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Washington, DC 20268-0001

Rate Adjustment Due To Extraordinary	:	
or Exceptional Circumstances	:	Docket No. R2013-11

Statement of Dr. James A. Clifton

on Behalf of the Greeting Card Association

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My name is James A. Clifton. I am the President of Clifton Associates LLC, (CLASSLLC) headquartered in Potomac, Maryland. CLASSLLC engages in the strategic use of economic analysis for private sector clients in a variety of venues, including federal and state legislative and regulatory policy, economics-based negotiating strategies, and expert testimony in judicial and quasi-judicial proceedings at the federal and state levels.

This is the fifteenth case in which I have submitted comments to or testified before the Commission. I testified before the Postal Rate Commission on a regular basis from 1990 through 2006. These included rate and reclassification cases, R90-1, R94-1, MC95-1, R97-1, R2000-1, R2001-1, R2005-1 and R2006-1. Under PAEA, private sector client consulting performed under my direction has been submitted in several cases, including R2010-4, R2010-4R, N2010- 1, N2012-1, RM2012-6 and RM2010-13.

I graduated from Cornell University with an A. B. in economics and was a Ford Foundation Fellow and President of the John R. Commons Club at the University of Wisconsin-Madison, where I received a Ph. D. in economics. In addition to strategic economic consulting, I have been Minority Staff Director of the Committee on the Budget, U. S. House of Representatives, Vice President of Finance and Chief Economist for the Manufactured Housing Institute, senior regulatory economist at the U. S. Chamber of Commerce, affiliated with the Washington DC offices of LECG Inc. and Nathan Associates LLC, and professor of graduate programs at Catholic University of America, assistant professor at the University of Maine-Orono, and Visiting Professor at Cambridge University.

I. INTRODUCTION

The Postal Service's request for a two cent increase in the first ounce rate for Single-Piece FCLM will be understood by consumers as a three cent increase because the proposed rates for the exigent increase and the mandatory price cap increase of one cent will happen on or around the same date in early 2014. For Single-Piece, the proposed exigent increase cannot be justified on the grounds stated by the Postal Service that the recession accelerated the diversion of Single-Piece volume to the Internet and, therefore, indirectly if not directly caused a significant drop in Single-Piece during and since the 2008-2009 recession.

The Postal Service's conclusion is based on an intricate econometric argument that there have been three distinct trends in diversion of Single-Piece: one starting in 1992Q4, the second starting in 2002Q4, and the third starting in 2007Q4. The Postal Service states in its filing of July 1, 2013[1], that Internet diversion caused the volume of Single-Piece to drop at an annual rate of -3.8% during the first trend, -4.7% during the second trend, and -9.7% during the third trend, double the rate of trend 2. (Narrative, page 15). The Narrative is referenced in R2013-11 in the "Further Statement of Thomas E. Thress on Behalf of the United States Postal Service", Appendix II, page II-1) as explaining the econometric demand equations submitted on September 26, 2013. Witness Thress in a Technical Conference held October 31, 2013 at the Commission has since rejected the above percentages, but in his "Further Statement" trend 3 commencing with the recession remains twice the rate of decline of trend 2.

The problem with the Postal Service's (and witness Thress's) argument is that when one peels back all the layers in the econometric analysis, there is essentially no difference in the annual rate of decline of Single-Piece volume caused by Internet diversion between the second and third trends. The peculiar way in which the Postal Service and witness Thress "filter" their macroeconomic employment variable and other factors in the Single-Piece demand equation causes diversion trend two to differ

[1] "Narrative Explanation of Econometric Demand Equations for Market Dominant Products Filed with Postal Regulatory Commission on January 22, 2013". Hereafter "Narrative".

significantly from diversion trend three. Several econometric tests GCA conducts of witness Thress's demand equation show little or essentially no difference between trend two and trend three, only 9.5 million pieces more per quarter in one test. GCA concludes that the recession had neither a direct nor an indirect material impact on the rate of Internet diversion compared to the rate of diversion before the recession and since the recession ended.[2] Thus, the Postal Service cannot claim any exigent circumstances in this case whatsoever which would justify raising Single-Piece FCLM rates by one cent, let alone 2 cents above the price cap increase.

Even if the Postal Service could claim exigent circumstances in the case of Single-Piece volume declines, raising Single-Piece first-ounce rates from their current level of 46 cents by two (or three) cents would be far too dubious and risky as a means of raising any further revenue compared to current rates. That is because the own-price elasticity of Single-Piece FCLM used in the demand equation to determine the impact of the exigent rate increase on Single-Piece volume is not credible. In fact, among a dozen independent studies of Single-Piece own-price elasticities, the Postal Service's price elasticity value (and that of the May 1, 2013 study by the USPS OIG) is a statistical outlier. There is a 99% probability that the own-price elasticity of Single-Piece FCLM is greater than -0.3, a 95% probability it is greater than -0.35 and a 90% probability that it is greater than -0.4.

In light of all the independent estimates of Single-Piece FCLM own-price elasticity made by highly respected academicians and postal analysts from five countries including the U. S., the current true value lies between -0.7 and -0.8. A three cent increase in the price of Single-Piece FCLM first ounce rates could easily push that value at the margin to -1.0 or over -1.0. In that case, the revenue raised from such a rate increase would be no more than, or less than, current revenue at 46 cents. Even if the own-price elasticity is still in the absolutely inelastic range at the margin after a three cent rate increase, the extra revenue raised would be far less than the Postal Service

[2] The Postal Service in this case has changed the position it held in R2010-4/4R, and has adopted the position that GCA held in R2010-4/4R with respect to the exigency and Single-Piece volume, namely that the 2008-2009 recession had no direct impact on Single-Piece volume.

claims it would be, making the proposal relatively unattractive compared to non-rate alternatives to cutting its deficits.[3]

In this case, the situation the Postal Service faces in trying to raise revenue is even worse when it comes to very-high contribution First-Class workshared letters. The six independent studies of Presort own-price elasticities GCA examined strongly suggest that when modeled correctly, the own-price elasticity of First-Class workshared letters is already in the absolutely price elastic range, at least -1.0 and probably closer to -1.1 or -1.2. There is little to no uncertainty about the revenue impact of raising Presort FCLM rates as proposed by the Postal Service in this case. The rate increase will cause the Postal Service to lose revenue and will increase its deficit. The Postal Service's econometric demand equation for Presort FCLM is fundamentally flawed because it does not incorporate any cross-price elasticity for esubstitutes or, as a second best approach, any simulation of the changing relative prices between letters and esubstitutes.[4] The studies which do incorporate either form of a cross-price elasticity for esubstitutes lead to estimates of the own-price elasticity for Presort FCLM that are at least three times the Postal Service's estimate of -0.345.

II. A REVIEW OF THE USPS CASE IN R2010-4/4R AND GCA'S RESPONSE

A comparison of the Postal Service's initial request for an exigent rate increase in R2010-4 and its current request in R2013-11 is provided below in TABLE ONE.

GCA submitted a Detailed Analysis (DA1) of the sources of lost volume in R2010-4R as part of its Comments filed with the Commission on July 25, 2011, and again with its Reply Comments filed on August 1, 2011 (DA2). It conducted "linear and

[3] The Postal Service's deficit fell in FY2013 in part due to the fruition of some cost cutting strategies.
[4] Simulations rest on the known fact that while we may not have a direct time-series data base for the price of esubstitutes in most cases, we do know with certainty that the relative price of letter mail has increased substantially as esubstitute prices have fallen greatly. Such simulations incorporated into traditional NPO econometric demand studies such as the Postal Service's are an important way of improving the accuracy of postal volume forecasts in a period of higher uncertainty and risk caused by Internet competition than existed when those demand models were first constructed.

non-linear best fits to postal volume data from the first quarter of PFY 2005 through the second quarter of PFY 2011 using RPW data." (DA1, page 9).

TABLE ONE

R2010-4 and R2013-11, Exigency Revenue Request

	R2010-4 % Change	R2010-4 $ Change	R2013-11 % Change	R2013-11 $ Change
FCM:				
Single-Piece Letters & Cards	4.652%	$616,855,582	4.276%	$464,152,564
Presort Letters and Cards	5.927%	$969,667,277	4.291%	$659,642,333
Flats	6.256%	$207,095,541	4.627%	$123,052,260
Parcels	5.415%	$61,871,846	4.349%	$29,385,529
DVD Mail	0.000%	$0	4.297%	$2,904,379
FCM International	4.973%	$46,297,704	2.391%	$13,600,018
Total Change	**5.433%**	**$1,901,787,950**	**4.281%**	**$1,292,737,084**
Standard Mail:				
LFP	5.985%	$727,803,168	4.264%	$500,485,891
ECR	4.681%	$224,761,942	4.266%	$230,917,685
Total Change	**5.616%**	**$952,565,110**	**4.264%**	**$731,403,576**
Periodicals:	8.035%	$154,315,980	4.297%	$73,938,480
Package Services:	6.700%	$105,454,416	4.303%	$37,287,443
Overall Change:	5.6%	$3,114,123,456	4.3%	$2,135,366,583

Sources:
Docket No. R2010-4,
FCM_Worksheets_Revised_Aug62010.xls
Docket No. R2010-4,
Standard_Mail_Wrkshts_Revd_Aug62010.xls
Docket No. R2010-4, Periodicals Worksheet Exigent Request, USPS-R2010-4/3
Docket No. R2010-4, Package Services Mail Worksheet, USPS-R2010-4/4

Docket No. R2010-4R (9-26-2013), First-Class Mail Work Sheets, WP-FCM-R2010-4R.xls, USPS-LR-R2010-4R/2
Docket No. R2010-4R (9-26-2013), Standard Mail Work Sheets, WP-STD-R2010-4R.xls, USPS-LR-R2010-4R/3
Docket No. R2010-4R (9-26-2013), Periodicals Work Sheets, WP-PER-R2010-4R.xls, USPS-LR-R2010-4R/4
Docket No. R2010-4R (9-26-2013), Package Services Work Sheets, WP-PSVC-R2010-4R.xls, USPS-LR-R2010-4R/5

The data was run excluding the six quarters of the 2008-2009 recession, and then re-run including the recession data. The equations estimated were nearly identical, indicating that "even if there had not been a recession in 2008-2009, Single-Piece volumes would have continued to fall at the same rate that they did during and after the recession." (DA1, page 10).

$Y = -182.71x + 11,700$	$R^2 = 0.8079$	Recession data excluded
$Y = -187.72x + 11,719$	$R^2 = 0.8002$	Recession data included

For Single-Piece FCLM, no-non-linear estimation outperformed the above linear equations. The R^2 in the non-linear estimation was 0.8045 including recession data and 0.8181 excluding recession data.[5] (Non-linear estimation outperformed linear in all other mail subclasses tested except for Periodicals mail.) GCA concluded that "[h]ad the recession never happened, Single-Piece volumes would have fallen at the same rate due to broadband diversion as they in fact did during and after the 2008-2009 recession." (DA1, page 10).

GCA's detailed analysis (DA2) submitted with its Reply Comments on August 1, 2011 focused only on the Postal Service's Initial Comments in R2010-4R. It noted that the Postal Service was now asking "for a $2.34 billion rate increase above any CPI cap" whereas its original request in R2010-4 was for a $3.11 billion exigency increase. (DA2, page 1). However, GCA noted that the Postal Service provided a menu of quantification options, of which one claimed "$11.86 billion in exigent losses including "losses" from the recovery to date, which volumes are lower than they would have been without the 2008-2009 recession. If taken seriously, this is an exigent rate "request" effectively 400% over its initial request in the case. It is $3.56 billion more than the Postal Service needs to close its projected $8.3 billion budget deficit in FY2011 in its entirety." (DA2, page 2).

[5] Non-linear estimation outperformed linear in all other mail subclasses tested except for Periodicals mail.

This “method two” analysis was based on generating not only $7.24 billion in extra revenue, but also making up for $4.62 billion in attributable cost cuts that the Postal Service said it was unable to make to keep up with the volume declines from FY2007-FY2009. As GCA stated:

> The ‘add-on’ to these losses is expressed as the volume variable costs incurred that should not have been, had the Postal Service been able to cut these costs step-by-step with declining volume. The Postal Service argues that it could not keep up with the rate of declining volume in trimming these volume variable costs, and that they are therefore exigent losses for which it should be compensated.” (DA2, pages 4-5)

In R2013-11, four years since the end of the recession, the Postal Service has still not kept up with the rate of decline in volume in its cost cutting efforts, and this argument it used in R2010-4R is even less plausible now as an excuse for raising rates than it was a couple years after the recession.

In R2010-4/R, using a “method 5” analysis, the Postal Service asked for $2.34 billion, not substantially different than its $2.14 billion request in R2013-11. The Commission rejected its $2.34 billion request in 2010. The only substantive macroeconomic difference between then and now is four years of economic recovery and expansion since the 2008-2009 recession rather than one year in 2010. Since the Commission rejected any exigent rate request right after the recession, when its impact was most pronounced, it is very hard to see how it could ever justify essentially the same request for the exact same exigent circumstance four years after the fact.

The fact that the Postal Service’s finances have worsened since the end of the recession does not in the least mean that that is due to the lingering effects of the recession. The factors that have caused its finances to deteriorate are well known: (1) the excessive pre-funding requirement for Retiree Health Benefits in PAEA; (2) the unwillingness or inability of postal management to trim its operating costs in step with the longstanding negative trend in its traditional letter markets due to Internet diversion,

a trend it should have anticipated and reacted to far more aggressively than it did at the end of the twentieth century rather than a decade and a half later.

III. THREE MORE YEARS OF DATA SINCE R2010-4/R STRENGTHENS GCA'S CONCLUSION THAT THERE WAS NO CHANGE IN THE LONG RUN TREND OF DIVERSION IN SINGLE-PIECE DURING OR SINCE THE RECESSION

A. Sources of Change Circa 2010 and Sources of Change Circa 2013

The Postal Service is at great pains in this case to prove that a material change in the volume of Single-Piece letter mail was caused by the last recession, or at least is highly correlated with its start after 2007Q4. If it cannot make this case, it is not possible to justify an exigent rate increase for Single-Piece. The Commission's Order No. 864 at page 42 made clear that the Postal Service cannot justify an exigent rate increase due to volume losses caused by the long-run structural change of competition from the Internet. Thus, the Postal Service has to have an argument that Internet diversion is the product of two influences: (1) Diversion not caused by the recession, or "long-run (LR) diversion"; and (2) Diversion caused by the recession, or "short-run (SR) diversion." "Pure diversion" and "diversion" are other common terms for the former, and "rec/div" is witness Thress's label for the latter.

The view of the Postal Service in 2010 on diversion and recession is perhaps best summarized in its response to GCA/USPS-T2-1-2 in another case, N2010-1. This included a detailed reply to the questions along with a "sources of change" table. "Specifically, macroeconomic effects account for approximately 69 percent of all the exclusively downward effects on volume (total market dominant and competitive products) in FY2009. …. Broadly speaking, it seems fair to say that the effects of the recession appear to account for something in the general neighborhood of two-thirds of the volume decline experienced in FY2009." For First Class Mail as a whole, "one sees a bump in estimated diversion from figures in the 2-3 percent range in 2002 to 2006, up to figures above 4 percent in the 2007-2009 period, coinciding with what we now believe

to be the beginning of the recession. While disentangling various effects is not an easy task, these data support the hypothesis that the recession may have accelerated diversion of First-Class Mail to the Internet." It is noteworthy that in response to that question as well as the exigent cases in 2010 and 2011 and R2013-11 that the Postal Service is careful to talk about the impact of the recession on "First Class Mail as a whole".

For First-Class Single-Piece Letters, the sources of change in mail volumes table from its answer to GCA in N2010-1 attributes nearly all of the lost volume to the Internet, not macroeconomic factors (principally the recession), as seen below in TABLE TWO.

TABLE TWO

Volume Losses in Single-Piece FCLM, 2010 Sources of Change

Year	Macro Factors	Internet
2007	(239.5)	(3,099.7)
2008	(606.6)	(3,263.2)
2009	(1,261.2)	(3,240.9)

In R2013-11, TABLE THREE below summarizes how the Postal Service now views sources of change due to the last recession in Single-Piece First-Class letter mail. Macro Factors now account for 54.7% for the decline in Single-Piece due to the impact of the recession while Diversion accounts for 45.3%. This is quite a large change in opinion even for the Postal Service and witness Thress in a mere three years. From TABLE TWO above, Diversion originally accounted for 92.7% of falling volume in the last year before the recession, 84.3% during the first year of the recession in 2008, and 72% during the last year of the recession. On average, before the advent of Mr. Thress's "Intervention Analysis" using three linear trends for Single-Piece, Macro Factors accounted for 18% of the drop in Single-Piece volume for the three years in TABLE TWO, and 22.3% during the recession years. In a mere three years, Macro

Factors have become 245% greater as an explanation for the decline in Single-Piece in the Sources of Change analysis sponsored by the Postal Service.

TABLE THREE

2013 Sources of Change, First-Class SP Letters
(Volume in millions)

			Intervention Decomposition		
	Col1	Col2=Col3+Col5	Col3	Col5	Col6=Col1+Col5
Time	**Employment**	**Interventions**	**Diversion**	**Rec/Diversion**	**Total Macro**
2002	(386)	(1,802)	(1,802)	0	(386)
2003	(415)	(1,875)	(1,875)	0	(415)
2004	(320)	(1,828)	(1,828)	0	(320)
2005	(245)	(1,764)	(1,764)	0	(245)
2006	(281)	(1,691)	(1,691)	0	(281)
2007	(439)	(1,744)	(1,632)	(112)	(551)
2008	(626)	(2,973)	(1,548)	(1,425)	(2,051)
2009	(672)	(2,992)	(1,392)	(1,600)	(2,271)
2010	(533)	(2,722)	(1,267)	(1,455)	(1,988)
2011	(282)	(2,457)	(1,143)	(1,314)	(1,595)
2012	(61)	(2,249)	(1,047)	(1,203)	(1,264)

Notes:

Intervention = Diversion + Rec/Diversion = Col3+Col5
Diversion = Pure Internet Impact on Volume = Col3
Rec/Diversion = Internet Diversion due to macro-economic conditions, acceleration of internet diversion during the recessionary period = Col5
Employment = Macro impact but not the total macro impact
Total Macro Impact = Employment + Rec/Diversion = Col1+Col5
Recession = Col4 = Used for some demand equations, but not single piece
Thress has a trend variable which is zero before 2007 and then 1, 2, 3, 4, 5 and etc. for years starting with 2007 and after.

Source: Sources-of-ChangeCalcs.xlsx in USPS-R2010-4R/10.

Lost volume from the macroeconomic variable “employment” is listed by year from 2002 through 2012 in column one of TABLE THREE. As expected, these losses are higher during the two recession years of 2008 and most of 2009. Unexpected, indeed counter-intuitive, is the fact that they are negative throughout the recovery and growth years between the 2001-2002 recession and the 2008-2009 recession. Employment was growing in these years, not falling. The second column introduces a term called “intervention”, a new econometric technique used by the Postal Service (and

witness Thress) for the first time in the econometric demand equations submitted to the Commission on January 22, 2013. This new technique was never explained until the July 1 Narrative.

> For the present set of demand equations, this use of "cumulative negative trend" variables has been abandoned. Instead, the unique impacts of the 'Great Recession' on mail volumes are estimated using a technique called Intervention Analysis which fits a non-linear function to the dependent variable (mail volume). The resulting intervention variables are smooth functions which shift gradually from zero to a "ceiling" level which represents the full unique impact of the Great Recession (or some other "intervention" event) on mail volume. (Narrative, page 9)

The impact of total Interventions on Single-Piece FCLM during the Great Recession was 2,973 million pieces in 2008 and 2,992 million pieces in 2009 as seen in column 2. The total Interventions are decomposed into parts in columns 3 and 5.

Unlike the 2010 and 2011 exigent cases, the Postal Service is now claiming that there was an <u>indirect</u> negative impact on Single-Piece FCLM as a result of the recession: an acceleration in the diversion of Single-Piece volume to the Internet not only throughout the recession, but ever since it ended as well. These volume losses are shown in column 5, and the long-run Internet diversion not due to the recession, or pure diversion, is shown in column 3. The total volume loss caused directly or indirectly by the recession (during and since) is the sum of losses from employment in column one plus losses from the acceleration of Internet diversion allegedly caused by the recession in column five. This sum by year is seen in the last column of <u>TABLE THREE</u> labeled "Total Macro".

What is the result on claimed losses in R2013-1 compared to R2010-4/4R as a result of changing the technique used to estimate econometric demand equations for Single-Piece FCLM? <u>TABLE FOUR</u> below shows the differences are dramatic and higher. For example, while the Total Macro loss in Single-Piece volume from the recession in 2008 (measured by fluctuations in employment) in the 2010 dockets was 442 million pieces, with the new econometric technique of Intervention Analysis, the

TABLE FOUR
Sources of Change in R2010-4/R and R2013-1, First-Class SP Letters

	Population		Employment		Own Price Elasticity		Inflation		Interventions	Internet	Intervention Decomposition			Total Macro	
											Diversion	Recession	Rec/Diversion		
	2013	2010	2013	2010	2013	2010	2013	2010	2013	2010	2013	2013	2013	2013	2010
2002	559	580	(386)	(878)	(123)	(171)	124	147	(1,802)	(1,717)	(1,802)	0	0	(386)	(878)
2003	536	553	(415)	(585)	(529)	(619)	148	182	(1,875)	(1,824)	(1,875)	0	0	(415)	(585)
2004	479	493	(320)	(220)	(0)	0	139	172	(1,828)	(1,710)	(1,828)	0	0	(320)	(220)
2005	472	477	(245)	15	0	0	186	230	(1,764)	(1,854)	(1,764)	0	0	(245)	15
2006	442	447	(281)	58	(154)	(207)	223	269	(1,691)	(2,038)	(1,691)	0	0	(281)	58
2007	448	447	(439)	(151)	(193)	(228)	141	170	(1,744)	(2,876)	(1,632)	0	(112)	(551)	(151)
2008	400	404	(626)	(442)	(200)	(231)	199	248	(2,973)	(3,081)	(1,548)	0	(1,425)	(2,051)	(442)
2009	337	360	(672)	(1,063)	(128)	(158)	56	57	(2,992)	(3,054)	(1,392)	0	(1,600)	(2,271)	(1,063)
2010	308		(533)		(167)		34		(2,722)		(1,267)	0	(1,455)	(1,988)	
2011	284		(282)		(3)		79		(2,457)		(1,143)	0	(1,314)	(1,595)	
2012	272		(61)		(45)		106		(2,249)		(1,047)	0	(1,203)	(1,264)	

Notes:
2013 Total Macro = Employment+Rec/Diversion
2010 Total Macro = Employment

Diversion means pure internet diversion
Rec/Diversion means internet diversion due to recession

Sources: Sources-of-Change.xlsx in R2010-4(R) Volume Loss Filed on November 21 2011 and
Sources-of-ChangeCalcs.xlsx in USPS-2010-4R/10 filed on Filed on 9-26-2013.

Total Macro losses were 2,051 million pieces, of which 69.5% was allegedly due to the acceleration of Internet diversion of Single-Piece after 2007Q4. In 2009, the old econometric technique showed Total Macro losses in Single-Piece volume of 1,063 million pieces while the new econometric technique using Intervention Analysis shows 2,271 million pieces lost, 70.4% of which was allegedly due to the acceleration in diversion caused by the recession.

The new technique assumes, of course, that there was a distinct "third" trend in diversion of Single-Piece volume continuing well past the recession. In 2012, the "lingering" Total Macro volume losses in Single-Piece are shown to be 1,264 million pieces. The percentage allegedly due to the acceleration of diversion is now 95.2% of the Total Macro impact in 2012 from the 2008-2009 recession. Even with witness Thress's answer to POIR No. 6, question one in this case, however, it has yet to be explained the quantitative step-by-step procedures used to apportion Diversion between pure diversion and short run diversion (rec/div) in his econometric model.

