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

POSTAL RATE AND FEE CHANGES, 2006	Docket No. R2006–1

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS THRESS
TO INTERROGATORIES OF GCA (GCA/USPS-T7-1 - 9)
(July 10, 2006)

The United States Postal Service hereby provides the response of witness Thress to the following interrogatories of GCA, filed on June 26, 2006: GCA/USPS-T7-1 – 9.

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

Respectfully submitted,

UNITED STATES POSTAL SERVICE

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July 10, 2006

RESPONSE OF POSTAL SERVICE WITNESS THRESS
TO INTERROGATORIES OF GCA

GCA/USPS-T7-1.

Please refer to Table 13 in your testimony, R2006-1, USPS-T-7, page 63, and to the corresponding Table 7 from your testimony in R2005-1, USPS-T-7, page 60. In R2005-1, your coefficient for the impact of the Internet on FCLM single piece volume has a negative value, -0.491, indicating that the Internet has a negative effect on the volume of single-piece mail.

a. Please confirm that for R2006-1, the estimated coefficient for your internet variable (CS_ISP) by itself, C0, is positive and equals 0.753. If you cannot confirm, please provide the correct value or explain.

b. If confirmed, state whether you agree that your Internet variable C0 in R2006-1 indicates that the Internet has had a positive effect on the volume of First Class single-piece mail. To the extent you disagree, provide the basis of your position in full. State whether a determination that the Internet has had a positive effect on the volume of single-piece mail is at odds with your prior work and USPS witness Bernstein's testimony in this case. To the extent you disagree, provide the basis of your position in full.

RESPONSE:

a. Confirmed.

b. I do not agree that the Internet has had a positive effect on the volume of First-Class single-piece mail. As presented in Table 13 of my testimony on page 63, the coefficient on the Internet variable, CS_ISP, at any time t, is equal to the following:

$$C_0 + C_1 \bullet \text{Trend} + C_2 \bullet \text{Trend}_{2002Q4}$$

The Trend variable here has a value equal to one beginning in 1971Q1, increasing by one each quarter thereafter. The first quarter in which the Internet variable, CS_ISP, has a value greater than zero is 1988Q2. The value for Trend in 1988Q2 is 70. Plugging this into the above formula, then, the coefficient on the Internet variable, CS_ISP, in 1988Q2, is equal to

$$C_0 + C_1 \bullet 70 + C_2 \bullet 0 = 0.753 - 0.011 \bullet 70 = -0.023$$

Because both C_1 and C_2 have negative coefficients, the aggregate coefficient on CS_ISP becomes more strongly negative over time. For example, the coefficient on CS_ISP in 2005Q4 is equal to

$$C_0 + C_1 \bullet 140 + C_2 \bullet 13 = -0.905$$

Hence, the Internet variable, CS_ISP, used in my work here never has a positive coefficient.

RESPONSE OF POSTAL SERVICE WITNESS THRESS
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GCA/USPS-T7-2.

Please refer to your testimony, R2006-1, USPS-T-7, page 63.

a. Please confirm that the estimated coefficient for the average worksharing discount is -0.096 in the FCLM single piece demand equation.

b. Please confirm that this coefficient when estimated in the workshared equation is a positive number.

c. Please confirm that you impose the negative sign of this coefficient in the single piece equation, and that the negative value is not, instead, the result of econometric estimation.

d. Please confirm, by doing the estimation, that including the average workshare discount directly into the single-piece equation leads to a positive econometric estimate for the coefficient of this variable. If you do not confirm, please provide your results, methodology, and all of the data and tests you used to answer the question.

e. If your answer to (d) is "Confirmed," is not your imposition of a negative sign on this coefficient in the single piece equation an econometric mis-specification of that equation? If your answer is anything other than an unequivocal "Yes," please explain fully why you have not mis-specified that equation.

