

NALC-T-1

BEFORE THE
POSTAL REGULATORY COMMISSION
WASHINGTON, D.C. 20268-0001

MAIL PROCESSING NETWORK RATIONALIZATION
SERVICE CHANGES, 2012 DOCKET N2012-1

DIRECT TESTIMONY
OF
DR. MICHAEL A. CREW
ON BEHALF OF
THE NATIONAL ASSOCIATION OF LETTER
CARRIERS, AFL-CIO

1 **AUTOBIOGRAPHICAL SKETCH**

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

My name is Michael A. Crew. I am the

Director of the Center for Research in Regulated Industries

("CRRRI") and CRRRI Professor of Regulatory Economics at

Rutgers University. I have taught economics at Rutgers

Business School since 1977. Prior to joining Rutgers, I

taught at Harvard University, Wesleyan University,

Carnegie-Mellon University, University of Strathclyde and

other universities in the United Kingdom. I received my

Ph.D. in economics in 1972 from the University of Bradford.

My principal research interest is

regulatory economics, including the economics of postal

services. My current research is concerned not only with

the economics of postal service but also public utility

regulation. My publications include five books, over twenty-

five edited books, and numerous journal articles, for

example, in *American Economic Review*, *Economic Journal*,

Bell Journal of Economics, *Journal of Political Economy*,

Journal of Regulatory Economics, *Public Choice* and

Quarterly Journal of Economics. I am the founding editor of

two journals, *Applied Economics* and the *Journal of*

Regulatory Economics, the latter which I have edited since

1988. I have also served on editorial boards of other

1 journals. I was the recipient of the 2009 Distinguished
2 Member Award, Transportation and Public Utilities Group,
3 the 2002 PURC Distinguished Service Award from the
4 Public Utility Research Center (PURC) at the University of
5 Florida, and the 1992 Hermes Award of the European
6 Express Organization.

7 In addition to my teaching, writing and editing,
8 I have consulted on pricing, economic costing, and
9 regulatory economics for a number of government
10 agencies, corporations and organizations, including the
11 United States Postal Service, the United States Treasury,
12 the United States Department of State, Royal Mail (United
13 Kingdom), the Government of Canada, Canada Post, the
14 European Commission, New Zealand Post, the New
15 Zealand Commerce Commission, bpost (the Belgian Post),
16 the Australia Competition and Consumer Commission,
17 Australia Post, AT&T, BellSouth, Independent Power
18 Producers of New York, Jersey Central Power and Light,
19 New York Telephone and Sithe Energies. I served on the
20 Board of Directors of Energy Initiatives, Inc., from 1984 to
21 1988.

22

1 **PURPOSE OF TESTIMONY**

2
3 The purpose of my testimony is to evaluate
4 the Postal Service's proposal to reduce the service
5 standards for first-class mail. I conclude that
6 implementation of the proposal, especially if USPS is also
7 successful in implementing its plan to abandon Saturday
8 delivery, may herald the death knell for the Postal Service.
9 USPS's relentless focus on cost-cutting to the effective
10 exclusion of other measures creates the serious danger of
11 irreparable damage to mail service and to the enterprise.
12 It threatens to undermine USPS's viability.

13 I explain in this report that, just as in the 5-day
14 case (PRC Docket No. N2010-1), USPS underestimates the
15 amount of business it will likely lose from reducing the
16 quality of its service. It also overestimates the savings its
17 proposal will generate and ignores the loss of benefits to its
18 customers.

19 **USPS's FLAWED APPROACH TO ESTIMATING LOST**
20 **MAIL VOLUME**

21
22 USPS's approach is based on the notion that
23 USPS knows best. Its lack of attention to the needs of
24 customers results in its underestimating the benefits that
25 would be lost as a result of its proposed actions. This can
26 be seen quite starkly in the testimony of USPS witness

1 Gregory Whiteman (USPS-T12), many of whose arguments

2 simply do not hold water. For example, Whiteman states:

3 Interestingly, many customers are either
4 unaware of First-Class Mail™ service standards
5 and/or perceive that First-Class Mail™ service
6 performance takes longer than the current
7 service standards (and longer than our actual
8 service performance); hence the changes in the
9 service standards would not be perceived as a
10 significant change.

11
12 USPS is clearly concluding what it wants and

13 hopes to be the case, namely, that the lowering of service

14 standards will not be perceived by customers as a

15 significant change. Indeed, the whole thrust of Mr.

16 Whiteman's testimony is that this change will have a

17 minimal effect. In reality, however, quite the opposite could

18 be concluded. If customers currently perceive the level of

19 quality to be lower than it actually is, then lowering quality

20 further may result in their perceiving quality as even lower.

21 The new perception of even lower quality may result in

22 customers deciding that the quality is so poor as to flee the

23 product in droves.¹ With this approach the intent is clearly

24 to find as small an impact as possible rather than an

¹ Mr. Whiteman attempts to downplay the fact that first-class mail customers care about speed of delivery. For example, he states that "[t]he key features of First-Class Mail, for most customers, are that it is: easy to use, dependable, safe and secure, and not costly." USPS-T12, at 3. However, speed of delivery is an important attribute of product quality. It is evident to me that if first-class mail becomes slower, *ceteris paribus*, its quality has declined.

1 accurate estimate of the effect. Indeed, to be viable the
2 case needs to support a low number.