B. The Postal Volume Declines Caused by the Recession Are Apparent from Quarterly RPW Data in the Classes and Products that Were Affected

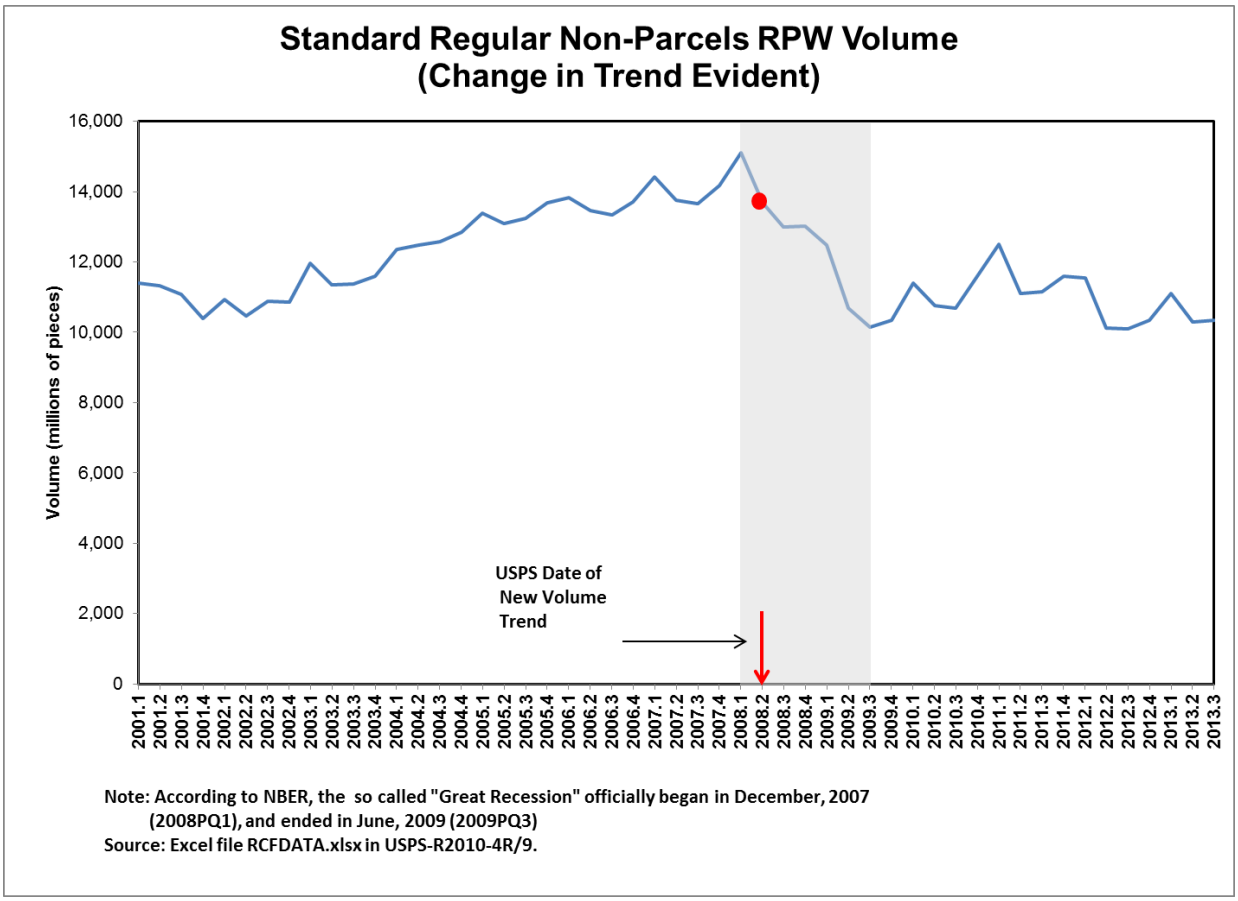
The charts which follow are the plots of actual quarterly volume data pre-recession, recession, and post-recession. The shaded area in the attached graphs is the recession period. The red arrows mark the starting dates of three trends in internet diversion of Single-Piece FCLM, Workshared FCLM, Standard Regular and Standard ECR that are based on the judgment of the econometrician and his investigation of spikes in recursive residuals.[6]

Standard Regular is the clearest case of a major market dominant product for the Postal Service that was greatly impacted by the recession. The break seen in Figure 1

[6] The only tables of recursive residuals for the single piece demand equation in the econometric output appear to be the final ones, where there are no spikes. The judgment of the econometrician as a factor in choosing the starting dates for three trends is based on a statement made by USPS witness Thress in a technical conference on 10/31/13, recorded on the Commission's website. On November 22, at 4 p.m. the Postal Service submitted material relating to this issue that, given its length, cannot be examined by the November 26th due date of this Statement. See USPS answer to POIR No. 8, question 1, pp. 1-86.

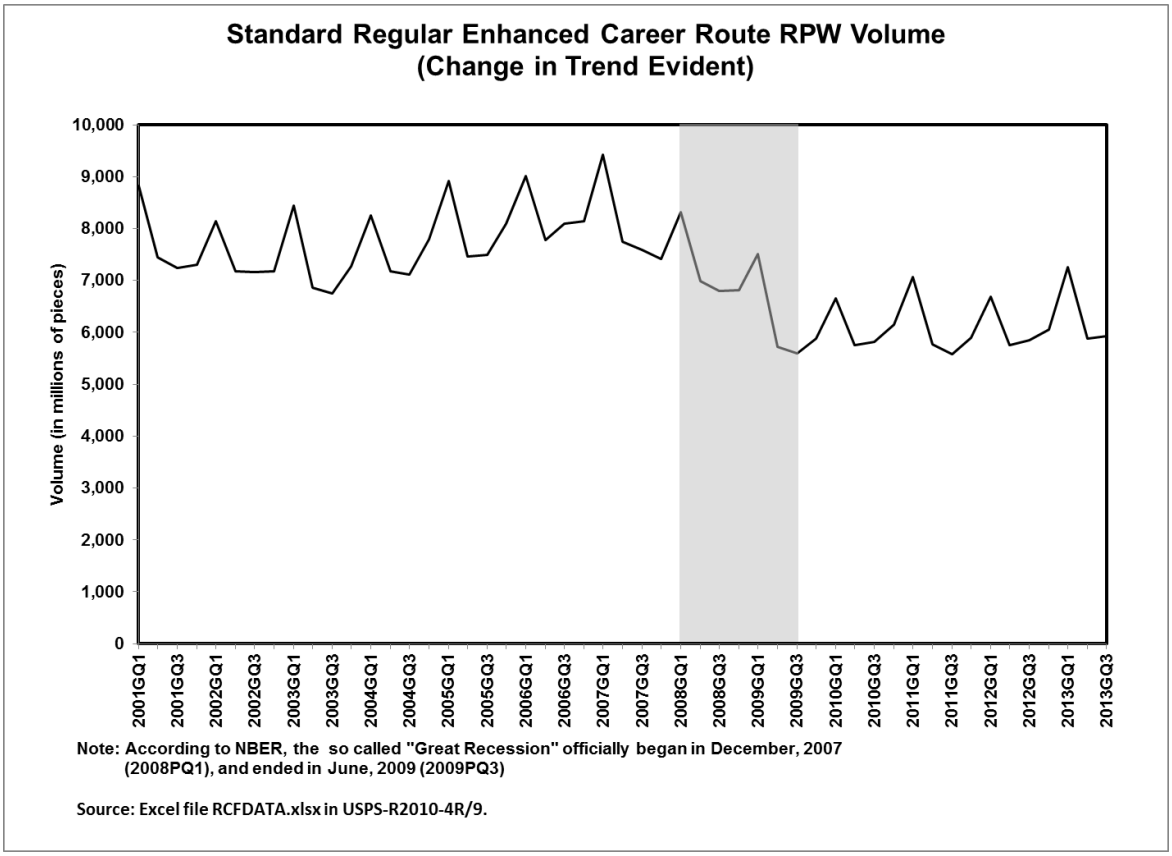
between continuous volume growth followed by a sharp downturn almost simultaneously with the onset of recession is clear-cut and dramatic. Volume has recovered since the end of the recession, but starting with 2011 appears to be trending back towards recession lows.

Figure 1



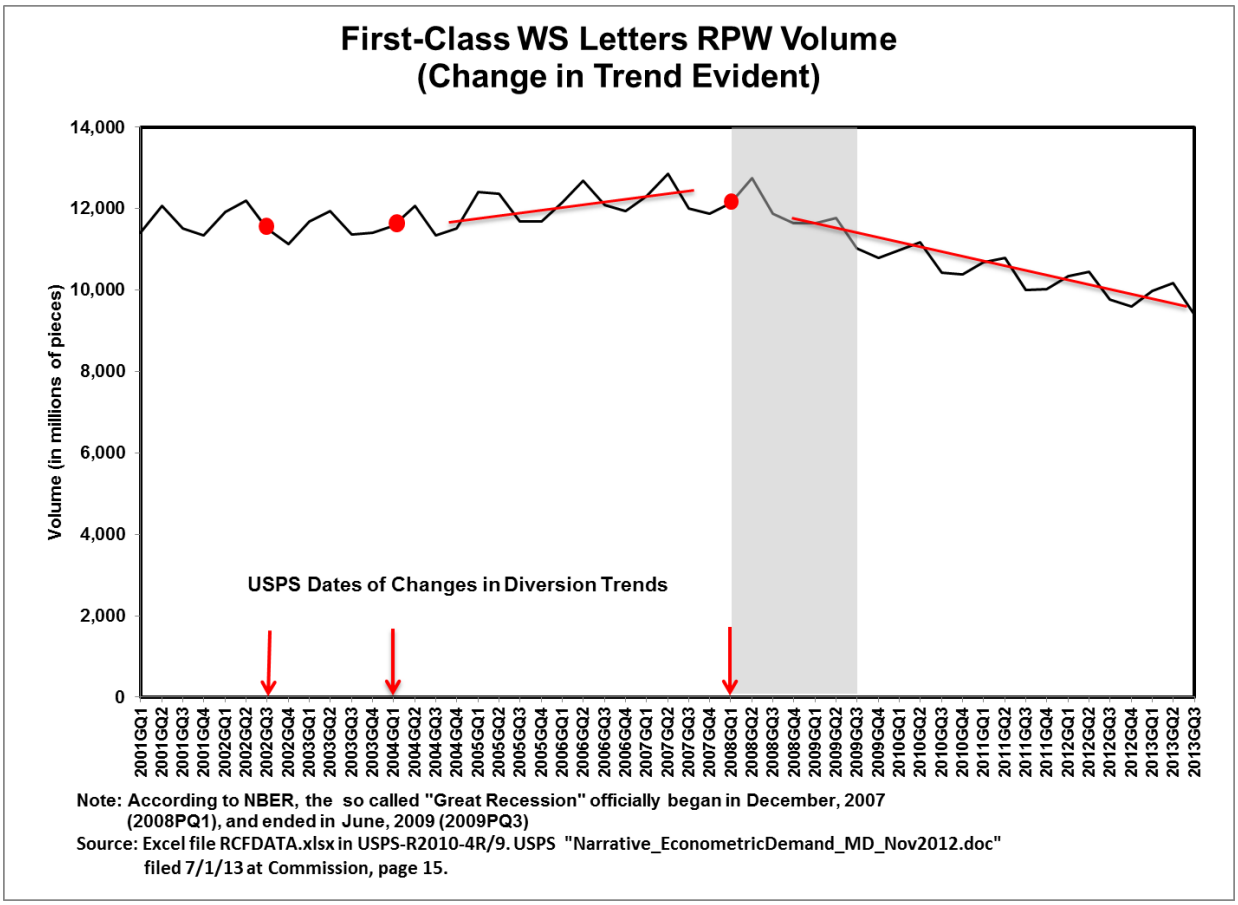
Standard ECR volume was also clearly affected by the recession. It was a leading indicator of its onset as seen in Figure 2. Volume fell outside the bounds of normal volatility after 2007Q2 before the start of the recession and followed that same trend until the end of the recession. Volumes have since stabilized, trending around recession lows at levels substantially below the pre-recession stability of ECR (8 billion pieces then vs. 6 billion now).

Figure 2



Presort FCLM is not a market dominant product one could conclude much about in 2010. GCA concluded that the impact of the recession on Presort volume was ambiguous. Extra quarterly data available in this case now makes it clear that Presort volume was hurt by the recession, and has never recovered since. (See Figure 3 below). It did not peak until the second quarter after the recession began although the Postal Service dates the start of a new Presort trend with the start of the recession in 2008Q1, one quarter before the new trend in Standard Regular. Presort experienced mild growth for some years before the recession. However, since the second quarter of 2008, Presort FCLM has exhibited a falling trend at about the same rate of decline post-recession as during the recession, indicating a planned phase-in of esubstitutes for transaction mail carried out systematically for long-run purposes. Did the recession cause the private sector's substitution of electronic products for bank and credit card statements?

Figure 3



This diversion would very likely have happened anyway but the planning and execution became timed differently as a result of the recession. Therefore, it is difficult to answer whether the decline in Presort during the recession was “caused by” the exigent evident or by plans in the making associated more with pure or long run diversion. The business facts and the continuation of the same new trend since the recession ended point to the latter explanation.

On page 11 of the July 1 Narrative, the Postal Service explains Intervention trends in its demand models: “As noted above, Intervention Analysis of this type is used to model unique aspects of the ‘Great Recession’ on several classes of mail, most significantly Standard Mail.” Figure 1 above does show a precipitous drop in Standard Mail that coincides with the NBER dating of the start of the recession. The drop is a

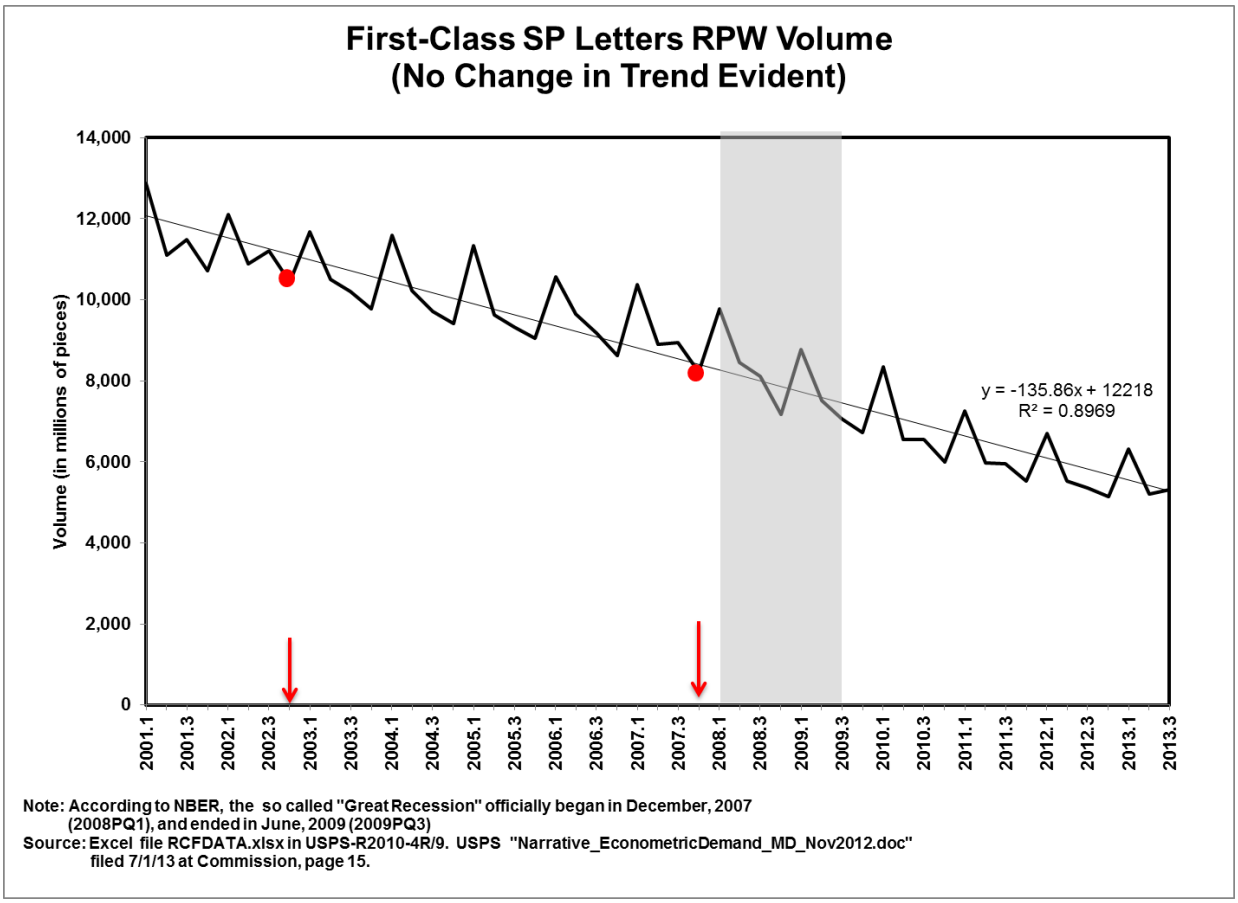
complete departure, a different trend altogether, from the relatively steady growth of Standard Mail volume leading right up to the start of the recession. The decline in Standard ECR and First-Class workshared mail is not as dramatic a change in trend as with Standard Regular, but it is clearly evident in Figure 2 and Figure 3 above. (Corresponding changes in quarterly RPW volume for Standard non-profit and Periodicals before, during and since the recession are found in APPENDIX I.)

What does USPS witness Thress say about the pre-recession, recession and post-recession volume trends in Single-Piece? The discussion appears in two documents; (1) his testimony in this case, "Further Statement of Thomas E. Thress…", (Docket Number R2013-1, Filed 9/26/13), (hereafter "Further Statement"; and (2) a companion narrative filed by the Postal Service without Docket Number on July 1, 2013, "Narrative Explanation of Econometric Demand Equations for Market Dominant Products Filed with Postal Regulatory Commission on January 22, 2013" (hereafter "Narrative").[7] In the Postal Service's July 1st Narrative the following statement is made which attempts (unsuccessfully) to link the observable downward trend in raw RPW quarterly data observed in Presort starting with the recession to the manufactured trend for Single-Piece observable only in the econometric demand model, but not the raw RPW quarterly data as seen in Figure 4 below.[8]

[7] It is unfortunate and a bit odd that this document is buried together with and after an unrelated filing on cost segments on July 1, 2013, rather than accompanying the econometric demand equations filed with the Commission on January 22, 2013 as such narratives have been since 2007. The Daily Listings at the Commission for July 1, 2013, state USPS filed a document "Summary Description of USPS Development of Costs by Segments and Components, Fiscal Year 2012; and Narrative Explanation of Econometric Demand Equations for Market Dominant Products as of November, 2012." Had the Narrative been filed in a timely manner in January it would have given prospective intervenors in this case adequate time to thoroughly look into the substantial differences in the Postal Service's econometric work than can be accomplished in the short timetable for Comments and analysis in an exigent rate case. The Postal Service has not offered any explanation for the 5 month delay in filing the Narrative or any explanation as to why it was listed with and after entirely separate CRA data in the Commission's daily listing.

[8] The term "manufactured" is used here to describe variables for which complex transformations have been made to basic data from BLS, BEA, Global Insight and related sources in order to serve the purposes of the econometric demand equations, the over-riding objective of which is to produce high R^2 for multiple regressions run against historical data. The danger of such a unilateral focus is that, in return for marginal improvements in R^2, it can distort the true micro- and macro- economic relationships between independent variables, especially as they actually exist in the historical context under investigation.

Figure 4



> The third and (so far) final diversion trend in the First-Class Single-Piece letters demand equation is estimated to have begun in 2007Q4. The timing here coincides closely with the onset of the 'Great Recession' (the NBER dates the recession as having started in 2008Q1). Like the second diversion trend, it also coincides closely with increased diversion of First-Class workshared letters as well, which has a second diversion trend that starts in 2008Q3. This third trend reflects further acceleration in the shift of many types of mail to electronic alternatives, a trend which appears to have been accelerated in part due to the 'Great Recession'. This third trend is estimated to have more than doubled the prior diversion rate, leading to an overall annual diversion rate of -9.7%. (Narrative, page 15.)

The above statement insofar as Presort is concerned is supported by looking at 2008Q3 in Figure 3 above. A peak is reached in 2008Q2, and the trend that follows thereafter during and since the 2008-2009 recession is noticeably different than the trend for First-Class Presort letters that preceded it. Is the same true for Single-Piece?

Unlike the RPW quarterly volume trends in Figures 1-3, there is no material difference in the diversion trend for Single-Piece before, during and after the 2008-2009 recession in Figure 4 above. A single linear trend from 2001 through 2012 has a very high R^2 value of .8969, one that does not entail any manipulation of the demand equation or manufacture of independent variables within it to maximize the R^2.

One of the greatest puzzles for the Commission as well as for GCA in the case presented by the Postal Service in R2013-11 in its econometric demand models is why changes in mail volume trends associated with the onset of the last recession are evident in RPW data as well as the Postal Service's econometric demand models for all major postal products except for Single-Piece FCLM. Only by using the manufactured trends in its econometric demand equation can the Postal Service contend that the average annual drop in Diversion of Single-Piece volume more than doubled annually after 2007Q4 compared to the average annual drop in a second manufactured trend which started in 2002Q2. It may well be that such a manufactured trend in Single-Piece was felt to be necessary because of the Postal Service's equitable arguments surrounding the across-the-board nature of its revenue request; if it could not show an exigent cause for the fall in a major volume, revenue and contribution product like Single-Piece, the across-the-board rate increase would have to be thrown out for all postal products, not just Single-Piece, because the latter is fully 30% of the total contribution loss from the recession calculated by the Postal Service.

How does the Postal Service manufacture an econometric demand model for Single-Piece showing distinct trends in diversion, especially the precipitous one it claims started in 2007Q4 when it is not evident in the least from the quarterly RPW data in Figure 4? For the proposed rate increases in this case, if any are to be approved by the Commission, should it rely on what the quarterly RPW data show, or the entirely different story that the Postal Service's manufactured trends for Single-Piece show? Sections C. and D. below seek to answer that question.

C. Regression Lines for the Postal Service's Three Linear Diversion Trends

The Narrative states that for the Single-Piece FCLM demand equation, "diversion is no longer modeled via explicit Internet variables, but, instead, is measured through a series of simple linear time trends which start at various times within the sample periods over which the Postal Service's demand equations are estimated." (Narrative, page 15).

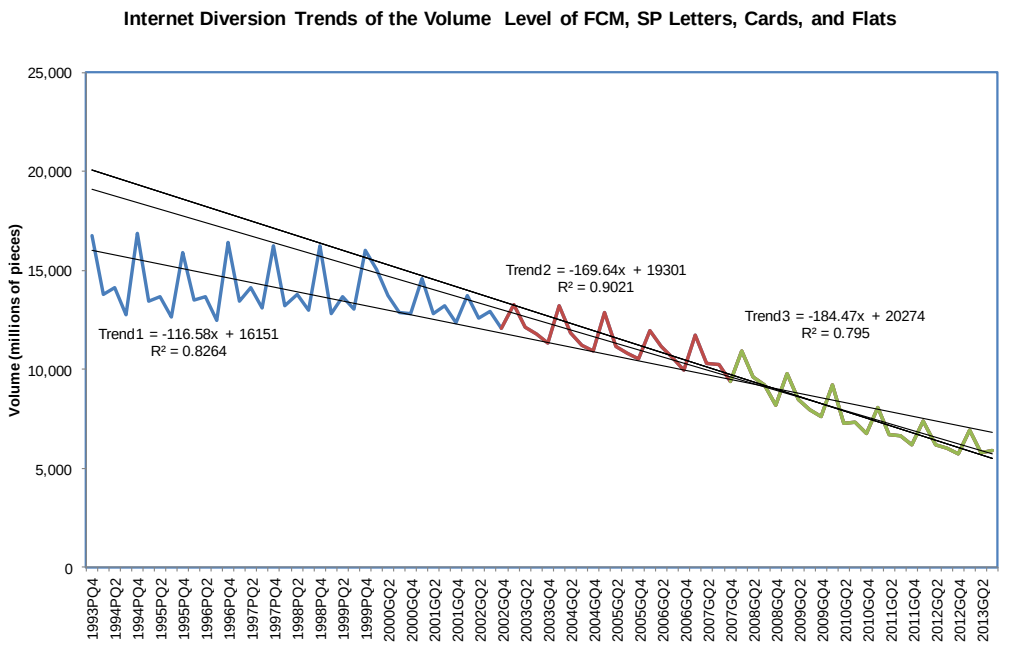
Figure 5 depicts these three linear trends as three colors for the quarterly data plotted. Using quarterly RPW volume data, one can see that the slope of Trend Line 2 immediately preceding the recession is extremely close to that of Trend Line 3, not twice the rate of decline as observed in the Postal Service's manufactured trends in its econometric demand equation for Single-Piece.

