?" If your answer is yes, please consider the following mathematical principal: For a nonlinear equation of Y as a function of X, the average value of Y over a given range of X does not equal the value of Y defined at the corresponding average value of X. Do you confirm that Ms. Crowder's mathematical derivation of system-level load time variability violates this mathematical principal? Please explain your answer fully.

RESPONSE TO USPS/OCA-T5-12:

(a)(1) Yes. Since the load time variability analysis suggests that load time at a stop is influenced by factors other than volume (i.e., elemental load time variability is

less than 100 percent), the non-volume-related, or "fixed," factors that affect load time at that stop must be embedded in the coverage-related component. This time increment is fixed with respect to volume and volume mix at a stop, but may vary across stops due to factors other than volume (e.g., receptacle type).

(a)(2) I have not evaluated Ms. Crowder's system-wide load time model as part of my testimony.

(a)(3) I believe that it is reasonable to assume that volume influences the coverage of stops in much the same way as volume influences the coverage of accesses, since accesses and stops are directly linked (a carrier obviously must access a stop to get to the stop).

(b) No.

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USPS/OCA-T5-13. The Commission's Docket No. R97-1 Recommended Decision, at page 179, paragraphs 3283-3284, makes the following statements:

> Witness Baron argues that witness Crowder's mathematical derivation of the established system-level load time model is invalid in every respect, because it assumes that the average value of the load time function equals the function of the average value of the cost driver.
>
> It is true that models that use average values for the independent variable under investigation are only approximations of models that attempt to account for the specific distribution pattern of the independent variable across a sample. They are close approximations, however, where the function is well behaved. The elemental variability function is such a function.

a. Do you believe the assumption "that the average value of the load time function equals the function of the average value of the cost driver" is an incorrect or invalid assumption? Please explain fully.

b. Do you believe "witness Crowder's mathematical derivation of the established system-level load time model" is valid despite the fact that it "assumes that the average value of the load time function equals the function of the average value of the cost driver?" Please explain fully.

c. If your answer to part (b) is in the affirmative, do you believe the assumption that "the average value of the load time function equals the function of the average value of the cost driver" is therefore **not relevant** to witness Crowder's mathematical derivation of the established system-level load time model?

d. If you believe the assumption that "the average value of the load time function equals the function of the average value of the cost drive" **is** relevant to Ms. Crowder's mathematical derivation of the established system-level load time model, then please explain fully how can that derivation be valid if the assumption is incorrect.

e. Please refer to the first paragraph of the above quotation from the Docket No.R97-1 Recommended Decision, where, according to the Commission, "[w]itness Baron argues that witness Crowder's mathematical derivation of the established system-level load time model is invalid in every respect...."

   (1) Please specify, what, in your view, are the different "respects" of witness Crowder's model that may or may not be valid.

   (2) Which of these respects or aspects of witness Crowder's model are valid and which are invalid? In particular, which are valid despite the Crowder

model's assumption that the average value of the load time function equals the function of the average value of the cost driver. Which are invalid because of this assumption? Please explain your answers fully.

f. Please refer to the second paragraph of the quotation from the Docket No. R97-1 Decision cited at the beginning of this interrogatory. (Paragraph 3284 at page 179). Do you believe that the "elemental variability function" is a "close" approximation of a model that attempts "to account for the specific distribution pattern of the independent variable across a sample?" Please explain fully why you believe the elemental variability function is or is not a "close approximation" of such a model.

g. Consider the SDR, MDR, and BAM load time regressions estimated by the Commission in its Docket No. R90-1 Recommended Decision and used to derive the alternative BY 1998 elemental and volume-variable coverage-related load time costs presented in Table 2 of your Docket No. R2000-1 Testimony (OCA-T-5 at page 7). Do you believe that these load time regressions are "close approximations" of "models that attempt to account for the specific distribution pattern of the independent variable across a sample?" Please explain fully the reasons for your answer.

h. Do you believe the SDR, MDR, and BAM regressions cited in part (g) of this interrogatory are "close approximations" to linear regressions? Please explain fully the reasons for your answer.

RESPONSE TO USPS/OCA-T5-13:

(a) The assumption is not precisely correct in the sense that, since the load-time function is non-linear, the average value of the load-time function does not equal the function of the average values of the cost drivers; however, I have not evaluated the validity of the assumption relative to the derivation of Witness Crowder's load time model. Furthermore, the assumption is not required to implement the Commission's method of using single-subclass ratios to attribute coverage-related load-time costs.

(b) I have not analyzed Witness Crowder's mathematical derivation of the established system-level load-time model.

(c) N/A

(d) See response to (b).

(e) See responses to (a) and (b).

(f) I have not performed a comprehensive statistical analysis to demonstrate the closeness of the approximation.

(g) The elemental load-time costs presented in Table 2 of my testimony are derived from the SDR, MDR, and BAM load time regressions estimated by the Commission in its Docket No. R90-1 Recommended Decision, using data from the 1985 LTV study. This study collected data at the stop level from a sample of stops related to a variety of factors that potentially affect load time, including stop type, receptacle/container type, and shape/volume characteristics. In this sense, these regressions represent a model that attempts to account for the specific distribution pattern of the independent variables across a sample.

