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 BRADLEY (USPS-T-14) TO INTERROGATORIES OF DIRECT MARKETING ASSOCIATION, INC. (DMA/USPS-T14-47-50 AND 52-59)

The United States Postal Service hereby provides responses of witness Bradley (USPS-T-14) to the following interrogatories of Direct Marketing Association, Inc.: DMA/USPS-T14-47-50 and 52-59, filed on September 17, 1997. Interrogatories DMA/USPS-T14-46 and 51 were redirected.

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

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

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Response of United States Postal Service Witness Bradley
to
Interrogatories of DMA

DMA/USPS-T14-46. Please refer to your response to DMA/USPS-T14-20b(ii)(a).

(a) What proportion of mail processing labor hours is spent clocked into operations during temporary equipment breakdowns lasting ten minutes or less? Please specify by craft, CAG, and MODS operation code.

(b) What proportion of mail processing labor hours is spent clocked into operations during temporary equipment breakdowns lasting more than ten minutes? Please specify by craft, CAG, and MODS operation code.

DMA/USPS-T14-46 Response:

This interrogatory has been redirected.

Response of United States Postal Service Witness Bradley
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DMA/USPS-T14-47. Please refer to your response to DMA/USPS-T14-20b(ii)(d).

a. Please explain what you meant by "HOCR and TOCR would not be affected."

b. Please confirm that the value ascribed to TOCR would be unaffected while that ascribed to HOCR would be larger by N times the length of additional time that it took to complete the sortation of the mail due to the breakdown (i.e., as a result of having to wait for the OCR to be fixed, move the mail to another machine, etc.). If not confirmed, please explain.

DMA/USPS-T14-47 Response:

a. I meant that if the breakdown was temporary and productive work (sweeping bins and loading ledges, etc.) could continue, then the amounts recorded for HOCR and TOCR would be unchanged.

b. Not confirmed. Although it is impossible to be specific without knowing about the nature of the breakdown, according to my understanding of the process, I can think of outcomes in which HOCR is increased, decreased, or stays the same. I can think of outcomes in which TOCR is decreased or stays the same. To try to illustrate my thinking consider the following three scenarios.

Scenario I: Breakdown is temporary, productive work continues during breakdown, no additional time is necessary to complete the sort scheme. Under this scenario, TOCR and HOCR would be unchanged.

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Scenario 2: Breakdown is temporary, productive work is slowed, so additional tiime is required to complete the sort scheme. Under this scenario, HOCR would rise, but TOCR remain the same.

Scenario 3: Breakdown is more long-lasting, mail must be moved to another activity to complete the sorting. Under this scenario, HOCR would fall and TOCR would fall.

Incidentally, I have no empirical data as to which of these hypothetical outcomes happens more often.

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DMA/USPS-T14-48. Please refer your response to DMA/USPS-T14-22, bearing in mind that the question referred you to your discussion of the choice of the *dependent variable* in a cost function.

a. Confirm that in common English parlance, the term "cost" refers to magnitudes of value denominated in dollars (or other currency units), not work hours or other "quantity" units. If you do not confirm, please explain.

b. Confirm that in the economic theory of production, the term "cost" refers to magnitudes of value denominated in dollars (or other currency units), not work hours or other "quantity" units. If you do not confirm, please explain.

c Confirm that the economic theory of production derives the cost function from the behavioral model of a firm minimizing its costs subject to the wages, prices, and technical possibilities it faces. If you do not confirm, please explain.

d. Confirm that the results of the cost-minimization exercise described in subpart c. include a cost function of the general form $C=f(p,w,Q)$, where C is the minimum cost of producing the desired quantity (or quantities) of the relevant good(s) and/or service(s), Q is said desired quantity (quantities), $f(.)$ is a function, p represents the relevant input price(s), and w represents the relevant wage(s). If you do not confirm, please explain.

e. Do you believe that the U.S. Postal Service strives to minimize its costs:
   (I) In its mail processing operations?
   (ii) In its other activities?
   Please explain fully.