Witness Thress does not use quarterly RPW volume in his demand equations. He uses a "normalized" transformation of RPW volume: volume per population aged 22 and over per USPS business day[9] in a quarter. Figure 6 below illustrates the three linear trends witness Thress identifies with SP FCLM volume using his measure of normalized volume. This figure should give an indication as to what the manufactured trends reflect using a different dependent variable than raw RPW quarterly data.

The reported R^2 for each trend line is higher than in Figure 5, and the difference between Trend Line 2 and Trend Line 3 is even closer than the observed differences using raw quarterly RPW data. This indicates Thress's normalized volume is a better variable for a demand function than is raw RPW data. However, by normalizing the dependent variable, any difference between Trend Line 2 and Trend Line 3 is barely observable, only 9.5 million pieces per quarter than trend line 2.

[9] This variable is entirely different from the Macro variable in his demand equation for FCLM, which is an "employment" measure.

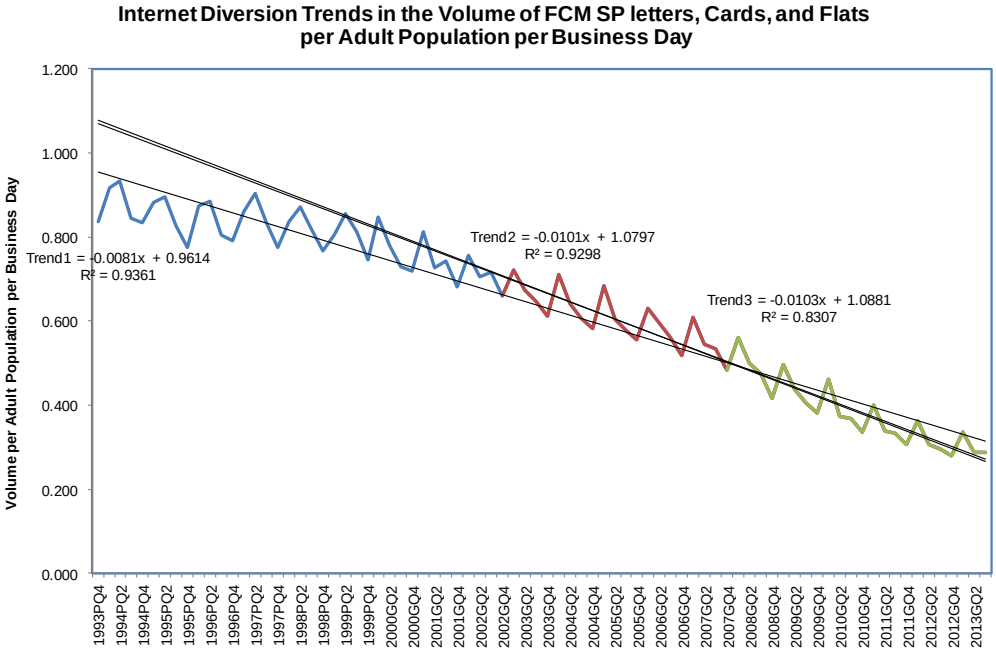
Figure 5



Note: Starting date of internet diversion trends are 1993Q4, 2002Q4, and 2007Q4. Linear trends on the chart are from the start date to the end date.

Source: RCFDATA.xlsx file in the library reference, USPS-R2010-4R-9.

Figure 6

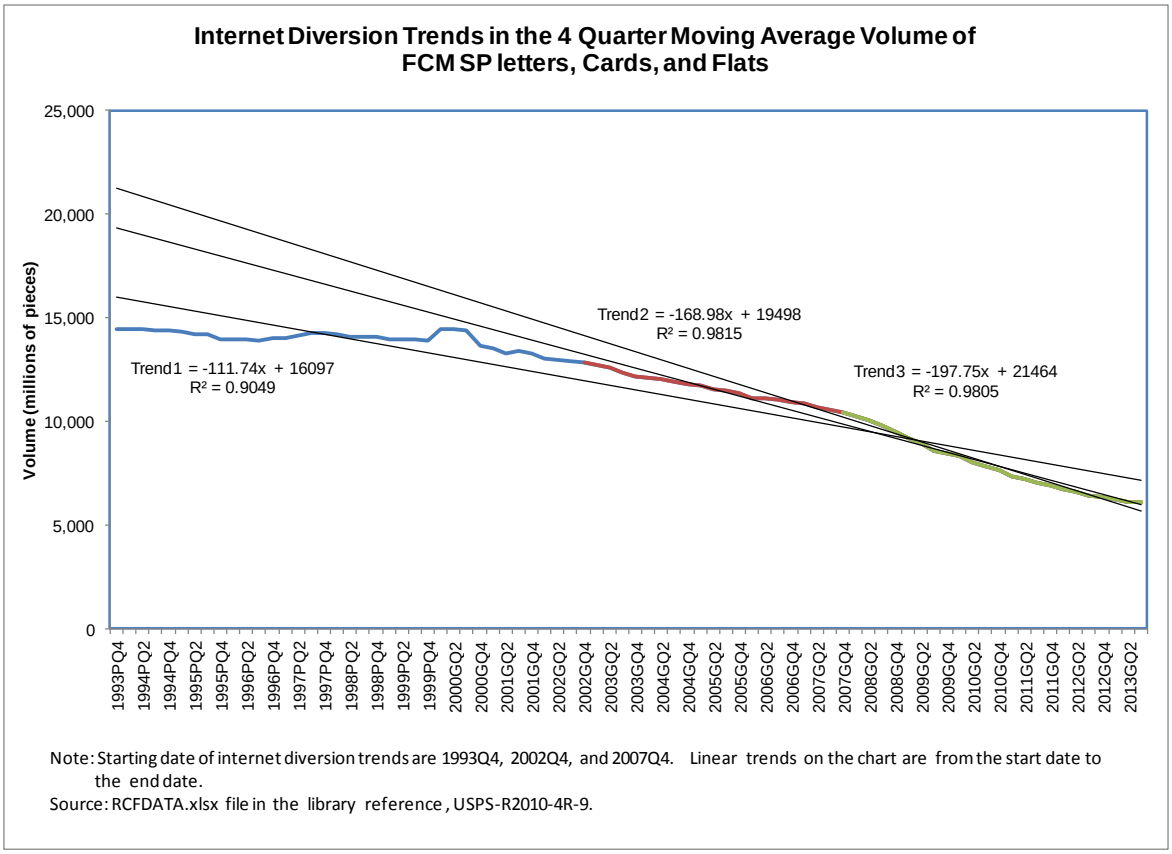


Note: Starting date of internet diversion trends are 1993Q4, 2002Q4, and 2007Q4. Linear trends on the chart are from the start date to the end date.

Source: RCFDATA.xlsx file in the library reference, USPS-R2010-4R-9.

One would have to conclude from the results in Figure 6 that the 2008-2009 recession did not cause Single-Piece letters to fall at a substantially faster rate than the long run diversion trend in place years before the recession as USPS witness Thress's model claims it did. It did not cause any material acceleration of diversion. Only a very small level of Single-Piece volume declines can be attributed to the exigent evident. This result in Figure 6 is largely consistent with GCA's position – in 2010 and now – that the 2008-2009 recession did not impact Internet diversion materially because diversion is being driven by long run esubstitute technology, price, and other product attributes that produce essentially the same trend before, during and since the recession ended.

Figure 7



Note: Starting date of internet diversion trends are 1993Q4, 2002Q4, and 2007Q4. Linear trends on the chart are from the start date to the end date.
Source: RCFDATA.xlsx file in the library reference, USPS-R2010-4R-9.

Figure 7 above represents the Postal Service's three Internet diversion trends based on a four quarter moving average of quarterly RPW Single-Piece volume data. While larger than the 9.5 million piece difference from Figure 6, this is also a relatively

insignificant change between Trends 2 and 3, which show overall quarterly volume losses of 169 million pieces per quarter for Trend 2 and 198 million pieces for Trend 3. Trend line 3 starting with 2008Q1 indicates that about 29 million more pieces of Single-Piece letter mail per quarter were lost to diversion during the recession and since than before the recession in Trend Line 2 ending in 2007Q4 (197.75-168.98 = 29 million pieces).

To summarize, using TABLE FIVE below, the three different dependent variables of Single-Piece volume estimated herein all produce very minor variations in the ratio of Trend 3 to Trend 2 slopes, whereas the ratio for the Postal Service's multivariate demand equation for Single-Piece is 2.163, indicating a dramatic acceleration in diversion of Single-Piece letter mail from the start of the recession until now nowhere evident in our basic tests. What other variables, structural characteristics, or judgments and assumptions made in the Postal Service's model are producing such a discrepancy?

TABLE FIVE

SLOPES OF LINEAR TREND LINES FOR INTERNET DIVERSION OF SINGLE-PIECE FCLM

(Bold denotes no material difference between trend 2 and 3)

Volume Measure	(1) 1993Q4 - TREND 1	(2) 2002Q4 - TREND 2	(3) 2007Q4 - TREND 3	(4) Tr 3 / Tr 2
1. Raw Vol data to end	-116.58	**-169.64**	**-184.47**	**1.087**
2. 4Qtr Moving Aver data to end	-111.74	**-168.98**	**-197.75**	**1.170**
3. Normalized Vol data to end	-0.0081	**-0.101**	**-0.103**	**1.020**
4. USPS/Thress corr for other factors	0.009896	0.010963	0.023709	2.163

Note: Data to end means linear trends for: 1993Q4-2013Q3; 2002Q4-2013Q3; and 2007Q4-2013Q3. Data ends with trend means linear trends for 1993Q4-2002Q3; 2002Q4-2007Q3; and 2007Q4-2013Q3.

Normalized volume means raw volume divided by the adult population and then divided by the number of USPS business days in a quarter.

Even if there were distinctive differences in the trend of diversion before the recession and during and since, as reflected in row 4 of column 4 in TABLE FIVE, it is far from clear that they were caused by the exigent event itself.

TABLE SIX below shows the pattern of growth for smart phones, a new set of esubstitutes the introduction of which just happened to coincide with NBER's dating of the start of the 2008-2009 recession. Did the ramp up of smart phones simply "replace" existing diversion or did all the features and mobility they offered "increase" (or "accelerate") diversion? Smart phones and other new products and technologies such as tablets and social networks like Facebook replacing older esubstitutes driving diversion, is fully consistent with Figure 4, which shows that the recession did not accelerate the rate of diversion of Single-Piece. The newer products simply extended the same pure long run diversion trend as before the recession.

New products typically follow an "S" shaped growth curve, they start out growing slowly, followed by rapid growth and then slower growth as the product matures. Internet diversion in the long run can be characterized as having followed multiple S curves as esubstitutes came into the market, followed their normal product life cycle, and were replaced or displaced by newer esubstitutes when the rate of return on a mature substitute fell below a normal rate of return for this high-tech sector of the economy. The reason the rate of diversion of Single-Piece mail has continued uninterrupted at the same rate is because when esubstitutes move through their individual product life cycles, the demand for new esubstitutes promising a return to higher growth and a higher rate of return stimulates the demand for investment in new esubstitutes. The process has continued uninterrupted causing the same long run diversion rate today that has existed for over two decades.

Broadband itself has exhibited S curve growth as Fiber Optic Cable replaced DSL, and as wireless 3G and 4G replaced Fiber. E-readers and tablets, Facebook and

TABLE SIX

Cell and Smart Phone Sales by Major Firms Selling in the U. S. Market
(Millions of Units)

Year	Apple	Motorola	Samsung	Nokia	RIM
2000	0	61	21	127	0
2001	0	60	29	140	0
2002	0	73	42	152	0
2003	0	76	55	182	0
2004	0	105	86	208	1
2005	0	145	104	265	4
2006	0	210 P	117	345	NA
2007	2.3	165	154	436	10
2008	12	108	202	475 P	25
2009	24	59	238	442	35
2010	42	39	282	463	10
2011	89	40	330	422	52
2012	157.6	NA	396.5	335.6	NA

Source: Compiled by Wikipedia from 42 separate sources.

- Sales are global by companies having major shares in the U. S. market.
- Nokia is the dominant firm in Europe but occupied a major share of the U.S. market until smart phones began to overtake cell phones
- Samsung is the dominant firm in Asia but occupies a large and increasing market share of smart phones in the U. S. in recent years
- Apple and RIM (until its recent financial problems) are the two time series most indicative of the U.S. and North American markets alone

other social media, and several generations of increasingly sophisticated smart phones with texting capability and mobile apps that can be installed are not different stages of a single gargantuan Internet S growth curve; each has its own S curve which displaces older esubstitutes which have moved well up their own S curve in such a way that the momentum of Internet diversion has remained steady over the long run.

The only issue here is whether the newer esubstitutes simply sustained the pre-existing trends of pure diversion or caused an accelerated trend in diversion which the Postal Service claims was caused by the recession, not by new esubstitutes. If there was no acceleration in diversion, this entire issue is moot. As witness Thress has stated, the pre-existing trend in diversion did not slow down. But it did not accelerate either as is clear from Figure 4. Yet nobody but the Postal Service and witness Thress

have claimed that diversion accelerated from prior trends using a demand model whose linear trends are totally inconsistent with actual RPW quarterly diversion trends in Single-Piece.

The fact that smart phones, tablets, social networks and other new esubstitutes only replaced older esubstitutes but did not accelerate diversion cannot logically lend support to the Postal Service's contention that most internet diversion during and since the recession was indirectly caused by the recession. If there was no acceleration in diversion in the first place during the recession and since, then clearly smart phone sales growth noted in TABLE SIX did not cause any acceleration in diversion. It simply replaced older esubstitutes in such a way as to maintain the same rate of growth and same rate of return on investment in this high tech sector, which has appeared as the same long run rate of diversion of Single-Piece letter mail.

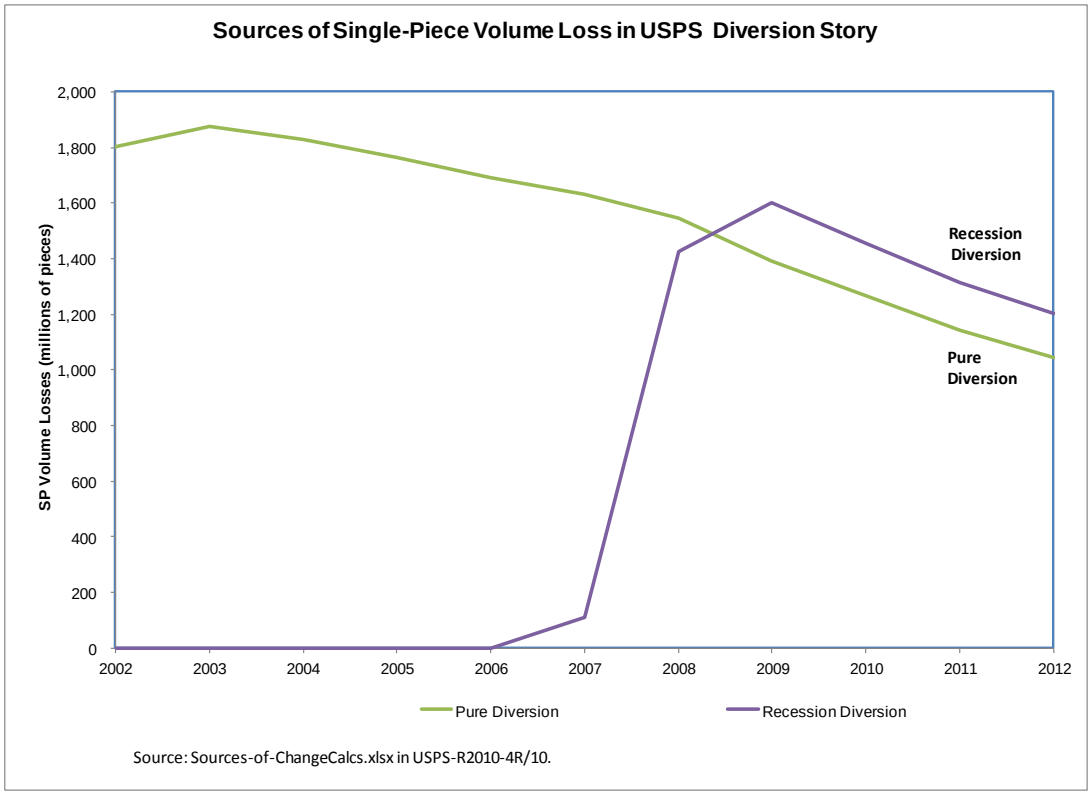
A person replacing paying bills on his PC versus his laptop versus a smartphone does not mean no further displacement of SP mail used by that person. Just to continue the same downward trend would require the same person using online services to increase his usage. That is exactly what has been going on innovation after innovation. Broadband Fiber Optic Cable made it much easier and faster to do online banking and bill paying from a desktop PC or laptop. Smartphones now enable the ability to do online banking and bill paying from anywhere. Increases in processor speed, increases in storage space and its location now on the Cloud have all contributed to maintaining the momentum that has caused a steady rate of mail diversion to esubstitutes. Put differently, more Single-Piece letter mail is being diverted per person, not fundamentally because so many more people are "signing up" for the Internet. All these innovations sustain the downward trend in SP mail volume at what appears to be the same historic rate of 5, 10 or even 15 to 20 years ago.

In summary, the fact that smartphone growth has not accelerated diversion does not prove that recession accelerated diversion because there has not been any

acceleration in diversion of Single-Piece in the first place, especially during the 2008-2009 recession.

Figure 9 below summarizes witness Thress's bifurcation of diversion in Single-Piece mail volumes. The assumptions and judgments made in his manufactured diversion story are simply not credible. Internet diversion of Single-Piece FCLM has been an ongoing long-period process whose momentum has developed and sustained itself over nearly two decades now. To make his case that this trend is still going on, but that a separate and distinct diversion trend called recession diversion (rec/div) suddenly appeared out of the clear blue at the exact date NBER dated the start of the recession and then accelerated so rapidly that it overtook long-period diversion quantitatively as an explanation of falling volumes in Single-Piece FCLM, witness Thress simply stretches the boundaries beyond which econometric modeling can be effective to a never-never land of complete incredulity.

Figure 9



NBER did not date the 2007Q4 peak and the 2008Q1 start of the 2008-2009 recession until a year later, in December of 2008. In witness Thress's view of consumer behavior in the use of Single-Piece mail, however, consumers must have been the best leading indicator of the onset of that recession that has ever existed in the long history of U. S. business cycle research.

If we are to believe witness Thress's model, after barely coming into existence in 2007, by the end of 2008, rec/div suddenly exploded onto the scene in consumers' minds, practically rivaling in importance all the technological innovation, price and other non-price reasons that drove the momentum of Internet substitution gradually but steadily over the previous twenty years. Moreover, during the last year of the recession in 2009 and ever since, consumer behavior has been so focused on switching to esubstitutes and out of the mail because of the recession and its aftermath, that consumers have lost their memories of all the price and non-price factors which drove their diversion behavior exclusively for the previous twenty years, including the aftermath of the1987 stock market crash, the 1990-1991 recession and the 2001 and 2002 recessions.

As Figure 9 above shows, in the Postal Service's and witness Thress's view, the lost volume in Single-Piece FCLM from 2009 through the present caused by consumer behavioral changes modeled in the rec/div variable have exceeded those due to long run momentum factors driving "pure" diversion from innovations like broadband and smart phones, falling esubstitute prices, non-price convenience, green paperless attributes, speed, memory, portability, computing power capacity, and the like. USPS witness Thress's econometric Intervention Analysis for Single-Piece FCLM has not produced a credible inference, nor has the witness or the Postal Service, that the recession caused material exigent volume losses in Single-Piece. As Figure 9 makes rather obvious, it has simply assumed that it did through manufactured econometric demand modeling. No such assumption is warranted. There was no material acceleration in diversion in Single-Piece FCLM that USPS can now claim four years

after the fact in R2013-11 as an exigent circumstance during or since the 2008-2009 recession.

D. USPS Witness Thress's Manufactured Variables Distort "Sources of Change"

Some of USPS Witness Thress's time series variables in the Single-Piece demand equation could be described as the econometric modeling equivalent of having had plastic surgery one-too-many times. The countenance after the face lift, Botox, nip and tuck and other procedures render the subject variables unrecognizable, in this case the measure of "employment" as one of the key independent variables in the Single-Piece demand equation.

To illustrate the problems that can occur when plastic surgery is performed on an explanatory variable for the Postal Service's quarterly RPW volume time series, namely, the transformation of the BLS employment data using adult population data and the trend component of the Hodrick-Prescott (H-P) macro filter, consider Figure 10 and Figure 11 below.

In Figure 10, as would be expected, one can see the impact of both the 2001-2002 and 2008-2009 recessions in negative trends in the BLS total non-farm employment data in the blue line. BLS employment resumes growing in 2003 and after the last recession in early 2010. This is not the employment variable witness Thress uses. As a first approximation to his variable, he uses private employment divided by the adult population 22 and over, as shown in the red line in Figure 10. The recovery in his employment variable from the last recession does not start until at least a year after the BLS measure in the blue line. In fact, depending on how one views the employment to population quarterly data from the bottom of the recession in 2009, one could argue there has been no growth in that measure, whereas there has been unmistakable growth in the BLS measure.

