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BEFORE THE

UNITED STATES OF AMERICA POSTAL RATE COMMISSION

WASHINGTON, D.C. 20268-001

Documentation of Statistical Analyses, 1989 Docket No. RM89-3

In Response to the Second Notice of Proposed Rulemaking

COMMENTS OF

THE STAFF OF THE BUREAU OF ECONOMICS OF THE

FEDERAL TRADE COMMISSION[1]

(submitted June 13, 1989)

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[1] These comments represent the views of the staff of the Bureau of Economics of the Federal Trade Commission. They are not necessarily the views of the Commission or any individual Commissioner. Questions about these comments may be addressed to John C. Hilke, Federal Trade Commission, Bureau of Economics, 6th Street and Pennsylvania Avenue, N.W., Washington, D.C. 20580, telephone: (202) 326-3483.

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I. INTRODUCTION

The staff of the Bureau of Economics of the Federal Trade Commission (FTC) appreciate the opportunity to submit these additional comments to the Postal Rate Commission (PRC) concerning the PRC's proposals to improve documentation of statistical analyses that underlie its rate and service decisions.[2] We limit these supplemental comments to (1) sensitivity tests and (2) the track record of Postal Service forecasting models in response to the PRC's request for more specific proposals concerning our initial suggestions submitted on April 24, 1989. In what follows, we now provide more specific proposals designed to offer substantial benefits in return for relatively modest costs.

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[2] The initial notice of proposed rulemaking and invitation to comment were published in the Federal Register, Vol. 54, No. 44, on March 8, 1989 at pages 9848-9852. The second notice of proposed rulemaking and invitation to comment were published in the Federal Register, Vol. 54, No. 98, on May 23, 1989 at pages 22317-22324.

II. EXPERTISE OF THE STAFF OF THE FEDERAL TRADE COMMISSION

The FTC is an independent regulatory agency responsible for maintaining competition and safeguarding the interests of consumers.[3] The staff of the FTC Bureau of Economics,[4] upon request by federal, state, and local government bodies, often analyze regulatory or legislative proposals that may affect competition or the efficiency of the economy. In the course of this work, as well as in antitrust and consumer protection research and litigation, the Bureau of Economics staff frequently present econometric and other statistical evidence and evaluate similar evidence presented by other parties.

We have commented previously on various issues before the PRC, including: (1) use of a single set of rate hearings to establish a series of United States Postal Service (USPS) rate changes;[5] (2) elaboration of competition issues inherent in proposed rate and classification changes related to electronic computer originated mail (ECOM);[6] (3) drawbacks to a proposed modification of the test period for cost recovery in ECOM;[7] (4) advantages of setting ECOM rates to cover full costs;[8] (5) costs and benefits

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[3] See 15 U.S.C. Section 41 et seq.

[4] Staffs of other FTC bureaus also file comments separately or jointly with the staff of the Bureau of Economics.

[5] PRC Docket No. MR82-3, filed November 4, 1982.

[6] PRC Docket No. R83-1, filed June 1, 1983.

[7] PRC Docket No. R83-1, filed June 16, 1983.

[8] PRC Docket No. R84-1, filed December 23, 1983.

of current preferred mail rates;[9] (6) expedited procedures in reviewing proposed rate changes for Express Mail;[10] (7) a complaint urging a study of the possibility of exempting addressed third class mail from the private express statutes;[11] and, most recently, (8) the PRC's original proposed regulations to improve documentation of statistical analyses.[12] Several of our comments have referenced the PRC's difficulties in reaching informed decisions on postal rates and services because of the lack of sufficient accessible data on the demands for and costs of different postal services.

III. THE PRESENTATION OF STATISTICAL ANALYSES

A. Introduction

For statistical analyses to provide information objectively and efficiently to the PRC for use in its rate and service decisions, participating statistical analysts should explain clearly what they did and why, and the sources and characteristics of the data on which they have relied.[13] Further, statistical results should be replicable, particularly if the

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[9] PRC Docket No. SS86-1, filed April 20, 1986.

[10] PRC Docket No. RM88-2, filed October 14, 1988.

[11] PRC Docket No. C89-1, submitted February 28, 1989.

[12] PRC Docket No. RM89-3, filed April 24, 1989. The present comments of the FTC staff follow up on the April 24th comments.

[13] See Leamer, E., "Sensitivity Analyses Would Help," American Economic Review 75:3 (June 1985), pp. 308-313. Also see McAleer, M., A. Pagan, and P. Volker, "What Will Take the Con Out of Econometrics?," American Economic Review 75:3 (June 1985), pp. 293-307.

PRC is to place substantial confidence in them.[14] Documentation and replication are central to the scientific method, and no less should be expected from the statistical analyses presented to the PRC. We thus support the PRC's efforts to insure that the statistical analyses on which the PRC is expected to rely adhere to these criteria. At the same time, the PRC recognizes that unnecessary and arbitrary restrictions on the presentation of statistical results could discourage analysis and reduce the amount of useful information available to the PRC.[15] We believe that the PRC's current proposal makes appropriate allowance for this concern.