DMA/USPS-T14-48 Response:

First, please let me make a slight correction in your question. DMA/USPS-T14-22 refers to my discussion of the choice of dependent variable in a cost equation not a cost function. I make this correction not to quibble with your question or mince words. Because cost equations are quite different than cost functions, I was careful to try always to couch the discussion of my econometric equation in terms of cost equations. A cost function is

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derived from the cost minimization process that you describe below. A cost equation is not A cost equation is simply an equation relating cost to its cost driver in a way that presumes the existence of a reasonably well-defined set of operating procedures used to process mail. It does not require or depend upon cost minimization.

a. Being an economics professor, I may not be the best source of "common English parlance" for economic terms. (My profession is well known for using terms somewhat differently than the general public.) I do agree, though, that when most people think of the term cost, they think of dollar or "nominal" cost. However, this is not typically what economists think of as cost. Economists tend to think about "real resource" or "opportunity costs."

b. Not confirmed. The theory of production is concerned with the real resource cost. While there are many cases in which the real resource is accurately captured by traditional dollar costs, there are also instances when it is not. For example:[1]

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[1] See, Arthur A. Thompson, Jr., Economics of the Firm: Theory and Practice, 4th ed., Prentice Hall, 1985 at 242.

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> Mention of the word *cost* immediately conjures up the thought of "money outlays." In the context of business operations, costs are commonly viewed as a firm's actual or historical expenditures for resource inputs. However, for many decision purposes historical costs are of limited significance.

One such instance would be when the opportunity costs deviate from the dollar costs:[2]

> [F]or some purposes the best measure of the true economic worth (cost) of a resource input may be the resource inputs' opportunity costs rather than the dollar outlays for the input appearing in historical accounting records.

I understand the point of this question to argue that my use of hours instead of dollar costs in the mail processing cost equations is somehow at variance with standard economic practice. And I would readily concede that most empirical estimates of cost functions use some measure of dollar costs as the dependent variable. I would note, however, that the instant analysis is different for two important reasons, each of which justifies the use of hours. First, as you indicate in a subsequent question, dollar costs are a function of both the amount of output (or the cost driver) and input prices. Thus, total dollar cost in a mail processing

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2 Id. At 244.

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activity could increase either because volume was rising or because input prices (wages) have increased. Because there is no measure of wages paid at individual sites for individual mail processing activities, the best way to control for potentially misleading wage effects is to strip them out by using hours instead of costs. This brings us to the second reason. The motivation behind estimating the econometric equations is measuring volume variability, the percentage response in cost to a given small sustained percentage increase in volume. As I showed in my response to OCA-T14-24, when variations in wages are accounted for, the use of hours and dollar costs are equivalent for measuring volume variability.

c. Confirmed.

d. Confirmed.

e. I have not studied whether or not the Postal Service minimizes its cost. As pointed out earlier in this response, such an assumption is not required for measuring volume variability.

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DMA/USPS-T14-49. Please refer to Table 7 of your direct testimony.

a. Confirm that the coefficient on "Manual Ratio" is negative and statistically significant in the Manual Letters, Manual Flats, and LSM cost pool regressions.

b. If subpart (a) is confirmed, please provide a qualitative interpretation of these results; since you interpret the manual ratio as an indicator of "the average quality of the mail remaining in the manual activities," please address what would appear to be an anomalous result. If subpart a is not confirmed, please explain.

c. Confirm that the coefficient on "Time Trend 1" is negative and statistically significant, and the coefficient on "Time Trend 2" is positive and statistically significant, in the Manual Letters, OCR, BCS, LSM, and FSM cost pool regressions.

d. If subpart c. is confirmed, please provide a qualitative interpretation of these results. If subpart c. is not confirmed, please explain.

e. Confirm that the coefficients on "Time Trend 1" and "Time Trend 2" are positive and statistically significant in the SPBS and Manual Priority cost pool regressions.

f. If subpart (e) is confirmed, please provide a qualitative interpretation of these results. If subpart (e) is not confirmed, please explain.

