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 TOLLEY TO INTERROGATORY OF THE OFFICE OF THE CONSUMER ADVOCATE (OCA/USPS–T6—1)

The United States Postal Service hereby provides the response of witness Tolley to the following interrogatory of the Office of the Consumer Advocate: OCA/USPS–T6—1, filed on September 3, 1997.

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

Respectfully submitted,

UNITED STATES POSTAL SERVICE

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September 17, 1997

RESPONSE OF POSTAL SERVICE WITNESS TOLLEY
TO INTERROGATORIES OF OCA

OCA/USPS T-6-1 (sic). The Postal Rate Commission's Opinion and Recommended Decision in Docket No. R94-1, pages II-36-45 discusses several areas which the Commission found troubling in your volume forecast testimony in that case. Please indicate whether you have addressed any of those concerns in your work in this case and how you or other witnesses have modified your studies to meet each of the following concerns addressed in that Opinion.

a. At times replacing the computed "net trends" for volume forecasts normally derived from forecast error analysis with a subjective estimate. (pages II-36-37).

b. The omission of forecasts of volumes for international mail, stamped envelopes, lock box/caller service, and various types of postal fees which are needed to develop satisfactory forecasts of postal revenues. (pages II-37).

c. The omission of an adequate quantitative description of the origins of the volume adjustment multipliers necessary to review and correct them if required. (pages II-40-41).

d. Use of unusual and ad hoc estimation techniques in place of generally accepted econometric methods such as multi-stage techniques to estimate "net trends", permanent income elasticities, several cross-price and cross-volume elasticities based upon prior information as if known with certainty, and "Z variables". (pages II-41-42).

e. Using seasonal indices derived by seasonally adjusting the residuals from a preliminary fit using the X-11 process that cannot perfectly separate the seasonal effects from the errors. (pages II-42-43).

f. Use of explanatory variables that cannot be directly measured and do not satisfy well-known standards for independent (explanatory) variables in least-squares estimations and other conventional econometric techniques. (pages II-43).

g. The use of ad hoc estimates, arbitrary assumptions and personal judgments, in the absence of data for new discount classes, to estimate the slope coefficients for 15 categories of automation discounts in first-class and third-class mail by measuring the response of the various automated mail streams to the changes in the automation rate discounts. (pages II-44-45).

RESPONSE:

When the Postal Rate Commission (PRC) handed down its decision in Docket No. R94-1, I carefully considered each of the PRC's comments on my testimony and

incorporated them into my work when I have felt it to be appropriate. Before addressing your specific questions about the PRC comments, let me state that in general the PRC comments sound more serious than they are, partly because of the aura in which they have been cast without perspective on their importance, and partly because several of the comments are either incorrect or are inappropriate for the task of volume forecasting.

The PRC's criticisms of my work in Docket No. R94-1 imply a divergence in view about the best postal forecasting methodology. In particular, the PRC seems to imply that forecasting can be a matter of fitting a standard econometric equation and inserting future values of independent variables into this equation to arrive at future predicted values. On the other hand, my belief -- shared by the Postal Service -- is that econometric estimation is only one of many sources of evidence throwing light on what the future holds. According to this view, forecasting is a matter of bringing together all available evidence, not simply econometric evidence, and making the best prediction possible based on all of the evidence. This view is more sharply evidenced in this case by the separation of volume forecasting, as attested to in my testimony, from econometric estimation, which is testified to by Thomas Thress in this case in USPS-T-7 but which was included as part of my testimony in previous rate cases. Mr. Thress specifically endorses the distinction between econometric estimation of demand equations and the development of volume forecasts in the following paragraph (USPS-T-7, p. 9, line 21 through p. 10, line 3):

> "In some cases, Dr. Tolley introduces additional non-econometric information in making volume forecasts. This is a necessary and prudent thing to do, particularly when this information is not available in the form of a quarterly time series amenable to introducing into an econometric demand equation. The demand equations presented and discussed in my testimony should be viewed therefore as providing a starting point for Dr. Tolley in making volume forecasts,

but should not be viewed as the end-all and the be-all in understanding mail volume behavior in the future."

This difference in view from that of the PRC about best postal forecasting methodology lies at the heart of much of the PRC's criticisms of my work in Docket No. R94-1. Believing that my view is correct, I have continued to rely on non-econometric information where useful, and I have not limited myself to textbook econometrics, when it is possible to do better as will be pointed out below. Having said this, let me go on to say that in my opinion it is desirable to include as many factors as possible in the econometric equations and to freely estimate as many elasticities as the data will allow. Consequently, I would agree with the PRC that it would be preferable to avoid the use of "net trends" and an undue use of "judgment" (as the term is used by the PRC) ***if possible***. I further believe that it is desirable to make as explicit and objective as possible the basis on which non-econometric evidence is introduced. I have made increasing efforts to do so.