In addition to adopting its current proposed rules, the PRC may wish to consider new rules pertaining to two additional aspects of statistical analysis, specifically, sensitivity tests and assessment of the track record of postal service forecasting models. The PRC's notice indicates its agreement in principle with our previous comments on these topics, and indicates an interest in further comments.[16]

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[14] Statistical results are replicable if other analysts obtain the same results when they employ the same data and procedures. Dewald, W., J. Thursby, and R. Anderson, "Replication in Empirical Economics: 'The Journal of Money, Credit, and Banking' Project," American Economic Review 76:4 (September 1986), pp. 587-603.

[15] For example, the PRC proposes that requests to the USPS from interested parties for additional statistical analyses be restricted to plausible alternative assumptions, rather than to all potential alternatives.

[16] Federal Register, Vol. 54, No. 98 (May 23, 1989), pp. 22317-22324.

B. Sensitivity Tests

There are many sensitivity tests that can aid in assessing the robustness of econometric results and the PRC could require that results for several of these be presented.[17] If the PRC wishes to restrict its sensitivity test requirements to a few relatively simple tests that are likely to entail modest cost and to be prepared in the normal course of standard econometric practice, the PRC may wish to require the three types of tests noted below. Interested parties in the rate hearings might reasonably be expected to routinely request the results of these tests if they were not required as part of the original submissions.[18] All of these tests are

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[17] Results are robust if slight changes in the data sample, variables, and/or statistical techniques do not substantially alter the results. These changes may be termed sensitivity tests. The goal of sensitivity testing is to show that "minor changes in the list of variable (and other similar minor adjustments) do not alter fundamentally the conclusions ..." Leamer, E., "Sensitivity Analyses Would Help," American Economic Review 75:3 (June 1985), p. 308. Unless results are robust, little confidence can be placed in them.

A list of widely used tests of the adequacy of econometric models (in addition to those described below) is shown, for example, on page 304 in McAleer, M., A. Pagan, and P. Volker, "What Will Take the Con Out of Econometrics?," American Economic Review 75:3 (June 1985), pp. 293-307.

Since standard econometric practice may evolve with changes in computer technology and advances in econometric techniques, the PRC may wish to assure that its rules on sensitivity testing are periodically updated by providing a "sunset" provision for these rules. This may help to avoid persistent application of outmoded requirements in the future.

[18] Interested parties would be able to make such requests under proposed rule 31(k)(2)(iii)(d). We believe that the cost and duration of the PRC examination of statistical analyses may be reduced by initially requiring these sensitivity tests rather than waiting for interested parties to initiate procedures under rules 31(k)(2)(iii)(d) to secure the results of such tests.

We note that sensitivity tests beyond the standard set discussed below could be requested by interested parties, if such additional testing seemed warranted by special circumstances.

frequently part of standard econometric practice and should not be costly to perform.[19]

Deletion of variables: The PRC could request that econometric tests be rerun deleting a different explanatory variable in each computer run until each variable has been omitted in one run. The resulting range of parameter estimates could then be reported.[20]

Deletion of data: The PRC could request that econometric tests be rerun deleting a proportion of the observations randomly selected from the entire set. The correct proportion of observations to be deleted is indeterminate, but in general is typically a substantial part of the whole. The PRC could consider a rule arbitrarily requiring that at least 10% of the sample be deleted.[21]

Alternative forms of the variables: The PRC could request that econometric tests be rerun using alternative forms of the variables. Traditionally, alternative forms have included the natural logarithm and squared transformations of the variables. One approach would be to require one regression run in which all variables are considered in natural logarithm

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[19] These sensitivity tests can be readily and inexpensively conducted with modern computer technology. The analyst typically makes the necessary changes in the model, translates these changes into computer commands, reruns the regression program, and makes the appropriate comparison between the initial results and the results for the revised model.

[20] This test represents a simplified approximation of the global sensitivity approach described in Leamer, E., "Sensitivity Analyses Would Help," American Economic Review 75:3 (June 1985), pp. 308-313.

[21] A more exacting and complex procedure for such partitioning of a data sample is termed the "jackknife" technique. See Efron, B., The Jackknife, the Bootstrap, and Other Resampling Plans, Philadelphia, Pa.: Society for Industrial and Applied Mathematics, 1982.

form and another run in which explanatory variables are included in both their original and squared forms.[22]

C. Track Record for Postal Service Forecasting Models

Section 3001.54 of the PRC's current proposed rules provides specific requirements for forecasts of postal demand.[23] Assessment of the reliability (or bias) of these forecasting models may be facilitated by requiring that the USPS also submit econometric analyses indicating (1) the accuracy of previous USPS models in predicting actual demand, (2) the accuracy of the current USPS models in predicting past changes in demand, (3) forecasts for future demand using previous USPS models rather than the current models.