Figure 10

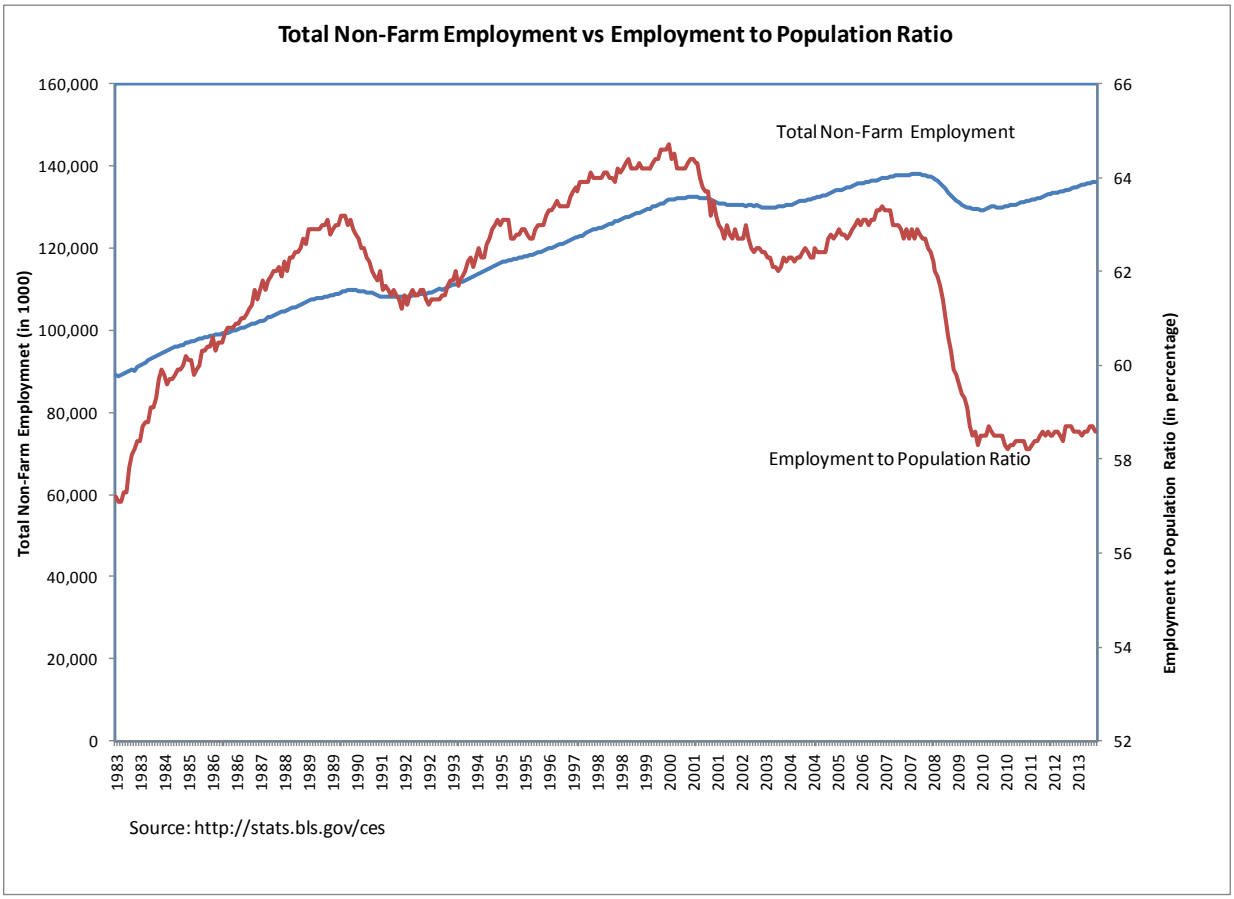
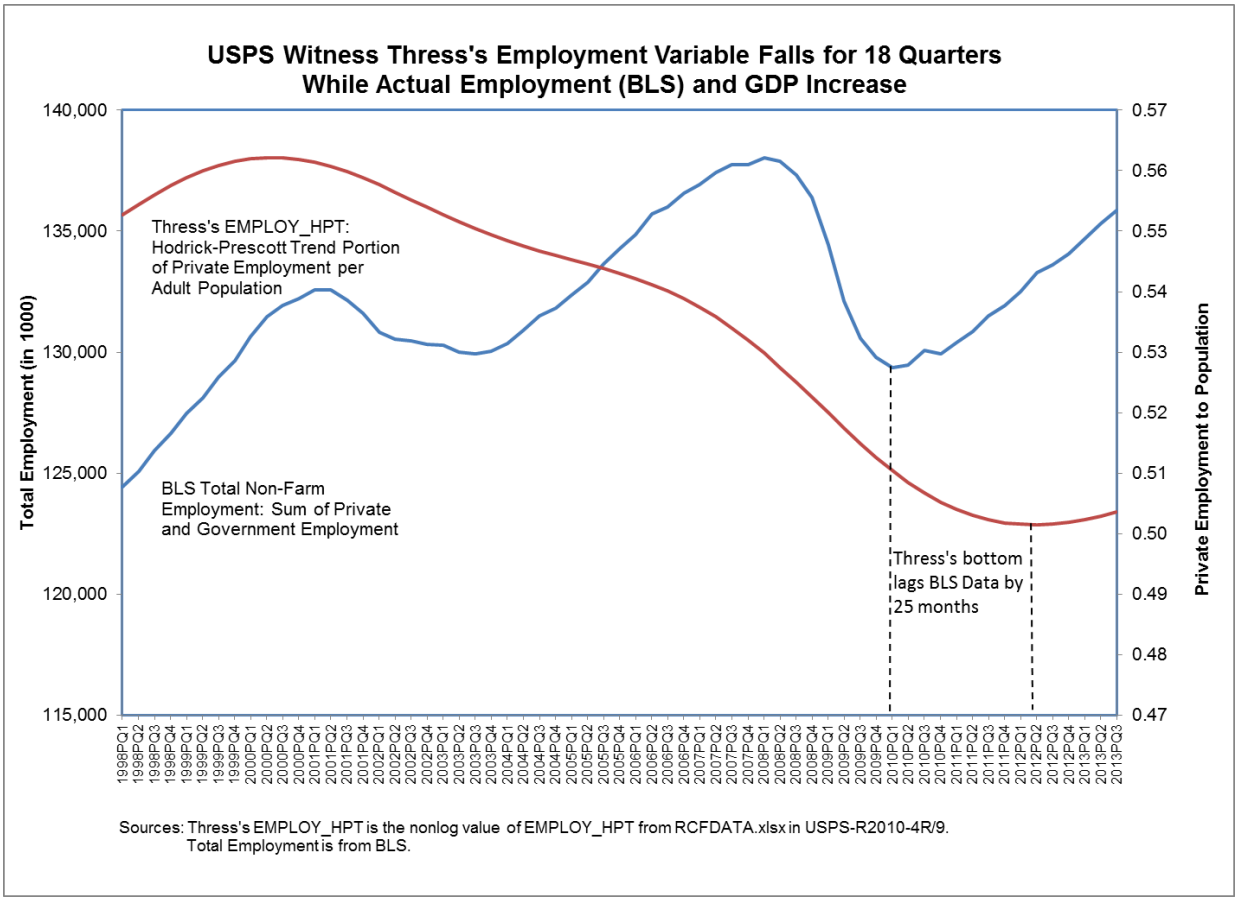


Figure 10 is the time series from 1983 – 2013, whereas Figure 11 zeroes in on the 1998 period and performs a further transformation on witness Thress' employment variable than the employment to population ratio in Figure 10. It adds the Hodrick-Prescott H-P trend Macro filter to the red line in Figure 10. The two versions of the employment to population ratio time series from 1998 – 2013 in both figures are dramatically different. Why does this matter in the sources of change analysis? It matters because one can use Figure 11 to illustrate how the Single-Piece econometric demand equation can surgically transform a four and a half year period of rising BLS employment and GDP growth between 2003 and 2007 into a period of continuous Macroeconomic decline using witness Thress' employment variable.

Figure 11 essentially highlights USPS witness Thress's revisionism of economic history on the BLS employment data variable even better than Figure 10 because it

adds a Hodrick-Prescott (H-P) transformation to the employment to population ratio which separates trend from cyclical employment in the red line of Figure 10. Thress's H-P filtered trend employment variable only turns around from being negative to positive after 2012Q2. Total BLS non-farm employment turns positive after 2010Q1. Using the H-P filter, the demand model for SP FCLM continues to show losses in SP volume caused by the recession, more specifically by rec/div, for two years after actual employment data from the BLS does.

Figure 11



That affects the sources-of-change analysis, it distorts the dependent variable in the equation by purporting to show that there was a negative employment effect on Single-Piece volume for two years after BLS data shows employment, by itself and apart from other factors affecting volume, should have had a positive effect on volume. The H-P filter used in the Single-Piece FCLM demand equation has a continuous

negative trend after 2000Q2. Using witness Thress's employment variable there is no positive contribution made to the demand for Single-Piece FCLM throughout the six years of economic recovery and growth following the 2001/2002 recession(s), a contribution clearly seen from the BLS employment data in the blue line between 2003 and 2008.

As a consequence of the negative long run trend created by the H-P filter, witness Thress's Macro conditions variable, the H-P trend filter for 'normalized' employment for adults 22 and over, appears to have ended up correlating with and reflecting little more than pure diversion, the main negative trend variable over the 2003-2008 period for Single-Piece.

USPS witness Thress's model is able to introduce a rec/div variable at the start of the recession, bifurcating diversion into two parts, but in truth he has already bifurcated diversion before the onset of recession. Because his negative employment variable prior to the 2008-2009 recession is mainly reflecting diversion, not the actual positive employment trends for years leading up to recession, Mr. Thress has actually cut the diversion apple into three pieces: pure diversion, Macro diversion caused indirectly by the recession (rec/div), and Macro pre-recession diversion (pre-rec/div) caused directly from the serious misspecification of his employment variable.

Witness Thress attributes the loss of 2.1 billion pieces of Single-Piece FCLM from 2002 to 2007 to his H-P trend employment proxy for macroeconomic conditions rather than diversion despite the fact this period saw employment growth and GDP growth. He thereby creates a time series far longer than, and well before, the 2008-2009 recession in which a negative employment trend always prevails so that a portion of the drop in Single-Piece FCLM volume is misleadingly re-allocated by his model from pure diversion to seemingly adverse Macro conditions that are nowhere in evidence over that 5-6 year period preceding the recession.

Witness Thress then extends his declining Macro employment variable time series into the actual recession and well beyond it. Much like he borrows some pure diversion declines in Single-Piece volume before the recession for attribution to negative Macro conditions, starting with the recession he borrows a lot more Single-Piece volume from a long run pure diversion trend and attributes it to the indirect impact of the recession in accelerating diversion.

All in all, the numbers themselves in Figures 9-11 show the complete lack of credibility in this story. Pure diversion falls in his model from 1.8 billion pieces annually in 2002 to about 1 billion pieces by 2012 even though most of this period was heavily influenced by the rapid growth of broadband service which facilitated deeper use of the Internet for transactions in lieu of mail and an explosion in new esubstitute devices for business and home use. In witness Thress's model, diversion caused indirectly by recession rather than long run factors like the spread of broadband actually becomes the main driver of total diversion in his model from 2008 to date. This is simply not a plausible description of how consumers of Single-Piece FCLM make choices, by completely changing the main reasons for their decisions to switch to esubstitutes over the past 5 years compared to the previous 5, 10 or 15 years.

IV. THE OWN-PRICE ELASTICITY USED BY USPS FOR SINGLE-PIECE IN R2013-11 IS A STATISTICAL OUTLIER AT A 99% CONFIDENCE INTERVAL WHEN COMPARED WITH TWELVE OPEN MINDED, RIGOROUS ESTIMATES

A. Postal Elasticity Studies Completed Since 2006

In 2006 there were few if any published studies examining own-price elasticities of FCLM other than those entered in rate cases before the PRC such as R2006-1 by the Postal Service. In that case, GCA questioned the methodology used in the econometric demand studies sponsored by the Postal Service. It questioned the use of CES demand functions at a time when it had become more than clear that the growth of Internet and especially Broadband competition suggested a VES model specification. The testimony

by GCA in R2006-1 included a very simple VES model specification, in part because there were no other studies available which estimated own-price elasticities for single piece FCLM in the presence of Internet diversion.

That is not the case in 2013. There have been several elasticity studies for FCLM published since R2006-1. One can use these studies to examine the credibility of the Postal Service's econometric demand models in R2013-11. These studies use postal data from the U.S., UK, France, Finland and Switzerland. The impact of the Internet and broadband on postal FCLM volumes in other developed countries has been virtually the same as in the U.S., other than minor variations in timing. Respected analysts such as Fève, Florens, Rodriguez and Soteri (2010) state that such other-country data along with forward-looking surveys of mailer responses to possible price increases are two Bayesian statistical techniques that one should use to shore up the weaknesses of traditional NPO econometric demand modeling in the face of Internet competition. That includes the demand models used by the U. S. Postal Service.[10] This analysis is limited to examining postal price elasticities in five countries and related issues, such as whether own-price elasticities are rising, falling or constant, whether cross price elasticities enter the demand equations, and how competition from esubstitutes is modeled.

The Postal Service and Mr. Thress have taken a very different direction in econometric demand modeling in R2013-11 than in prior work submitted to the Commission around January each year since enactment of PAEA. The "Narrative Explanation of Econometric Demand Equations for Market Dominant Products Filed with Postal Regulatory Commission on January 22, 2013" (Narrative) was itself not filed at the Commission until July 1, 2013, which is insufficient time for a thorough technical review of all the changes in the model. One such major change is that it eliminates all past approaches to measuring the impact of the Internet: "consumption expenditures on

[10] Fève et al. (2012) states that including information from other countries in calibrating baseline postal econometric demand models in a changing external environment is one of four sources of information to "form prior distributions for the model parameter set." "Fourth, information from other relevant markets, including postal markets in other countries." pp. 121-122.

Internet Service Providers, the number of households with Broadband Internet access, and the number of Global Internet Servers." (Narrative, page 14).

Unlike most other demand models in five countries including the U.S., the Postal Service does not go outside of its traditional econometric model comfort zone in addressing Internet diversion. Instead, it tries to model diversion by linear trends within the demand model, which it attributes to Internet diversion of the mail. It adopts a new definition of Single-Piece FCLM that produces an even lower own-price elasticity than its traditional letters, flats and parcels (LFP) approach used through the FY2011 ACR process. The new definition combines letters, flats and cards to estimate Single-Piece own-price elasticities.

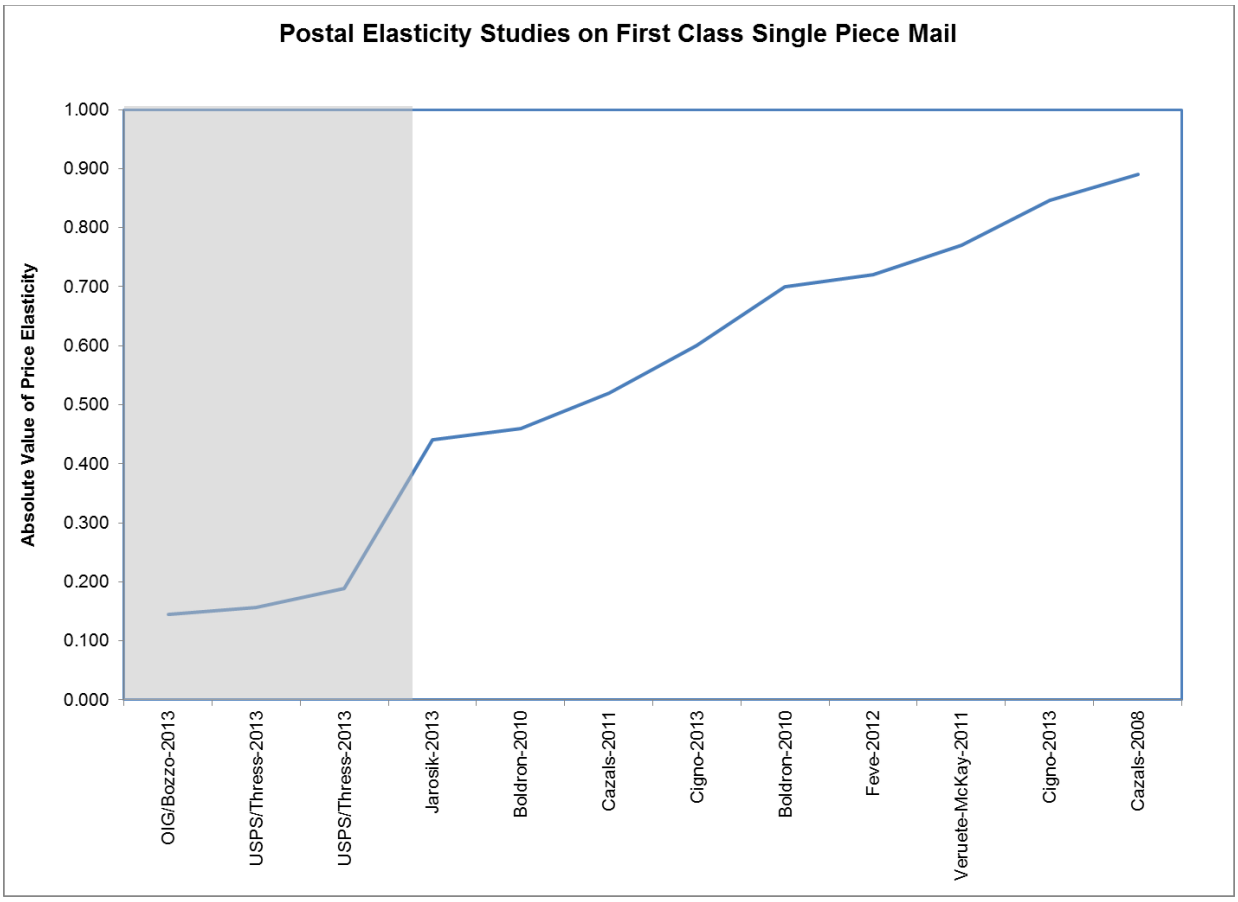
B. The Results Of Elasticity Studies For Single-Piece And Presort

In Figure 12 the own-price elasticities of Single-Piece FCLM are organized from the lowest findings to the highest. The authors and dates of the studies are shown below the elasticity estimate by each. The earliest study is from 2008, and the latest is from 2013. Two different values are shown for USPS, one for each definition of Single-Piece. This weights the sample toward a lower range as does the inclusion of the 2013 USPS OIG elasticity number.

What is most striking about the range of recent own-price elasticities from all available studies summarized in Figure 12 is that the Postal Service's and USPS OIG's estimates are by far the lowest using a one-tailed statistical test; the 99% confidence level for the Single-Piece own-price elasticity is shown outside the shaded area. Based on the available evidence from five countries, one can state with 99% certainty that the true value of the Single-Piece own- price elasticity is above -0.3, with 95% certainty that it is above -0.35 and with 90% certainty that it is above -0.4. (See statistical tests in APPENDIX III.) The average of all own-price elasticities from 12 studies in Figure 12, below, excluding USPS and OIG "outliers", is -0.661. The average FCLM own-price elasticity of the highest 6 studies is -0.754. This means one can reject with a 99%

probability that any of the USPS/Thress and USPS OIG/Bozzo estimates are true values for the own-price elasticity. The plausible range of FCLM own-price elasticities from studies with nine point estimates appears to be -0.44 to -0.89. With the exception of an estimate done in 2008, all of these studies were done in the 2010-2013 timeframe. It should also be noted that GCA's original range of estimates noted in R2006-1 of -0.46 to -0.76 falls well within this 99% confidence level of plausible elasticities from other studies. The Postal Service's 2012/2013 and the USPS OIG's 2012/2013 estimates do not, and should not be used in this case.

Figure 12



Looking at all point estimates in Figure 12 the weight of evidence based on Bayesian theory suggests that a three cent rate increase on FCLM SP has a tangible risk of: (1) moving the own-price elasticity to -1.0 if the true own-price elasticity is close to the five studies with own-price elasticities at -0.7 or higher, thus defeating any point in

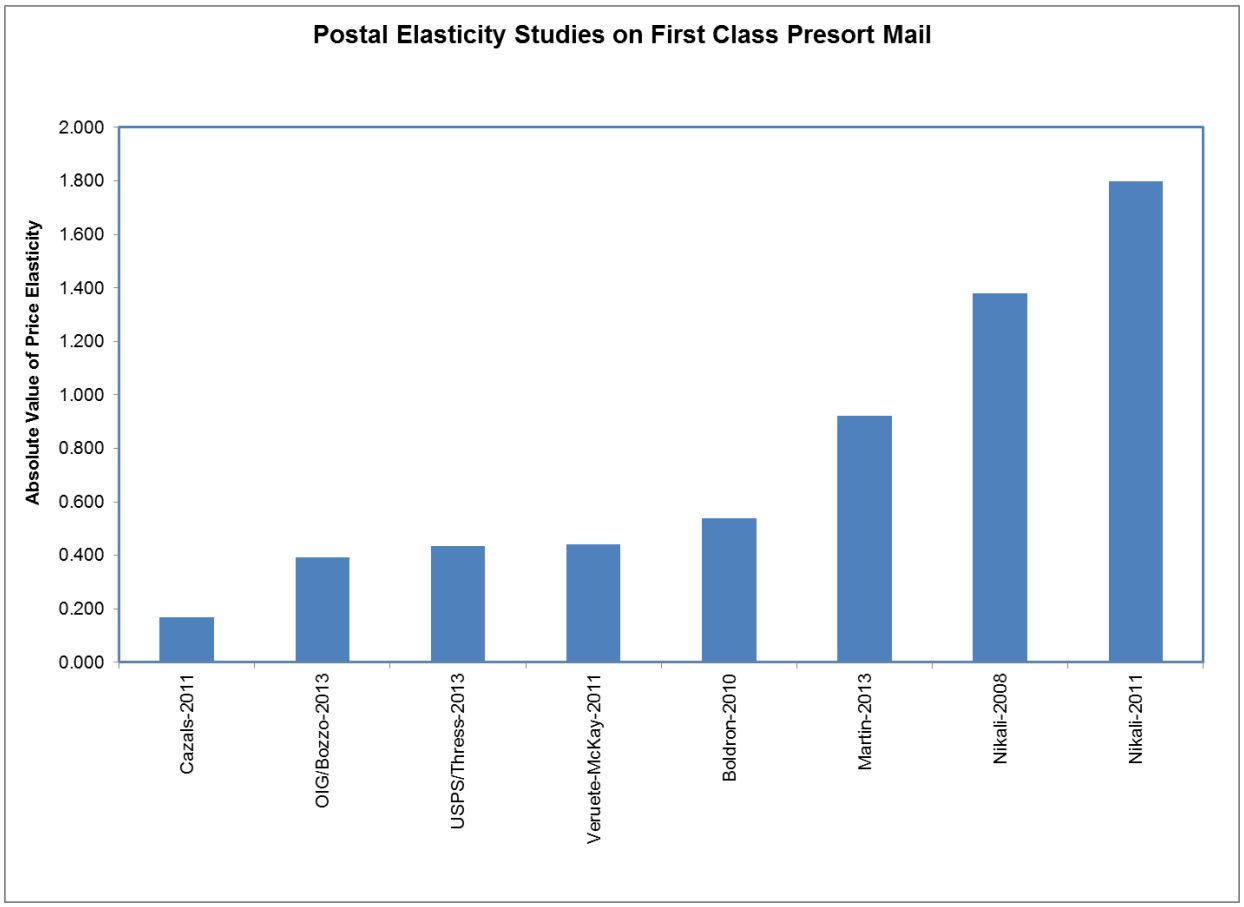
the exigent increase; or (2) reducing revenue if it moves the price elasticity above -1.0 into the absolutely elastic range if the true own-price elasticity is already close to the near-unitary price elasticity of the Cazals (2008) or Cigno (2013) levels.

The postal own-price elasticities for First Class workshared mail shown in Figure 13 below are remarkably consistent across countries, for the U. S. (-0.393, -0.345), UK (-0.17, -0.44), and for France -(0.539). However, there is one glaring exception: the three studies using data from Finland (-0.921, -1.38, -1.8). The two sets of data are uniquely different in one regard. The highest two estimates from Finland include a cross-price elasticity derived from numerical time series data for esubstitute prices. No other country appears to have such a time series for esubstitute prices.

When an explicit cross-price elasticity for non-postal substitutes representing competition from esubstitutes is included in an econometric demand equation, as Nikali's work on Presort demonstrates, the impact on presort own-price elasticities appears to be dramatic, raising the estimates from a moderately inelastic value averaging -0.378 across countries, to an average price-elastic range above unitary elasticity, -1.37. The Martin study like Nikali is based on data from Finland but does not include any cross-price elasticity for Presort.[11] A survey of bulk mailers' behavior expected to be introduced in R2013-11 reinforces the Nikali results. The proposed increases on Presort FCLM could cause the loss of a substantial amount of revenue and contribution for the Postal Service. Even if the true own-price elasticity for Presort is slightly inelastic in the -0.9 range, there is a strong probability that the rate increases proposed in this case could at the margin move it into the elastic range of over -1.0.

[11] The -0.911 to -0.921 price elasticities he finds may be a better benchmark than the -0.378 average for judging the impact of including a cross price elasticity for esubstitutes in the calculation of an own-price elasticity; on this basis, including the esubstitutes cross price elasticity increases the own price elasticity of Presort in the U. S. is 0.469 or 0.889 depending on which Nikali own price elasticity estimate is used.

FIGURE 13



C. The Independent Studies Reach Completely Different Conclusions Than USPS Witness Thress on Related Issues

The Postal Service's approach to econometric demand functions is a traditional one used by other NCOs in developed countries. The very design of these models was created when NCOs and the Postal Service in particular had an economic and legal monopoly over letter mail. The models may have been adequate for forecasting and rate-making before the onset of esubstitutes, but have become increasingly unreliable as the intensity of competition for letter mail has increased. GCA first raised problems with the Postal Service's approach with expert testimony in R2006-1. There has been far more work seeking to improve postal econometric demand models emanating from Europe than the U. S. since 2006, as is evident from TABLE SEVEN below.