RESPONSE:

a. Confirmed.

b. Confirmed.

c. Not entirely confirmed. The coefficient estimate in the First-Class single-piece letters equation is econometrically estimated subject to a stochastic restriction from the First-Class workshared letters equation.

d. Confirmed.

e. My imposition of a negative sign on this coefficient is not an econometric mis-specificiation. As explained in detail in my testimony at pages 53 – 56, the theory underlying the inclusion of the First-Class worksharing discount in the First-Class letters equations clearly indicates that "the total volume leaving First-Class single-piece mail due solely to changes in worksharing discounts should be

exactly equal to the volume entering First-Class workshared mail." (p. 53, ll. 11-13)

Knowing this underlying economic theory as well as knowing that the econometrically estimated coefficient of this variable from the First-Class workshared letters equation is -0.098 with a variance of 0.0000980, it would be incorrect not to include this information when estimating the appropriate coefficient on the worksharing discount in the First-Class single-piece letters equation.

RESPONSE OF POSTAL SERVICE WITNESS THRESS
TO INTERROGATORIES OF GCA

GCA/USPS-T7-3.

a. Please confirm that the correlation between your ISP variable and your time trend variable is 0.9407. If you do not confirm, please provide the estimate.

b. Please confirm that your use of the ISP variable is essentially little more than a time trend variable. If you cannot confirm, please explain and provide the basis for your conclusion in full.

c. Please confirm that your new ISP variable is essentially nothing more than an estimated proxy for the number of users of Internet services, i.e. consumption expenditures on the Internet divided by the price index for ISP. If you cannot confirm, please explain and provide the basis for your conclusion in full.

d. Please confirm that your demand equation for single piece mail does include the price of single piece mail, but does not include the prices of any competing substitutes (other than the worksharing discount you impose). If you cannot confirm, please explain and provide the basis for your conclusion in full.

e. Please confirm that your ISP variable in R2006-1 is an entirely new variable from your ISP variables in R2001-1 and R2005-1, but **still** does not represent the unit price of that competing substitute. If you cannot confirm, please explain and provide the basis for your conclusion in full.

RESPONSE:

a. Not confirmed. The correlation between consumption expenditures on Internet Service Providers (CS_ISP) and a linear time trend (TREND) over the sample period across which the First-Class single-piece letters demand equation is estimated (1983Q1 – 2005Q4) is 0.8796.

b. Not confirmed. The value of CS_ISP is equal to zero through 1988Q1. Over this time period, which includes the first five years of the sample period over which the First-Class single-piece letters equation is estimated, then, CS_ISP and TREND are perfectly uncorrelated. Even since 1988Q2, the growth pattern of CS_ISP differs in meaningful ways from a simple linear time trend (or any other simple time trend) in ways that are far more revealing about the factors

which have driven the negative trend in First-Class single-piece letters volume over this time period than would be the simple inclusion of a generic time trend.

As shown in Table 11 on page 52 of my testimony, the Internet variable in the First-Class single-piece letters equation explains a cumulative loss of 33.7 billion First-Class single-piece letters over the sample period used to estimate this demand equation. Even if a simple time trend were to arrive at a similar cumulative estimate, it would, by its nature, assume that these 33.7 billion pieces were distributed uniformly across the full sample period, i.e., that First-Class single-piece letters volume was reduced by 1.4 – 1.5 billion pieces per year for each of the 23 years of the sample period.

On the other hand, as shown in Table 10 on page 51 of my testimony, the Internet variable reveals that none of this diversion occurred prior to 1988, with annual diversion growing gradually from just over 400 million pieces in 1988 to more than 2 billion pieces in 1995, and that the level of electronic diversion grew further over the three most recent years, 2003 – 2005, to an annual level in excess of 2.8 – 2.9 billion pieces of mail diverted per year, a figure nearly twice as great as the average annual diversion over the full sample period.

c. Confirmed that the ISP variable included in my First-Class single-piece letters demand equation is a proxy for the number of users of Internet services, i.e. consumption expenditures on the Internet divided by the price index for ISP.

d. Not entirely confirmed. To the extent that one of the factors which led to an increasing use of the Internet and other electronic alternatives to mail has been declining prices associated with such alternatives to mail, the ISP variable included in the First-Class single-piece letters equation will incorporate the price of these electronic alternatives.

e. Somewhat confirmed. The “ISP variable” that serves as the basis for my econometric estimate of the impact of the Internet and other types of electronic

diversion on First-Class single-piece letters volume is the same variable as I used in the two previous cases, consumption expenditures on Internet Service Providers. I have, however, modified the precise specification of this variable within the First-Class single-piece letters equation in this case as part of my continual effort to improve this equation.