Although we understand that the USPS may create its forecasting models only for the PRC's omnibus rate hearings and that the models have changed considerably from hearing to hearing,[24] we do not believe that this

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[22] An exception to this rule must be available when the transformation will result in undefined values. For example, a natural logarithm transformation of a dummy (0 or 1) variable would be undefined whenever the original variable takes the value of zero.

[23] Although this section applies explicitly to the USPS's demand forecasts, the PRC may wish to require similar information if forecasting models are submitted by other parties.

[24] The PRC notes discontinuities in adjustments to and application of the USPS's demand forecasting models, observing that the demand forecast models have "only been implemented three times ..." to the best of the PRC's knowledge. Notice at p. 22223. As additional omnibus rate hearings take place, additional applications will be available for purposes of comparison. This should make the assessment of the track record of the models more informative over time.

obviates the potential usefulness of examining the track record of the USPS's demand forecasting models.[25] In particular, the estimations of the models discussed below should help the PRC to identify persistent biases in the demand forecasts, major effects on the demand forecasts of changes in the specifications, improvements in the accuracy of the demand forecasts over time, and explanatory variables that have been particularly critical to the accuracy of the demand forecasts. Arguably, the importance of assessing the track record of the USPS's demand models is increased rather than diminished by the fact that the models are not maintained and applied on a continuous basis.[26]

We do not believe that requiring econometric analyses sufficient for a modest review of this track record would be particularly costly to the USPS since most of the necessary data should be readily available and no new econometric modeling would be required.

One informative approach to establishing the track record of USPS demand forecasts might consist of comparisons between the USPS's forecasts produced at previous hearings and the forecasts that would have been

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[25] Even if there were only two implementations of the forecasting model, comparisons between the models could still be critical in identifying and understanding the practical effects of changes in assumptions, variables, and techniques.

[26] Intermittently maintained and applied models may be more susceptible to ad hoc and idiosyncratic adjustments that have little predictive power, but which give the models explanatory power with respect to one set of recent data. Long-term continuous modeling efforts may be less susceptible to such questionable adjustments because forecasts are regularly contrasted to actual events. When forecasts are regularly assessed, ad hoc and idiosyncratic adjustments that add little to the long-term accuracy of the models can be more effectively identified and deleted.

produced if the current specifications of the USPS's demand forecasting models had been in place in each of the prior omnibus rate hearings. Forecasts (based on the new and old specifications) could also be contrasted in each of these instances with actual demand. During the 4th rate hearings (as yet unscheduled), for example, the then current specifications of the demand forecast models will be applied to then current data to produce the new demand forecasts proposed by the USPS.[27] The following comparisons could then be made:

a. Current specifications of the demand forecast models applied to data from the previous omnibus hearings (3rd hearings). This would produce forecasts to compare with the forecasts presented by the USPS at the third hearings (which used the specifications and data from the 3rd hearings). The forecasts using the new specifications and 3rd hearing data also could be compared with actual demand observations after the third hearings.

b. Current specifications of the demand forecast models applied to data from the 2nd hearings. This would produce forecasts to compare with the forecasts presented by the USPS at the second hearings (which used the specifications and data from the second hearings). The forecasts using the new specifications and 2nd hearing data also could be compared with actual demand observations after the second hearings.

c. Current specifications of the demand forecast models applied to data from the 1st hearings. This would produce forecasts to compare with the forecasts presented by the USPS at the first hearings (which used the specifications and data from the first hearings). The forecasts using the

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[27] In all cases, the USPS and other interested parties could be invited to supply evaluations of differences in results for different models and different time periods.

new specifications and the 1st hearing data also could be compared with actual demand observations after the first hearings.

Another avenue of inquiry might be to compare the current forecasts with forecasts produced by applying each of the previous specifications of the USPS's forecasting models to current data. During the next omnibus rate hearings the following comparisons could be made:

d. Specifications of the demand forecast models from the third hearings applied to current data to produce demand forecasts to compare with the USPS's new demand forecasts.

e. Specifications of the demand forecast models from the second hearings applied to current data to produce demand forecasts to compare with the USPS's new demand forecasts.

f. Specifications of the demand forecast models from the first hearings applied to current data to produce demand forecasts to compare with the USPS's new demand forecasts.

IV. CONCLUSION

The PRC's proposals to improve documentation of statistical analyses appear to be well conceived and in our view may result in substantial improvements at modest cost. In two areas, the PRC may wish to consider certain additional proposals which we believe may also provide substantial benefit at relatively modest cost.

In the area of sensitivity tests, we have identified a number of tests that we believe could supply important information about the robustness of statistical analyses presented to the PRC. In general, these tests are relatively simple and inexpensive to perform. Further, we believe that analysts are likely to have performed them in the normal course of statistical investigation. Finally, costs and delays might be decreased since other interested parties should now find it unnecessary to independently request the results of these common tests for robustness.

In the area of assessing the track record of the USPS's demand forecasts, the PRC may wish to require a relatively simple and low cost set of comparisons that may provide important insights about features and changes in the USPS's demand forecasting models.