DMA/USPS-T14-49. Response.

a. Confirmed.

b. I don't think the result is anomalous, although my explanation of it may not have been as clear as it could have been. As more and more mail is diverted to automation, the mail stream for manual (and LSM) activities becomes dirtier. Thus,

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mail quality falls. An increase in automation thus implies a decline in the manual ratio and a decline in mail quality in the manual operations. This decline in mail quality means that more hours are required for the same number of TPH — hence the negative coefficient.

c. Confirmed.

d. The negative coefficient for Time Trend 1 would mean that there was an autonomous decline in hours in these activities in the 1988-1992 period and a positive coefficient for Time Trend 2 would mean that there was an autonomous increase in hours in these activities for the 1993-1996 period.

e. Confirmed.

f. A positive coefficient for both Time Trend 1 and Time Trend 2 means that there was an autonomous increase in hours in both periods.

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DMA/USPS-T14-50. Please refer to your response to DMA/USPS-T14-24b, which suggests that inclusion of a trend variable in your mail processing cost equations "could pick up...autonomous changes in the quality of the labor force, improved efficiency of the *machinery, or more effective integration of the machine into the operating system....*"

a. Could a trend variable also pick up variations over time in the numbers of excess workers clocked into an operation, assuming such a phenomenon exists? (In answering, please bear in mind that surplus labor in an operation need not be manifested by workers being obviously "idle": another possible manifestation could be, e.g., excessive breaks and personal time as a percentage of total hours clocked into an operation.)

b. In light of the results cited in subpart c. of DMA/USPS-T14-49, is it likely that the coefficient on Time Trend 2 reflects improvements in the quality of the labor force, the efficiency of the machinery used, or the integration of said machinery into the operating system over the FY93-FY96 period in the Manual Letters, OCR, BCS, LSM, and FSM cost operations? Please explain whether the coefficient might also reflect increases over time in the number of excess workers clocked into these operations.

c. In light of the results cited in subpart (e) of DMA/USPS-T14-49, is it likely that the coefficients on Time Trend 1 and Time Trend 2 reflect improvements in the quality of the labor force, the efficiency of the machinery used, or the integration of said machinery into the operating system over the FY88-FY96 period in the SPBS and *Manual Priority operations*? *Please explain whether the coefficient might also* reflect increases over time in the number of excess workers clocked into these operation.

DMA/USPS-T14-50 Response:

a. I'm not conceding that such a phenomenon has occurred, but if it did, a time trend term would be a good way of controlling for it in an econometric regression and not letting it influence the estimation of volume variability.

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b. The factors that you describe would more likely be associated with negative coefficients on a time trend (like for Time Trend 1). I'm not conceding that the phenomenon you propose has occurred, but if it did, a time trend term would be a good way of controlling for it in an econometric regression.

c. The factors that you describe would seem to be more likely be associated with negative coefficients on a time trend (like for Time Trend 1). I'm not conceding that increases over time in the number of excess workers clocked into these activities occurred, but if it did, a time trend term would be a good way of controlling for it in an econometric regression and not letting it influence the estimation of volume variability.

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DMA/USPS-T14-51. Please refer to page 25 of your direct testimony, Library Reference H-148 at page H148-4, and your response to DMA/USPS-T14-26a, all of which emphasize the "great value" MODS brings to your econometric analysis because it is an "operational data set...used for management decisions." Please list all Postal Service planning and management functions or decisions you are aware of which rely, or have relied, on MODS data, and describe the role(s) MODS data plays (or played) in each.

DMA/USPS-T14-51

This interrogatory has been redirected.

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DMA/USPS-T14-52. Please refer to your response to DMA/USPS-T14-28. Did you experiment with inclusion of a time-trend interaction terms in your allied activities regressions? If so, please provide the regression log and listing files from these runs.

DMA/USPS-T14-52 Response:

No.

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DMA/USPS-T14-53. In preparing the regression results that you reported in your direct testimony, did you experiment with any specifications that omitted lagged piece handlings, the manual ratio, or both? If so, please provide the regression log and listing files from all such runs.

DMA/USPS-T14-53 Response:

No.

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DMA/USPS-T14-54. In preparing the regression results that you reported in your direct testimony, did you experiment with any specifications that used a functional form other than the translog? If so, please provide the regression log and listing files from all such runs.

DMA/USPS-T14-54 Response:

No.