3 Given this, it is not surprising that in its
4 testimony, USPS suggests that the degradation in service
5 standards that it is proposing will have a minimal effect on
6 mail volume: it estimates that total mail volume would drop
7 by 1.7%. USPS-T12 (Whiteman), at 7. Indeed, USPS's
8 proposed service change can only be justified if USPS
9 presents the change as having a small impact. In reality, no
10 one can know with certainty how much volume will be lost
11 as a result of lower quality first-class mail service.
12 However, limitations in USPS's analysis, and flaws in its
13 methodology that bias USPS's estimate downwards,
14 suggest that the mail volume lost would be far greater than
15 the USPS' estimates provided in the reports of Mr.
16 Whiteman or USPS witness Rebecca Elmore-Yalch (USPS-
17 T11).

18 First, USPS's market research is of limited
19 value since it only asked respondents to estimate how their
20 mailing behavior would change in 2012. See USPS-T11, at
21 145 (Question U7A). However, there is no reason to
22 believe that the volume loss will be a limited, one-time
23 phenomenon. To the contrary, the volume loss will likely

1 continue over time, as customers dissatisfied with degraded
2 services standards turn to alternatives. Indeed, Mr.
3 Whiteman acknowledges that “customers experience some
4 amount of inertia when faced with change” and that “the
5 estimated change may take effect over a much longer
6 period of time.” USPS-T12, at 8. The estimated mail
7 volume drop in 2012 would likely be just the beginning.

8 Another limitation on USPS’s analysis is that it
9 considers the proposed first-class mail service changes in
10 isolation, without regard for the impact of other possible
11 changes to postal operations that USPS is contemplating
12 and which may cause mail volumes to fall, such as
13 elimination of Saturday delivery or the closure of thousands
14 of post offices. Combined, these operational changes,
15 which would reduce the quality of mail service or make
16 postal services less accessible, would likely cause a far
17 greater loss of mail volume than would any one change
18 considered separately. Indeed, I understand that during the
19 hearing on USPS’s case, there was evidence that ORC
20 International performed research on the anticipated impact
21 on mail volume of, *inter alia*, multiple USPS initiatives and
22 that ORC’s preliminary results showed that first-class mail

1 volume would suffer a precipitous decline of over 10%. See
2 Hearing Transcript at 844.

3 Even putting aside these obvious
4 problems with USPS's analysis, the quantitative market
5 research performed by ORC International on behalf of
6 USPS contains flaws that bias downward USPS's estimate
7 of lost mail volume.

8 These type of flaws are illustrated in Figure 41
9 of the testimony of Ms. Elmore-Yalch (USPS-T11, at page
10 49), which is reproduced below. Figure 41 illustrates, using
11 hypothetical numbers, how ORC calculated volume change.
12 It shows that the respondent estimated a first-class mail
13 volume in 2012 of 100,000, which would drop to 90,000 if
14 the reduced service standards were in place. However,
15 rather than accepting this reduction of 10,000 pieces
16 estimated by the respondent, ORC "adjusts" the estimate
17 down to 2,500, or 25% of the original stimulated loss.

18
19
20
21
22
23

1 **Figure 41: Example of Calculating Volume Change 1**

| Estimated 2012 Volume Using First-Class Mail | Estimated 2012 Using First-Class Mail if Revised FCM Standards Had Been in Place | % of Increase / Decrease in Volume Solely Attributable to Change to FCM Standards | Probability of Change (0–100 scale) | Adjusted Volume of First-Class Mail if FCM Standards Changes are Implemented* |
|--|--|---|-------------------------------------|---|
| 100,000 | 90,000 | 50% | 50% | 97,500 |

** (90,000 pieces of First-Class Mail After Change – 100,000 pieces of First-Class Mail Before Change) x (.5) x *.5) + 100,000 pieces of FCM Before Change = 97,500 pieces of First-Class Mail if changes to First-Class Mail if changes to service standards are implemented.*

2

3

To achieve this adjustment, ORC first

4

multiplies the 10,000 estimated pieces of lost mail by a

5

“probability of change” factor that cuts the 10,000 in half. It

6

derives this “probability of change” factor by asking

7

respondents to state the likelihood, on a scale of 0 to 10

8

that they would either change the number of pieces of mail

9

they mailed or modify the way the pieces were mailed. See

10

USPS-T11, at p.143 (Questions U5A, U5B).

11

ORC used exactly this same “probability of

12

change” factor to reduce estimated mail loss in the 5-day

13

case. I explained in that case that use of such a “probability

14

of change” factor to reduce what was already the

15

respondent’s best estimate was inappropriate. See Direct

16

Testimony of Dr. Michael A. Crew, NALC-T4, Docket No.

1 N2010-1, at 6. The Commission also found the use of the
2 likelihood factor unsupported:

3 The Commission finds that there is not, in the record,
4 any evidence demonstrating the use of a likelihood
5 factor in the way the Postal Service utilizes it.
6 Furthermore, there is no support for the contention
7 that the participant's estimates of their volume
8 responses to five-day delivery were likely to be
9 overstated. Therefore, reducing the estimates using
10 an expected value function or "likelihood factor" is not
11 appropriate.

12 *Advisory Opinion on Elimination of Saturday Delivery,*
13 Docket No. N2010-1 (March 24, 2011), at 112-13 (emphasis
14 added).