It is important to understand, also, that the Internet variable here serves as a proxy for all of the myriad ways in which mail may be diverted by the Internet as well as by other electronic alternatives. As such, it would not be possible to identify a single "unit price" associated with such alternatives.

RESPONSE OF POSTAL SERVICE WITNESS THRESS
TO INTERROGATORIES OF GCA

GCA/USPS-T7-4.

Please refer to your testimony R2006-1, USPS-T-7, page 46, where you state starting at line 17: "E-mail has emerged as a potent substitute for personal letters, bills can be paid online, and some consumers are beginning to receive bills and statements through the Internet rather than through the mail."

a. Please confirm that the normal specification of a demand equation in the presence of competing substitutes includes the prices of the substitutes as well as the price of the good in question.

b. When you refer to "alternatives" to First Class single piece mail, to "electronic diversion" or "electronic substitution", or to "losses" of single piece mail, please confirm that you are referring to the existence of competing substitutes for single piece mail in one or more markets.

c. Please confirm that if the price of a strongly competing substitute is not controlled for in the demand equation for a good, the coefficient representing the impact of the price on the demand equation will be mis-specified and the impact of the price of the good on demand for the good will be biased.

d. Please confirm that if time series data were available on price per unit for electronic media substitutes and Internet substitutes for mail, these time series would be appropriate variables along with single piece mail price to include in the demand equation for single piece mail volume. If you cannot confirm, please explain and provide the basis for your conclusion in full.

e. Please confirm that over several rate cases now, the absence of the direct price variables for these competing substitutes noted in c. (above) is one reason why you have used consumption expenditures on internet service providers (ISP) or time trend variables. If you cannot confirm, please explain and provide the basis for your conclusion in full.

f. Please confirm that your ISP variable is not the price of electronic media substitutes or the price of Internet substitutes for single piece mail. If you cannot confirm, please explain and provide the basis for your conclusion in full.

RESPONSE:

a. Not confirmed. For a product in a mature market with a fixed set of substitutes, it is common for a demand equation to include price measures for substitute goods. See, for example, my demand equation for Express Mail

(pages 140 – 150 of my testimony), which includes a cross-price with respect to Federal Express.

If, however, such substitutes are newly emergent or are growing in their market reach, it will also be important to explicitly account for this market growth in assessing the demand for the product, even if the competing substitutes, in such a case, compete primarily based on price. See, for example, my demand equation for Priority Mail (pages 156 – 166 of my testimony), where the own- and cross-price elasticities change over time to reflect the increasing market presence of Federal Express in the ground package market.

Finally, however, the competition between two or more products may not be primarily price-based. For example, the price, to me, of paying my credit card bill online, given that I already own a computer and have Internet access, is zero, and has been since online bill-payments were accepted by my credit card company. The factors which led to my decision to begin to pay bills online included the ease of paying said bill, my comfort level with Internet transactions, and the timeliness with which online payments are received, each of which has changed over time in a way that would not be captured in looking at a simple time series of the price of online bill-paying, which, in this case, would be infinite prior to online bill paying being available and zero since that time.

The simple modeling technique of identifying all substitutes and putting their prices into an econometric equation will frequently prove insufficient in understanding consumer behaviors in real economic markets.

b. Confirmed.

c. Not confirmed. If a variable which affects the true demand for a product is omitted from an econometric specification, then the coefficients on the included variables will only be biased to the extent to which these variables are correlated with the omitted variable.

d. If time series data were available on price per unit for electronic media substitutes and Internet substitutes for mail, these time series would be excellent candidates for investigation for possible inclusion within the First-Class single-piece letters equation. Whether these variables would, in fact, turn out to be "appropriate variables" would ultimately be an empirical question that could only be answered by econometric experimentation.

e. Not confirmed. The Internet variables which I have included in several of my demand equations have been included to attempt to explicitly account for the effect of competing electronic alternatives on mail volumes.

f. Confirmed.

