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VALPAK INITIAL COMMENTS

APPENDIX
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THE REVISED VALPAK MODEL FOR OPTIMIZING CONTRIBUTION FROM STANDARD MAIL

by

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EXECUTIVE SUMMARY

The Valpak Model for optimizing contribution from Standard Mail has been revised in the following ways, which are intended to make it more versatile and user friendly.

- Users now can change the assumed elasticity of each product individually.
- The model now allows for independent secular trends in volume as optional user inputs.
- If independent secular trends are introduced, the model distinguishes between trend-induced and elasticity-induced changes in volume.
- The model now can allow unit costs to increase, and distinguish between nominal and real price adjustments.

Several scenarios are explored. The first scenario, labeled the "Base Case," incorporates the most recent FY 2012 data on volumes, unit costs, prices, revenues, and contribution, including price elasticities provided by the Postal Service in January, 2013. In

the Base Case, costs now are assumed to increase in step with inflation, as measured by the CPI. The maximum contribution at an assumed CPI of 2 percent is $192,467 (thousand).

A second scenario using Base Case data imposes a limit on rate adjustments for the two underwater products, Flats and Parcels, that is set equal to 5.0 percent more than the CPI, *i.e.*, CPI x 1.05. This constraint, which the Postal Service proposes to use in future price adjustments, reduces the maximum obtainable contribution under the price cap by 36 percent, to $123,700.

The next scenario explores the effect of different elasticities for Flats. Sensitivity analysis is conducted. This demonstrates that assuming a higher elasticity for deeply underwater Flats will increase the contribution available under the cap, *i.e.*, the greater the decline in the volume of money-losing Flats induced by a price increase, the greater is the gain in contribution. Consideration that elasticity of Flats may be greater than estimated by the Postal Service thus provides no basis for moderating price increases for Flats. If the elasticity of Flats is assumed to be -1.35, as suggested by ACMA, the maximum contribution available under the cap actually *increases* from $192,4678 to $221,524.

Introducing an independent declining secular trend for Flats similarly increases contribution by virtue of hastening a reduction of money-losing volume. Even before any prices are changed, the secular decline increases contribution because of the fact that Flats are an underwater product — *i.e.*, the more the volume of the underwater Flats product decreases, then *ceteris paribus* the greater will be the increase in contribution. An assumed secular trend of -8.0 percent causes a significant reduction in the volume of Flats (by 475,171) before any price-induced change in volume occurs, and contribution maximizing prices increase

contribution to $215,011. Sensitivity analysis demonstrates that the greater the declining secular trend for Flats, the higher the contribution available under the price cap, hence consideration that Flats may be subject to a declining secular trend likewise provides no basis for moderating price increases for Flats.

To sum up, basic economics, as well as common sense, indicate that when a product is losing money because the product's variable unit cost exceeds the price, profitability will increase as volume of the product declines. Both arguments that have been proffered with the intent of moderating price adjustments on Flats — *i.e.*, Flats have higher elasticity, and Flats are subject to a declining secular trend — do not alter the conclusion that higher contribution can be obtained if price increases are focused on Flats, and the decline of Flats volume is accelerated until the product begins to cover its attributable cost.

Appendix 4

THE REVISED VALPAK MODEL FOR OPTIMIZING CONTRIBUTION FROM STANDARD MAIL

I. Introduction

One recurring issue in postal pricing is how the Postal Service, when operating under a CPI price cap regime, can maximize contribution to institutional cost. Although the Postal Service asserts that its pricing optimizes contribution, it never has presented a model designed to demonstrate that its pricing adjustments maximize contribution from any class of mail.[1] Valpak respectfully dissents from the Postal Service's assertion.