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DMA/USPS-T14-55. Please refer to your response to DMA/USPS-T14-29b, where you state that the goal of your research was "to estimate the volume variability for a single national cost pool for each activity."

a. Please confirm that by "national cost pool" you meant the aggregate costs (i.e., work hours) for all facilities that perform mail processing activities within each cost pool. If you do not confirm, please explain.
b. Please confirm that, for a given cost pool, the set of observations in your data set from any one facility reflects the work hours and associated total piece handlings not of the entire "national cost pool," but rather of a component thereof. If you do not confirm, please explain.
c. Confirm that the costs (i.e., work hours) for the "national cost pool for each activity" may be obtained by aggregating work hours for said activity over all facilities within a cost pool by AP, that the total piece handlings for the "national cost pool for each activity" may be obtained in similar fashion, and that the manual ratio for the "national cost pool for each activity" may obtained by aggregating the numerator and the denominator values of said ratio over all facilities within a cost pool by AP and then forming the ratio for each AP and cost pool. If you do confirm, please provide any weights or other ancillary information necessary to properly aggregate across facilities within a cost pool. If you do not confirm, please explain.
d. Did you run any mail processing labor cost (i.e., work hours) variability regressions using aggregate time series data on hours and piece handlings rather than the panel data you used for the analysis you presented in your direct testimony? If so, please provide the log and listing files from all such runs.

DMA/USPS-T14-55 Response:

a. Confirmed.

b. If the question is asking if the hours and piece handlings for any activity at one facility is less than the total national hours and piece handlings for that activity, then I confirm.

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c. For a particular activity, in a given AP, one could certainly aggregate the hours across facilities to come up with an estimate of the national hours for that activity for that AP. The result would be an aggregate time series for hours. One could aggregate piece handlings in a similar manner. The result would be an aggregate time series for piece handlings. One could calculate an aggregate manual ratio by the method you suggest, but whether or not the aggregate manual ratio is meaningful is less clear to me and would take further study.

d. With the exception of the Registry activity, I did not. The aggregate time series approach suffers from two difficulties. Not all sites report hours and piece handlings in each accounting period, so some care would have to be taken to make sure the aggregate accounting period values were comparable through time. Second, the aggregate time series approach reduces the maximum number of observations for any activity to 117 (9 years times 13 accounting periods per year). This is a tremendous reduction in information. For example, in the manual letter activity this would reduce the number of observations used to estimate the coefficients from 25,090 to (at most) 117.

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DMA/USPS-T14-56. Please refer to pages 41-42 of your direct testimony, and to your response to DMA/USPS-T14-30a.

a. Confirm that, to generate the OLS residuals used in the GNR regressions to test for site-specific effects, you regressed the mean-centered natural logarithm of work hours on the mean-centered natural logarithm of total piece handlings and its square, the mean-centered natural logarithm of the manual ratio and its square, and the interaction of the logarithms of the mean-centered piece handlings and manual ratio variables, thereby omitting the time trends, AP dummies, and the lagged piece handling variables. If you do not confirm, please explain.

b. Which omitted variables listed in subpart (a) "account for [the] facility-specific effects" mentioned in your response?

c. Is it a fair characterization of the method used to generate the parameter estimates reported in Tables 1 and 7 to say that the fixed facility-specific effects were "swept out" of the data, and not considered further except insofar as they shifted the individual facility intercept terms up or down? If not, please explain fully.

d. If your response to subpart c. is anything other than an unqualified "no," please explain how any of the included variables in your final model "account for" the facility-specific effects.

DMA/USPS-T14-55 Response:

a. Almost confirmed. The OLS estimation used for the GNR regressions also embodied the site-specific dummy variables used in the fixed effects model to control for site-specific effects.

b. The site-specific dummy variables used in the fixed-effects model to control for site-specific effects.

c. As explained on page 40 of my testimony, the fixed effects method includes a set of site-specific dummy variables that are used to control for non-volume site-specific

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effects. As you describe it in the question, this provides an intercept dummy for each of the facilities. However, when there are many cross sectional units, it is computationally inconvenient to recover the site-specific dummy coefficients. An alternative but exactly equivalent method the obviates the need for recovering the hundreds of individual coefficients, is to "sweep out" the site-specific effects. The phrase that the facility-specific effects are "not considered further" seems to suggest that they were not properly considered in the estimation. I think that that characterization is unfair. It is in the estimation of the volume variability that one must control for the facility-specific effects regardless of the whether the dummy coefficients are estimated explicitly or they are "swept out."

d. Suppose, for example, that a particular site is more productive than others, at any level of volume, because it is blessed with extraordinarily good weather and thus highly motivated workers. This favorable condition would cause its productivity to be higher at all levels of volume, as compared to other sites. A facility-specific dummy variable would control for this non-volume effect by estimating a negative coefficient for its dummy variable, controlling for the fact that a given amount of volume takes fewer hours at this site as compared to other sites.