RESPONSE OF POSTAL SERVICE WITNESS THRESS
TO INTERROGATORIES OF GCA

GCA/USPS-T7-5.

Please refer to your testimony, R2006-1, USPS-T-7, pages 312-316 and the following table showing the correlation coefficient matrix for several of the variables you have included in your SP equation over 1988-2005 periods.

Correlation Coefficient Matrix: 1988Q2-2005Q4

	D1_3WS_FIT	EMPL_T	CS_ISP	TREND
D1_3WS_FIT	1.0000	-0.9251	0.8184	0.9625
EMPL_T		1.0000	-0.9202	-0.9681
CS_ISP			1.0000	0.9407
TREND				1.0000

a. Please confirm that the variable reflecting the average workshared discount is accounted for by the variable D1_3WS_fit in your dataset. If you cannot confirm, please explain why.

b. From the above table, please confirm that there exists a very high correlation between each of the three variables and the time trend. If you cannot confirm, please explain why.

c. Please confirm that the inclusion of the trend variable alone would have been sufficient to capture the effect of these variables. If you cannot confirm, please explain why.

d. Please confirm that the inclusion of any one of the three variables alone in the above table would have been sufficient to capture the effect of all three. If you cannot confirm, please explain why.

e. Please confirm that the very high correlations among the variables shown in the above table could result in multi-collinearity in the model. If you cannot confirm, please explain why. Please provide any tests that you have conducted showing that multicollinearity is not present in your single piece equation, and more specifically among the three independent variables in the above table.

f. On page 313 lines 20-22, you state that “in my work, multi-collinearity is particularly acute with regard to a high degree of correlation between current and lagged prices….” Please confirm that, in light of the above table, multi-collinearity is also “acute” between and among the three variables identified above, *i.e.,* D1_3WS_FIT, EMPL_T, and CS_ISP.

g. Please confirm that the presence of multi-collinearity in the model can result in the coefficients not being correctly estimated. In other words multi-collinearity masks the separate effect of each variable. If you cannot confirm, please explain why.

h. Please confirm that the presence of multi-collinearity could also affect the estimated coefficient of the FCLM single piece own price variable. If you cannot confirm, please explain and provide the basis for your conclusion in full.

RESPONSE:

a. Not fully confirmed. The variable D1_3WS_FIT is included in the First-Class workshared letters equation to reflect the effect of the average First-Class worksharing discount on First-Class workshared letters volume. The variable D1_3WS is included in the First-Class single-piece letters equation to reflect the effect of the average First-Class worksharing discount on First-Class single-piece letters volume. The difference between D1_3WS_FIT and D1_3WS and the logic underpinning their use is described in my testimony at pages 53 – 55.

b. Confirmed that the correlation coefficients shown in your table are high.

c. Not confirmed. I do not estimate any demand equations which include the variables D1_3WS_FIT, EMPL_T, and CS_ISP within the same equation, nor do I estimate any demand equations which include any of these three variables using a sample period of 1988Q2 – 2005Q4. Hence, the correlation coefficient matrix shown above has no particular relevance to any of my demand equations.

Assuming your interest is specifically with respect to the First-Class single-piece letters equation, I can say that replacing the Internet variable with a simple time trend in the First-Class single-piece letters equation results in a clearly inferior equation for all of the reasons discussed in my response to GCA/USPS-T7-3(b). The changes in the level and magnitude of ISP consumption over time do a far better job of explaining the changes which have occurred in First-Class single-piece letters volume over time than would a simple constant trend factor.

d. Not confirmed. The fact that these variables are highly correlated should not be confused with a claim that these variables are perfectly correlated. There are

clear differences between these variables and, in a well-specified, well-estimated econometric equation, these differences can be isolated in such a way as to develop a much richer and fuller understanding of the factors which affect the demand for mail volume than would be possible if only one of these variables was included.

In the specific case of my First-Class single-piece letters demand equation, the t-statistics on EMPL_T (−2.79), CS_ISP (16.42), CS_ISP interacted with a time trend (−19.01), and CS_ISP interacted with a time trend starting in 2002Q4 (−4.78), indicate that each of these is important in fully understanding the behavior of First-Class single-piece letters consumers over time.