15 To illustrate the inappropriate nature of the
16 "probability of change" factor imagine a group of people
17 asked to predict how often a hundred flips of a coin would
18 land on heads. Most would give an estimate near 50.
19 However, then if they were asked how likely they thought
20 their estimate would be accurate, they would express less
21 than 100% certainty -- say, 80%. It would obviously be
22 wrong to multiply this uncertainty factor of 80% by 50 to
23 conclude that the respondents' best estimate of the number
24 of heads would be 40! However, ORC employed exactly
25 this sort of illogic.

26 This problem is compounded, in my view,
27 since it is not clear how accurate or biased are the
28 respondents' estimates of probabilities. I am not convinced

1 that the concept of probability is well understood by most
2 survey respondents. Adjusting the respondents' estimates
3 of mail volume by their estimates of probabilities only further
4 muddies the results.

5 ORC not only again uses the inappropriate
6 "probability of change" factor but compounds the error by
7 further reducing the respondent's estimated mail volume
8 drop by a second factor: the percentage of the mail volume
9 drop that the respondent said was "solely attributable" to
10 changes in first-class mail services. However, the question
11 posed to the respondent to elicit the respondent's estimate
12 of mail volume drop asked for an estimate of mail volume
13 "under the First-Class Mail Service standards." USPS-T11,
14 at 145 (Question U7A). The respondent was not asked to
15 consider any causes for a possible change in mail volume
16 *other* than the proposed first-class mail service standards.
17 Since the question posed to the respondent was already
18 limited to a drop in mail volume caused by the proposed
19 service standard changes, no basis existed to further
20 reduce the estimated drop in mail volume by the "solely
21 attributable" factor. Indeed, ORC did not use such a "solely
22 attributable" factor to adjust downward estimates of lost mail
23 volume in the 5-day case. There was no legitimate basis for

1 making such an adjustment in the 5-day case and, likewise,
2 there is no basis for it here either.

3 USPS provides no indication in its testimony
4 of how much greater its 1.7% estimate of lost mail volume
5 would be if it did not apply either the “probability of change”
6 factor or the “solely attributable” factor. However, in Ms.
7 Elmore-Yalch’s example in Figure 41 it is apparent that the
8 estimated mail volume loss would have been four times
9 higher: 10,000 instead of 2,500. In other words, absent the
10 flaws in ORC’s analysis, USPS’s projected loss of mail
11 volume in the hypothetical example Elmore-Yalch gives
12 would have been 4 times greater!

13 Another flaw in USPS’s case is its
14 presentation of its predicted loss of total mail volume as a
15 single point estimate: 1.7%. A point estimate is not
16 sufficient. A range, or confidence interval, should have
17 been provided. Such an interval provides the range within
18 which the estimate is expected to fall were the survey to be
19 repeated. For example, a 95% confidence interval is the
20 range within which 95% of the observations would be
21 expected to fall.

1 USPS's point estimate of total volume loss of
2 1.7% is not useful if the confidence interval associated with
3 it is low. Recognizing the importance of confidence
4 intervals, NALC asked USPS to provide a confidence
5 interval for the 1.7% estimate of total mail volume loss.
6 However, USPS provided no such confidence interval. See
7 NALC/USPS-T12-13 (Elmore-Yalch asserting that "it is not
8 possible to compute confidence intervals around the total
9 volume, revenue, cost and net contribution changes
10 provided by witness Whiteman").

11 Ms. Elmore-Yalch did provide confidence
12 intervals separately for national, premier and preferred
13 accounts and for small business, home-based business and
14 consumers. See NALC/USPS-T12-13. These show large
15 ranges of possible outcomes. For example, for preferred
16 accounts, ORC's point estimate for first-class mail volume
17 was a drop of 4.61% but the confidence interval shows the
18 lower-bound of the estimate at negative 14.15%. See *id.*

19 Moreover, Ms. Elmore-Yalch's confidence
20 intervals for the estimates of first-class mail reductions were
21 flawed in that they were computed on a normal distribution,
22 which assumes a bell-shaped curve of observations
23 emanating in either direction from the point estimate. As a

1 result of this normal distribution, her confidence intervals
2 contain a range greater than zero, implying that there is a
3 chance that the proposed degradation in first-class mail
4 service standards could *increase* the volume of first class
5 mail. For example, Ms. Elmore-Yalch reports for “Small
6 Businesses” a confidence interval of negative 2.67% for the
7 lower bound and *positive* 1.39% for the upper bound. See
8 NALC/USPS-T12-13. This implies the nonsensical result
9 that there is a real probability that small businesses would
10 increase their first class mail usage in response to the
11 proposed reduction in first class mail quality. Ms. Elmore-
12 Yalch should not have “forced” a normal distribution, as it
13 cannot apply given that the distribution is right-censored
14 and so the confidence intervals cannot have upper bounds
15 of the range greater than zero.

