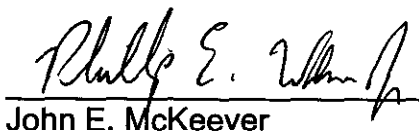
BEFORE THE
POSTAL RATE COMMISSION

POSTAL RATE AND FEE CHANGES, 2000	DOCKET NO. R2000-1

ANSWERS OF UNITED PARCEL SERVICE WITNESS KEVIN J. NEELS TO UNITED STATES POSTAL SERVICE INTERROGATORIES (USPS/UPS-T1-32 and 33) (June 27, 2000)

Pursuant to the Commission's Rules of Practice, United Parcel Service hereby files and serves the answers of UPS witness Kevin J. Neels to the following interrogatories of the United States Postal Service: USPS/UPS-T1-32 and 33.

Respectfully submitted,



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ANSWER OF UNITED PARCEL SERVICE WITNESS NEELS
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USPS/UPS-T1-32. Please refer to your testimony, UPS-T-1, at pages 34-35. You indicate at page 34, lines 13-14, that "measurement error in the dependent variable is absorbed in the error term." You subsequently provide estimating equations for the regressions you use to estimate the elasticities of TPH (or TPF) with respect to FHP at page 35, lines 3 and 7.

a. Please confirm that the terms u_{it} in the equations cited above denote the "error term[s]" to which you refer in the statement quoted above. If you do not confirm, please explain.

b. Please confirm that, for a multivariate linear regression, a consistent estimator of the error variance $\sigma_u^2 = \text{var}(u_{it})$ is $\left(\sum \hat{u}_{it}^2\right)/(N_{obs} - K)$; where $\sum \hat{u}_{it}^2$ is the sum of squared residuals from the regression, N_{obs} is the number of observations, and K is the number of regressors. If you do not confirm, please provide the formula you believe to be correct for a consistent estimator of the error variance σ_u^2, and provide a proof (or a citation to a proof) of its statistical properties.

c. Please provide the estimated error variances for each regression reported in Table 6 and Table 7 of UPS-T-1, using the formula that you confirm (or otherwise provide) in response to part (b). If the estimated error variances are provided in your workpapers, UPS-NEELS-WP-1, please provide detailed citations to the locations in the workpapers where they may be found. Otherwise, please provide detailed documentation of the methods you use to generate your response, including computer programs you employ and the output of those programs.

Response to USPS/UPS-T1-32.

(a) Confirmed.

(b) I do not confirm. A consistent estimator of the error variance σ_u^2 is given by: $\sum_i \hat{u}_{it}^2 /(N_{obs}\text{-}K\text{-}N_{sites})$

where $\sum_i \hat{u}_{it}^2$, N_{obs}, and K are as defined in this question and N_{sites} is the number of mail processing facilities included in the estimation. See page 467 of William H. Greene, Econometric Analysis (New York: Macmillan Publishing Company, 2nd edition, 1993), or page 38 of Cheng Hsiao, Analysis of Panel Data (New York: Cambridge University Press, 1986).

(c) See attached "Table 1 of 2 Prepared in Response to USPS/UPS-T1-32" and "Table 2 of 2 Prepared in Response to USPS/UPS-T1-32." The estimated error variance for all but Parcels in Table 6 of UPS-T-1 is calculated by the program fhptphm.prg, contained in the subdirectory "Appendix – Analysis Program Files/fhptphm.prg" of UPS-Neels-WP-1. The estimated error variance for the shapes level analysis in Table 7 and Parcels in Table 6 is calculated by the program fhptphs.prg, contained in the subdirectory "Appendix – Analysis Program Files/fhptphs.prg" of UPS-Neels-WP-1 (UPS-T-1). The estimated error variance (called "sig2e," in the programs) is calculated in the GAUSS subroutine called "fe." To obtain the estimates for the attached tables, I simply modified fhptphm.prg and fhptphs.prg to print out "sig2e" after the estimation of each model shown in Tables 6 and 7.