By way of review, the price cap constrains the amount of increase in total revenue from price adjustments within each class of mail.[2] Within each class, the Postal Service can allocate its pricing authority by making tradeoffs in use of allowable cap space among the different products. For any permitted percentage increase in prices — *e.g.*, 2.0 percent — a very large number of different individual price adjustments exist that would exactly utilize all of the increase in allowable revenue. Collectively, the totality of possible price adjustments that would provide the maximum increase in allowable revenue represents a multi-dimensional

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[1] The only models ever sponsored by the Postal Service, developed by Christensen Associates, disclaim any effort to maximize contribution, stating that "these are not models of optimal pricing paths." Christensen Associates Report, p. 2. Instead, the sole purpose of that model is a "risk analysis," designed to defend the Postal Service's continued countenance of losses on Flats. *Id.*, p. 2. *See* Docket Nos. R2013-1 and ACR2012.

[2] The price increase for a product is a weighted average increase for each of the individual pricing elements. To avoid unnecessary complexity, however, the remainder of this discussion ignores pricing of individual elements. The average revenue from each product is considered here to be a reasonable proxy for the price of a product, which can be achieved by adjusting prices of the individual elements.

"maximum pricing frontier." Any point on this frontier represents one particular set of price changes that produce the maximum increase in revenue allowed by the price cap.[3] The problem is, of course, that revenue is not contribution.

To increase its liquidity, the Postal Service needs to use its pricing flexibility to achieve greater contribution.[4] A different contribution may be associated with every point on the maximum pricing frontier, and determining the maximum contribution possible within the price cap is not a straightforward exercise. Even if the Postal Service does not adjust prices so as to achieve the maximum contribution, it should be able to ascertain and know the maximum contribution achievable. Furthermore, if a conscious decision is made not to seek the maximum contribution, the Postal Service (and the Commission) should at least know the extent of drain on the Postal Service's liquidity by virtue of deliberate failure to set prices in a manner that would achieve the maximum contribution.

The contribution realized from any particular price adjustment that uses all available price cap space and achieves the maximum contribution will be affected by the profit margin on each product, as well as by each product's elasticity (*i.e.*, price-induced changes in

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[3] Along this multi-dimensional maximum pricing frontier, movement in any direction involves tradeoffs in prices and allowable revenue for each product. That is, increasing the price and revenue from one product requires that the price and revenue from other products in the class be decreased by an appropriate corresponding dollar amount. Somewhat less obvious are the changes that occur with respect to contribution when moving along the maximum pricing frontier. As a technical matter, the pricing frontier constitutes a convex set.

[4] See Docket No. R2013-11, Statement of Witness Stephen J. Nickerson; see especially his Attachments 4 and 18.

volume).[5] To the extent that the Postal Service wants to ascertain the prices that would maximize contribution, the challenge facing the Postal Service is how to:

- Go directly to the point on the maximum pricing frontier that yields the maximum contribution, or else
- Move along the maximum pricing frontier in an iterative manner that will lead systematically to the maximum contribution.

The immediate issue faced by the Postal Service is how to determine a set of price adjustments that will: (i) maximize the total additional contribution from all the products within each class, while (ii) not exceeding the price cap. The result, when determined, can be described as the *unconstrained maximum contribution* available under the price cap. This is exactly what the Valpak Model for Optimizing Contribution seeks to identify — *i.e.*, those product price changes which lead to a set of prices within Standard Mail that can be described as *optimal*, meaning no further improvement in the Postal Service's bottom line is possible.

Within each class of mail, every adjustment to the price of a product has an impact on the amount of revenue allowed under the price cap. Each price increase, when applied to base year volume, utilizes some of the Postal Service's price cap space, otherwise defined here as "allowable revenue." Conversely, a price decrease on some product (which rarely occurs) could increase the available cap space within the class. Once a set of price increases utilizes all of the allowable revenue — *i.e.*, additional revenue from the price adjustment reaches the limit set by the price cap — a further increase in the price of any one product then must be offset by

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[5] Only contribution is affected by elasticity. Movement along the maximum pricing frontier, from one set of feasible price changes to another, does not reflect elasticity.

an appropriate reduction in the price of one (or more) other products. Such offsetting changes are referred to here as "*tradeoffs*."