Finally, I believe that it is important to remember that econometric investigation itself is nothing more than a series of judgments regarding which explanatory variables to include, which functional form to use, which data to rely upon, and, ultimately, even whether to engage in econometric analysis at all. The apparent distinction between "econometric" information and "subjective" information within the PRC's criticisms is only a semantic one, and one which is ultimately untenable if one is forced to forecast mail volumes in the real world.

a. I discuss my net trends on page 21 of my testimony at lines 5 through 25. For this case, I have made a concerted effort to limit my use of net trends and to rely upon objective calculations to derive net trends in those instances where they are used. Of particular note is the fact that net trends are not used in forecasting either First-Class

Mail, with the exception of private First-Class cards, or Standard mail, with the exception of parcel post mail. Both of these exceptions are made because the level of detail at which forecasts are made in these cases is finer than the level of detail at which the corresponding demand equations are modeled. Specifically, net trends are used to separate single-piece and workshared First-Class cards in the forecast period to reflect shifts between these two categories. Net trends are also used to separate inter-BMC, intra-BMC, and DBMC parcel post, reflecting differences in the growth patterns of these three categories of parcel post historically. In these and in all other cases where net trends are used by me in making forecasts, the net trends are calculated mechanically as described in my Appendix at page A-34, lines 5 through 12.

b. As in earlier cases, it was the Postal Service's decision in this case that I was not responsible for developing forecasts of international mail, stamped envelopes, lock box/caller service, and various types of postal fees. I understand that an explanation of the Postal Service's forecast for international mail was submitted in response to Presiding Officer's Information Request No. 1, 10(a). The volume of Post Office Boxes and Caller Service was presented in the testimony of witness Paul Lion in this case (USPS-T-24), while the forecasts for stamped envelopes, P.O. Box and caller service revenue, and postal fees were made by witness Susan Needham (USPS-T-39).

c. In response to this criticism, a more detailed description of the volume-adjustment multipliers used in this case has been made than was the case in the past. Volume-adjustment multipliers are made in this case for three reasons. First, volume-adjustment multipliers are applied to single-piece and workshared First-Class letters to reflect shifts in mail resulting from the implementation of classification reform on July 1, 1996. The derivation of these volume-adjustment multipliers are documented in my Technical Appendix, at page A-18, line 17 through A-21, line 26. Second, certified mail

volume is adjusted to remove merchandise return receipts from the base volume. This was done to conform to the PRC's forecast of certified mail in its MC96-3 decision. Finally, a series of small volume-adjustment multipliers were introduced into the forecast in 1997Q4 to reflect the impact of various proposals adopted by the PRC in their MC96-3 decision. These volume-adjustment multipliers are described in Library Reference LR-H-173, pp. 4-5.

d. This criticism on the part of the PRC appears to reflect the view that forecasting can be a relatively simple econometric exercise using a basic Ordinary Least Squares technique and including in the econometric (and, hence, forecasting) equations only variables which can be directly measured and which are amenable to inclusion in a quarterly time series regression. Even if I agreed with the PRC that volume forecasting ought to be solely an econometric exercise, which I do not, the PRC's criticism here of the so-called "ad hoc estimation techniques" employed to estimate permanent income elasticities, cross-price and cross-volume elasticities, and "Z variables" would be unwarranted.

The overall approach to econometric volume estimation in this rate case is summarized by witness Thress in his testimony at page 8, line 21 through page 9, line 20:

> "The primary source of information on mail volumes is the Postal Service's quarterly RPW reports. These data serve as the dependent variable in the demand equations developed and described in my testimony.
>
> In general, variables which are believed to influence the demand for mail volume are introduced into an econometric equation as a quarterly time series in which an elasticity of mail volume with respect to the particular variable is estimated, using a Generalized Least Squares estimation procedure that is described more fully in section III below.
>
> The estimation of elasticities with respect to certain variables may be problematic, however, in an isolated quarterly time series regression. Even if quarterly time series data exists on information, additional data may be brought into the regression process, including the result of independent regression procedures. The Household Diary Study provides an alternate source for

> modeling the relationship of mail volume with other factors. The Household Diary Study data provides cross-sectional, rather than time series, data. For certain mail relationships (e.g., modeling the effect of income on mail volume received by consumers), cross-sectional data lends itself more easily to evaluation and estimation than does time series data. In addition, the Household Diary Study provides a means of dividing mail within a particular subclass or rate category by content, sender, or recipient, in a way that is not possible with RPW data (e.g., distinguishing First-Class advertising mail from First-Class non-advertising mail). In selective instances, information was obtained from the Household Diary Study, and was then introduced in such a way as to continue to gather the maximum possible amount of information from the time series data themselves."