Even beyond this obvious empirical superiority, however, it is also the case that the demand equation which I have presented in this case, by including each of these distinct variables, provides a level of understanding about the factors which have driven mail volume which is not possible if one were to simply include a single time trend and measure the extent to which it correlates with First-Class single-piece letters volume over time.

e. Confirmed.

f. As noted in my answer to part (c) above, I have no demand equations which include all of the variables shown in your table. It is certainly true that multicollinearity will inevitably exist, to at least some degree, in any empirical econometric work. The inclusion of more than one variable which contains an obvious trend is certainly one example of multicollinearity.

g. The presence of multicollinearity may lead to an inefficient estimator of one's elasticities. Elasticity estimates in the presence of multicollinearity will remain unbiased, however. Please see my testimony at pages 312 – 313.

h. Multicollinearity is not an issue for the own-price elasticity estimate because the own-price variable is not strongly correlated with the other variables in my equation.

Over the sample period over which the First-Class single-piece letters equation is estimated (1983Q1 – 2005Q4), the correlation between the price of First-Class single-piece letters and the average worksharing discount (D1_3WS) is −0.0922, the correlation between the price of First-Class single-piece letters and EMPL_T is 0.0162, the correlation between the price of First-Class single-piece letters and CS_ISP is −0.1541, and the correlation between the price of First-Class single-piece letters and a linear time trend (TREND) is −0.0773.

RESPONSE OF POSTAL SERVICE WITNESS THRESS
TO INTERROGATORIES OF GCA

GCA/USPS-T7-6.

Please refer to your LR-L-64, File demandequations.txt.

a. Please confirm in your estimation of the FCLM single piece demand equation that the Shiller coefficient is zero.

b. Is it unusual to have a Shiller coefficient value equal to zero in the presence of multicollinearity? Please explain fully.

RESPONSE:

a. Confirmed.

b. No. Multicollinearity can lead to inefficient coefficient estimates, i.e., the coefficient estimates will tend to have large standard errors associated with them. But coefficient estimates will still remain unbiased even when multicollinearity is present. Hence, the expected values of the coefficient estimates will continue to have their expected signs. The Shiller restriction is only binding, in my work, in those cases where the signs on one or more price lag coefficients do not have their expected sign. In the case of First-Class single-piece letters, the freely-estimated own-price coefficients are both of the correct sign. Hence, it is not necessary to impose a Shiller restriction in this case.

RESPONSE OF POSTAL SERVICE WITNESS THRESS
TO INTERROGATORIES OF GCA

GCA/USPS-T7-7.

Please refer to your R2005-1, LR-K-65 and R2006-1, LR-L-65, after rate forecasts.

a. Please confirm that the annual single piece volume forecasts given in the following table are correct. If you cannot confirm, please provide the correct numbers.

R2006-1 vs R2005-1 SP Volume Forecasts
(in millions of pieces)

TIME	R2006-1	R2005-1	Difference
2006	41,410.402	42.459.296	(1,048.894)
2007	39,104.641	41,271.110	(2,166.469)
2008	37,206.438	N/A	N/A

b. Please state approximately when your forecast in R2005-1 was made and when your corresponding forecast in R2006-1 was made.

c. Please explain what factors, including the changes in the FCLM single piece equation model, have caused the R2006-1 forecast to be more than 1 billion pieces lower than the R2005-1 forecast for the year 2006.

d. Please explain what factors or changes, including the changes in the SP equation model, have caused the R2006-1 forecast to be almost 2.2 billion pieces lower than the R2005-1 forecast for the year 2007.

e. Please confirm that, given the trend in the difference between your R2006-1 and R2005-1 forecasts, if in R2005-1 you had forecast FCLM single piece volume for the year 2008 in R2005-1, the difference would have become even wider than 2.2 billion pieces, and likely well over 3 billion pieces. If you cannot confirm, please explain why.

f. Please confirm that had you used the same volume trends for single piece mail in R2006-1 that you used for R2005-1, on that account alone the revenue requirement for this case would be $1.5 billion lower for TY2008, ($0.51 revenue per piece X 3 billion pieces).