To compare the effect of different price adjustments on contribution, the model described herein computes a tradeoff schedule for each product. The tradeoff schedules show the Postal Service's additional contribution derived from each dollar of allowable revenue utilized by each additional $0.001 increment in price. They are declining functions, and depend upon each product's profitability and elasticity.[6] Maximum contribution obtainable from any given set of initial parameters can be determined by an iterative process that utilizes the tradeoff schedules, as described herein.[7]

In Docket No. ACR2012, Valpak offered an earlier version of this model, described there as the Valpak Standard Mail Contribution Model.[8] The Postal Service and ACMA offered the following criticisms of that prior Valpak Model in their respective Reply Comments:

A. The model used only the elasticity of Standard Flats as filed by the Postal Service and failed to consider the possibility that Flats elasticity may differ substantially.

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[6] Tradeoff schedules would need to be re-computed each year to reflect changes in the underlying parameters.

[7] An iterative procedure that uses these tradeoff schedules to maximize contribution is akin to one method of solving linear programming problems. Explicit instructions for using the Revised Valpak Model can be found at the end of this appendix..

[8] *See* Docket No. ACR2012, Valpak's Initial Comments on the United States Postal Service FY 2012 Annual Compliance Report, pp. 80-106, and the spreadsheet submitted as Appendix A.

B. The model did not allow for exogenous secular trends in volume, most especially the declining trend in Standard Flats.

C. The model is "static," for one period only.

To address these criticisms, the Valpak Model for optimizing contribution from Standard Mail has been revised in ways intended to make it more versatile and user friendly.[9] In addition to finding the set of prices that maximizes contribution, the model can be used for sensitivity analysis — *i.e.*, to study the effect of changes in various parameters — as described herein.

A. Changes in Elasticity.

Users now can change the assumed elasticity of each product individually. A product's elasticity, coupled with a change in price, determines a price-induced change in volume (and contribution), which is shown in Table 2 (col. 9b) under the green tab "Max. Contribution." User changes to the elasticity of a product automatically will change that product's "tradeoff schedule" found under both the corresponding product tab and the tab "Tradeoffs Compared" (which, for convenience, shows tradeoff schedules for all products in one place).

The default setting is for the elasticities reported by the Postal Service on January 22, 2013. Those elasticities are the same for the following two groups of products:

- High Density and Saturation Letters, High Density and Saturation Flats & Parcels, and Carrier Route; and
- Letters, Flats, and Parcels.

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[9] The model can be adapted for use with any class of mail. The intellectual basis for the model derives from the work of Kenneth Arrow and Gerard Debreau. *See* Kenneth J. Arrow, "General Economic Equilibrium: Purpose, Analytic Techniques, Collective Choice," Nobel Memorial Lecture, December 12, 1972 and the references cited therein.

If the Postal Service should start to determine elasticities for individual products, as urged by the Commission in it FY 2012 ACD, those elasticities can be incorporated readily into the revised model. In the meantime, the model permits sensitivity analysis to study the effect of different assumed elasticities; see Section III, *infra*.

B. Secular Trends.

The model now allows for independent secular trends in volume as optional user inputs; *see* Table 1, column 10, under green tab "Max. Contribution." For each individual product, users can input any assumed secular trend, either positive or negative. This automatically changes the product's volume in the succeeding year under study, as well as the tradeoff schedule for that product. Section IV, *infra*, contains an illustration of sensitivity analysis for different secular declines in Flats volume.

Any assumed secular trend of course results in a change of volume that is independent of any price-induced change in volume. At each price level a positive trend will increase the tradeoff, or contribution per dollar of allowable revenue. Conversely, a negative trend will reduce the tradeoff at each price level. Changes in volume from trend and price changes are totally distinct. To help avoid confusion, in Table 2 of the model a column has been added that shows separately trend and price-induced volume change; *see* columns 9a and 9b. (For each product the default setting is zero, *i.e.*, no trend.)

C. Multi-year Model.

Although the current model is for one period only, a planned future development is to extend the model to more than one period.

D. Overview.

Section II, *infra*, highlights results when the initial parameters of elasticity and secular trend are left unchanged, described here as the Base Case scenario. Within the Base Case, only prices are adjusted.

In Section III the effect of changes in the elasticity of Flat is demonstrated.

In Section IV the effect of a declining secular trend in the volume of Flats is introduced, while elasticity remains unchanged from the Base Case.