16 At the very least, given the limitations and
17 flaws in its market research, the Postal Service should
18 have also considered alternatives to its survey approach.
19 Given that Mr. Whiteman and Ms. Elmore-Yalch are so
20 concerned about bias it is somewhat ironic that USPS had
21 no time for econometric analysis and similar statistical
22 analysis, which provide another means of predicting how
23 reducing service standards would impact mail volume. The

1 Postal Service has a long history of using econometric
2 analysis in various applications, including to measure
3 elasticity of demand. Indeed, postal operators worldwide
4 employ econometrics extensively.² Econometric studies
5 can predict, using historical data on price increases, how a
6 future price increase will impact mail volume. Similarly,
7 other aspects of postal service, for example percentage of
8 on-time delivery, can be assessed as to their consequences
9 for demand. By estimating the value of a reduction in
10 service quality for various customer segments and products,
11 USPS could have estimated how a quality reduction would
12 impact demand. Indeed, other postal operators have used
13 econometric studies when seeking to assess demand
14 elasticity in connection with contemplated service changes.
15 These have also led to calibrated simulation studies and
16 sensitivity analyses on the consequences for demand
17 resulting from changes in pricing structures, postal networks
18 and delivery frequency. By contrast, as in the 5-day case,
19 the Postal Service continued to reject any rigorous
20 economic analysis of demand effects of its proposal. Mr.

² For a recent example of combining survey results with econometric studies of demand, see, e.g., Veruete-McKay, L., S. Soteri, J. Nankervis and F. Rodriguez (2010), "Letter traffic demand in the UK: an analysis by product and envelope content type" (presented at the Institut d'Economie Industrielle (IDEI) Sixth Conference On Regulation, Competition and Universal Service In The Postal Sector", Toulouse, March 25-26 2010 and the Rutgers University CRR1 18th Conference on Postal and Delivery Economics, Porvoo, Finland, June 2-5, 2010).

1 Whiteman and Ms. Elmore-Yalch see bias as such a
2 significant problem but USPS eschews econometric
3 analysis, choosing to rely instead solely on the ORC's
4 flawed market research. This approach puts in doubt its
5 projections regarding the impact on mail volume of
6 changing first-class mail service standards.

7 **USPS OVERESTIMATES THE SAVINGS THAT ITS**
8 **PROPOSAL WILL GENERATE**

9
10 In addition to underestimating the likely loss of
11 mail volume that its proposal would cause, USPS also likely
12 overestimates the savings that the proposal would
13 generate.

14 First, to the extent the degradation of first-
15 class mail service standards would cause demand and
16 therefore volume to drop, USPS will have to spread its fixed
17 costs over less volume. Falling output turns those same
18 economies of scale, which have explained a large part of
19 USPS' past success, into a serious problem. With falling
20 output *ceteris paribus*, its average costs will rise. Falling
21 output requires greater and greater costs savings to stay
22 ahead of the curve.

23 Moreover, USPS's estimate of its cost savings
24 in this case are based to a large extent on its assumption
25 that reducing service commitments will allow it to use its

1 mail processing machinery and its labor more productively.
2 See USPS-T10 (Bradley), at 11, 17. However, this
3 presumed productivity gain is misleading. Since USPS is
4 proposing to reduce the quality of its first-class mail service,
5 the product that USPS will be providing after implementing
6 the changes will be a lower-quality product. Comparing
7 USPS's productivity producing a higher-quality product to its
8 productivity producing a lower-quality product is an apples-
9 to-oranges comparison.

10 In addition, USPS takes little account of
11 transition or implementation costs. In response to an NALC
12 interrogatory, USPS witness Stephen Masse (USPS T-2)
13 gave what he called a "preliminary" estimate of capital costs
14 of facility modifications and material handling projects of
15 \$191 million and costs of transporting equipment of \$124
16 million. See NALC/USPS-T2-2. In addition, he saw some
17 one-time costs of relocating employees of around \$6,000
18 per capita. See *id.* Masse conceded that there would be
19 other costs but did not expect them to be "material." *Id.*

20 In my view, Mr. Masse's estimates are based
21 on an extremely optimistic scenario, with implementation
22 costs being very small and effectively one-time only. There
23 is a very real possibility, however, that the transition costs of

1 a major change of this kind are likely to be significant.
2 Whatever the magnitude of the transition costs, one thing is
3 clear: USPS has not given the matter much attention and it
4 could be seriously in error in ignoring such costs.

5 The literature on project implementation
6 suggests that when an enterprise undergoes a major
7 process change in its operations, transition costs, which
8 often arise unexpectedly, can be substantial, especially for
9 large projects.³ USPS is an enormous, complex
10 organization. Furthermore, changing service standards in
11 this manner would be a major alteration of its operations
12 that would impact virtually every aspect of the Postal
13 Service. Many facilities would be closed and the remaining
14 facilities would have to be reorganized to handle a higher
15 throughput unless volume losses exceed even the most
16 pessimistic projections.⁴ USPS's proposed changes would
17 impact the transporting, storing, processing and delivery of
18 mail, interactions with senders and recipients of mail, and
19 the potential reassignment or redeployment of many
20 employees. It is difficult for me to imagine how such a

³ See, e.g., Tyre, M. J. and O. Hauptmann, "Effectiveness of Organizational Responses to Technological Change in the Production Process," *Organization Science*, Vol. 3, No. 3, 301-320, 1992.

⁴ USPS's cost savings and claimed productivity improvements derive from closing plants and operating the remaining facilities much more intensively than previously. If volume drops only by the amount projected by USPS this would likely have profound effects on the manner in which facilities operate. Apparently, USPS does not see this as a significant problem.