TABLE SEVEN

MODEL STRUCTURE AND RESULTS FOR EIGHTEEN ELASTICITY STUDIES

	Study	Data Period Mail Type	Elasticity	Elasticity Change	Cross Elasticity	CES/VES
1	EMA (2002)	2002 SP	NA	Rising	No	VES
2	Trinkner (2006)	1980-2004 Total Traffic	-0.27	Rising	Yes	
3	GCA-Clifton (2006)	1983-2005 SP	-0.46/-0.76	Rising	No	VES
4	Cazals (2008)	1976-2008 SP	-0.89	NA		
5	Nikali (2008)	1991-2007 Bulk B2C	-1.38	Rising	Yes esubstitute price	CES
6	Fève (2010)	TIL	-0.35		Yes	VES
7	Boldron (2010) Boldron (2010)	1996Q-2007Q FCLM SP Presort	-0.46/-0.7 -0.539	Rising	Yes	CES
8	Nikali (2011)	1991-2009 Bulk B2C	-1.8	Rising		VES
9	Cazals (2011)	1980/81-2007/08 Social SP Presort	-0.52 -0.17	NA		
10	Veruete-McKay (2011)	1982/83- 2007/08 SP	-0.77	NA	Yes	
11	USPS-Thress (2013) USPS-Thress (2013)	1983Q1-2013Q3 SP letters, cards Presort	-0.157 -0.345	No	No	CES
12	Fève (2012)	1960-2009 Total inland letters	-0.5	Rising		VES
13	Fève (2012)	1976Q1-2003Q2 SP	-0.72		Yes	CES
14	Jarosik (2013)	1982/83-2010/11 SP	-0.44			
15	USPS-Thress (2013)	1983Q1-2013Q3 SP LFP	-0.189	No	No	CES
14	Veruete-McKay (2013)	17,152 Obs Presort Transac	-0.35/-0.44	Rising as Price incr		
15	Cigno (2013)	SP	-0.846	NA	Yes	
16	Cigno (2013)	SP	+0.4/-0.6	Rising	No	CES
17	OIG-Bozzo (2013) OIG-Bozzo (2013)	1983Q1-2012Q4 SP Presort	-0.151 -0.393	Falling	No	CES
18	Martin (2013)	Presort	-0.921 B2C -0.911 B2B			

The studies in TABLE SEVEN do not include all the work done on all facets of postal demand modeling, but they do include all or most all of the recent work done that focuses on related issues as well as postal price elasticities. Some of the issues raised have to do with the specification of variables and questions the models can answer, cross price variables, changes in own-price elasticities over time with rising competition, esubstitute variables, and surrogates for the absence of direct data on esubstitute prices in most countries. Others have to do with model specifications and testing, CES or VES models, the application of Bayesian statistics to a highly uncertain postal future, forward looking simulations, the use of ECM or vector ECM, time series or discrete choice models. See APPENDIX IV for notes on TABLE SEVEN and APPENDIX V for summaries of each study.

C.1. Cross-Price Elasticities Are Generally Used in Estimating First Class Single-Piece Letter Own-Price Elasticities

If one understands the relative price concept from microeconomic theory, there can be no debate about whether cross price variables need to be or do not need to be specified in postal (or any other) econometric demand models. For esubstitutes they must be included explicitly where data exists or implicitly through simulations of the changing relative prices of mail and esubstitutes where data does not exist.
See APPENDIX VI for the theoretical underpinnings of this argument and a summary of recent debates over whether they should be included or excluded in postal demand models, which require accurate estimates of own-price elasticities.

Where cross-price elasticities have been explicitly or by simulation included in postal demand equations for FCLM, the own-price elasticities that emerge are substantially higher than if they are excluded. From TABLE SEVEN, for Single-Piece the studies by Boldron et al. (2010), Veruete-McKay et al. (2011), Fève et al. (2012), Cigno et al. (2013-1) and Cazals (2008) all produce substantially higher own-price

elasticities for Single-Piece than studies which omit cross-price elasticities, GCA (Clifton, 2006), USPS/Thress (2009-2013), USPS OIG, (2013), (Cigno et al., (2013-2).[12]

The same is true for Presort FCLM even though the number of studies is fewer than for Single-Piece. From TABLE SEVEN, for Presort the studies by Nikali (2008, 2011), Martin (2013) and Boldron (2010) that include cross-price elasticities all produce substantially higher Presort own-price elasticities than studies which omit cross-price elasticities for Presort, USPS/Thress (2013), USPS OIG/Bozzo (2013).

USPS witness Thress is a highly experienced applied econometrician. He, no less than other analysts in and outside the U. S., recognizes the quandary for traditional time series econometric demand models posed by the absence of time series price data for esubstitutes. Finland appears to be the only country where there is a reliable time series of price data for esubstitutes. The concern is that unlike most other analyses , those sponsored by the Postal Service for rate-making purposes appear to have been wandering for years now through a maze of ever changing second-best approaches to measuring the impact of competition from esubstitutes, a maze full of dead ends from which the Postal Service and its contractors seem unable to extricate themselves. For many past rate cases on behalf of the Postal Service, witness Thress has introduced one after another measure of esubstitute quantity data in lieu of the unavailable price data for esubstitutes. In R2013-1, he has abandoned all explicit esubstitute variables in favor of a series of linear time trends purportedly measuring diversion without being either price or non-price measures of diversion dynamics.

Unlike the Postal Service's demand models, many European studies over the past few years have created an explicit surrogate for the absence of esubstitute prices that does not entail quantity-based variables for Internet competition or internal model-

[12]The 2013-1 Cigno/Pearsall study found the own price elasticity for SP was -0.856 while their study from 2013-2 found it was -0.1 (in the same range as USPS/Thress models), although the 95% confidence interval around that estimate was extremely wide, from -0.6 to +0.4. However, the main explanation for the difference in the mean elasticity as the authors acknowledge is that their 2012 study included cross price elasticities when calculating the own price elasticity of -0.856, whereas the 2013 study was a USPS/Thress and OIG/Bozzo - like model which omitted cross price elasticities, and accordingly produced a very low own price elasticity.

generated trend line “guesstimates” of how Internet competition is impacting postal volumes. These surrogates generally take the form of combining a simulation of relative price changes between the price of letters and the price of esubstitutes with a traditional NPO econometric demand model based on long run time series data and multiple regression analysis. The simulation is grounded on the empirical fact that compared to letter mail the relative prices of esubstitutes are falling over time. In the simulations, various assumptions can be made about the rate at which this is happening.

For example, before a Senate Committee in June 2009, Verizon general counsel Randall Milch stated that “most Verizon customers subscribe to a texting plan, and as a result they “pay less than a penny per message”, a reduction of almost two-thirds since 2006. “As a result of the price cuts, usage has grown six-fold,” he said.” (Reardon, M., “AT&T and Verizon deny price fixing accusations”, CNET News, June 16, 2009.) This information implies an own-price elasticity of -8.9 over those years. It is a dramatic, if anecdotal, example of what is happening to relative prices between letter mail in the U. S. and esubstitutes.

Econometricians from the independent and highly respected Toulouse School of Economics (TSE), as well as from Royal Mail in the UK and elsewhere appear to have had a somewhat greater measure of success than have the USPS demand models getting to the end of the maze by introducing such simulations for the behavior of letter prices over time relative to the prices of esubstitutes. The introduction of Bayesian techniques like simulations and business surveys to further augment traditional NPO econometric demand models like the U. S. Postal Service’s has also improved their adaptability to an environment of rapid and often unpredictable changes in the market for letter mail.

Based on a much more comprehensive view of postal demand studies than those filed each January by the Postal Service at the Commission in the Annual Compliance Review process, there is little point in the current and future communications market in trying to make precise before-rates and after-rates forecasts

of postal volumes based almost exclusively, or even mainly, on highly correlated regressions of past data. As a humorous old saying goes, when one businessman asked another how his economist had worked out he answered: “His estimates were both precise and useless.” Today’s and tomorrow’s environment is closer to another old saying: “Sir, if you must forecast, do it very often.”

C.2. All VES Models (and some CES Models) Show Postal Price Elasticities Increasing

From TABLE SEVEN, there is not even one postal demand study using variable elasticity of substitution (VES) model structures that concludes own-price elasticities are not increasing over time as competition from esubstitutes has increased. See EMA (2002), GCA-Clifton (2006), Nikali (2011), and Fève et al. (2012-1). Constant elasticity of substitution (CES) models, which also show own-price elasticities rising are Nikali (2008), Boldron et al (2010), Fève et al. (2012) and possibly Cigno et al. (2013-2).

Not a single econometric demand study of own-price elasticities for Single-Piece FCLM that investigates the question of whether postal price elasticities are changing concludes they are constant or falling except for the Postal Service’s and the USPS OIG (2013) models. A 2002 simulation model by EMA showed that a USPS annual forecast through 2011 made in its 2003 Strategic Plan was consistent with an increasing own-price elasticity for Single-Piece FCLM. The EMA model left all forecast variables for revenue, volume and other factors the same as the Postal Service’s. The EMA small model only changed the CES assumption, adopting instead a variable elasticity of substitution (VES) assumption.

The conclusion is similar for other mail products. Studies which show the own-price elasticity for Presort rising include Nikali (2008, 2011), Boldron (2010), and Veruete-McKay (2013). Studies of total traffic (Swiss data) and total inland letters (UK data) also show own-price elasticities increasing: Trinkner (2006) and Fève (2012).

D. The May 2013 USPS OIG Contractor's Review Of Five Outside Elasticity Studies Is Silent on Some Major Findings and Distorts Others

APPENDIX B of the May, 2013 USPS OIG report prepared by Christensen Associates Inc. (CAI) reviews a few empirical time series studies "with similar economic content to the USPS baseline models" using UK data, Veruete-McKay et al. (2011) and Jarosik et al. (2012) and a third using data from Finland, Martin et al. (2012). (CAI, pages 51-53). It also reviews a time series "theoretical and simulation-based paper" by Fève et al. (2012). One purpose of APPENDIX B appears to be to cite and summarize CRRI conference papers that CAI feels supports the findings of its review of USPS econometric demand models. These four studies are mischaracterized in large part by CAI and non-representative of over a dozen such elasticity studies done since 2006. Another purpose of attempting to summarize the four time series studies using European data appears to be to set up its critique of a paper by Cigno et al. (2012) that departs "radically from the time series approaches of the USPS baseline models and the other CRRI time series models." (page 52).

The biased and misleading way in which CAI APPENDIX B is structured and written and the way its incomplete "summaries" of certain CRRI conference series papers completely undermines their attempted use to reinforce the legitimacy of USPS demand equation modeling. APPENDIX B as a whole is, moreover, so non-representative of other postal econometric demand studies that it undermines the entire credibility of the CAI review, and by inference those USPS models and their findings as well.

CAI devotes only one sentence to the Veruete-McKay (2011) study, noting that deflated UK letter prices are stationary due to the binding RPI inflation cap applied to the nominal letter prices. CAI ignores virtually all of the major conclusions of this study: an own price of elasticity for UK First Class non-presort letter mail of -0.77 and a cross price elasticity with respect to second class non- presort letter prices of +0.33.[13] These

[13] The study also includes own price elasticities for mail content, -0.43 for "social" mail, about twice the price elasticity of commercial mail, -0.19. CAI also ignores the fact that this study also uses error correction models (ECM).

findings are close to Cigno et al. (2013), which estimated an own-price elasticity for Single-Piece FCLM of -0.846 using cross price elasticities for mail substitutes, findings heavily criticized by CAI as departing "radically" ….. from the other CRRI time series models." (CAI, page 52). The main "radical departure" of Cigno et al. (2013) and Veruete-McKay (2011) is that their estimates of own-price elasticities are over five times larger than that of CAI!

CAI does report correctly that Jarosik et al. (2013) include cross price variables for postal and non-postal substitutes, and for Second Class and presort/access volumes "annual relative price terms … to allow for 'increasing levels of competition' in the sense of increased sensitivity of volume to product price differentials." (CAI, page 51). However, CAI fails to mention that Jarosik et al. estimate the long-run own-price elasticity for First Class letter mail as -0.44, nearly three times higher than the CAI ECM model estimate, and where the cross price elasticity with respect to second class non-presort letters is +0.24. (Jarosik et al., page 202). Jarosik et al. also note that between 1999 and 2008, "the estimated price elasticities for "total traffic" in mail volume may have increased somewhat over time (from around -0.2 to -0.3)." (Jarosik et al., page 206). Thus, CAI neglects three findings of Jarosik et al. that contradict its own findings: (1) price elasticities appear to be rising over time; (2) the price elasticity for single piece is substantially larger; (3) cross price elasticity is a key aspect to producing accurate own-price elasticities, here specifically for Single-Piece.

Martin et al. (2013) according to CAI finds that "consumer-sent mail has highly inelastic demand, while business-to-consumer and business-to-business invoices are nearly unit elastic." (CAI, page 51). However, CAI largely dismisses the study as having "rudimentary estimating equations" and long run own price elasticities for B2B and B2C invoice volumes that "are not very precisely estimated." (CAI, page 51). What CAI ignores in this summary is the fact that the most important segment from the standpoint of estimating Single-Piece FCLM own-price elasticities is not at all examined by Martin et al., namely the C2B segment or transactions mail segment. The C2C own-price elasticity of -0.145 they do estimate is a very poor proxy for single piece letter mail

generally because by far the largest volume of single piece letter mail is transactions related C2B mail.[14] CAI also neglects to point out the authors' finding that "the changing environment has led to intertemporal increases in price elasticities across letter volume segments traditionally thought to be very price inelastic only a few years earlier." (Martin et al., 2013, p.164). Finally, CAI neglects to point out that Martin et al. (like CAI itself) use error correction models (ECM) which, by comparison with USPS models, would have to make the latter "rudimentary" as well.

The paper by Fève et al. is the only paper cited and summarized by CAI that was not published in the 2013 CRRI conference series volume.[15] CAI claims the major focus of the Fève et al. paper is to "show that the average price elasticity during the demographic transition [from an Lpeople to an Epeople economy] can remain low, as mail demand becomes relatively concentrated in customers with less elastic demands…" (CAI, page 52). What the authors actually state is: "The simulation properties of the model yield a true price elasticity of demand for letters that increase over time (from around -0.4 to -0.5) and depend on the evolution of technology related esubstitution amongst the population (that is, the number of Epeople)." (page 5).[16]

While Fève et al. is a simulation model as CAI notes, it does populate the 50 time periods in the model with data that in some cases is "informed by publicly available studies", though it adds the caveat that "the values are stylized and should not be considered to be values to any particular national postal operator." (page 5) This data

[14] There is some evidence from other studies than Martin et al. in other countries that in recent years the elasticities of B2C and C2B transactions mail are tracking each other more closely than at the start of Internet diversion in the 1990s in the U.S.

[15] The title of that paper presented at the May, 2012, CRRI conference in Brighton, England, was "Are Letter Price Elasticities Higher than Econometricians Think?" While that paper was not published by CRRI and unavailable as of the time of this filing at the Commission, a substantially similar draft entitled "Evaluating demand for letter price elasticities and technology impacts in an evolving communications market" was available and is the basis of the discussion of Fève et al. (2012) herein.

[16] Most of the paper is devoted to testing various models the "hypothetical econometrician" might construct at various phases of a logistical curve modeling the growth of E people relative to L people when more or newer information is available but much uncertainty remains about the ongoing dynamics of postal volumes in an Internet world. The authors choose a "best model" for each phase, and the reported own-price elasticities the econometrician would choose because of superior test statistics are: stage 1, early adopter Epeople phase, -0.65; stage 2, first half of main Epeople transition period, -0.55 for single break term, -0.57 using double break trend term, and -0.71 for the model using Epeople proxy; stage 3, the second half of the rapid Epeople transition period, -0.54.

includes UK total addressed inland letter traffic prices for financial period years 1976/77 to 2010/11, and UK GDP data for the period 1960-2009.

In lieu of having actual relative price data for letters and e-substitutes from which one could calculate cross-price elasticities in order to isolate the true values of own-price elasticities, the simulation by Fève et al. makes an eminently reasonable assumption in its simulation model properties: “The overall price of letters is assumed to trend downwards relatively slowly over time whereas the price of ecommunications is assumed to exhibit a more pronounced downward trend.” (page 5). This is never mentioned by CAI.

On the one hand, CAI acknowledges in its main findings concerning USPS econometric demand modeling in 2012 that they “have lost some economic content over successive model revisions, particularly insofar as they have dropped terms that explicitly modeled postal cross-product and electronic substitution effects …”. (page 5). On the other hand CAI criticizes Cigno et al. (2012) in APPENDIX B when they do incorporate cross-price elasticities. In an empirical econometric analysis, what cross elasticities are implausible will tend to be revealed in the model’s quantitative estimates of them, and the analyst can then determine which to include and which to exclude using the results along with a priori knowledge. In a somewhat bizarre statement for econometricians, CAI evidently believes that only a priori knowledge should be used to render those decisions, the econometrics can be thrown out the window. (See APPENDIX B, page 53). (See also page 15 of the OIG review.)

This inconsistency of critiquing USPS demand models for not using cross price elasticities and critiquing Cigno et al. for using them is apparently at bottom due to the fact that when cross price elasticities are included in postal econometric demand equations as in Cigno et al., the own price-elasticity using U. S. data for single piece

FCLM is -0.846, not below -0.2 as in USPS and CAI estimates when cross-price elasticities are excluded.[17]

CAI also fails to mention that it is not just Cigno et al. that include cross price elasticities in their model, the CRRI study by Jarosik et al. (2012) that CAI mentions also has explicit cross price elasticities. So does the 2011 CRRI study by Veruete-McKay that CAI cites. Had CAI bothered to sample a wider and more representative range of studies from the annual CRRI conference volumes and other European studies, they would have found other recent time series studies that, unlike the 2013 USPS demand models, use cross price elasticities when estimating own-price elasticities, for example Boldron (2010).

Finally, CAI states that Cigno et al. (2012) "frames all mailing decisions in terms of consumers' utility-maximizing consumption choices, whereas much postal demand arises more directly from a variety of business (production) decisions." This is certainly not true of Single-Piece FCLM, most of which is driven directly by consumer decision making, for example, transactions mail and greeting cards.

E. Revenue Implications for Plausible Own-Price Elasticities

The Commission should throw out the elasticity estimates that are, statistically speaking, "outliers", and specifically the Postal Service's 2013 econometric demand models for First Class Single-Piece and Presort letter mail. Instead, it should rely in part on other elasticity studies such as those presented here and in part on major mailer business surveys of likely reactions to the proposed rate hikes in order to assess the risk of increasing rates at what clearly appears to be an approaching tipping point. A tipping point is where a slightly inelastic own-price elasticity for Single-Piece becomes price-elastic at the margin and raises USPS deficits rather than reducing them. Presort

[17] CAI fail to discuss another paper by Cigno et al. (2013) that produces a much lower own-price elasticity because as the authors state no cross price relationships are included. The -0.1 point estimate is almost meaningless, however, because the 95% confidence interval band surrounding it is so wide, -0.4 to +0.6. The major point of this paper, discussed elsewhere, is to show that many of the product elasticities for U. S. mail volumes have variable own price elasticities of demand, not constant (CES) as Postal Service and the OIG CAI. This includes single piece FCLM.

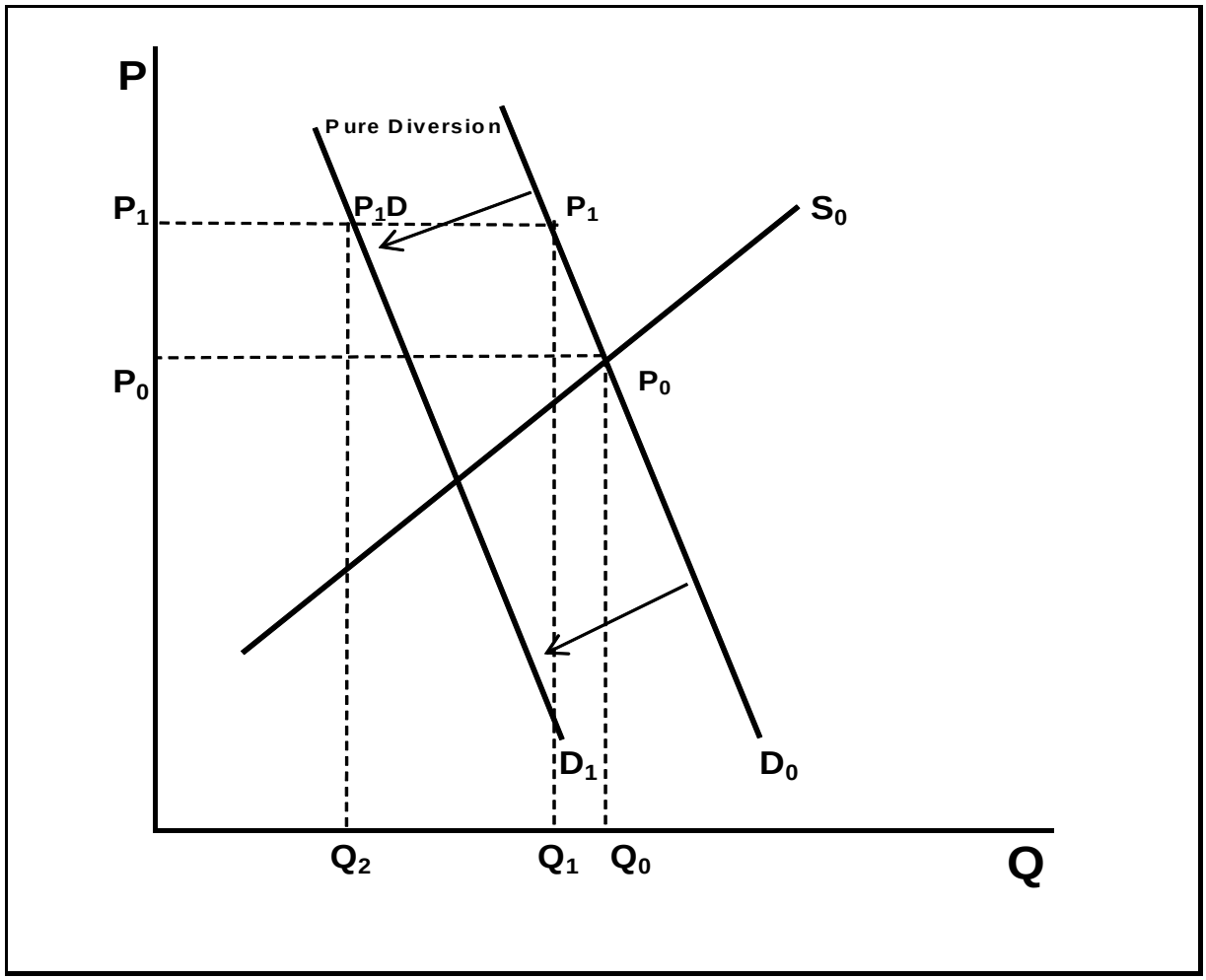
FCLM own-price elasticities may well already exceed a unitary value when the cross price elasticity of esubstitutes is explicitly included in estimating the own price elasticity. These are not risks the Commission any less than the Postal Service can or should take given the magnitude of the Service's deficit problem.

The Postal Service maintains that a 2 cent increase in the Single-Piece FCLM first-ounce rate will lead to a drop of only 68 million pieces, but the own-price elasticity used to make this forecast is a statistical outlier among a broad range of twelve studies estimating SP own-price elasticity. A more realistic expectation based on a plausible range of own-price elasticities is that on top of continued losses in SP volume and revenue caused by Internet diversion year by year, the 2 cent increase will cause SP volume to fall by an additional 300 – 340 million pieces annually. This is a pure price-effect in consumer behavior. The comparative volume losses are shown in TABLE EIGHT on page 52.

If the total proposed rate increase of 3 cents leads consumers not thinking about switching to the Internet before the 2 cent exigent increase plus the1 cent price cap increase, to in fact decide to switch after the price increase, there may be a further diversion effect not captured by current diversion trends and not captured by the own-price elasticity of demand. This would constitute a movement up the demand curve in Figure 14 below in response to the price increase as well as an inward shift of the demand curve in response to abandoning letter mail in favor of esubstitutes. TABLE EIGHT below only captures the direct impact of the price increase based on own-price elasticities of -0.7 and -0.8 for Single-Piece FCLM.

Ceteris Paribus, the revenue that the Postal Service can raise by increasing Single-Piece FCLM rates by 2 cents is between $170 and $190 million as seen below in TABLE EIGHT on page 52, not the $300 million plus it thinks it will raise. But, other things are not equal. The Postal Service will face an after-rates loss of revenue even assuming inelastic demand at the margin because of the continued inward shift of the demand curve due to pure diversion.

Figure 14



This is depicted above in Figure 14. The before-rates revenue of the Postal Service is the rectangle 0 Q_0 P_0 P_0. The after- rates revenue at the higher rate, P_1, would be greater in the absence of pure diversion assuming inelastic demand, D_0. The rectangle P_1 P_1 0 Q_1 in Figure 14 is larger than the before-rates rectangle, indicating greater revenue. However, the demand curve, D_0, is never stable under conditions of diversion. It is shifting inward and to the left over time every year. The proposed rate increase will leave the Postal Service with revenue approximating the rectangle P_1 P_1D Q_2 0, less than the after-rates revenue and far less than the before-rates revenue. In the figure, the Postal Service finds itself with about half the revenue it believed its rate increase would produce.

The fact that in some purely academic sense the situation the Postal Service finds itself in is not due to the rate increase per se is cold comfort. The real world situation is even worse, because the new conditions of demand depicted by D_1 assume the same own-price elasticity of demand as before. The empirical evidence from twelve elasticity studies introduced above is fairly conclusive that the demand curve is becoming more elastic over time. In the figure, one can portray this by imagining that as the demand curve shifts inward from D_0 to D_1 it is also rotating counter-clockwise. Because own-price elasticities have been variable and rising with the proliferation of esubstitutes, the actual after-rates intersection of P_1 and D_1 would be to the left of the point P_1D, less revenue than if the own-price elasticity at the margin was not increasing.