Finally, in Section V both elasticity and secular trend for Flats are changed simultaneously.

II. Base Case Results

Within the Valpak Model, data for the Base Case scenario are from FY 2012, the most recent period for which a CRA Report was available; see Table 1 under the green tab "Max. Contribution." These basic data on unit costs, volumes, etc., do not change in any of the subsequent scenarios presented herein. They are exogenous — *i.e.*, not generated by the model — and can be updated manually as and when more recent data become available. Results described here under the Base Case scenario incorporate the following parameters (which do change in subsequent scenarios):

- the elasticities as reported on January 22, 2013, and
- no exogenous trend for any product in Standard Mail, except as described in Section IV, *infra*.

Appendix 11

A. Maximum Contribution for Unconstrained Positive Rate Adjustments.

In the original version of the Valpak Model submitted in Docket No. ACR2012, the maximum allowable increase in revenue from Standard Mail permitted by the price cap (assumed to be 2 percent), was $329,120.[10] This revised model continues to assume that (i) 100 percent of allowable revenue as determined by the permissible cap is utilized, and (ii) price adjustments are restricted to increases — *i.e.*, in this revised model no decreases or negative price adjustments in nominal terms are permitted (as before).[11] An important change between the original version and this revised model is that projected unit costs are assumed to increase during the forthcoming year by an amount equal to the increase in CPI used to set the price cap.[12] This changed assumption reduces the maximum contribution available under the price cap to $192,467. This maximum contribution can be achieved by the price adjustments shown in Table II-1.[13]

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[10] N.B. All figures for revenues and volumes are in thousands.

[11] Allowing decreases in nominal prices on the most profitable products, offset by price increases on other products, could increase contribution further.

[12] This projection of future costs is a user input, hence can be changed readily. In Docket No. R2013-11, Exigent Rate Request, the Postal Service has projected that it will realize substantial, almost unprecedented reductions in unit cost in FY 2013. This could be accommodated in the current model by having the assumed cost change be negative, instead of positive.

[13] The term "price adjustments" used here is shorthand for "increase in average revenue." The Postal Service does not change prices at the 5-digit decimal level shown in Table II-1, but with appropriate 3-digit adjustments to individual pricing elements within each product, adjustments to average revenue finer than 3-digits can be achieved.

Appendix 12

Table II-1

Price Adjustments for Standard Mail Maximum Contribution
Base Case

	Price Adjustment (1)	Marginal Contribution/ Dollar of Allowable Revenue[14] (2)
• HD & Sat Letters	$0.00000	$0.628
• HD & Sat Flats & Parcels	$0.00000	$0.639
• Carrier Route	$0.00000	$0.824
• Letters	$0.00000	$0.809
• Flats	$0.05171	$1.002
• Parcels	$0.07245	$1.002

The price-induced change in volume from the indicated price adjustments is shown here in Table II-2. To achieve maximum contribution, all price increases are focused on Flats and Parcels — the two Standard Mail products that are underwater. Flats volume declines about 5.1 percent from Base Year volume, and the reduction in the volume of Parcels is about 2.5 percent of Base Year volume.

[14] This column shows the marginal contribution when the price shown in column (1) is increased or decreased by $0.00001.

Table II-2

Change in Standard Mail Volume, Price-Induced
Base Case

Product (1)	Change in Volume (2)
HD & Saturation Letters	78,340
HD & Saturation Flats	165,735
Carrier Route	128,417
Letters	403,572
Flats	-305,80
Parcels	-7,593

Tradeoff comparisons. Under assumptions in the Base Case scenario, the first increment in the price of Flats ($0.001) produces an additional contribution of $1.121 for each dollar of allowable revenue. This large gain in contribution for each dollar of allowable revenue reflects the extent to which Flats are unprofitable at the margin. The tradeoff schedules are declining functions. At the indicated price increase of $0.05171 for Flats, the marginal contribution for each dollar of allowable revenue declines to $1.002. Similarly, at a price increase of $0.07245 for Parcels,[15] the marginal contribution for each dollar of allowable revenue also is $1.002 — *i.e.*, a further marginal price adjustment for either of these two products produces the same contribution per dollar of allowable revenue. Also, the marginal contribution from each of these two products exceeds the marginal contribution obtainable