1 monumental change in the Postal Service's operations
2 would not give rise to logistical glitches, as well as problems
3 in modifying information systems and other elements of
4 operations and infrastructure support. These problems
5 could produce unexpected and substantial costs, not only
6 internally but also to its customers. Moreover, contrary to
7 USPS's optimistic view, the transition costs would not likely
8 be incurred entirely in the first year. To the extent the
9 Postal Service is underestimating the transition costs of its
10 purported network consolidation and service standard
11 changes, it is further overestimating the savings that it
12 would realize.

13 **USPS's ANALYSIS IGNORES THE COSTS THAT IT**
14 **WOULD IMPOSE ON ITS CUSTOMERS**

15
16 USPS's analysis not only underestimates the
17 business it would lose from its proposed degrading of first-
18 class mail service standards and overestimates the savings
19 it would capture, but it also ignores the costs that the
20 changes would impose on its customers. This is evident
21 from USPS's misguided approach to the peak load problem.

22 USPS witness Marc A. Smith (USPS-T9)
23 explains in his testimony that USPS has what he refers to
24 as a "peak load problem," namely, that USPS needs
25 sufficient capacity to meet peak demand periods, but

1 because its production capacity is inflexible, during non-
2 peak periods it ends up having significant underutilized
3 capacity. See USPS-T9 at 3. USPS's proposed response
4 to this peak load problem is to smooth out the peaks by
5 relaxing its service standards for first-class mail. In other
6 words, it seeks to solve the peak load problems by reducing
7 the quality of the product it provides to first-class mail users.

8 I am very familiar with the peak load problem,
9 having studied and written about it in various industries
10 since the 1960s, including in works cited by Mr. Smith. See,
11 e.g., M. Crew, P. Kleindorfer, *Peak-Load Pricing in Postal*
12 *Services*, Economic Journal (1990); M. Crew, P.
13 Kleindorfer, M. Smith, *Peak Loads and Postal Services:*
14 *Some Implications of Multi-Stage Production*, in *Managing*
15 *Change in Postal and Delivery Industries* (M. Crew, P.
16 Kleindorfer, eds. 1997) (cited in USPS-T9, at v).

17 It is true that the costs of the peak could be
18 reduced or eliminated if peak capacity were reduced,
19 leaving peak demand unmet. However, this is a misguided
20 approach, because almost always the benefits to the

1 customer lost by not meeting peak demand would exceed
2 the costs saved by reducing capacity.⁵

3 Consider the following example. An electric
4 utility faced with a peak load problem could achieve
5 considerable cost savings if it regularly cut customers off at
6 the peak, leaving some or all of them in the dark. However,
7 that approach would deprive the electric utility's customers
8 of the benefit of the electricity. For example, a factory that
9 relies on electricity might have to close, losing business, or
10 might have to incur the expense of installing its own back-
11 up generators. We know as a matter of economics that
12 customers of the electric utility are buying the electricity
13 because they value the benefit of the electricity at least as
14 much as the price they pay for the electricity. If they did not,
15 they would not buy it. Where the electrical utility
16 disconnects the customers at peak, and the forgone benefit
17 to the customers of the electricity exceeds the cost of the
18 electricity that the utility saves, it creates an economically
19 inefficient result.

20 The solution to the peak load problem cannot
21 be achieved just by disconnecting customers at peak as the

⁵ For a detailed analysis of optimal capacity with peak load pricing under conditions of stochastic demand see Michael A. Crew and Paul R. Kleindorfer, *Public Utility Economics*, St Martin's Press, New York, 1979, and *Public Utility Economics*, MacMillan, London, 1986.

1 normal order of business. Because cutting off the
2 customers during the peak causes a net loss of welfare,
3 economists would deem it to be an inefficient approach to
4 the peak load problem.

5 Although cited by Mr. Smith, my work with
6 Paul Kleindorfer on the peak load issue, far from supporting
7 USPS's approach of reducing capacity, shows that the peak
8 load problem is solved by differentiated pricing. In
9 particular, the vast body of economic literature on the
10 subject shows that the peak load problem is solved by
11 raising the price of the product driving the peak and
12 lowering the price of the off-peak product. This produces an
13 efficient result, whereby, in the electric utility example
14 above, customers willing to pay the higher peak price are
15 not deprived of the benefit of the electricity during peak
16 hours and the utility is compensated for the cost of
17 maintaining sufficient capacity to supply it to them. Peak
18 load pricing provides optimal prices that maximize the net
19 benefit. Nothing in my writing on this subject, or in the
20 literature, supports the notion that the peak load problem is
21 best solved by simply reducing capacity or by denying
22 customers service.

23

1 No rational economic analysis can consider
2 costs without also considering benefits, but that is exactly
3 what USPS does here. It ignores how degrading the
4 service standards for first-class mail will deprive its
5 customers of the benefit they derive from those service
6 standards. Mailers deprived of current standards may incur
7 additional costs, such as having to truck their mail to a
8 further drop off point in order to guarantee its arrival by a
9 desired date, or having to prepare the mail for drop off
10 earlier. The adjustments required may not be simple and
11 mailers may have to hire consultants to assist them in
12 making the changes necessary to compensate for the
13 lowering of service standards. USPS's analysis clearly fails
14 to account for the benefits that its customers will lose if
15 service standards are reduced.