It is for these reasons from economic analysis, as well as the legal reasons enumerated in the Comments, that GCA feels the proposed exigent increase on Single-Piece, even if the Postal Service had been able to show that the 2008-2009 recession affected Single-Piece volumes, is a far more dubious plan to reduce its deficit than dozens of cost-cutting initiatives it can pursue on its own without Congressional legislation or collective bargaining. More dubious because of the simultaneous presence of Internet diversion and rising own-price elasticities at the margin. More dubious because even considered in isolation, it will not raise much if any revenue, but will be the largest single rate increase in the Single-Piece first ounce price since June of 2002, an amount that consumers will remember and act upon differently from any PAEA price cap increase to date. More dubious because it would be the only 3-cent increase ever, if enacted, that was made more than 9 months after the end of a recession.[18]

[18] The April 1998 and January 2005 increases were unrelated to business cycle factors.

TABLE EIGHT

SP Letters: Before Rates						
TIME	Volume (in millions) (Elas=-0.157)	Volume (in millions) (Elas=-0.7)	Volume (in millions) (Elas=-0.8)	Revenue (millions $) (Elas=-0.157)	Revenue (millions $) (Elas=-0.7)	Revenue (millions $) (Elas=-0.8)
2012GQ1	6,707	6,707	6,707	$3,055	$3,055	$3,055
2012GQ2	5,526	5,526	5,526	$2,563	$2,563	$2,563
2012GQ3	5,364	5,364	5,364	$2,503	$2,503	$2,503
2012GQ4	5,138	5,138	5,138	$2,404	$2,404	$2,404
2013GQ1	6,312	6,312	6,312	$2,936	$2,936	$2,936
2013GQ2	5,211	5,211	5,211	$2,455	$2,455	$2,455
2013GQ3	5,306	5,306	5,306	$2,532	$2,532	$2,532
2013GQ4	4,848	4,827	4,823	$2,318	$2,308	$2,306
2014GQ1	5,795	5,773	5,769	$2,754	$2,743	$2,741
2014GQ2	4,879	4,858	4,854	$2,313	$2,303	$2,301
2014GQ3	4,795	4,792	4,791	$2,288	$2,286	$2,286
2014GQ4	4,506	4,527	4,531	$2,154	$2,164	$2,166
FY2014	19,975	19,950	19,945	$9,509	$9,497	$9,495

SP Letters: After Rates, Extigency January Implementaion						
TIME	Volume (in millions) (Elas=-0.157)	Volume (in millions) (Elas=-0.7)	Volume (in millions) (Elas=-0.8)	Revenue (millions $) (Elas=-0.157)	Revenue (millions $) (Elas=-0.7)	Revenue (millions $) (Elas=-0.8)
2012GQ1	6,707	6,707	6,707	$3,055	$3,055	$3,055
2012GQ2	5,526	5,526	5,526	$2,563	$2,563	$2,563
2012GQ3	5,364	5,364	5,364	$2,503	$2,503	$2,503
2012GQ4	5,138	5,138	5,138	$2,404	$2,404	$2,404
2013GQ1	6,312	6,312	6,312	$2,936	$2,936	$2,936
2013GQ2	5,211	5,211	5,211	$2,455	$2,455	$2,455
2013GQ3	5,306	5,306	5,306	$2,532	$2,532	$2,532
2013GQ4	4,848	4,827	4,823	$2,318	$2,308	$2,306
2014GQ1	5,795	5,773	5,769	$2,754	$2,743	$2,741
2014GQ2	4,878	4,856	4,852	$2,405	$2,394	$2,392
2014GQ3	4,765	4,661	4,642	$2,400	$2,347	$2,338
2014GQ4	4,468	4,359	4,340	$2,254	$2,200	$2,190
FY2014	19,906	19,649	19,602	$9,813	$9,684	$9,661

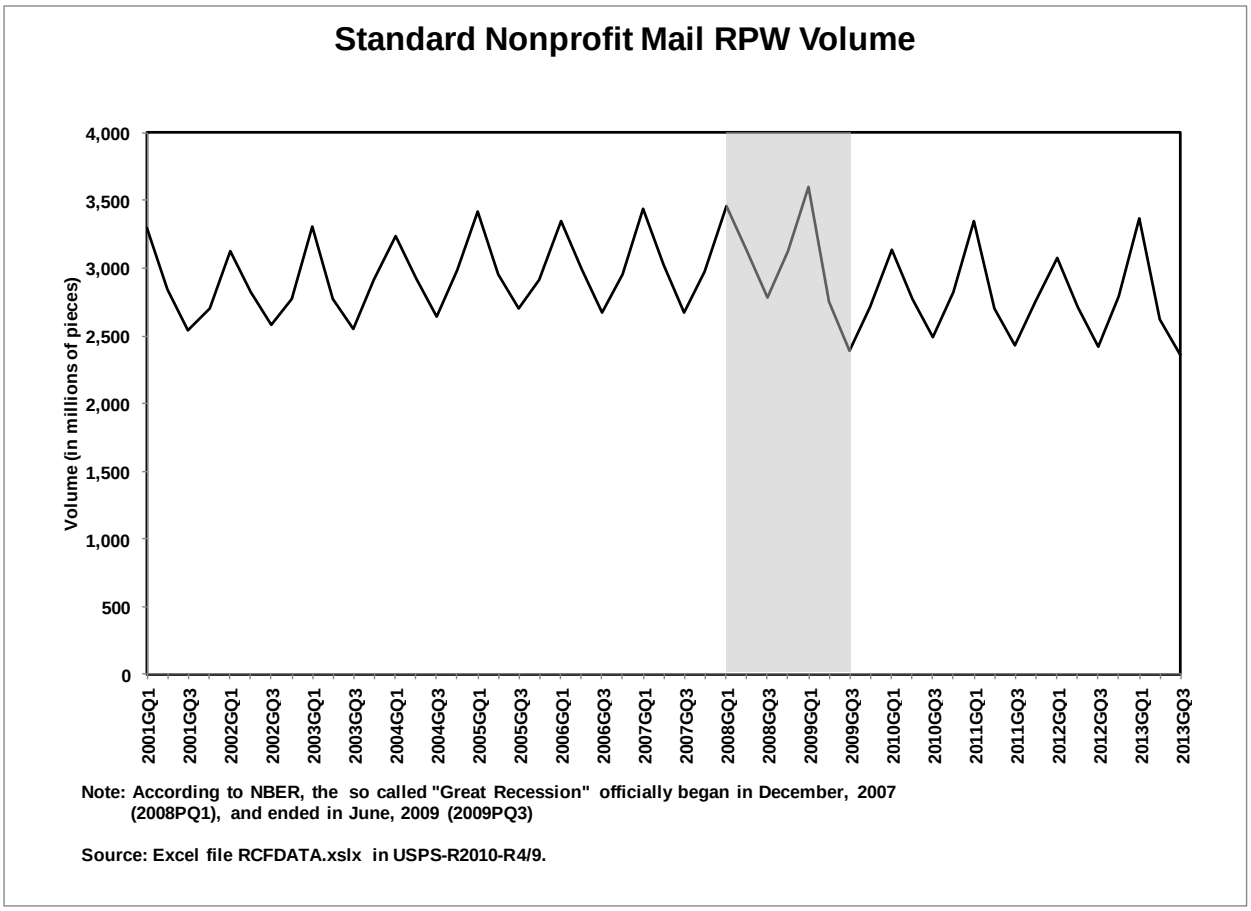
SP Letters: After Rates & Before Rates Volume and Revenue Differences						
TIME	Volume (in millions) (Elas=-0.157)	Volume (in millions) (Elas=-0.7)	Volume (in millions) (Elas=-0.8)	Revenue (millions $) (Elas=-0.157)	Revenue (millions $) (Elas=-0.7)	Revenue (millions $) (Elas=-0.8)
2012GQ1	0	0	0	0	0	0
2012GQ2	0	0	0	0	0	0
2012GQ3	0	0	0	0	0	0
2012GQ4	0	0	0	0	0	0
2013GQ1	0	0	0	0	0	0
2013GQ2	0	0	0	0	0	0
2013GQ3	0	0	0	0	0	0
2013GQ4	0	0	0	0	0	0
2014GQ1	0	0	0	$0	$0	$0
2014GQ2	(1)	(2)	(3)	$92	$91	$91
2014GQ3	(30)	(131)	(149)	$112	$61	$52
2014GQ4	(38)	(168)	(191)	$100	$35	$23
FY2014	(68)	(300)	(343)	$304	$187	$166

Sources: Forecasts for different elasticities than Thress were obtained using BeforeRate.xlsx and AfterRates-Exig-Jan.xlsx files given in USPS-R2010-4R/9.

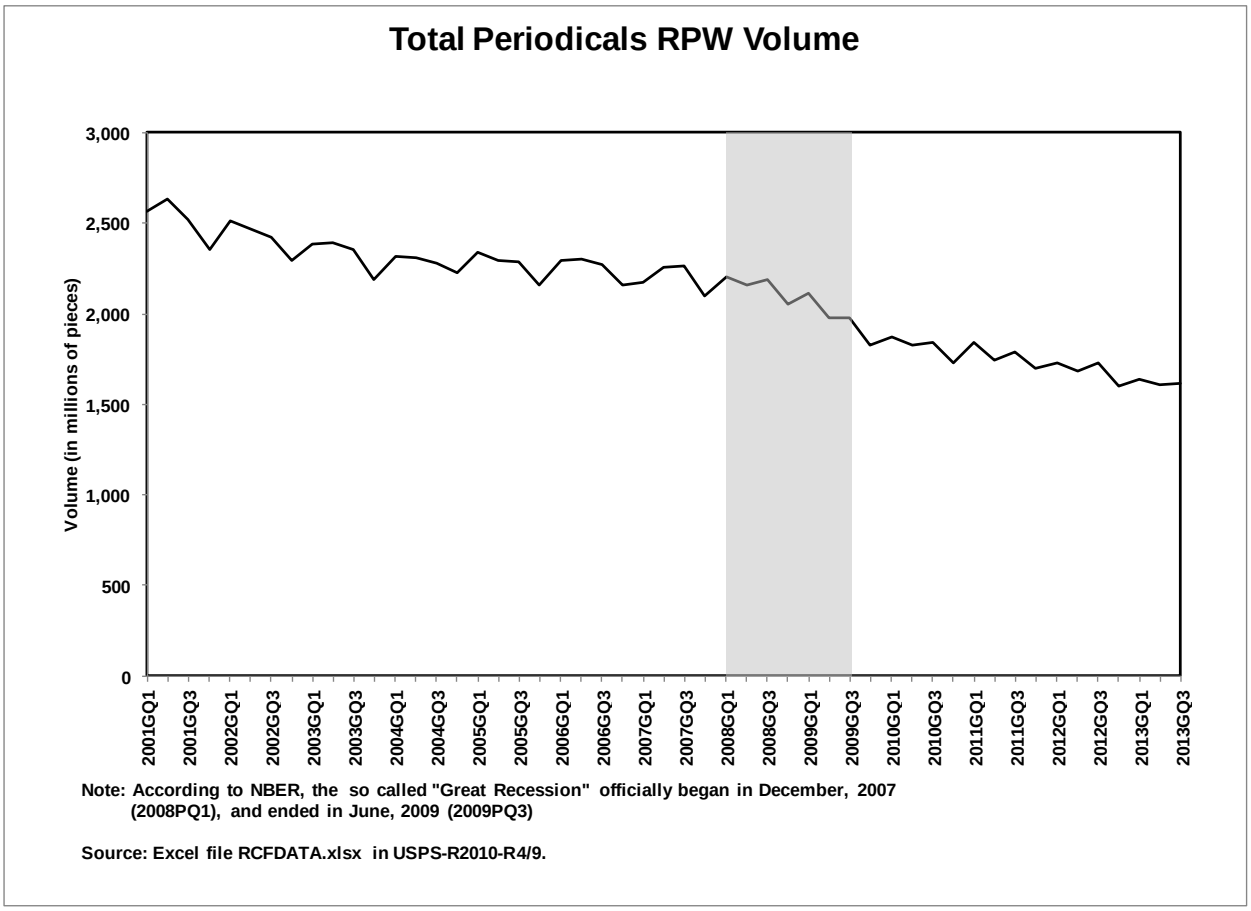
Note: Each assumed elasticity was divided to current and lag in proportion to the original one.

APPENDIX I

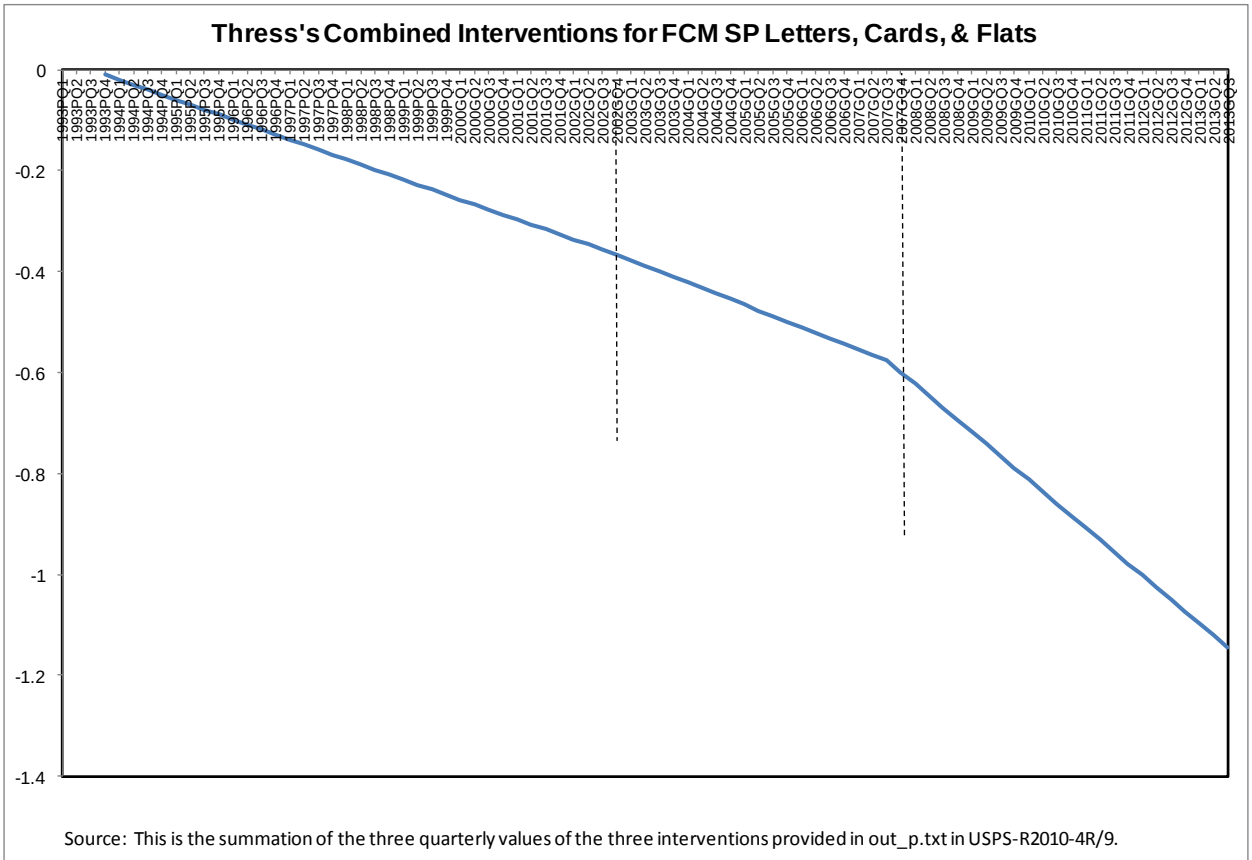
Standard Non - profit was affected a little by the recession, but as seen in the figure below has basically maintained the same trend pre- and post-recession.



Periodicals was the next least affected volume trend from the recession after SP FCLM, though one can from the figure below a very small recession and post-recession impact on periodicals volume, unlike SP FCLM.

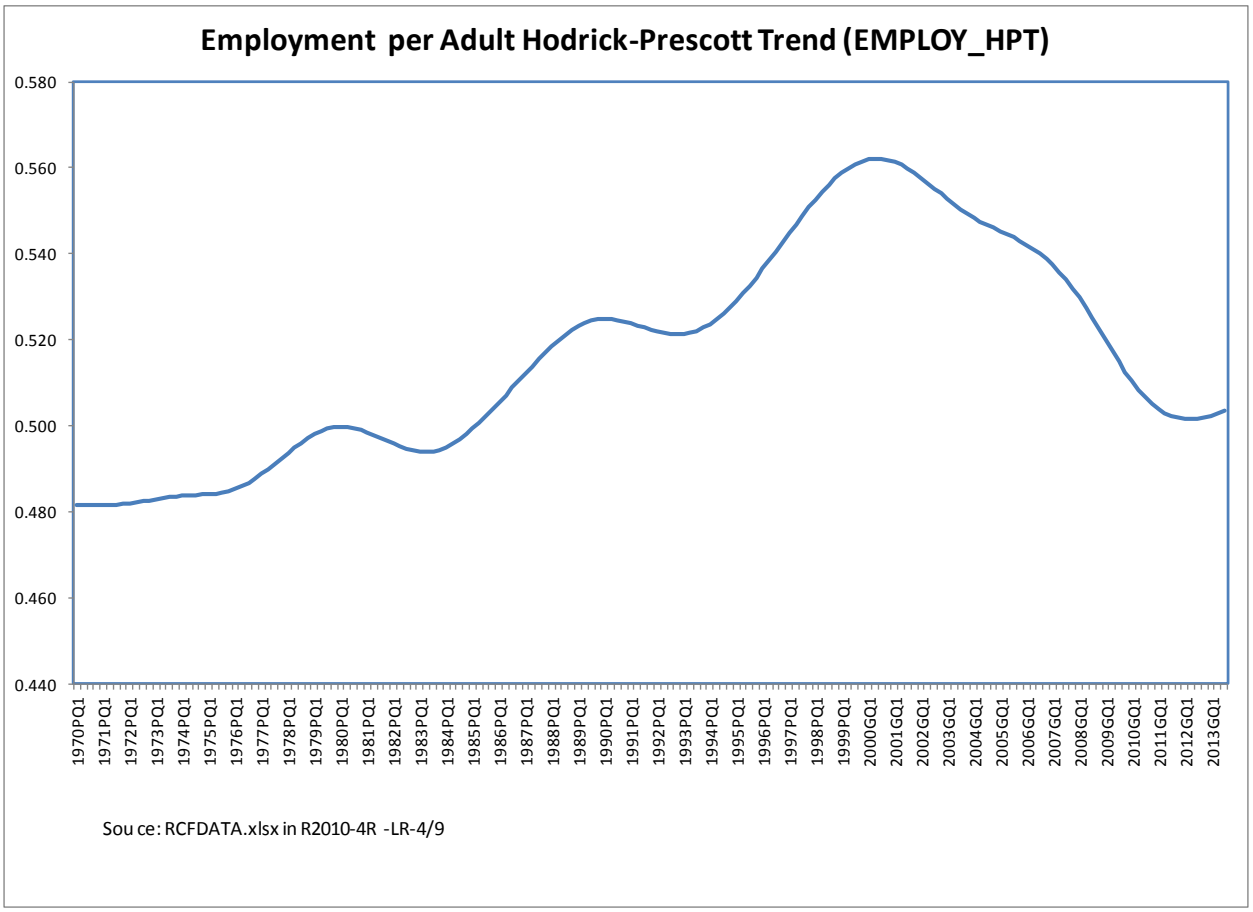


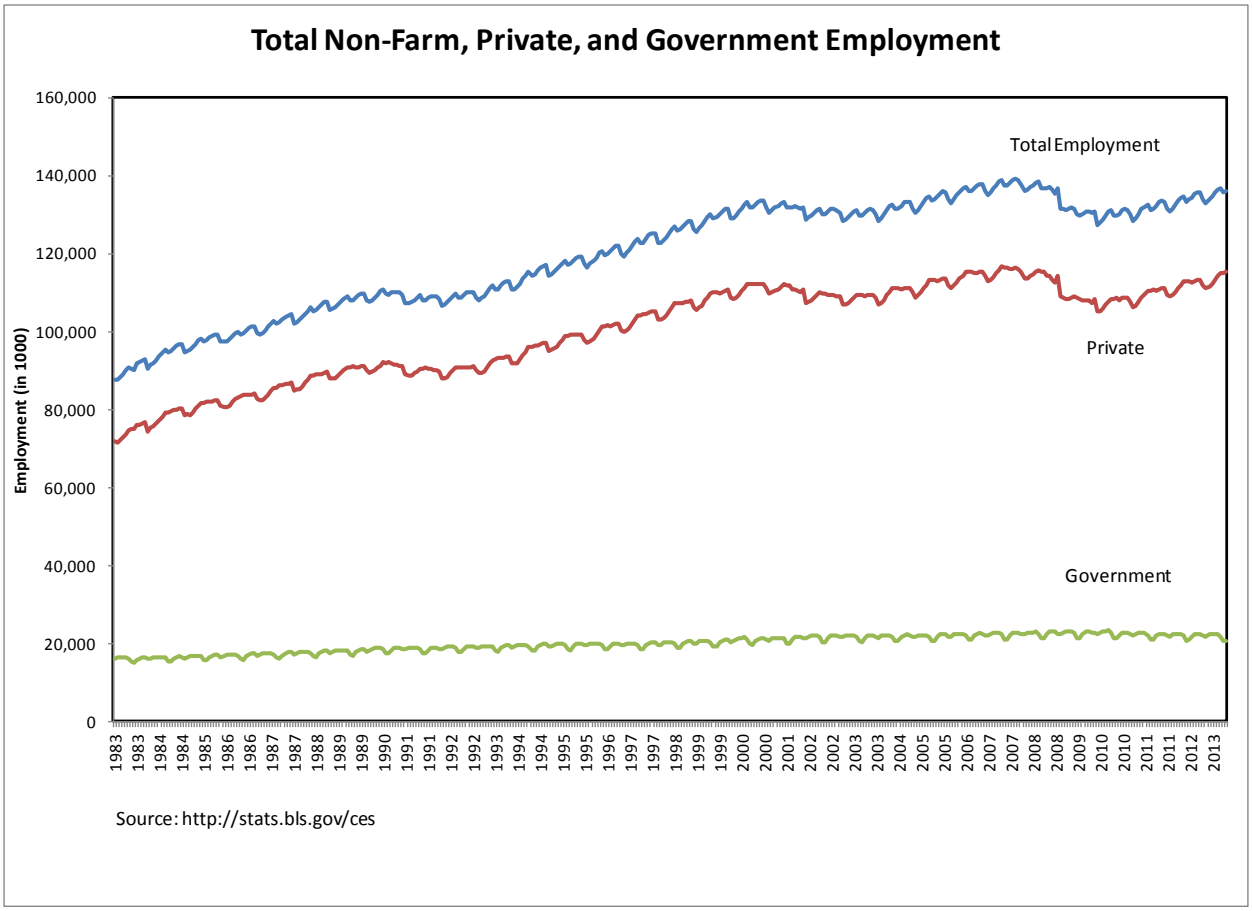
APPENDIX II

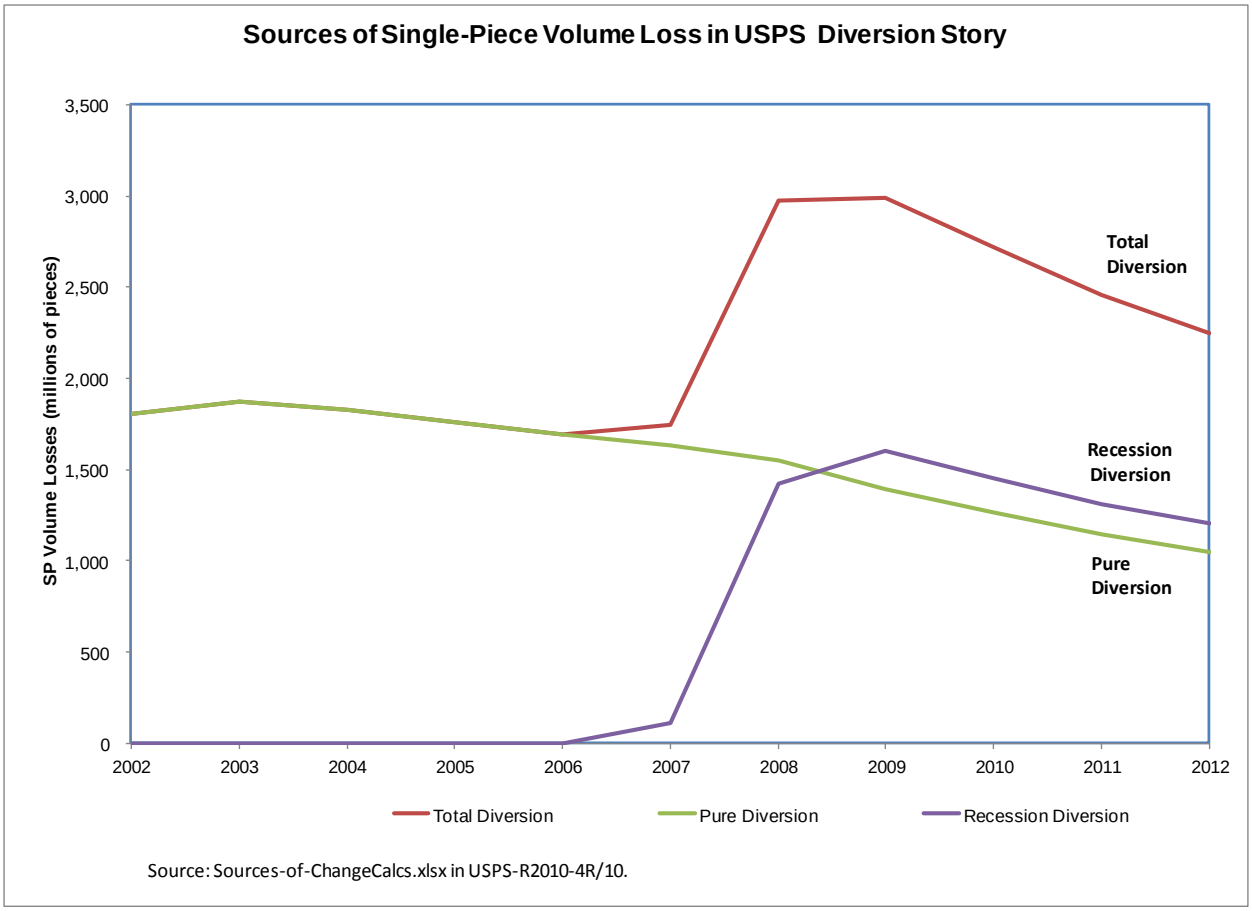

Thress's Combined Interventions for FCM SP Letters, Cards, & Flats
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
Source: This is the summation of the three quarterly values of the three interventions provided in out_p.txt in USPS-R2010-4R/9.

