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

POSTAL RATE AND FEE CHANGES, 2000

Docket No. R2000–1

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS BOZZO TO INTERROGATORIES OF UNITED PARCEL SERVICE (UPS/USPS–T15–9-17)

The United States Postal Service hereby provides the responses of witness Bozzo to the following interrogatories of United Parcel Service: UPS/USPS–T15-9-17, filed on March 8, 2000.

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

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

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March 22, 2000

UPS/USPS-T15-9. Refer to the data presented below for MODS group 1 (OCR):

FNOT14	TTREND	HRS	TPH	MAN	DPT	QICAP	WAGE
0	1	9012	75829	0.04	413255	890207	20.94
0	2	9308	78540	0.03	413327	927301	21.65
0	3	9955	73134	0.04	414356	942962	20.77
0	4	9229.5	66954	0.05	415262	970228.5	20.01
0	5	9393	73083	0.06	417593	949056	20.23
0	6	9812	80967	0.06	417645	959974	20.72
0	7	9645	74746	0.05	418551	995016	19.82
0	8	9645.75	72858	0.05	419943	1039347.75	20.39
0	9	10156	86694	0.04	422496	1260435	20.41
0	10	10925	90738	0.06	423605	1249987	19.79
0	11	11672	81509	0.05	424874	1260687	20.20
0	12	12076.5	79896.75	0.04	426909	1238822.25	21.39
0	13	11276	75555	0.04	428174	1171348	23.01
0	14	13491	81919	0.04	429608	1211470	22.79
0	15	11696	73618	0.04	430269	1215913	22.74
0	16	10371	71914.5	0.04	431992	1242970.5	21.95
0	17	11570	73159	0.04	434216	1241618	22.12
0	18	13525	75886	0.05	435436	1262696	18.48
0	19	11130	63744	0.04	436177	1258917	19.62
0	20	10155.75	57360.75	0.04	437311	1299757.5	19.78
0	21	10064	59780	0.05	438670	1119442	20.01
0	22	9042	58343	0.06	439441	1115111	20.12
0	23	10098	55828	0.06	439996	1143298	20.38
0	24	9969	52599.75	0.06	441045	1159366.5	20.62

For each time period for site #1, HRS > 40, TPH > 0, PRODLOW < TPH/HRS < PRODHIGH, DPT > 0, QICAP > 0 and WAGES [sic] > 0, yet you drop all of these observations from your analysis sample. Why?

UPS/USPS–T15–9 Response.

The referenced observations were inadvertently omitted from the regression sample due to a programming error. In the tables attached to this response, I provide versions of Table 3, Table 6, Table 7, and Table 9 from USPS-T-15 as they would appear with corrections to this programming error and to another minor programming error that prevents a small number of observations with a missing or invalid NWRS wage from being flagged for exclusion from the

regression samples (note that TSP eliminates observations in the sample with missing data prior to computing the estimates). The results reported in my testimony are correct given the regression samples actually employed in the LR-I-107 programs, but the samples themselves are slightly different from those that would result from the selection rules as intended. None of the estimated elasticities reported in the attached tables differ from the values in USPS-T-15 by an amount greater than the estimated standard error. The other changes to the results are correspondingly slight. I am providing the TSP programs and output that generate the attached results, with changed or added code clearly marked with comment lines, in USPS LR-I-239.

1 **Table 3. Summary of Effect of Sample Selection Rules on Sample Size**

Cost Pool	Non-missing	Threshold	Productivity	Minimum Obs	Lag Length (Regression N)
BCS	6882	6880	6777	6716	5406
			98.5%	97.6%	78.6%
OCR	6642	6637	6493	6396	5097
			97.8%	96.3%	76.7%
FSM	5441	5441	5423	5361	4373
			99.7%	98.5%	80.4%
LSM	5155	5149	5126	5035	3904
			99.4%	97.7%	75.7%
MANF	6910	6910	6416	6176	4891
			92.9%	89.4%	70.8%
MANL	6910	6910	6820	6800	5512
			98.7%	98.4%	79.8%
MANP	5831	5621	4709	3936	3037
			80.8%	67.5%	52.1%
Priority	5713	5640	4992	4193	3234
			87.4%	73.4%	56.6%
SPBS	2241	2236	2210	1986	1584
			98.6%	88.6%	70.7%
1CancMPP	6744	6716	6597	6524	5251
			97.8%	96.7%	77.9%

Table 6. Principal results for letter and flat sorting operations, USPS Base Year method

Cost Pool	BCS	OCR	FSM	LSM	Manual Flats	Manual Letters
Output Elasticity or Volume-Variability Factor	.897 (.030)	.752 (.038)	.820 (.026)	.956 (.021)	.773 (.027)	.737 (.024)
Deliveries Elasticity	.248 (.045)	.333 (.061)	.221 (.037)	.037 (.045)	.317 (.043)	.461 (.039)
Wage Elasticity	-.825 (.052)	-.597 (.071)	-.611 (.041)	-.139 (.077)	-.241 (.060)	-.688 (.051)
Capital Elasticity	.025 (.019)	-.004 (.027)	.050 (.014)	.010 (.022)	.054 (.020)	.033 (.017)
Manual Ratio Elasticity	.070 (.015)	-.007 (.020)	-.048 (.011)	-.055 (.018)	-.035 (.028)	-.195 (.021)
Auto-correlation coefficient	.642	.701	.623	.558	.674	.693
Adjusted R-squared	.986	.972	.994	.991	.988	.991
N observations	5406	5097	4373	3904	4891	5512
N sites	298	289	236	274	278	300

Elasticities evaluated using arithmetic mean method; standard errors in parentheses.