Table 1 of 2 Prepared in Response to USPS/UPS-T1-32

Estimates of the Elasticity of TPH with respect to FHP
Imputed from the Reverse Regression of FPH on TPH - MODS Level Analysis

MODS Group	Specification	AR1-Fixed Effects	Ho: Proportionality	F-Statistic	Pvalue	Estimated Error Variance
OCR	Full	1.597	reject	20.304	0.000	0.034
		(0.043)				
	Partial	1.386	reject			0.036
		(0.030)				
LSM	Full	1.069	reject	6.446	0.000	0.184
		(0.030)				
	Partial	0.956	reject			0.189
		(0.018)				
BCS	Full	2.091	reject	25.748	0.000	0.017
		(0.058)				
	Partial	1.560	reject			0.018
		(0.027)				
Manual Letters	Full	1.229	reject	14.606	0.000	0.009
		(0.012)				
	Partial	1.174	reject			0.009
		(0.010)				
FSM	Full	1.544	reject	56.969	0.000	0.006
		(0.027)				
	Partial	1.138	reject			0.007
		(0.012)				
Manual Flats	Full	1.010	reject	9.000	0.000	0.008
		(0.008)				
	Partial	0.969	reject			0.009
		(0.006)				
Parcels	Full	1.795	reject	7.692	0.000	0.139
		(0.099)				
	Partial	1.786	reject			0.143
		(0.088)				
Priority	Full	1.013	reject	1.697	0.030	0.003
		(0.003)				
	Partial	1.010	reject			0.003
		(0.002)				

Notes and Sources:

1. Data from fhp9398.xls and reg9398.xls, provided in USPS-LR-I-186 and USPS-LR-I-107, respectively.
2. Standard errors shown in parentheses.
3. Estimated effects are significantly different from zero and one at or below the 1% significance level.
4. Partial specification regresses ln(FHP) on ln(TPH) and the square of ln(TPH).
5. Full specification regresses ln(FHP) on ln(TPH), the square of ln(TPH), ln(DPT), and a set of 18 time dummies (one for each quarter, excluding the first one).
6. F-Tests (statistics and pvalues shown in table) uniformly favor the full specification.
7. Appendix C of UPS-T-1 shows the full set of estimation results.

Table 2 of 2 Prepared in Response to USPS/UPS-T1-32

Estimates of the Elasticity of TPH with respect to FHP
Imputed from the Reverse Regression of FPH on TPH - Shapes Level Analysis

Shape	Specification	AR1-Fixed Effects	Ho: Proportionality	F-Statistic	Pvalue	Estimated Error Variance
Letters	**Full**	2.062	reject	14.148	0.000	0.009
		(0.061)				
	Partial	1.689	reject			0.010
		(0.034)				
Flats	**Full**	1.318	reject	46.449	0.000	0.003
		(0.015)				
	Partial	1.078	reject			0.004
		(0.009)				
Parcels	**Full**	1.795	reject	7.691	0.000	0.139
		(0.099)				
	Partial	1.786	reject			0.143
		(0.088)				
Priority	**Full**	1.013	reject	1.697	0.030	0.003
		(0.003)				
	Partial	1.010	reject			0.003
		(0.002)				

Notes and Sources:

1. Data from fhp9398.xls and reg9398.xls, provided in USPS-LR-I-186 and USPS-LR-I-107, respectively.
2. Standard error shown in parentheses.
3. Estimated effects are significantly different from zero and one at or below the 1% significance level.
4. Partial specification regresses ln(FHP) on ln(TPH) and the square of ln(TPH).
5. Full specification regresses ln(FHP) on ln(TPH), the square of ln(TPH), ln(DPT), and a set of 18 time dummies (one for each quarter, excluding the first one).
6. F-Tests (statistics and pvalues shown in table) uniformly favor the full specification.
7. Appendix D of UPS-T-1 shows the full set of estimation results for Letters, Flats, and Parcels. Appendix C shows the full set of estimation results for Priority.

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USPS/UPS-T1-33. Please refer to your testimony, UPS-T-1, at page 35, lines 3 and 7, where you provide mathematical formulas for the estimating equations you employ in your analysis of the relationship between FHP and TPH. Please interpret the term TPH to refer to TPF where appropriate. Please also refer to your testimony at page 34, line 10, where you indicate that you estimated the "reverse regression" of FHP on TPH and other variables.

a. Please confirm that, based upon the estimating equations provided at page 35, lines 3 and 7, the mathematical formula for the elasticity of FHP with respect to TPH is $\partial \ln FHP / \partial \ln TPH = \beta_1 + 2\beta_2 \ln TPH$. If you do not confirm, please provide a mathematical derivation of the elasticity formula you believe to be correct.