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DMA/USPS-T14-57. Please refer to your response to DMA/USPS-T14-30b and confirm that "the point of the GNR procedure" you performed was to test for the presence of facility-specific fixed effects, not "to test if the variables [listed in DMA/USPS-T14-56 subpart (a) as having been omitted] should be included in the final specification." If you do not confirm, please explain.

DMA/USPS-T14-57.

Not confirmed. Because time-period-specific effects are controlled for by the time trends and AP dummies and because facility-specific effects are controlled for by the facility-specific dummy variables, the two phrases mean the same thing.

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DMA/USPS-T14-58. In witness Moden's response to DMA/USPS-T14-1, he stated that Postal managers at mail processing facilities generally have "adequate flexibility to size the workforce to the work-load": *within a shift*, by clocking out Casual and Part-Time Flexible employees, polling Full-Time Regular employees for those willing to take Annual Leave or Leave Without Pay, or rescheduling non-pref volumes for immediate processing; *within an AP*, by planning "week-by-week their estimated casual and Part Time Flexible needs;" and *over the course of a year*, through attrition and "contractual provisions for reassignment and termination."

a. Were you provided with witness Moden's expert opinion prior to specifying and estimating your variability regressions, similar to the presentation to you of exogenous information about the "fundamental restructuring of Postal Service operations in FY 1993" as noted on page 15, lines 13-14, of your direct testimony?

b. If your answer to subpart (a) is "no," would you have included a lag term in total piece handlings if you had been? Please explain your response fully. If your answer to subpart (a) is "yes," please explain fully your reasons for including a lag term in total piece handlings despite Moden's response.

c. Please refer to your response to DMA/USPS-T4-33, subpart c., where you state that "examination of the coefficients on the contemporaneous and lagged terms shows how much of the adjustment takes place in current period and how much takes place in the subsequent period." Please confirm that the figures contained in the following table are the lagged piece handling coefficients as a percentage of their corresponding current piece handling coefficients, based on Table 7 of your direct testimony:

MODs Sorting Operation	Lagged TPH Coefficient As Percent of Current TPH Coefficient
Manual Letters	3.3
Manual Flats	15.8
OCR	25.2
BCS	22.2
LSM	4.1
FSM	17.6
SPBS Priority	29.5
SPBS Non-Priority	26.5
Manual Priority	11.1

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Manual Parcels	31.7
Cancel & Mtr. Prep	15.7

If not confirmed, please provide the correct figures.

d. Based upon your response to subpart (c), do you find any contradiction between your econometric results and Moden's response concerning the applicability of a lagged TPH coefficient? Please explain your response fully.

e. In light of witness Moden's response, how would you explain your finding of large, statistically significant lagged effects for a number of MODS operations?

f. Please discuss the possible existence of other possible phenomena besides staffing rigidities that might explain the significant lagged terms in your regressions. In responding, please consider (but do not limit yourself to) both statistical issues (e.g., misspecification of the functional form, failure to adequately model the error structure, failure to include one or more regressors in the model) and managerial/operational issues (e.g., misreporting of MODS data, workers being clocked into operations that they are not really working on, use of outdated or incorrect conversion factors).

DMA/USPS-T14-58 Response:

For the sake of accuracy, it is probably worthwhile repeating witness Moden's complete answer to say, part b. of DMA/USPS-T14:

> Certainly there are limits. Our managers understand that mail volume varies day-by-day throughout the month, and they plan week-by-week their estimated Casual and Part Time Flexible needs. This ability to reduce Casual and Part Time Flexible schedules generally provides sufficient flexibility to size the workforce to the workload. (Emphasis added).