RESPONSE:

Irrelevant to this answer, my after-rates volume forecasts in the last two cases were presented in library references LR-K-66 and LR-L-66.

a. Confirmed, although I would note that the R2005-1 after-rates volume forecast included no rate increases beyond R2005-1, while the R2006-1 after-rates volume forecast assumes an additional rate increase in 2007Q3. The R2006-1 before-rates volume forecast is therefore more directly comparable to the R2005-1 after-rates volume forecast as shown in the corrected table below.

R2006-1 vs R2005-1 SP Volume Forecasts
(in millions of pieces)

TIME	R2006-1	R2005-1	Difference
2006	41,410.402	42.459.296	(1,048.894)
2007	39,401.453	41,271.110	(1,869.657)
2008	38,161.662	N/A	N/A

b. The R2005-1 before-rates forecast was made some time in January of 2005, with the after-rates forecast made in March of that year. The R2006-1 before-rates forecast was made in December of 2005.

c.-d. The primary reason for the difference in the volume forecast for First-Class single-piece letters from R2005-1 to R2006-1 is the addition of three new quarters of actual volumes, 2005Q2 – 2005Q4. For these three quarters, the R2005-1 volume forecast predicted First-Class single-piece letters volume of 31,898.624 million pieces. Actual volume for these three quarters was instead 30,998.727 million pieces. Hence, simply updating the base period to include these three quarters had the effect of reducing the First-Class single-piece letters volume forecast by nearly one billion pieces per year throughout the forecast period.

Beyond the direct effect of plugging these volumes into the base volume, this over-forecast of First-Class single-piece letters volume over these three quarters also served as the impetus to investigate further the relationship between First-Class single-piece letters volume and the Internet. This investigation, which

culminated in the adoption of the demand equation used in this case, is described in some detail in Library Reference LR-L-65 at pages 196 – 290.

e. Not confirmed. Extending the R2005-1 volume forecast through GFY 2008 produced a volume forecast for First-Class single-piece letters of 40,321.183 million pieces, which is 2.16 billion pieces greater than the R2006-1 Test Year before-rates volume forecast.

f. Not confirmed. I am not the revenue requirement witness, and I thus am not aware of all the factors that might need to be considered to determine the revenue requirement. Nevertheless, taking your average revenue figure of $0.51 as given, the difference of 2.16 billion pieces shown above would lead to a difference in revenue of approximately $1.1 billion. This revenue change is not, however, equivalent to the change in the revenue requirement, which is beyond the scope of my testimony.

Of course, using the R2005-1 volume forecast in this case, in the face of actual First-Class single-piece letters volumes in the last three quarters of 2005, would be incorrect.

RESPONSE OF POSTAL SERVICE WITNESS THRESS
TO INTERROGATORIES OF GCA

GCA/USPS-T7-8.

Please consider the following simple hypothetical example which deals with the impact on own price elasticity from not including the prices of competing substitutes in a demand equation. Table 1 shows the raw annual data on quantity demanded of good X, the price of good X and the price of substitute good Y, given in Columns 1-3 and the corresponding natural log of these variables, given in Columns 4-6. Column 7 shows the price of substitute Y divided by the price of X and Column 8 shows the price of X divided by the price of substitute Y reflecting the relative prices. Table 2 shows the regression of the natural log of the quantity demanded of good X with respect to the natural log of its own price. Table 3 shows the regression of the natural log of the quantity demanded of good X with respect to the natural log of its own price and the natural log of the price of the substitute good, Y. Regressions were conducted in Excel.

a. Please refer to Table 2. Please confirm that the results for the quantity demanded with respect to its own price when the price of the substitute is excluded from the equation, indicates an own price elasticity of -0.7435, which implies an inelastic demand for good X. If you cannot confirm, please explain and provide the basis for your conclusion in full.

b. Please refer to Table 3. Please confirm that the results for the quantity demanded with respect to its own price when the price of the substitute is included, indicates an own price elasticity of -1.3955, which implies an elastic demand for good X in the presence of the substitute. If you cannot confirm, please explain why.

c. Refer to Table 1 Column 7. Please confirm that the price of the substitute good Y is falling relative to the price of good X. If you cannot confirm, please explain and provide the basis for your conclusion in full.

d. If your answer to (a) is affirmative, please confirm that economic theory predicts that consumers will substitute good Y for good X when the relative price of good Y is falling.

e. Please confirm from economic theory that in the long-run the availability of substitutes for a given good X with falling relative prices should result in the good's own price elasticity becoming more elastic, properly measured. If you cannot confirm, please explain why and provide specific citations to supporting economic authorities.