FCM SP LCF Demand Equation Coefficients	
Own-Price Elasticities	
Current	-0.002625
Lag 1	-0.154398
Lag 2	0.000000
Lag 3	0.000000
Lag 4	0.000000
SUM (not used)	-0.157023
Constant	1.555905
Extra Coefficients:	
EMPLOY_HPT	1.0931200
D_R90	-0.057480
MC95	0.032557
R2006PHOP	-0.023093
D_R07	-0.018625
	0.043691
INTERVENTION ANALYSIS:	
INTERVENTION 1	
W0: Pulse	0.000000
W1: Lag Pulse	0.000000
W2: Step	0.000000
W3: Trend	-0.009896
Qtrs pre-End	80.000000
Delta	1.000000
INTERVENTION 2	
W0: Pulse	0.000000
W1: Lag Pulse	0.000000
W2: Step	0.000000
W3: Trend	-0.001067
Qtrs pre-End	44.000000
Delta	1.000000
INTERVENTION 3	
W0: Pulse	0.000000
W1: Lag Pulse	0.000000
W2: Step	0.000000
W3: Trend	-0.012746
Qtrs pre-End	24.000000
Delta	1.000000

Source: out_p.txt in USPS-R2010-4R/9.


Employment per Adult Hodrick-Prescott Trend (EMPLOY_HPT)
0.580
0.560
0.540
0.520
0.500
0.480
0.460
0.440
1970PQ1
1971PQ1
1972PQ1
1973PQ1
1974PQ1
1975PQ1
1976PQ1
1977PQ1
1978PQ1
1979PQ1
1980PQ1
1981PQ1
1982PQ1
1983PQ1
1984PQ1
1985PQ1
1986PQ1
1987PQ1
1988PQ1
1989PQ1
1990PQ1
1991PQ1
1992PQ1
1993PQ1
1994PQ1
1995PQ1
1996PQ1
1997PQ1
1998PQ1
1999PQ1
2000GQ1
2001GQ1
2002GQ1
2003GQ1
2004GQ1
2005GQ1
2006GQ1
2007GQ1
2008GQ1
2009GQ1
2010GQ1
2011GQ1
2012GQ1
2013GQ1
Sou ce: RCFDATA.xlsx in R2010-4R -LR-4/9


Total Non-Farm, Private, and Government Employment
Employment (in 1000)
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Total Employment
Private
Government
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Source: http://stats.bls.gov/ces


Sources of Single-Piece Volume Loss in USPS Diversion Story
SP Volume Losses (millions of pieces)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Total Diversion
Recession Diversion
Pure Diversion
Total Diversion
Pure Diversion
Recession Diversion
Source: Sources-of-ChangeCalcs.xlsx in USPS-R2010-4R/10.

Re-Estimation of Thress Demand Equation of FCM SP Letters, Cards, and Flats

	Own Price Elasticity	R-Sqrd	Adj R-Sqrd	Intervention1	Intervention2	Intervention3	Slope1 for 1993Q4-2002Q3	Slope2 for 2002Q4-2007Q3	Slope3 for 2007Q4-2013Q3	Slope3/ Slope2
Original Equation	-0.157020	0.998260	0.997898	-0.009896	-0.001067	-0.012746	-0.009896	-0.010963	-0.023709	2.162638
No Employment Var.	-0.234690	0.997380	0.996778	-0.008924	-0.005101	-0.012164	-0.008924	-0.014025	-0.026189	1.867308
No Employment and D_R07 Var.	-0.259820	0.997330	0.996810	-0.008786	-0.006103	-0.012002	-0.008786	-0.014889	-0.026891	1.806098

Re-Estimation of Thress Demand Equation of FCM SP Letters

	Own Price Elasticity	R-Sqrd	Adj R-Sqrd	Intervention1	Intervention2	Intervention3	Slope1 for 1993Q4-2002Q3	Slope2 for 2002Q4-2007Q3	Slope3 for 2007Q4-2013Q3	Slope3/ Slope2
Original Equation	-0.192135	0.998046	0.997640	-0.009721	-0.001847	-0.011422	-0.009721	-0.011568	-0.022990	1.987379
No Employment Var.	-0.323018	0.996841	0.996221	-0.009077	-0.005047	-0.011202	-0.009077	-0.014124	-0.025326	1.793118
No Employment and D_R07 Var.	-0.341114	0.996837	0.996290	-0.009059	-0.005353	-0.011149	-0.009059	-0.014412	-0.025561	1.773591

Notes:

Slope1=Intervention1; Slope2=Intervention1+Intervention2; Slope3=Intervention1+Intervention2+Intervention3

Note: Employment variable (EMPLOY_HPT) is Hodrick-Prescott trend component of private employment per adult population.

D_R07 is a dummy variable equal to one since the Postal Service's May, 2007, rate change (2007Q3).

D_R07 was dropped due to being insignificant.

Source: USPS-R2010-4R-9

APPENDIX III

One-Tailed Statistical Tests of Outliers From 12 Single-Piece Own-Price Elasticity Estimates

Critical t-values for df=11:

1.363 for 10% significance level
1.796 for 5% significance level
2.718 for 1% significance level

1) Test whether the own-price elasticity is equal to 0.300 or greater:

H0: Elasticity < or = 0.300
H1: Population Mean elasticity > 0.300
Calculated t=(0.536-0.300)/((0.265/sqrt(12))=3.085

Since calculated-t of 3.085 > critical t-values of 1.363, 1.796, and 2.718 then reject H0; This implies that true elasticity is greater than 0.300 at 10%, 5%, and 1% levels respectively.

2) Test if the own-price elasticity is equal to 0.400 or larger.

H0: Elasticity < or = 0.400
H1: Population Mean elasticity > 0.400
Calculated t=(0.536-0.400)/((0.265/sqrt(12))=1.778

Since calculated-t of 1.778 > critical t-value of 1.363, then reject H0; This implies that the true elasticity is greater than 0.400 at the 10% significance level. However, since the calculated t-value is 1.778 less than the critical t-value of 1.796 and 2.718, then it is less than 0.400 at 5% and 1% significance levels.

3) Test if the own-price elasticity is equal to 0.350 or larger.

H0: Elasticity < or = 0.350
H1: Population Mean elasticity > 0.350
Calculated t=(0.536-0.350)/((0.265/sqrt(12))=2.431

Since calculated-t of 2.431 > critical t-value of 1.363 and 1.796, then reject H0; This implies that the true elasticity is greater than 0.350 at the 10% and 5% significance levels. However, calculated t-value of 2.431 is less than the critical t-value of 2.718, then it is less than 0.3.50 at 1% significance levels.

Elasticities are assumed to be normally distributed and independent of each other.

APPENDIX IV

LIST OF ALL ELASTICITY VALUES AND NOTES

	Author	Year	Elasticity
1	USPS/Thress	2013	0.157
2	USPS/Thress	2013	0.189[1]
3	OIG/Bozzo	2013	0.144
4	Jarosik	2013	0.440
5	USPS/Thress	2013	0.435P
6	OIG/Bozzo	2013	0.393P
7	Trinkner	2006	0.270TT[2]
8	Fève	2010	0.35TIL
9	Boldron	2010	0.460
10	Cazals	2011	0.520[3]
11	Cigno	2013	0.600[4]
12	Boldron	2010	0.700[5]
13	Cazals	2008	0.890[6]
14	Fève	2012	0.720[7]
15	Veruete-McKay	2011	0.770[8]
16	Cigno	2013	0.846
17	Nikali	2011	1.80P[9]
18	Fève	2012	0.5TIL[10]
19	Nikali	2008	1.38P[11]
20	Veruete-McKay	2011	0.44P[12]
21	Boldron	2010	0.539P
22	Cazals	2011	0.17P
23	Martin	2013	-0.921P

Notes:

[1] 0.189 is based on the traditional definition of SP as LFP. Thress's new definition of SP is L+C.

[2] First Class and Second Class addressed total traffic. Separate SP data not reported before 1996.

[3] "Social" letter mail from content time series study.

[4] 95% Confidence Interval Band too wide for plausible point estimate. Other end of band +0.4 ruled out based on theory.

[5] Low end of -0.46 to -0.7 range that is used here.

[6] Public tariff First Class Mail, excludes presort.

[7] First Class non-presort from Royal Mail Group ILTM model (also used as calibration in Cazals (2008)).

[8] First Class non-presort. Social content own-price elasticity was -0.43.

[9] B2C in 2009. B2B in 2009 was -0.8.

[10] Preliminary Draft only cited in 2013 OIG report RARC-WP-13-008. Simulation populated with UK price and GDP data shows own-price elasticity increasing from -0.4 to -0.5 over the period.

[11] Comprises 69% of all letter traffic. B2B comprises 21%, and own-price elasticity was-0.37. Nikali's demand equations are the only study which incorporates a cross price elasticity from having a price for esubstitutes.

[12] "Other traffic", which is mainly presort. Commercial content only own-price elasticity was -0.19.

APPENDIX V

DETAILED SUMMARIES OF OWN-PRICE ELASTICITY STUDIES

1. Envelope Manufacturers Association, "Elasticities from EMA's Small Economic Model", 2002.

EMA uses the USPS demand model and data, benchmarked to the USPS September 2003 Strategic Plan. The model structure and forecast outputs through 2011 remain the same in the EMA model except for the CES assumption that the own-price elasticity of demand for single piece FCLM remains the same from 2002-2011 at -0.331. The model is re-run using a VES assumption and calibrated so that it fits all USPS forecast output from the Strategic Plan. The USPS forecast is shown to be consistent with a rising own-price elasticity of demand due to higher rates and increased competition from substitutes. The own-price elasticity with the VES assumption begins at -0.3196 in 2002 and rises to -1.5783 by 2011.

The EMA study from 2002 is illustrative of the impact on USPS (September 26, 2013) and OIG (May 1, 2013) postal demand models from using CES rather than VES demand equations. The EMA study found that if the CES assumption and only that assumption is changed in the USPS econometric forecasting models, the elasticities are higher for the four postal products examined, which includes SP and Presort FCLM. In a simulation model based on actual 2002 data that forecasted through 2011 using official USPS forecast outputs from their September 2003 strategic plan, the VES assumption led to progressively higher postal price elasticities compared to the CES assumption. While the USPS elasticity for SP FCLM remained constant at -0.31 from 2002 through 2011 using the CES assumption, it grew from -0.32 to -1.58 by 2011 using a VES specification in the USPS model. (For Presort, while the CES assumption was -0.07, the VES assumption led to an elasticity of -0.28 by 2011 for Presort.)

2. Trinkner, U. and Grossman, M., “Forecasting Swiss Mail Demand”, Crew M. and Kleindorfer P. (editors), Progress Towards Liberalization of the Postal and Delivery Sector, 2006

Trinkner et al. note that in the Swiss case, the growth of mail volumes over time increased economies of scale, enabling postal rates to stay relatively low despite increasing labor costs and better service. “Whereas real wages grew exponentially, Swiss Post’s real rates are today even lower than in the 1920s” (p. 279.) Recursive estimates of own-price elasticity for Swiss total traffic postal data yield an increasing elasticity between 1990 and 2004. (See Figure 3, p. 272). The author states: “With increasing competition between letters and the substitutes , prices become more important; customers get more price sensitive (price elasticity grows from -0.1 to about -0.2) and cross-price elasticity becomes significantly different from zero after 2002.” (page 272.) A separate long run approach to Swiss mail demand uses a vector error correction model with quarterly data from 1982 through 2004. The model uses cross price elasticities, which become significantly different from zero after 2002 with increasing competition between letters and esubstitutes. The Swiss ministry for telecommunications has published a telecommunications price index since 1993 which includes broadband Internet access prices. Three models are run, the first uses a traditional model with no use of eproxy data, the second uses eBank data for eproxy and the third uses eUse data for eproxy. The first two models produce an own-price elasticity of -0.27, the third an elasticity of -0.22. (page 274, Table 3).

3. Greeting Card Association, “Direct Testimony of James A. Clifton on Behalf of the Greeting Card Association”, GCA-T-1, November 2, 2006, Postal Rate Commission, R2006-1, Postal Rate, Fee and Classification Changes, 2006

Expert testimony by Clifton begins by noting that demand equations for own price postal elasticities are considerably sharpened when cross price elasticities from competing substitutes such as the Internet are included. Where the cross price elasticity is high, the own price elasticity will also be high. (pp. 17-18). He notes while the CES assumption using long-period data sources is convenient for econometric demand models, it is less useful than VES models focusing on changing elasticities in the short

run due to broadband diversion. (pp. 37, 45-48.) Clifton concludes that the own-price elasticity for Single-Piece FCLM is increasing, from -0.456 he estimated in R2005-1 to -0.565 with more recent data available in R2006-1. At the margin, he estimated the elasticity in R2005-1 to be -0.765.[19] (page).

4. Cazals, C., Florens, J. P., , Rodriguez, F., and Soteri, S., "Forecast Uncertainty in Dynamic Models: an application to the demand for mail", in Crew, M. and Kleindorfer, P., (eds.), Competition and regulation in the Postal Delivery Sector, EE, (2008)

As with other studies examining the issue of confidence intervals, Cazals concludes "the level of forecast uncertainty increases substantially over the forecast time period." (p. 67). There are two types of uncertainty: within-model risk, and off-model risk. Changes in technology are the primary example of the latter, and can cause out-of-sample model projections to "suffer systematic forecast failure if such off-model risks are ignored." (p. 64). The author uses Monte Carlo simulations to establish this, and the econometric model used to forecast uncertainty uses a standard error correction model specification. The estimated own-price elasticity for First Class next day service is -0.89. (page 72, Appendix, Table A.1.) (The own-price elasticity of -0.72 for 1C is based on Royal Mail's model the UK 1C tariff index deflated for the all items RPI. See Table 5.1, page 66.)

[19] Two criticisms of the GCA approach were raised by the PRC, including an Appendix evaluating the testimony by an "outside consultant." The first criticism was that in GCA's demand function for single piece FCLM, the estimated coefficient with respect to worksharing discounts had the wrong sign, positive rather than negative. Thus, the GCA model was "misspecified". The positive coefficient, as GCA explained in its testimony, reflects the fact that there is for all intents and purposes no more conversion mail. All major bulk mailers of FCLM acknowledge this business fact, several such as MMA in expert testimony. The "outside consultant" to the Commission preferred to ignore the contemporary business facts in favor of maintaining the original philosophical rationale for worksharing discounts, which requires the existence of conversion mail, and hence a negative coefficient, in order to maintain linkage between single piece rates and worksharing rates in the elaborate labyrinthine mantra of postal rate design. The business facts, and GCA's positive sign estimated coefficient consistent with those facts, make it unambiguously and irrefutably clear that circa 2006 USPS and Commission demand equations were mis-specified, not GCA's. Notably, in R2013-11 the Postal Service has eliminated the worksharing discount variable in the Single-Piece FCLM demand equation. The second criticism was that GCA testimony used "a defective method for dealing with autocorrelated errors." (R2006-1, Postal Rate Commission, Opinion and Recommended Decision, p. 8, para. 2017.) One model GCA used for single piece letter demand did not have to correct for autocorrelation because there was none. In the other model GCA used, it was necessary to correct for autocorrelation. GCA corrected for autocorrelation by including a lagged dependent variable but did not similarly include lagged independent variables, and should have as did witness Thress. Following this criticism in the O&RC, however, GCA witnesses re-ran the model in question in E-views with the lagged dependent and independent variables to correct for autocorrelation. The results did not alter GCA's model estimates at all; hence while there was a "technical" problem with GCA's original autocorrelation test, there was no problem with GCA's model results. The re-run of the model in E-views is available upon request to GCA.

5. Nikali, H., “Substitution of Letter Mail for Different Sender-Receiver Segments”, Crew, M., and Kleindorfer, P., Competition and Regulation in the Postal Delivery Sector, EE, (2008)

Nikali focuses on the business to consumer (B2C) sector noting that this captures more about consumer behavior than business behavior. While the data set includes first and second class mail, Nikali emphasizes that his own-price elasticity estimate of -1.38 cannot be explained by second class mail because the elasticity estimated for second class only from earlier studies is considerably lower. (pages 99-100). The electronic substitutes in his research are e-mails, text messages, phone calls and telefax. The Ministry of Transport and Communications Finland (MoTC) has a long time series of telecommunications prices going back to the 1970s. Emails, ninety percent of which use broadband, proved to be the best measure of substitute for letters. The price of broadband halved in Finland between 2003 and 2006 according to MoTC. (page 95). Nikali cites numerous studies to argue that the own-price elasticity for first class letter mail has increased: from -0.3 in the 1960s to -0.4 in the 1970s, -0.5 in the 1980s, -0.7 in the 1990s and -1.4 from his own 2004 study. (page 100).

6. Fève, F., Florens, J. P., Rodriguez, F., and Soteri, S., “Forecasting Mail Volumes in an Evolving Market Environment”, in Crew, M. and Kleindorfer, P., (editors), Heightening Competition in the Postal and Delivery Sector, Edward Elgar, 2010.

The study by Fève et al. is a theoretical model that does not use any postal data.[20] However, it is without question the best available study that explains how NPO econometric demand forecasting models should be constructed in the face of changing technology (Internet competition causing postal volumes to fall) and the transition on pricing away from being a pure monopolist. Fève’s model focuses “on an environment where a traditional monopoly market is evolving towards a fully competitive environment and technology is negatively impacting on mail volumes. Prior to structural changes of this kind taking place, or more generally in the early stages of such changes, it is not possible for the NPO to use standard econometric modeling techniques alone to

[20] It does use stylized values not representative of any particular NSO to simulate model outcomes using Monte Carlo techniques. Model output includes 95% confidence interval values.

adequately model the demand for mail in the new market environment. This chapter develops instead a modeling approach that can be adopted that is Bayesian in character." (Fève, 2010, p. 133.) The essence of the Bayesian approach in Fève is as follows:

> However, in the absence of any observable outcome data it is not possible for the NPO to extend its econometric time series model to, say, a three-equation system in order to forecast the impact of either competitive entry or changes in technology. While there is no direct observable outcome data on each of these two effects up to and including period T, other less formal information may exist. Such information may include non-econometric type forecasting models calibrated with business expert information on the potential extent of technology-related substitution, or business opinion and market research on the extent to which customers may switch supplier at different price levels, perhaps informed by contingent valuation market research. (Fève et al., 2010, p. 119)

The important "take-away" here for the Commission in evaluating the proposed exigent rate increase request of the Postal Service in R2013-11 is that surveys of mailers' expected business behavior following such an increase is at least as important in evaluating the request as the Postal Service's econometric demand model forecast of pre- and post-rate increase volumes.

7. Boldron, F., Cazals, C., Florens, J. P., and Lecou, S., "Some dynamic models for mail demand: the French case", in Crew, M. and Kleindorfer, P., (editors) Heightening Competition in the Postal and Delivery Sector, EE, 2010

Boldron et al. use French quarterly postal data from 1996-2007. The authors note at the very outset of their paper: "It is very important to estimate own- or cross-price elasticities." (page 100).The long run own-price elasticity for total traffic (1C, 2C and direct mail) using error correction modeling techniques is -0.679. The authors note this is much higher than an earlier estimate by Florens et al. (2002), and concludes: "Traffic appears to be more sensitive to price." (p. 105) The estimate for transaction mail is -0.539, a less stable estimate than for total traffic, but well above the -0.27 estimated for transaction mail by Florens et al. (2002). (page107). For 1C mail, depending on the

introduction or withdrawal of some dummies or trends, the range of long run own-price elasticities is -0.46 to -0.7. Cross price elasticities for 1C mail are between +0.5 and +0.8. Boldron notes limitations of the data: changes in French postal prices are rare, no instances of price decreases to study, and "not enough variables in order to take into account fully the phenomenon of electronic substitution." (p. 112) These weaknesses notwithstanding, Boldron concludes that "price sensitivities are larger than they were before 1996." (p. 112).

8. Nikali, H., " Does the level of price elasticity change with the progression of substitution?", Crew M, and Kleindorfer, P., (editors), Reinventing the Postal Sector in an Electronic Age, EE, 2011

Nikali examines differences in substitution rates and price elasticities, and changes therein, for three sectors: B2B, B2C, and C2C. However, he ignores the most important sector when it comes to analyzing single piece own-price elasticities and changes therein: C2B, which is mainly transactions mail. While the entirety of first class letter demand has an own-price elasticity of about -1.0, a number that has trended upward since 1971, (see Fig. 3.2, p. 39) the emphasis of the paper is the considerable differences in elasticities and their trends by sector and the fact that substitution appears to take place at very different speeds by sector. In the C2C sector the elasticity is very low, or has disappeared altogether. Substitution is complete. In the B2C sector, substitution is at a relatively early stage, and the own price elasticity is high, -1.8, and in the B2B sector it is in between the B2C and C2C sectors. He notes: "demand for 1st class letter services is extremely price sensitive." (page 38). Overall, however, the author states: "It would appear that increasing competition between the paper letter and electronic channels should not be oversimplified to mean that competition leads directly to increasing or diminishing price elasticities." (p. 39).