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Please note the Witness Moden does not argue that there is unlimited or instantaneous flexibility. Moreover, there is nothing in witness Moden's statement inconsistent with the less-then-perfect adjustment in the workforce suggested by a one-period lag.

a. No. However, I was provided with the expert opinion of other Postal Service mail processing experts before specifying the equations and I was provided with witness Moden's expert opinion before finalizing my testimony.

b. Yes. There is nothing in witness Moden's response that argues against including a single period lag. As witness Moden pointed out, there are limits to the adjustment of the workforce to changes in workload. An appropriate way to test for the significance of those limits is by including a lagged term for workload.

c. I confirm your calculation, but I think the ratio you calculate is a bit misleading. For example, suppose I simply reversed the ratio, so that I calculate the current TPH coefficient as a percent of the lagged TPH coefficient:

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MODS Sorting Operation	Current TPH Coefficient as a Percent of the Lagged TPH Coefficient.
MANUAL LETTERS	3038.6%
MANUAL FLATS	631.7%
OCR	397.0%
BCS	451.0%
LSM	2413.1%
FSM	567.4%
SPBS PRIORITY	338.7%
SPBS NON-PRIORITY	376.7%
MANUAL PRIORITY	897.6%
MANUAL PARCELS	315.1%
CANCEL AND MTR. PREP.	638.4%

Now the same ratio tells a dramatically different story — the current TPH coefficient seems to be massively larger than the lagged TPH coefficient. Perhaps a better way to look at this issue is to calculate what percentage of the total effect is accounted for by each of the coefficients. This can be calculated

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by dividing each of the coefficients by the sum of the two. This set of calculations is presented below:

	% of Total Effect Contributed by the Current Coefficient on TPH	% of Total Effect Contributed by the Lagged Coefficient on TPH
MANUAL LETTERS	96.8%	3.2%
MANUAL FLATS	86.3%	13.7%
OCR	79.9%	20.1%
BCS	81.9%	18.1%
LSM	96.0%	4.0%
FSM	85.0%	15.0%
SPBS PRIORITY	77.2%	22.8%
SPBS NON-PRIORITY	79.0%	21.0%
MANUAL PRIORITY	90.0%	10.0%
MANUAL PARCELS	75.9%	24.1%
CANCEL AND MTR. PREP.	86.5%	13.5%

This table shows that in most cases 80% to 90% of the adjustment to the volume change takes place in the first period with the remaining 10% to 20% takes place in the second period. I think this is exactly what witness Moden had in mind when he suggested that there is substantial but limited flexibility in responding to sustained volume changes.

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d. I think that my finding of a moderate lagged effect is entire consistent with witness Moden's response.

e. I would not characterize the lagged effect as "large." As I explain in my response to part c., I think the size of the effect is entirely consistent with witness Moden's response.

f. I think the econometric results on the lagged term are reasonable and capture the less-than-perfect adjustment in mail processing hours. I think that specifying such a lag is a step toward modeling operational reality and that it does not reflect any infirmity in the specification.

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DMA/USPS-T14-59. Please refer to your response to DMA/USPS-T14-33, subpart a., where you state that your "understanding" is that "on average, part time and casual workers are already working close to a full work week" and where you rely on "DMA-T4-26" [sic].

a. Please confirm that witness Moden's response to DMA/USPS-T4-26 does not concern the workhours of part time and casual workers.

b. Please provide a complete list of all citations to the record where support for your statement exists. If this statement is supported by information outside of the record, please describe such information and provide it as a library reference.

DMA/USPS-T14-59 Response.

a. Confirmed. My response contained a typographical error. It should have said "DMA/USPS-T4-24" instead of "DMA/USPS-T4-26."

b. Please look at the response to DMA/USPS-T4-24, sections c., d. and e. (answered together). Please look at the first page of the attachment to that response. The last set of data on the page is entitled "Average Number of Work Hours Per Week." The first row of data is entitled "Casuals" and lists the average hours per week for casual employees by accounting period. For example, the average hours in accounting period two is listed as 38.16. The second row of data is entitled "Part-Time." Similar values are provide for part-time workers. In accounting period 2, the average hours for weekly hours for part-time workers is listed as 38.82.

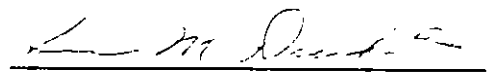
DECLARATION

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

Dated: Oct. 1, 1997

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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