16
17 **USPS's REDUCTION OF FIRST-CLASS MAIL SERVICE**
18 **STANDARDS WOULD CONSTITUTE A PRICE**
19 **INCREASE AND POSE A REAL DANGER TO THE**
20 **VIABILITY OF THE ENTERPRISE**

21
22 The Postal Accountability and Enhancement
23 Act of 2006 imposes a price cap that severely constrains
24 USPS's ability to raise nominal prices. USPS is trying to
25 end run this price cap by imposing, *de facto*, a real price

1 increase through a reduction in first-class mail service
2 standards.

3 Postal operators in other countries are subject
4 to regulation that would not typically allow the exploitation of
5 a loophole of this kind. Regulators of major postal
6 operators take steps to see that real-price increases are not
7 instituted by cuts in service standards. Interestingly, some
8 European postal operators, aware of the constraints they
9 face in imposing back-door real price increases, have
10 responded to the peak load problem with differentiated
11 pricing.⁶

12 USPS may currently be significantly restricted
13 in its commercial freedom and constrained from
14 acting with the same freedom as other postal operators.
15 However, its approach of increasing the real price of first-
16 class mail and its relentless focus on cost-cutting and
17 quality reduction – making its services less accessible to
18 and less attractive to its customers – can only make its
19 situation worse. Degrading first-class mail service
20 standards will only drive away the customers who buy

⁶ Filipa Silva, "Priority and Non-Priority Services: Returning to the Origins" in Michael A. Crew and Paul R. Kleindorfer (eds), *Multi-Modal Competition and the Future of Mail*, Edward Elgar Publishers, Cheltenham, UK, 2011. The pricing policies analyzed are consistent with the theory of peak load pricing, including the work of Crew and Kleindorfer, and stand out in contrast to the approach of USPS.

1 USPS's most profitable product and undermine USPS's
2 chances of maintaining the value of its enterprise.

3 **CONCLUSIONS**

4
5 USPS's proposed reduction in first-class mail
6 service standards has many problems including the fact that
7 it amounts to a real price increase. It is short-sighted and
8 ill-advised. It seeks short-term savings at the risk of
9 causing irreparable damage to the business. Combined
10 with other quality reductions like the ending of Saturday
11 delivery, USPS's approach could create a downward spiral
12 of lost business from which USPS will not be able to
13 recover.

14

1 References:

2 Crew, Michael A. and Kleindorfer, Paul R., *The Economics*
3 *of Postal Service*, Kluwer, 1992

4

5 Crew, Michael A. and Kleindorfer, Paul R., "Two-Tier Pricing
6 under Liberalization," in *Postal and Delivery Services:*
7 *Pricing, Productivity, Regulation and Strategy*, edited by
8 M.A. Crew and P.R. Kleindorfer, Kluwer Academic
9 Publishers, 2002.

10

11 Silva, Filipa, "Priority and Non-Priority Services: Returning
12 to the Origins," in Crew, M and Kleindorfer, P. (eds) *Multi*
13 *Modal Competition and the Future of Mail*, Edward Elgar
14 Publishers, Northampton, MA, 2012 (forthcoming)

15

1 **Technical Appendix**

2

3 The following discussion was submitted by M. A. Crew and
4 P. R. Kleindorfer in support of NALC in Docket No. N2010
5 1:

6

7 As many texts and public documents discuss, confidence
8 intervals provide an estimate of how sure a survey
9 researcher is about the value of a particular statistic that
10 arises from a survey. (See, for example, the introductory
11 discussion of such confidence intervals for public health
12 surveys in the URL:
13 <http://health.utah.gov/opha/IBIShelp/ConfInts.pdf> .) In the
14 present context, ORC and USPS should be interested in the
15 confidence they attach to their estimate of volume declines
16 associated with USPS's proposal. As noted in Witness
17 Crew's testimony, no such confidence intervals are provided
18 in the initial ORC testimony. The ORC testimony simply
19 states a point estimate of 0.71% decline in mail volumes
20 resulting from the 5-day proposal. It does not say, for
21 example, that this estimate is likely to be between 0.40%
22 and 1.1% (with a confidence of 95%). It simply provides a
23 single or point estimate.

24

25 There is some attempt to rectify this fundamental omission
26 in the rebuttal testimony of Witness Boatwright. He states in
27 footnote 25 on p. 26 that the 95% confidence interval for the
28 ORC estimate is 0.35% to 1.06%. He states also that he
29 used the "standard asymptotic normal formula for
30 percentages" to estimate this confidence interval. There are
31 several problems with this footnote and with the underlying
32 notion advanced by Witness Boatwright that the 95%
33 confidence interval for the ORC estimate of volume
34 reductions is likely to be small to insignificant in their impact
35 on the cost savings.

36

37 On the cost side, as Witness Crew does not endorse USPS
38 cost estimates as claimed by Witness Boatwright (p2, line1-
39 2). As Witness Crew describes in detail, these are steady
40 state cost estimates that neglect both transition time and
41 likely also significantly underestimate implementation costs.