RESPONSE OF POSTAL SERVICE WITNESS THRESS
TO INTERROGATORIES OF GCA

TABLE 1

date	Qx	Px	Py	LQx	LPx	Lpy	Py/Px	Px/Py
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1990	23.00	142.17	8.00	3.14	4.96	2.08	0.056	17.771
1991	22.61	143.93	8.05	3.12	4.97	2.09	0.056	17.880
1992	23.41	146.50	8.10	3.15	4.99	2.09	0.055	18.086
1993	22.74	150.80	8.20	3.12	5.02	2.10	0.054	18.390
1994	22.04	160.00	8.10	3.09	5.08	2.09	0.051	19.753
1995	16.24	161.30	7.80	2.79	5.08	2.05	0.048	20.679
1996	16.69	170.47	7.68	2.81	5.14	2.04	0.045	22.196
1997	18.20	188.10	8.30	2.90	5.24	2.12	0.044	22.663
1998	18.51	189.37	8.50	2.92	5.24	2.14	0.045	22.278
1999	17.65	189.53	8.60	2.87	5.24	2.15	0.045	22.039
2000	17.68	197.88	8.90	2.87	5.29	2.19	0.045	22.234
2001	17.76	199.77	9.00	2.88	5.30	2.20	0.045	22.196
2002	17.67	211.23	9.10	2.87	5.35	2.21	0.043	23.212

TABLE 2

Dependent Variable: LQx

Regression Statistics	
Multiple R	0.7558
R Square	0.5712
Adjusted R Square	0.5322
Standard Error	0.0934
Observations	13

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.12793	0.12793	14.65073	0.00281
Residual	11	0.09606	0.00873		
Total	12	0.22399			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	6.7903	0.9999	6.7911	0.0000
LPx	-0.7436	0.1943	-3.8276	0.0028

TABLE 3

Dependent Variable: LQx

Regression Statistics	
Multiple R	0.9164
R Square	0.8397
Adjusted R Square	0.8077
Standard Error	0.0599
Observations	13

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	0.1881	0.0940	26.2007	0.0001
Residual	10	0.0359	0.0036		
Total	12	0.2240			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	5.6451	0.6994	8.0710	0.0000
LPx	-1.3955	0.2022	-6.9027	0.0000
LPy	2.1236	0.5187	4.0939	0.0022

RESPONSE:

Before answering your specific questions, I wanted to address your claim that this example illuminates “the impact on own price elasticity from not including the prices of competing substitutes in a demand equation.” In fact, your example here does no such thing. Rather, your example here illustrates the impact on the coefficient of one variable from including or excluding a second variable which is highly correlated with the first variable.

The reason why you find that the “own-price elasticity” changes by so much when the “price of good Y” is added to this equation is not because variable Py has been defined as “the price of competing good Y” but simply because the correlation between Px and Py in this case is equal to 0.7938 (in logs).

This example, therefore, says nothing about the impact on own-price elasticity from excluding the prices of competing substitutes in a demand equation if these

competitor prices are uncorrelated with the own price. Relating this, then, to the case of First-Class single-piece letters and the "price" of electronic alternatives to the mail, this example is only of interest to the extent that we would expect the price of electronic alternatives to be correlated to the price of First-Class single-piece letters.