b. Please confirm that your estimators of the elasticity of TPH with respect to FHP, used to generate the results presented in Table 6 and Table 7 of UPS-T-1, have the form $(\partial \ln TPH / \partial \ln FHP) = (\hat{\beta}_1 + 2\hat{\beta}_2 \ln TPH^*)^{-1}$, where $\hat{\beta}_1$ and $\hat{\beta}_2$ are the estimates (from Appendix C) of the parameters β_1 and β_2 from the appropriate estimating equation, and $\ln TPH^*$ is the value of $\ln TPH$ at which the elasticity formula from part (a) of the interrogatory is evaluated. If you do not confirm, please provide mathematical formula(s) for the estimator(s) you employ, and also please provide detailed citations to your workpapers, UPS-NEELS-WP-1, indicating where the formula you provide, and the implementation of the formula, may be found.

c. Please describe the value(s) of $\ln TPH$ you chose to evaluate the elasticity estimator from the response to part (b). Please provide detailed citations to the section(s) of your workpapers, UPS-NEELS-WP-1, in which your calculations are implemented.

d. Please confirm that the estimating equations for the conceptually correct "non-reverse" regression of TPH on FHP and other variables—i.e., the estimating equations you presumably would have employed, if the FHP data were to have appropriate statistical qualities—corresponding to the reverse regressions you actually estimated would be:

$\ln(TPH_{it}) = \delta_i + \gamma_1 \ln(FHP_{it}) + \gamma_2 \ln(FHP_{it})^2 + \gamma_3 \ln(DPT_{it}) + \gamma_4 TimeDummies_{it} + v_{it}$ (the "full estimating equation"), or $\ln(TPH_{it}) = \delta_i + \gamma_1 \ln(FHP_{it}) + \gamma_2 \ln(FHP_{it})^2 + v_{it}$ (the "restricted model"). If you do not confirm, please provide the "non-reverse" estimating equations you believe to be conceptually correct, and explain fully the basis for your belief.

Response to USPS/UPS-T1-33.

(a) Confirmed.

(b) Confirmed, with the exception that estimates for β_1 and β_2 for Parcels in Table 6 are from Appendix D, not Appendix C. Similarly, non-Priority estimates for β_1 and β_2 used for Table 7 are also from Appendix D.

(c) In keeping with Dr. Bozzo's preferred elasticity calculations presented in USPS-T-15, I evaluate the elasticity of the estimator (Est) from part (b) at the arithmetic sample mean of TPH ($\overline{TPH}$):

$$Est(\frac{\partial \ln(TPH)}{\partial \ln(FHP)}) = \left(\hat{\beta}_1 + 2 \times \hat{\beta}_2 \ln(\overline{TPH})\right)^{-1}$$

For all but Parcels in Table 6, this calculation is implemented in program fhptphm.prg, contained in the subdirectory "Appendix – Analysis Program Files/fhptphm.prg" of UPS-Neels-WP-1. For all but Priority, the shapes level analysis in Table 7, and Parcels in Table 6, this calculation is implemented in the program fhptphs.prg, contained in the subdirectory "Appendix – Analysis Program Files/fhptphs.prg" of UPS-Neels-WP-1. The estimate of the marginal effect of TPH on FHP ($\beta_1 + \beta_2$ ln TPH) is calculated in the GAUSS subroutine called "mareff." The estimate of the marginal effect of FHP on TPH (($\hat{\beta}_1 + \hat{\beta}_2$ ln TPH)$^{-1}$) is printed out in the GAUSS subroutine called "out."

(d) I do not confirm. The model I estimated cannot be transformed mathematically into the model described in the interrogatory. The "non-reverse" regression of TPH on FHP which corresponds to the model that I have estimated is not the one presented above in USPS/UPS-T1-33(d). The correct "non-reverse" regression equations are implicitly defined by the regression models on page 35, lines 3 and 7, of my testimony.

DECLARATION

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

Kevin Neels

Kevin Neels

Dated: 6/27/00

CERTIFICATE OF SERVICE

I hereby certify that I have this date served the foregoing document by first class mail, postage prepaid, in accordance with Section 12 of the Commission's Rules of Practice.

Phillip E. Wilson, Jr.
Attorney for United Parcel Service

Dated: June 27, 2000
Philadelphia, Pa.

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