9. Cazals, C., Florens, J. P., Veruete-McKay, L. Rodriguez, F., and Soteri, S., "UK letter mail demand: a content-based time-series analysis using overlapping market survey statistical techniques", Crew M, and Kleindorfer, P.,(editors), Reinventing the Postal Sector in an Electronic Age, EE, 2011

This study estimates the long run own-price elasticity of UK mail by letter content traffic per household. The own-price elasticity of social mail is considerably greater than for commercial (mainly transactional) mail, -0.52 for social versus -0.12/-0.17 for transactional. The own-price elasticity of direct mail is slightly inelastic at -0.92. (Page 100, Table 7.2)

10. Veruete-McKay, L., Soteri, S., Nankervis, J., and Rodriguez, F., (2011), "Letter traffic demand in the UK: an analysis by product and envelope content type", in Review of Network Economics, vol 10 issue 3

This study estimates own-price elasticities for First Class and Second Class non-presort for the UK as well as "other traffic", which the authors state is mainly presort. The estimated long run own price elasticity of demand for First Class non-presort letter mail is -0.77, and the cross price elasticity with respect to second class non-presort is +0.33. (Table 2). The paper also estimates demand elasticities by letter content (Social mail and Commercial, mainly transactional mail, as well as direct mail). The latter estimates combine First and Second Class non-presort so the content elasticities differ from the product elasticities. One important finding is that the long run own-price elasticity for social mail is about twice that (-0.43) of transactional mail, whose elasticity is estimated to be -0.19. (Table 3).The authors note that the higher elasticity for social mail is "more likely to reflect the value that Social letter mailers obtain from sending mail such as birthday and Christmas cards rather than factors relating to sender-to-receiver information." (page 17, manu.). The lower elasticity for transactional mail they explain as reflecting "the lower degree of choice open to the large majority of sender-to-receiver channels for such communications. The low price elasticity could reflect the fact that this type of mail (which includes bills, statements and invoices) is usually sent to a specific named individual of business, and in general, cannot be substituted without additional information about the receiver (such as their email address or mobile telephone number) which in most cases may not be readily available." (pages 16-17, manu.).

11. Martin, V., Paterson, C., Nikali, H., and Li, Q., “Dynamic Letter Volume Models: How Does an Economic Downturn Affect Substitution Propensities?”, in Crew, M. and Kleindorfer, P., (editors), Reforming the Postal Sector in the Face of Electronic Competition, EE, 2013.

Martin et al. use data from Finland to investigate own-price elasticities by business segment. While their paper is primarily focused on the impact of long run factors and the recession on mail volume, an important finding is that in the B2C segment the own-price elasticity of demand is almost unitary at -0.921. (page 174). The most important segment from the standpoint of estimating Single-Piece FCLM own-price elasticities is not at all examined by Martin et al., namely the C2B segment, which is largely transactions mail. The C2C own price elasticity of -0.145 they do estimate is a very poor proxy for single piece letter mail generally because by far the largest volume of single piece letter mail is transactions related C2B mail. (page 172). (There is some evidence from other studies than Martin et al. in other countries that in recent years the elasticities of B2C and C2B transactions mail are tracking each other more closely than at the start of Internet diversion in the 1990s in the U.S.)

12. Fève, F., Florens, J. P., Rodriguez, F., Soteri, S. and Veruete-McKay, L., “Evaluating demand for letter pricing and technology impacts in an evolving communications market”, (preliminary draft, 2012); presented at the May 2012 CCRI conference in Brighton, England (without Rodriquez as a co-author) under the presentation title “Are Letter Price Elasticities Higher than Econometricians Think?”

Fève et al. structure their model by defining two groups of people: L people, who only use letter mail; and E people, who send and receive communications by Internet and letter mail. The proportion of E people rises over time, following a logistical curve. The model is based on UK data from 1960 to 2009. Before the advent of E people, the model indicates a “true” own-price elasticity of demand of -0.5. (Table 2, p. 9). For each successive stage, the authors run several variations of their model. The first is the early phase of E people adopting Internet usage. These models indicate own-price elasticities ranging from -0.52 to -0.69, with model four being their preferred result with an elasticity of -0.65. (page 11).The next phase is the first half of the rapid Internet adoption period. For models using a single trend break term, the own-price elasticities range from -0.55

to -1.18. (page 14, Table 4.). Using double trend break term models and in addition an "Epeople proxy" model, the elasticities vary between -0.57 and -0.71, the lowest being the preferred model. (page 14, Table 4)/The second half of the rapid Internet adoption period uses only double trend break terms and the models produce a range of own-price elasticities between -0.30 and -0.59, -0.54 being the outcome with the preferred model. (page 16).

13. Fève, F., Florens, J. P., Veruete-McKay, L., Soteri, S., and Rodriquez, F., "Uncertainty and Projections of the Demand for Mail", in Crew M. and Kleindorfer, P., (editors), Multi-modal Competition and the Future of Mail, EE, 2012

Fève et al. discuss an important aspect of current econometric modeling of postal demand, namely the increased uncertainty of the results using traditional methods. This study incorporates a set of ex ante Bayesian informative priors "in the form of additional net trend adjustments to the effects of the of explanatory variables in the equations." (p. 79). "[D]ifferences between the projected and outcome traffic volumes can be ascribed to five potential sources of error: errors in forecasting model input variables; revisions to past observations of variables used to estimate the model; errors in the estimation of parameters; random model errors; and structural breaks." (p. 82) The own-price elasticity used in the model is from Royal Mail's Inland Letter Traffic Model. The value for the Single-Piece long run price elasticity, -0.72, was used to prepare projections of mail volumes for the price control review.

14. Veruete-McKay, L., Sheldon, R., Burge, P., and Lawrence, A., "Electronic Substitution and Postal Price Elasticities: a customer market approach", in Crew, M.,and Kleindorfer, P., Reforming the Postal Sector in the Face of Electronic Competition, EE, (2013)

This study is based on a cross sectional survey with over 17,000 observations from over 500 businesses. It is limited to three types of transactions mail and payments to customers/suppliers. In addition to the elasticity range for transactions on average (reported in Table One -0.35 to -0.44 for Presort), it also tracks increasing elasticities over 1, 3 and 5-year time horizons. For example, under a survey scenario of high price increases over the next 5 years, bills and invoices own-price elasticity increases

from -0.3 in year 1 to about -0.5 in year 5; own-price elasticity for payments to customers or suppliers increases from about -0.9 in year 1 to over -1.4 in year 5. (page 238, Figure 16.4).

15. Cigno, M., Clendenin, K., and Pearsall, E., (2013), "Are U. S. Postal Price Elasticities Changing?", presentation, 21st Conference on Postal and Delivery Economics, May, 2013, Cigno (2013-1)

The 2013 Cigno et al. study was designed to study the question of whether postal price elasticities are fixed (the CES assumption) or changing over time. Their model structure reflects the question they posed. "The restricted trans-log equation is a flexible form that allows the demand elasticities with respect to Internet penetration and own-price to change linearly" as functions of I and P/P bar. (page 5) The paper actually tests whether the CES assumption is valid in postal demand equations. They conclude that 5 of their 18 postal products do not exhibit a constant elasticity.

"Our research reveals that although postal price elasticities remain mostly in the inelastic range, the elasticities are changing over time. The prevalent pattern is for demand to become more elastic as prices rise and as households adapt to an expanding Internet. However, our estimates of elasticities by categories tend to become less certain as we approach the present." (p. 2-3.)

While the inference the authors draw from their results is that one cannot state for certain that the Internet has "compromised" the Postal Service's ability to raise revenue by raising rates, an equally valid inference is that unlike the pre-2000 years, one can no longer state for certain from their evidence that raising rates from current levels will lead to an increase in revenue for the Postal Service. In fact the most unambiguous conclusion that follows from their results is that compared to rate increases in the past, which have raised revenue, it is far less certain that further rate increases would do so from the current rate levels at the Postal Service.

> Finally, we have inconclusive evidence that both Internet penetration and higher postal prices lead to more elastic

> demand behavior by US postal customers. … However, the most conspicuous pattern seen in our estimates of price elasticities is a recent tendency for confidence intervals to expand dramatically. …Therefore, it is premature to conclude that postal demand is becoming more elastic in the US even though this is the pattern most evident in the graphs of Appendix B. (page 21)

A confusing element of their analysis of changing elasticities is that the five products they cite in the text as having a constant elasticity differ markedly from those shown in their own Table 3 . (See bottom of p. 18 text, compared to Table 3.) Only two of their 18 products exhibit a constant elasticity, First Class workshared letters, flats and parcels, and outside county periodicals. Two other products appear to be close to having constant elasticity, Standard nonprofit carrier route and Express mail. Fourteen of their 18 products including single piece First Class letters, flats and parcels have variable own-price elasticities when it comes to the impact of the Internet. Another principle finding of this study was that the 95% confidence interval band was extremely wide around the point estimate of -0.1, namely -0.6 to +0.4. Accordingly, the range is presented in Table Seven in our analysis above, not the point estimate. A positive own-price elasticity is at odds with economic theory and may indicate their model is mis-specified The authors stress that the calculation of the own price elasticity in this paper did not involve calculating cross price elasticities although another of their 2013 papers did use cross-price elasticities and estimated the own-price elasticity at -0.846.

16. Cigno, M., Patel, E. and Pearsall, E., (2013), “Estimates of U. S. Postal Price Elasticities of Demand Derived from a Random-Coefficient Discrete-Choice Normal Model”, in Crew M. and Kleindorfer, P. (editors) Reforming the Postal Sector in the Face of Electronic Competition, EE, 2013

The authors use a matrix of postal product cross price elasticities based on USPS volume data to show that when included in an econometric demand model, the own-price elasticity of Single-Piece FCLM is -0.846. This finding came under severe attack by the USPS OIG study of USPS postal demand models released May 1, 2013. USPS demand models have not used any cross price elasticities for several years, and produce own-price elasticities for Single-Piece as low as -0.09, -0.157 and -0.189

depending on the years and what is included in the definition of singe-piece FCLM. (See Section IV. C. of the analysis for a critique of how this and other studies were summarized in the OIG consultants' report.)

17. Jarosik, M., Nankervis, J, Pope, J., Soteri, S., and Vereute-McKay, L., "Letter Traffic Demand in the UK: Some New Evidence and Review of Econometric Analysis Over the Past Decade", in Crew and Kleindorfer, (editors), Reforming the Postal Sector in the Face of Electronic Competition, EE, 2013.

    Jarosik et al. estimate the long-run own-price elasticity for UK First Class letter mail as -0.44, where the cross price elasticity with respect to second class non-presort letters is +0.24. (page 202). They also note that between 1999 and 2008, "the estimated price elasticities for "total traffic" in mail volume may have increased somewhat over time (from around -0.2 to -0.3). (page 206).

18. 2013 USPS Econometric Demand Models. (Equations filed equations January 22, 2013, Narrative on those 1/22/2013 equations filed July 1, 2013. Revised demand model estimates with data through FY2013Q3 filed September 26, 2013 in R2013-11 and references July 1 Narrative as an explanation of that filing.)

    The own-price elasticity for single piece letters (flats, and cards) is -0.157 in the latest USPS econometric demand models submitted with the exigent rate filing on September 26, 2013. For single piece letters alone (LFP), the own-price elasticity is -0.192, the same as in 2009, with 2010 and 2011 having been -0.182 and -0.189 respectively. Evidently, the "official" SP elasticity now includes letters and cards only. For 2012, this elasticity was -0.09. For workshared FCLM, the own-price elasticity is -0.345. The model for Single-Piece FCLM is a CES demand equation without cross-price elasticities for any postal or electronic substitutes.

19. Bozzo, T., Capogrossi, K., Eakin, K., and Srinivasan,, M. "Is Demand for Market Dominant Products of the US Postal Service Becoming More Own Price Elastic?" USPS OIG (2013), Report #RARC-WP-13-008, Christensen Associates, May 1, 2013.

This report by OIG (No. RARC-WP-13-008) is an 8 page essay in persuasion based on and followed by an outside “open-minded, rigorous” 52 page review of the demand for postal products by Christensen Associates, Inc. (CAI). (OIG cover letter, dated May 1, 2013).

For Single-Piece FCLM, CAI examined the USPS econometric demand models for January 2012 and January 2013. CAI makes certain changes and corrections to the baseline USPS demand models. They alter the distributed lag price variables to eliminate the volatility of results, for example “anomalous results such as large positive elasticities.) (pages 19-20.) They use all four lags of the price index variable for all products instead of constraining the elasticities to zero for certain lags in some products (which has typically in USPS demand models included the single piece demand equation). CAI also changes the non-linear Intervention Analysis used for some products. When all these changes are made to the USPS baseline model, the CAI estimate of the January 2012 own-price elasticity estimate for Single-Piece letters (LFP) is -0.331 using data through FY2011 rather than the Postal Service’s estimate of -0.189. Its estimate of the modified USPS baseline model for January 2013 is -0.347 for Single-Piece letters and cards, whereas the Postal Service’s estimate is -0.09.

CAI rejects the USPS models’ stationarity assumption for Single-Piece price indexes as a result of KPSS and ADF tests at a 2.5% significance level (but not at a 1.0% level). It also rejects the stationarity assumption for some other product variables for price indexes, volumes and economic activity variables. As a result, he authors investigated error correction model (ECM) specifications of the USPS demand models.[21] They do this for the traditional Single-Piece volume demand data (LFP) rather than the letters and cards data. Using their corrected baseline USPS model for FY2011 and ECM, CAI finds the own-price elasticity for Single-Piece FCLM is -0.151 and using data available through FY2012, they find the Single-Piece elasticity to be -0.144.

[21] ECM and vector ECM are fairly standard, if not universal, techniques used in recent econometric demand model studies of European postal data.

The analysis overall examines an extremely limited set of options for estimating postal econometric demand functions and recommends certain minor changes that the Postal Service should make in its econometric demand modeling. It also purports to show that U. S. postal own-price elasticities are not changing, or if they are, they are falling..

CAI lists seven main findings in its examination of the 2012 version of USPS econometric demand equations submitted by USPS to the Commission on January 22, 2013. First, "demand for postal products has remained own price inelastic". Second, "[a]s a theoretical matter, the total effect of all technological changes on the price elasticity of postal services is ambiguous." Third, while the 2012 baseline USPS demand equations can be used to test whether elasticities have changed, the "models have lost some economic content over successive model revisions", because of the deletion of cross-price elasticities and electronic substitution effects. Fourth, "[n]either the Postal Service's January, 2012 models nor the alternative models in the CRRI conference papers explicitly allow for own price elasticities that change over time." Fifth, rolling and recursive analysis undertaken by CAI to test underlying conditions in demand elasticities "are somewhat limited in that they require relatively long samples of quarterly data to obtain reasonable estimates of the own price elasticity, among other demand model parameters. As a result, it is not possible to run the demand models solely on data after the Great Recession or other recent events." Sixth, USPS has made errors in believing that demand data are stationary, and error correction methods of analysis should be used to address that specification error. Seventh, own price elasticities for the Postal Service's market dominant products "are relatively stable over longer sample periods". (pages 5-6).

With regard to CAI finding one, the issue is not so much whether own-price elasticities have remained inelastic over time, they probably have. The questions are, rather, twofold. At what level are they? And, if close enough to a unitary elasticity, could a three cent price increase (in the case of single piece FCLM) push the own price elasticity over -1.0, causing the Postal Service to lose revenue relative to the volume at

current rates? Implied in the question is whether the own price elasticity of demand has changed with the rise of internet competition and if so by how much.

With regard to CAI finding two, there is no ambiguity at all on the clear cut direction of the relative prices of letter mail and esubstitutes since the advent of email products from the Internet and broadband in particular. One does not need to know the exact magnitude of this change in relative prices in order to test a reasonable range of such changes because the direction is well known.

Econometric demand equations for U. S. postal volumes can be structured in the same way many simulation models are in European studies. Relative prices of letters in real terms can be set constant (or rising or falling slowly), and of esubstitutes falling by zero in real terms (the USPS case since no cross price elasticities are used) and falling by varying percentages per quarter and per year. The impact on the own price elasticity of demand can then be directly measured from varying assumptions about the rate at which the prices of esubstitutes are falling relative to letter mail prices. In our view, a hybrid “empirical content based simulation” is a far more useful way of estimating the impact of esubstitutes on mail volume demand than highly imperfect alternatives to esubstitute prices such as Intervention Analysis or proxy quantity variables that are highly flawed as alternatives to Internet cross price elasticity time series data.

With regard to CAI findings three and four, the comparisons of the 2012 USPS econometric demand models with “recent CRRI conference papers” is entirely misleading both because CAI mischaracterized the relatively few CRRI papers they selected for comparison, and because the much wider sample of CRRI papers and related studies using European postal data that were available to be compared, have conclusions strongly at odds with nearly all of the seven CAI “main findings”. These points are covered more fully in the body of the analysis of Appendix B in the CAI study in Section IV. C.

CAI finding five qualifies or weakens their conclusion in finding seven that postal own-price elasticities in the U. S. are “relatively stable” with no evidence of “recent structural breaks”. (CAI, Appendix B, page 6). Rolling and recursive coefficient analysis to test the validity of the CES assumption in postal demand models is “somewhat limited in that they require relative long samples of quarterly data to obtain reasonable estimates of the own-price elasticity…”. (Appendix B, page 6). Finally, CAI is correct in finding six that there is a specification error in the 2012 USPS econometric demand models that leads to an incorrect conclusion that the demand data are stationary. In its September 26, 2013 filing in R2013-11, the Postal Service appears to have ignored CAI’s advice to correct this by doing an ECM model.

APPENDIX VI

Relative Prices Are the Only Way to Correctly Conceptualize a Postal Demand Function in the Presence of Intense Competition from Diversion

There has been considerable debate over the past few years as to whether cross-price elasticities should be included or excluded from postal demand equations. USPS witness Thress does not use cross-price elasticities in his 2013 econometric demand equations, and has not used them starting with the demand equations filed at the Commission on January 20, 2010. He explains his reasoning in response to ChIR #8 question 5, filed with the Commission on March 8, 2010. In R2006-1, GCA witness Clifton in GCA-T-1 argued that cross-price elasticities should be used in the Single-Piece econometric demand equation; however, limited data available for telecommunications products and services did not allow his basic VES demand function to formally incorporate cross-price elasticities for esubstitutes.

Cigno et al. (2013) incorporate several postal product cross-price elasticities in their estimation of the own-price elasticity for Single-Piece FCLM, but do not include any esubstitute cross-price elasticity. Bozzo et al. in the May 1, 2013 USPS OIG study of USPS econometric demand models from Christensen Associates Inc. criticize Cigno et al. (2013) for not including an esubstitute cross-price elasticity (even though time series price data is not available in the U.S. with which to calculate such an esubstitute elasticity), but castigate them for including postal cross-price elasticities even though U. S. time series price data is available to make such calculations.

To bring the debate full-circle and up to date, Bozzo et al. (2013) while generally approving of the Postal Service's approach to its econometric demand models, criticize those models for not including cross-price elasticities and for not including explicit time-series variables that measure the quantity of Internet substitutes. However, Bozzo et al. themselves fail to include cross-price elasticities in their own ECM model using U.S. postal time series data. It is highly unlikely they could have estimated as low an own-

price elasticity of demand for Single-Piece FCLM as they did had cross-price variables been included in the estimation.

If one is talking about the inclusion or exclusion of a cross-price elasticity for esubstitutes per se, the point to be made in this appendix is that any valid postal demand function in the presence of Internet substitution must include such a cross-price elasticity from time series data, either explicitly or as a simulation. The reason is because underlying the debate over cross-price elasticities is the fundamental microeconomic principle from the theory of value that all prices under competitive conditions are relative prices. In the context of today's intensely competitive communications market, this refers to the price(s) of letter mail relative to the price(s) of esubstitutes. Time series quantity variables for esubstitutes can never replace, or substitute for, explicit or simulated relative price data if one is concerned with an accurate own-price elasticity for First Class letter mail. Neither minimizing mean square errors (MSE) or its dual, maximizing R^2, can trump sound microeconomic theory in the construction of an applied econometrics demand function. No textbook on the theory of econometrics would ever say it can.

The Postal Service's econometric demand models were created about thirty years ago under market conditions when it had an economic monopoly on letter mail, created in part by its legal monopoly. In modern times it was treated as a regulated utility, and the federal regulatory body was charged with seeking to ensure that postal prices came as close as possible to resembling those that would prevail in a competitive market. This was accomplished through a system of cost-based rate regulation. It was appropriate for the applied econometric demand models first developed by Prof. George Tolley, and later advanced and refined by USPS witness Thress to take the following form under conditions of monopoly:

$$\text{Ln } Q = a + \text{Ln } P_L + \text{Ln } X_i$$

where Q is postal volume, P_L is postal letter price, and X_i are other factors affecting demand beyond price.

Consider the following relative price situation under today's competitive conditions:

Time Period Simulation

Price	1	2	3	4		N
P_L	1.0	1.0	1.0	1.0	……	1.0
P_E	1.0	0.75	0.50	0.25	……	0.0

This reflects the fundamental fact of the price of postage, P_L, compared to the price of using the Internet for postal – type products such as email and transactions payments P_E. In periods 1 – (N-1) we assume the real price of postage at the margin remains the same. In period one, the relative price, P^E / P_L is the same (1.0/1.0 = 1) and there is no incentive on price grounds to use one product over the other. In period 2, the relative price begins to change as a result of the declining cost and consequent growth of broadband and the proliferation of esubstitutes that have accompanied it.

In the table above, the price of the internet has gone down relative to postage prices from 1.0 to 0.75. It does not matter which way we compute the relative price, the important point from microeconomic theory is that the quoted price in U. S. dollars and cents is always a relative price.

Using P_L/P_E as the relationship, the relative price of postage continues to go up in periods 3 and 4, from 1.33 to 2.0 to 4.0. The inexorable increase in postage prices is not a result driven by a rate cap case under PAEA or an exigent rate case. The rising (relative) price of postage is not a result of decision makers at the Postal Service, its Board of Governors, the Commission or the U. S. Congress. It is dictated by competitive market forces working aggressively against the Postal Service's current letter price offerings.

Consider the difference between computing postal price elasticities based on the relative price concept from economic theory as opposed to how a businessman (or a monopolist, or a bygone NPO of decades ago) might compute such an elasticity.

(1) $\text{Ln } Q = a + \text{Ln } (P_L/P_E)$

(2) $\text{Ln } Q = a + \text{Ln } P_L - \text{Ln } P_E$

(3) $\text{Ln } Q = a + \text{Ln } P_L$

Equations (1) and (2) are correctly specified in that the price P_L is the price of postage relative to the price of esubstitutes in a market where competitive conditions prevail. The concepts of opportunity cost and consumer choice require that prices be relative prices in economics, especially under competitive conditions. The P_E variable in the second equation is the cross price elasticity for a particular substitute, in our case the esubstitute.[22]

If own price elasticities are calculated correctly under competitive conditions, they must be based on relative prices and must include the net effect after cross price elasticities based on the concept of relative prices are figured in. USPS (Thress) and USPS OIG (Bozzo) do not use functional forms based on relative prices. Their version of equation (1) despite the transformation from the monopoly of three decades ago to intensely competitive conditions still remains equation (3) above: $\text{Ln } Q = a + \text{Ln } P_L$.[23] Their omission of cross-price elasticities is, at bottom, an untenable position that one can compute an own-price elasticity of demand under competitive conditions by abandoning the concept of relative prices in the theory of value, the very core of microeconomic theory.

One does not have to have a good empirical variable for P_E to stay true to the concept of relative prices and the incorporation of a cross-price elasticity into a demand equation based on it. Neither the Postal Service nor the Commission need wander in a maze of quantity-based substitute variables in a postal demand equation, and then abandon all esubstitute measures whether quantity or price in favor of amorphous

[22] Cigno and Pearsall's elasticities in their 2012 paper are correctly calculated based on the fundamental microeconomic principles of opportunity cost, consumer utility theory and relative prices in that they compute a matrix of cross price elasticities in order to isolate true own-price elasticities for several postal products. Unfortunately, esubstitutes is not one of those competing products because U.S. price data is not available.

[23] Bozzo conjures up totally subjective "survey" type reasons why he omits cross price elasticities in his work for USPS OIG. (See, for example his critique of Cigno et al. (2013) on page53) None of these have any merit because if a cross price elasticity can in fact be omitted, that will show up objectively in the cross price calculations, not some conversation with postal management.

trends that patch over the basic structure of an econometric demand model like a band-aid because it no longer works.

In the absence of a time series of direct esubstitute prices, one can introduce a simulation into the econometric model because it is known with certainty what the direction of relative prices between letter mail and esubstitutes is over time. It is only the rate of the change that is unknown, but various simulations can be run based on such evidence as we do have of the rate of change of relative prices. The process by which one or a range of rates of change in relative prices is chosen for postal forecasts may be less deterministic than an own-price elasticity without a cross-price elasticity for esubstitutes, but it would be far more helpful to the Postal Service and the Commission, as well as other interests, to have a less deterministic estimate and a more realistic range of estimates involving some Bayesian techniques.