42

43 On the demand side itself, two problems can be easily
44 noted here. First, and most importantly, the mean estimate
45 itself (of 0.71%) underlying these statements is
46 fundamentally biased by the method used by ORC and

1 Witness Boatwright to determine it (this is the most basic
2 problem identified by Witness Crew with the ORC
3 testimony). Second, the method used by Witness
4 Boatwright to estimate the 95% confidence interval for the
5 percentage reduction in volumes is incorrect. The method
6 he uses is appropriate for determining a confidence interval
7 for the proportion of respondents in a survey, who endorse
8 a particular binary choice (e.g., the proportion of survey
9 respondents that say that they are smokers or the number
10 of heads in n flips of a coin). This is completely different
11 from the confidence interval of interest in the ORC study.
12

13 We examine this issue above in more detail. Witness
14 Boatwright estimates the standard error in the "Percentage
15 Decline in Volumes" as:
16

$$17 \quad \sigma_B = \sqrt{\frac{p_B(1-p_B)}{n}}$$

18
19 where n = the number of survey respondents and where
20 p_B = the
21 mean reduction in volumes estimated by the ORC
22 procedure. This gives rise to his estimate of the standard
23 error $\sigma_B = 0.00181$. Witness Boatwright uses his estimate
24 of the standard error to compute the 95% confidence
25 interval for the decline in volumes in the usual manner
26 (based on the normal distribution approximation) by adding
27 and subtracting 1.96 times this standard error to the ORC
28 mean estimate, whereupon he provides the following
29 confidence interval :
30

$$31 \quad 95\% \text{ Confidence Interval} = 0.71 - 1.96 * 0.181 = 0.35 \text{ to } 1.06 = \\ 32 \quad 0.71 + 1.96 * 0.181$$

33
34 From this, Witness Boatwright concludes that there is only a
35 5% chance that the volume reductions associated with the
36 5-day proposal will lie outside the interval of 0.355% to
37 1.06% of total benchmark volume declines (which he takes
38 to be the ORC estimate of 0.71%). Even assuming the
39 correctness of the ORC/B approach to estimating the
40 expected volume declines (i.e., their estimate of 0.71%), the
41 procedure used here is inappropriate. Witness Boatwright
42 does imply in his footnote that he considered alternative
43 approaches to the above incorrect approach to estimate
44 standard errors, but he states that they all yielded only small
45 confidence intervals. Given how far off the mark the

1 approach suggested (and noted above) by Witness
2 Boatwright is from a correct approach, one must be very
3 skeptical of these statements.
4

5 The correct answer to estimating the confidence intervals
6 depends on the underlying model assumed for survey
7 responses and their relationship to the statistic of interest.
8 To illustrate, let us assume the ORC/B approach to
9 estimating volume declines, which can be summarized as
10 follows (to simplify the exposition, we focus only on total
11 mail, not individual products).
12

13 Notation:

14
15 n = number of survey respondents

16
17 $v2(i)$ = baseline volumes for respondent i under the current
18 6-day regime

19
20 $v1(i)$ = anticipated volumes under the 5-day regime for
21 respondent i
22

23 $p(i)$ = response by respondent i to question 10k (understood
24 here as a probability)

25 $V1$ = total volumes for all respondents under the 5-day

26 regime =
$$\sum_{i=1}^n v1(i)$$

27 $V2$ = total volumes for all respondents under the 6-day

28 regime maintained =
$$\sum_{i=1}^n v2(i)$$

29
30 $\delta(i) = v2(i) - v1(i)$ = anticipated change in mail volumes for
31 respondent i in response to 5-day proposal,
32 conditional on the fact the respondent actually
33 changes behavior in response to the 5-day proposal
34 (where this latter event is assumed by ORC and
35 Witness Boatwright to occur with probability $p(i)$)
36

37
$$\Delta = \sum_{i=1}^n \delta(i) = \sum_{i=1}^n (v2(i) - v1(i))$$
 = total anticipated change in
38 mail volumes for all respondents to the survey
39

40 The ORC/B model for estimating actual changes in

1 response to the 5-day proposal is assumed by them to be
 2 the following. The respondents are assumed to believe that
 3 with probability $p(i)$ they will send $\delta(i) = v2(i) - v1(i)$ fewer
 4 pieces of mail under the 5-day proposal and with probability
 5 $1 - p(i)$ they will not reduce their mail at all under the 5-day
 6 proposal. Let this random variable of anticipated volume
 7 reductions be denoted as $\tilde{x}(i)$. From probability theory,
 8 $\tilde{x}(i)$ has the following properties:

9 Expected Value of $\tilde{x}(i) = p(i)\delta(i)$

10 Variance of $\tilde{x}(i) = p(i)[1 - p(i)]\delta(i)^2$

11 Let $\tilde{X} = \sum_{i=1}^n \tilde{x}(i)$ be the total reductions across all

12 respondents in response to the 5-day proposal. This is a
 13 random variable, of course, and we will be interested in
 14 computing the probability that outcomes of this random
 15 variable are well above or well below the mean of \tilde{X} .

16 According to the assumptions underlying the
 17 ORC/B model), \tilde{X} has the expected value

18
$$E\{\tilde{X}\} = \sum_{i=1}^n p(i)\delta(i)$$

19 which has the reported value $0.0071 \cdot V2$ (or 0.71% of
 20 baseline volumes). To compute the confidence interval for
 21 the % reduction in mail volumes in response to the 5-day
 22 proposal, we need to compute the standard error (i.e. the
 23 standard deviation) of the following random variable

24 $100 \cdot (\tilde{X}/V2)$. To do so, we make the assumption that
 25 respondent answers are statistically independent. In fact,
 26 they are more likely to be positively correlated because they
 27 are responding to similar underlying factors in the economy.
 28 So the estimates provided here on confidence intervals are
 29 likely to underestimate the width of the confidence interval.