(h) I have not performed a comprehensive statistical analysis to determine whether these regressions are close approximations to linear regressions.

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USPS/OCA-T5-14. At page 48, lines 3-6 of Docket No. R2000-1, MPA-T-5, witness Crowder states that "when volume on a route increases and there is less than 100% delivery coverage on the stop, then some of the volume goes to newly covered stops/deliveries (causing whatever fixed stop/delivery time is appropriate)...."

a. Do you agree with witness Crowder that when some of the mail volume resulting from a volume increase goes to a previously uncovered stop, it causes corresponding additional fixed stop time? Please explain fully.

b. If you do not agree, is it your position that no additional fixed stop time occurs as a result of a carrier going to a newly covered stop in response to volume growth? Please explain fully.

RESPONSE TO USPS/OCA-T5-14:

(a) Yes. In covering the previously uncovered stop, the carrier will likely engage in certain loading activities that are not influenced by the amount of volume at that stop. For example, the carrier will have to open and close the receptacle regardless of how much mail is loaded. I would regard this time as fixed with respect to the volume loaded at the stop. However, depending upon the characteristics of the stop, the fixed time may be minimal. For example, the LTV dataset contains several measured load times of less than one second. OCA-T-5, pp. 15-17.

(b) N/A

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USPS/OCA-T5-15. At Appendix B, page 10, footnote 9 of Docket No. R2000-1, MPA-T-5, witness Crowder, evaluates "the volume-load time relationship observed at the stop level." She states that "at the stop level, the cost-volume curve does have a positive intercept, indicating fixed stop time," and that "[e]xtending the plot of this curve to zero volume would indicate a positive intercept value, revealing the fixed stop load time."

a. Do you agree with Ms. Crowder that some of total load time "at the stop level" is "fixed stop load time?"

b. If you agree, would you regard this "fixed stop load time" as coverage-related load time? In addition, would you regard this "fixed stop load time" as the *coverage-related* load time that the Commission referred to when it stated in its R97-1 Decision (as quoted by you at page 8 lines 16-19 of your Testimony) that:

> [t]he coverage-related load time analysis was intended to find the additional volume variability resulting from the fact that additional deliveries are caused by additional volume.

Please explain your answers fully.

c. If you agree with Ms. Crowder that some of load time "at the stop level" is "fixed stop load time," in what sense do you believe this "fixed stop load time" is fixed? For example, is it fixed with respect to volume and volume mix? Please explain fully.

RESPONSE TO USPS/OCA-T5-15:

(a) Yes, since the carrier is likely engaged in loading activities at the stop level that are not influenced by the volume of mail delivered to the stop.

(b) The elemental load time analysis estimates the portion of load time at the stop level that varies with volume delivered at the stop level. By definition, therefore, "fixed stop load time" cannot be embedded in the elemental portion of load time. As such, it must be embedded in the residual portion of total load time, after the elemental portion has been estimated. As defined by Witness Crowder in the citation provided above, the intercept of the cost-volume curve represents fixed

stop time; however, since the load time regressions are non-linear, residual coverage-related load time evaluated using the means of the volume parameters will not necessarily be exactly equal to fixed stop time as measured by the intercept of the cost-volume curve.

(c) This time increment is fixed with respect to volume and volume mix at a stop, but may vary across stops due to factors other than volume (e.g., receptacle type).

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USPS/OCA-T5-16. At page 48, footnote 46 of MPA-T-5, witness Crowder makes the following statement:

> When there is less than 100% coverage, a volume increase causes an increase in coverage which reduces average volume per stop on the route. If there are stop/delivery-level load time scale economies (i.e., elemental load time variability is less than 100%), then average per piece load time actually increases (coverage-related load time is positive). On the other hand, if there are no such scale economies (i.e., elemental load time variability is 100% and there is no fixed stop/delivery time), then average load time per piece does not change and changes in coverage have no effect on per piece load time (i.e., coverage-related load time is zero).

a. Do you agree that if there are no scale economies in the loading of mail at the individual stop or delivery point, then there is "no fixed stop/delivery time?" Please explain your answer fully.

b. Do you agree that if there are no scale economies in the loading of mail at the individual stop or delivery point, then "coverage-related load time is zero?" Please explain fully.

c. Do you believe that if there is no fixed stop or delivery time, coverage-related load time can still be positive? Please explain fully.

RESPONSE TO USPS/OCA-T5-16.

(a) Yes, defining "no scale economies" to mean that unit costs are constant with respect to volume changes.

(b) Yes, defining "no scale economies" to mean that unit costs are constant with respect to volume changes.

(c) If no fixed stop or delivery time exists because no scale economies exist, then coverage-related load time will be zero.

CERTIFICATE OF SERVICE

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

Emmett Rand Costich

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Washington, DC 20268-0001
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