With the exception of net trends, which are discussed in more detail in my response to part a. of this interrogatory, the other so-called "ad hoc estimation techniques" employed in both R94-1 as well as in the current Docket are employed out of necessity due to multicollinearity between the independent variables, particularly between permanent income, other economic variables, and time, as well as between Postal prices across subclasses. The incorporation of outside information in such a case is a generally accepted method of dealing with such problems and is widely employed within the econometrics profession. For example, The Theory and Practice of Econometrics, 2nd edition, by George G. Judge, et al. (1985) makes the following assertion:

> "Once detected, the best and obvious solution to [multicollinearity] is to ... incorporate more information. This additional information may be reflected in the form of new data, a priori restrictions based on theoretical relations, prior statistical information in the form of previous statistical estimates of some of the coefficients and/or subjective information." (p. 897)

While the PRC's specific criticisms of my estimation techniques in R94-1 are unwarranted in my opinion, the specific justifications associated with each of the so-called "ad hoc estimation procedures" have been expanded in the present case, in the hopes of more adequately elucidating the importance and reasonableness of these

procedures.

The theory underlying the use of the permanent income variable is expanded upon significantly from the discussion in Docket No. R94-1. The theoretical underpinnings of the permanent income hypothesis are presented in witness Thress's testimony at page 117, line 3 through page 120, line 7. The calculation of the permanent income variable is described in detail at page 120, line 8 through page 121, line 12 of witness Thress's testimony. Finally, the estimation procedure used to estimate permanent income elasticities within the econometric demand equations is described by witness Thress at page 121, line 13 through page 122, line 16, at page 137, line 1 through page 139, line 19, and in Workpaper 2, "Estimation of Permanent Income Elasticities for Mail Categories from the 1994 Household Diary Study" accompanying Mr. Thress's testimony.

The Slutsky-Schultz symmetry condition used to constrain several cross-price elasticities is derived by Mr. Thress at page 142, line 14 through page 144, line 22 of his testimony. The application of the Slutsky-Schultz symmetry condition to Mr. Thress's econometric results is described at page 145, line 1 through page 146, line 13 of his testimony.

The estimation of the cross-price relationship between First-Class letters and Standard regular mail is presented in detail in Mr. Thress's testimony at page 26, line 3 through page 29, line 4. The estimation of the cross-volume relationship between First-Class letters and Standard bulk mail is described at page 23, line 7 through page 26, line 2 of Mr. Thress's testimony.

Finally, the theory underlying the use of "Z variables," the methodology used to calculate these variables, and the specific reasons for the inclusion of this variable where it was used in this case are found in Mr. Thress's testimony at page 149, line 1

through page 153, line 4. Z-variables are no longer included in the demand equations associated with First-Class letters, Standard regular, Standard ECR, and Standard bulk nonprofit mail due, in part, to a truncation of the sample periods associated with these equations to exclude the late 1970s and early 1980s. In addition, the price of computer equipment is introduced explicitly into the demand equation for Standard regular mail.

I agree with the PRC that it would be preferable to not have to include z-variables in the econometric equations, and I consider the removal of the z-variables in the forecasting equations for First-Class letters and Standard bulk mail to be an improvement in the current case. It appears to me that the PRC carries this position too far, however Specifically, it would be incorrect, if, as I interpret the PRC's comments, one were to insist that it would never be appropriate to include a z-variable in an econometric equation if its inclusion appreciably improves the resulting demand equation estimates and if justified on theoretical grounds, such as being suggested by the theory of market penetration.

e. The criticism of my use of the X-11 seasonal adjustment process has been made obsolete by the development and use of a new treatment of seasonality by witness Thress in this case. This seasonal adjustment process, which is described in detail in witness Thress's testimony (USPS-T-7) at page 123, line 7 through page 128, line 16, utilizes seasonal variables which are tied to the Gregorian (i.e., regular, 365-day) calendar rather than the Postal (i.e., 52-week, 364-day) calendar. By modeling seasonality as being driven by factors which are constant within the Gregorian calendar (e.g., Christmas), movements in the observed seasonal patterns of mail volumes are found to be explained predominantly by changes in the Postal calendar relative to the Gregorian calendar due to the difference in the length of these two calendars. Consequently, additional techniques for modeling movements in seasonality over time,

such as the X-11 procedure, are not needed.

f. This criticism appears to be redundant. The only variables mentioned in the paragraph to which I assume you refer (page II-43, para. 2121) are permanent income and the X-11 seasonal index, both of which are criticized in earlier paragraphs of the PRC's decision. Please see my responses to sub-parts d. and e. of this interrogatory for a discussion of these specific issues.