Table 7. Principal results for other operations with piece handling data, USPS Base Year method

Cost Pool	Manual Parcels	Manual Priority	SPBS	Cancellation & Meter Prep
Output Elasticity or Volume-Variability Factor	.522 (.028)	.540 (.024)	.645 (.045)	.547 (.036)
Deliveries Elasticity	.218 (.088)	.524 (.103)	.051 (.105)	.360 (.054)
Wage Elasticity	-.583 (.150)	-1.219 (.156)	-1.311 (.087)	-.545 (.085)
Capital Elasticity	.100 (.045)	.093 (.052)	.116 (.039)	.065 (.020)
Autocorrelation coefficient	.579	.501	.596	.671
Adjusted R-squared	.933	.940	.987	.983
N observations	3037	3234	1584	5251
N sites	182	200	95	291

Elasticities evaluated using arithmetic mean method; standard errors in parentheses.

Table 9. Comparison of Postal Service BY1996 and BY1998 volume-variability factors

Cost Pool	BY 1996 Variability (Docket No. R97–1, USPS–T–14)	BY 1998 Variability	Percent difference – BY98 vs. BY96
BCS	.945	.897	-5.1%
OCR	.786	.752	-4.3%
Manual Flats	.866	.773	-10.7%
Manual Letters	.797	.737	-7.5%
FSM	.918	.820	-10.7%
LSM	.905	.956	5.6%
SPBS	.552[1]	.645	16.8%
Manual Parcels	.395	.522	32.2%
Manual Priority	.448	.540	16.8%
Cancellation and Meter Prep	.654	.547	-16.4%
Composite	.810	.762	-5.9%

[1] Volume-variable cost percentage for combined SPBS – Priority and SPBS – Non-Priority cost pools. See Docket No. R97–1, USPS–T–12, at 15 [Table 4].

Response of United States Postal Service Witness Bozzo
To Interrogatories of United Parcel Service

UPS/USPS-T1 5-10. Refer to the data presented below for MODS 2 (LSM), site #145, for Q195 to Q196:

FNOT14	QTR	HRS	TPH	MAN	DPT	QICAP	WAGE
0	195	44064	59929	0.14	914587	667246	24.72
0	295	48099	64016	0.11	922380	673083	24.67
0	395	40348	52385	0.11	925991	681034	24.73
0	495	35820	47967	0.10	931401	694023	24.97
0	196	22754	30468	0.09	949767	662259	26.61

For each time period, HRS > 40, TPH > 0, PRODLOW < TPH/HRS < PRODHIGH, DPT > 0, QICAP > 0 and WAGES [sic] > 0, yet you drop all of these observations from your analysis sample. Why?

UPS/USPS–T15–10 Response.

The statement that TPH>0 for each time period is not correct. The data you report as TPH is actually TPF (total pieces fed). The site's reported value of LSM TPH for quarter 1, FY 1995, is negative. Thus, while the TPF are not otherwise anomalous, that observation does not pass the initial check for non-negativity of the variables, including TPH. The remaining observations are dropped because the first reported observation would be used for a lagged piece handling variable.

UPS/USPS-T15-11. Refer to the data presented below for MODS 12 (SPBS), site #83, Q294.

FNOT14	QTR	HRS	TPH	MAN	DPT	QICAP	WAGE
0	294	34661	3345	0.08	238611	1816709	20.26

For each time period, HRS > 40, TPH > 0, PRODLOW < TPH/HRS < PRODHIGH, DPT > 0, QICAP > 0 and WAGES [sic] > 0, yet you drop this observation from your analysis sample. Why?

UPS/USPS–T15–11 Response.

The value of SPBS TPH for this site in quarter 2, FY 1993, is negative. Thus, this observation is excluded from the regression sample because of invalid data in a lagged observation. See also the response to UPS/USPS-T15-10.

Response of United States Postal Service Witness Bozzo
To Interrogatories of United Parcel Service

UPS/USPS-T15-12. To perform your Generalized Least Squares estimation you multiply data for the first period of each run by $\left(1-\rho^2\right)^{1/2}$. While this may be the correct transformation in panels without gaps, why do you use the $\left(1-\rho^2\right)^{1/2}$ transformation on the first period of each run within panels? What is your source of authority for this approach?

UPS/USPS–T15–12 Response.