In fact, I would expect these prices to be quite uncorrelated. I would expect that the price of electronic alternatives to the mail, measured in any meaningful way, has surely declined dramatically over time and, in fact, is likely to be highly negatively correlated with a simple time trend, such as my variable TREND. But, as I explained in my response to GCA/USPS-T7-5(h) above, over the sample period over which the First-Class single-piece letters equation is estimated (1983Q1 – 2005Q4), the correlation between the price of First-Class single-piece letters and a linear time trend (TREND) is −0.0773.

a. Replicating your results in Excel, I get a coefficient estimate of -0.7436, which I assume is due to differences in rounding, so, yes, in general I can confirm both your results and your conclusions.

b. Replicating your results in Excel, I get a coefficient estimate of -1.3950, which I assume is due to differences in rounding, so, yes, in general I can confirm both your results and your conclusions.

c. Confirmed.

d. I don't know that "economic theory" has much to say about whether or how much "consumers will substitute good Y for good X when the relative price of good Y is falling." The price of high-definition television sets has fallen relative to the price of housing in recent years and yet, I am not aware that many people have chosen to go homeless so that they can purchase multiple high-definition televisions.

The extent to which two goods are substitutes and the extent to which consumers would be expected to substitute between two goods because of changes in the relative price of the goods is ultimately an empirical question that can not be answered generally, but can best be answered in a specific case via rigorous econometric investigation.

e. I can confirm that economic theory does suggest that, all other things being equal, a good is likely to be more own-price elastic the more available and closer are substitutes for the product. Hence, if all other things are equal, it could be the case that, as the number and availability of substitutes increases, this will lead to an increase in the own-price elasticity of a particular good. This appears to be the case, for example, with respect to Priority Mail and the increasing market presence of FedEx Ground, as discussed in my testimony at pages 161 and 162 of my testimony.

Of course, all other things are never equal, so this general suggestion need not be applicable to every case. For example, the introduction of a new product may induce more price-elastic consumers to stop using the old product, leaving the average own-price elasticity of the product's remaining customers lower than before the introduction of the new product, even when one accounts for the increasing own-price elasticity of these individual consumers relative to their own individual elasticities prior to the introduction of the new product. It could also be the case that the nature of the two products may make them substitutes, not on the basis of price, but on the basis of other factors, such as relative availability, convenience, or other factors.

RESPONSE OF POSTAL SERVICE WITNESS THRESS
TO INTERROGATORIES OF GCA

GCA/USPS-T7-9.

Please refer to your testimony at page 37.

a. Please confirm that the only reason you applied the Box Cox transformation to your ISP variable was to make it non-linear. If you cannot confirm, please explain and provide the basis for your conclusion in full.

b. Please confirm that this was not a necessary transformation to estimate your model, i.e. you could have left the ISP data as linear in your translog model.

c. Have you applied the Box Cox transformation to all variables rather than just the ISP variable? If "yes", please provide the results.

d. Please confirm that imposing Box Cox coefficient values of zero and one across all variables in your single piece model yields the two extreme versions of the model, namely the log linear version and the linear version respectively. If you cannot confirm, please explain and provide the basis for your conclusion in full.

e. Please confirm that any value between zero and one for the Box Cox coefficients when the transformation is applied across all variables would be a set of values determined by the data rather than imposed by the researcher. If you cannot confirm, please explain and provide the basis for your conclusion in full.

f. Why is your Box Cox coefficient for the ISP variable of 0.122 so different from last year's estimate of 0.326? Provide the basis for your explanation in full.

RESPONSE:

a. As I explained in my testimony at page 37 (see, especially lines 5 – 9), I applied a Box-Cox transformation to the ISP variable because it was not possible to take the natural logarithm of this variable, as I do with most of the variables included in my demand equations, because the ISP variable has a value equal to zero prior to 1988Q2. Making a Box-Cox transformation does not preclude the possibility of the variable entering the equation linearly, which will be the case if the Box-Cox coefficient is equal to one.

b. The First-Class single-piece letters equation could have been estimated with the ISP variable included linearly. Given that the resulting Box-Cox coefficient of

0.122 is significantly different from a value of 1.0, however, it is clear that such a specification would have been inferior to the specification which I used.

c. No.

d. Confirmed.

e. Confirmed.

f. Because the exact specification by which the ISP variable enters the First-Class single-piece letters equation has changed from R2005-1 to R2006-1, these two Box-Cox coefficients are not directly comparable.

CERTIFICATE OF SERVICE

I hereby certify that I have this date served the foregoing document in accordance with Section 12 of the Rules of Practice and Procedure.

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Eric P. Koetting

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