I am uncertain what is meant by the statement that these variables "do not satisfy well-known standards for independent (explanatory) variables." To the extent that this is meant to suggest that data are only to be used if taken unadjusted from an outside source I would object. It is neither unusual, nor unwise, to attempt to construct data, drawing on all available sources, which may fit a particular purpose. For example, Dr. Lester Taylor, in developing a demand equation for First-Class letters at the request of the PRC included in his equation "a proxy for the number of financial accounts [which was] constructed that is based on the M3 money supply and the amount of consumer installment credit outstanding ... deflated by the implicit deflator for GNP and then divided by the number of households." ("The Demand for First-Class Mail: An Econometric Analysis" by Lester D. Taylor, Review of Industrial Organization, 1993, vol. 8, p. 531). Examples of such constructed variables can be found in many published econometric analyses.

The assertion that the permanent income variable is unusual because it "cannot be known without error," fails to recognize that virtually all data, including widely-used economic statistics reported by the federal government, have some degree of error associated with them, insofar as these data represent statistical samples rather than pure measures. In addition, many of these variables are calculated using what could be called arbitrary assumptions, which may later be brought into question. For

example, there is much current debate over the appropriateness of the Commerce Department's current methodology for calculating the Consumer Price Index (CPI). Does this mean that the current CPI is still not the best available estimate of the price level of consumer goods in the U.S. economy?

g. The methodology used to forecast the use of automation and presortation is quite different in this case than in Docket No. R94-1, making the PRC's general criticisms in that case largely obsolete. The methodology used in this case, which is described in detail in section IV of witness Thress's testimony (pp. 160-230), is the same methodology used by me in Docket No. MC96-2, which was first introduced to the PRC by me in Docket No. MC95-1.

In its Opinion and Recommended Decision in Docket No. MC95-1, the PRC described this methodology as "sophisticated in its description of the economic behavior of mailers, yet mathematically elegant in its reduction of the behavior to simple formulas," (page IV-89, para. 4201) and noted that this "new share model is clearly superior as a theoretical construct to the share equations previously used by Postal Service witnesses." (p. IV-90. para. 4203).

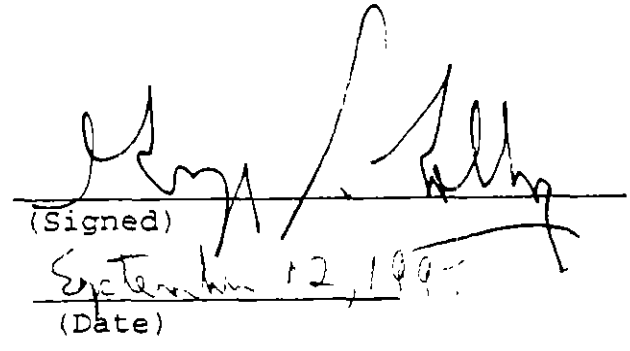
The PRC made two criticisms of the share equation methodology as employed in MC95-1. First, they noted that my definition of opportunity costs as "the benefit that would have been realized by using a ***more highly discounted*** category or categories," (USPS-T-16, p. A-151, emphasis added) was "defective." (PRC Op., Appendix E, p. 7). This was corrected in MC96-2 by introducing a "sophisticated 'two-way' street iterative model of opportunity costs, consistent with economic theory." (PRC Opinion and Recommended Decision, MC96-2, page 10).

Second, the PRC noted that I applied "an unusual mixture of econometric method, nonstatistical estimation and direct judgment," so that "[u]ltimately (and

probably inevitably), the parameter estimates are best characterized as the judgments of witness Tolley." (PRC Opinion and Recommended Decision, MC95-1, p. IV-90, para. 4203). The need to introduce nonstatistical estimation and direct judgment arose because of the significant changes being proposed in MC95-1 in worksharing requirements, for which there was no historical precedence. In contrast, classification reform has been in effect now for some time, so that the parameter estimates in the present case are all estimated econometrically.

DECLARATION

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



(Signed)

September 12, 1997

(Date)

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.

Eric P. Koetting

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September 17, 1997