My approach transforms each "run" of consecutive observations such that the covariance matrix of the run of transformed residuals is a scalar multiple of an identity matrix, given AR(1) disturbances with autocorrelation coefficient ρ. See also Cheng Hsiao, *Analysis of Panel Data* (Cambridge University Press, 1986), at page 56. My treatment does not make use of any correlation between the errors in different runs of data for sites with multiple runs. The "textbook" alternative would be to drop the first observation in each run of data after the first, or to use only a single run of data for each site, either of which will tend to have adverse consequences for the statistical efficiency of the estimates.

Response of United States Postal Service Witness Bozzo
To Interrogatories of United Parcel Service

UPS/USPS-T15-13. A number of sites appear to have an intermittent presence of various MODS operations. For example, site # 6 has an intermittent presence of Manual Parcels (MODS group 7) (from 193 to 194 TPH07 > 0, from 294-295 TPH07 = 0, then in 296, TPH07 > 0 again) and Priority (MODS group 8). Explain why these operations appear only intermittently.

UPS/USPS–T15–13 Response.

The term "intermittent presence" is vague; without a more precise definition, I cannot comment in general on the extent of the problem or potential causes. In the case of site #6, positive manual parcels workhours are reported for each period from PQ1 FY93 to PQ3 FY98; manual Priority workhours are reported for all periods covered by my data set. In that sense, the presence of these operations is not "intermittent." The reporting of manual parcels TPH at this site appears to be intermittent as specified in the interrogatory, but manual Priority TPH are reported for each period from PQ4 FY94 to PQ4 FY98 after a gap from PQ3 FY93 to PQ3 FY94. In contrast to the other MODS operations I studied, manual parcel and Priority volumes must be manually logged, so the volume data collection process is considerably more labor intensive than for operations in which volume data are transmitted from equipment or scales via electronic interfaces.

In the case of site #6, the result of inquiries indicated that the intermittent reporting of manual parcel piece handlings may reflect periods in which manual and SPBS parcels were commingled, and the gap in the manual Priority volume reporting may reflect a period prior to the filling of a related in-plant support

position. Note also that the manual parcels observations from this site do not enter the manual parcel regression sample, while a portion of the manual Priority observations (during the later period of continuous recording of TPH) are included in the manual Priority regression sample (see the sampsel.xls spreadsheet, LR-I-186).

Response of United States Postal Service Witness Bozzo
To Interrogatories of United Parcel Service

UPS/USPS-T15-14. What other variables did you consider for your labor demand specification? Describe each such variable and explain why you decided not to pursue it.

UPS/USPS–T15–14 Response.

I did not consider any variables other than those described in USPS-T-15 and/or LR-I-107. See USPS-T-15 at pages 49, line 11, to page 52, line 4, for the requested discussion of additional and/or alternative network and piece handling variables I considered.

Response of United States Postal Service Witness Bozzo
To Interrogatories of United Parcel Service

UPS/USPS-T15-15. What other econometric estimators did you consider? Describe each such econometric estimator and explain why you decided not to pursue it.

UPS/USPS–T15–15 Response.

I did not compute any estimators other than the seven presented in USPS-T-15 and/or LR-I-107 (i.e., the between estimator plus OLS and FGLS versions of the pooled, fixed-effects, and random effects estimators). I considered the applicability of the "seemingly unrelated regression" (SUR) estimator (i.e., allowing for potential correlation between the equations for different mail processing operations), but did not pursue this approach due to time and resource constraints, as well as the fact that the only potential improvement from the use of SUR would be a potential gain in statistical efficiency of the estimates. For a discussion of why I prefer the fixed-effects estimators over the other estimators I did compute, please see USPS-T-15 at pages 122-4, 130-1 and the response to MPA/USPS-T15-2.

Response of United States Postal Service Witness Bozzo
To Interrogatories of United Parcel Service

UPS/USPS-T15-16. What other error structures, other than the AR(1) structure, did you consider? Describe each such error structure and explain why you decided not to pursue it.

UPS/USPS–T15–16 Response.

I did not compute FGLS estimators for any "error structures" other than the AR(1). However, my decision not to pursue alternative FGLS estimators is based in part on the consideration that my results are consistent (though not necessarily statistically efficient) for an arbitrary "GLS" error process (i.e., the error vector has mean zero and covariance matrix proportional to some nonsingular matrix Ω).

Response of United States Postal Service Witness Bozzo
To Interrogatories of United Parcel Service

UPS/USPS-T15-17. What other functional forms, other than the translog form, did you consider? Describe each such functional form and explain why you decided not to pursue it.

UPS/USPS–T15–17 Response.

In reaching my conclusion that the use of the translog functional form is appropriate, I reviewed the relevant economic theory, and accordingly considered other functional forms to that extent. See USPS-T-15 at pages 65-67, and footnote 29 on page 69. Insofar my review revealed no a priori advantages for other functional forms (for example, since all of the explanatory variables should take on positive values if accurately reported), I did not compute estimates using alternative functional forms.

DECLARATION

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

A. Thomas Bozzo

Dated: 3/22/00

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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March 22, 2000