30
 31 Under the assumption of statistical independence, one
 32 computes the variance of $100 \cdot (\tilde{X}/V2)$ as follows:

33
 34
$$\text{VAR}[100 \cdot (\tilde{X}/V2)] = \frac{10,000}{V2^2} \sum_{i=1}^n \text{VAR}(x(i)) = \frac{10,000}{V2^2} \sum_{i=1}^n [p(i)(1 - p(i))](\delta(i))^2$$

35 From this, the desired standard error is the square root of
 36 the variance of $100 \cdot (\tilde{X}/V2)$, namely:

1
$$\sigma[100*(\tilde{X}/V2)] = \frac{100}{V2} \sqrt{\sum_{i=1}^n [p(i)(1-p(i))](\delta(i))^2}$$

2 This is somewhat easier to interpret if one multiples and
 3 divides this quantity by Δ , which yields the following
 4 equivalent expression:

5
 6 (*)
$$\sigma[100*(\tilde{X}/V2)] = 100 \frac{\Delta}{V2} \sqrt{\sum_{i=1}^n [p(i)(1-p(i))](\beta(i))^2}$$

7
 8 where $\beta(i) = \frac{\delta(i)}{\Delta}$ is respondent i's share of the total reported
 9 decrease in volumes across all respondents in the survey
 10 (so that the sum of the $\beta(i)$ is 1.0). Assuming an
 11 asymptotic normal approximation, which is reasonable here
 12 given the sample sizes involved, the desired 95%
 13 confidence interval for volume reductions would be obtained
 14 by adding and subtracting from the mean estimate of 0.71%
 15 1.96 times the quantity $\sigma[100*(\tilde{X}/V2)]$ defined in (*). This
 16 is obviously a very different expression from that which
 17 Witness Boatwright suggests using in footnote 25 on
 18 p.26 of his testimony. Since we do not have the data on $p(i)$
 19 or $\delta(i)$, we cannot actually compute this confidence interval,
 20 but ORC did have the data and should have computed this.
 21 In any case, a couple of facts can be noted here just by
 22 considering the structure of the expression (*) for the
 23 standard deviation of $100*(\tilde{X}/V2)$. First, the expression
 24 that Witness Boatwright provides for his standard error
 25 resembles the expression under the square root sign in
 26 equation (*) if the respondents were identical. Indeed, if all
 27 respondents are identical, so that $\beta(i) = 1/n$ for all i and $p(i)$
 28 $= p$ for all i , then the expression under the square root sign
 29 in (*) becomes $\sqrt{p(1-p)/n}$. However, it is to be noted that
 30 the "p" in the expression (*) is not at all the one Witness
 31 Boatwright would have us use (recall that he suggests using
 32 $p = .0071$, the mean reduction fraction across all
 33 respondents). This is not the $p(i)$ one sees in the correct
 34 expression (*) for the standard deviation of total declines in
 35 volumes. In the correct expression (*), the "p" in question
 36 (assumed identical across respondents in this simple
 37 example) is the respondents' answer to question 10k.

38
 39 The second point to note from (*) is the interplay in

1 computing the standard error between the size of each
2 respondent's reported reduction (namely $\delta(i)$ (or
3 equivalently his share $\beta(i) = \frac{\delta(i)}{\Delta}$ in total reductions) and the
4 same respondent's answer to question 10k. Indeed,
5 responses from larger mailers with greater uncertainties
6 (namely reported likelihoods of change $p(i)$ closer to 0.5) will
7 swamp the responses of smaller and more certain mailers
8 in computing this standard deviation. This is the well-known
9 impact of larger variance sub-populations on confidence
10 intervals for overall populations. Generally, the failure by
11 ORC/B to analyze, even for their own model, the
12 interactions and interdependencies across respondents'
13 reported values of $p(i)$ and $\delta(i)$ is a further egregious
14 omission in the discussion of how to interpret the results of
15 the ORC survey.
16

17 The third and final matter of central importance here
18 is that the estimate of the standard error in (*) for volume
19 reductions is an adjustment that is multiplied by the
20 maximum percentage decrease across respondents,
21 namely, $100 * \Delta / V2$. Obviously, if the wrong estimate for
22 the maximum were used, the width of the resulting interval
23 would be affected in the same direction as the error in the
24 estimate on the maximum, percentage decrease. Note that
25 ORC/B do not report the maximum percentage $\Delta = V2 - V2$.
26

27 All of this suggests that the discussion provided in
28 Witness Boatwright's testimony on confidence intervals
29 should be completely discounted. In particular, the failure to
30 appreciate, even for their own model, the interactions of $p(i)$
31 and reported reductions $\delta(i)$ suggests, at the very least, a
32 lack of sensitivity of both ORC and Witness Boatwright to
33 the central drivers underlying confidence intervals
34 surrounding their estimates of volume reductions in
35 response to the 5-day delivery proposal. This problem is
36 compounded with the larger problem that the
37 ORC/Boatwright model is itself constructed on a
38 fundamentally flawed and biased approach to computing
39 the expected value of respondents' anticipated responses to
40 the 5-day proposal as demonstrated in the testimony of
41 Witness Crew.
42