[15] In the FY 2012 CRA the reported volume for parcels was material. Subsequently, however, most parcels have been reclassified as Competitive Products. Going forward, the volume of expected for parcels is *de minimis*.

from a positive price adjustment to any of the other four Standard Mail Products; *see* column 2 in Table II-1, *supra*, or tab "Tradeoffs Compared." Assuming nominal price adjustments have a floor of zero — *i.e.*, no reductions in nominal prices — equality of marginal contributions for Flats and Parcels results in a Pareto Optimal situation, where no further positive price adjustments along the frontier of allowable revenue will increase contribution.

B. Maximum Contribution Constrained by Postal Service Cap on Price Increases for Underwater Products.

The Postal Service proposes to set the price increase on Flats at just 1.05 percent times the increase in CPI.[16] For purposes of illustrating maximization of contribution when an arbitrary constraint such as this is imposed, we assume the same capped increase also applies to Parcels, the other underwater product in Standard Mail. The Base Case assumes a 2.000 percent increase in the CPI, so the Postal Service's arbitrary cap would limit the price adjustment for Flats and Parcels to 2.100 percent. In lieu of the maximum contribution of $192,467 with no constraints, under these constrained price adjustments, the maximum contribution obtainable is reduced to $123,700, assuming (i) that 100 percent of allowable revenue is utilized, and (ii) the Postal Service entertains only positive nominal price adjustments. The constrained price adjustments on Flats and Parcels mean that the Postal Service will forgo $68,768 of potential contribution, and receive only 64 percent of the maximum contribution obtainable in order to restrain prices increases on its underwater products for another year. This constrained maximum contribution is achieved by the price adjustments shown here in Table II-3.

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[16] USPS ACR FY 2012, p. 19.

Table II-3

Price Adjustments for Standard Mail Maximum Contribution
Base Case with Arbitrary Limits on Price Adjustments

	Price Adjustment (1)	Marginal Contribution/ Dollar of Allowable Revenue (2)
• HD & Sat Letters	$0.00000	$0.628
• HD & Sat Flats & Parcels	$0.00000	$0.639
• Carrier Route	$0.00601	$0.795
• Letters	$0.00480	$0.795
• Flats	$0.00788	$1.051
• Parcels	$0.01971	$1.051

The price-induced change in the volume from these price adjustments is shown in Table II-4. As a result of the constraint on price adjustments for underwater Flats and Parcels, the decline in their volume is only a small fraction of that shown in Table II-2, *supra*. That lower decline in the volume of underwater products is offset by reductions in the volume of two profitable products — Carrier Route and Letters. For Carrier Route and Letters, the change in volume in Table II-2 is identical with that shown in Table II-4.

Table II-4

Change in Standard Mail Volume, Price-Induced
Base Case with Arbitrary Limits on Price Adjustments

Product (1)	Change in Volume (2)
HD & Sat Letters	78,340
HD & Sat Flats	165,735
Carrier Route	-28,395
Letters	-94,236
Flats	-2,584
Parcels	-133
TOTAL	118,637

Tradeoff comparisons. At the indicated capped price increase of $0.00788 for Flats, the marginal additional contribution for each dollar of allowable revenue utilized is $1.051. Similarly, at the capped price increase of $0.01971 for Parcels, the additional marginal contribution for each dollar of allowable revenue utilized is just under $1.051; see Table II-3, *supra*, or tab "Tradeoffs Compared." At the price increase indicated above for Carrier Route and Letters, the marginal additional contribution for each dollar of allowable revenue utilized is $0.795; *i.e.*, at the margin the additional contribution from these two products is equal. Imposition of the arbitrary cap on underwater Flats means, for example, that for each dollar of allowable revenue not utilized for Flats, the Postal Service is forgoing a potential gain in contribution of $1.051 from Flats in order to obtain $0.795 from Carrier Route and Letters, *i.e.*, it is making a tradeoff that is highly unfavorable to the Postal Service's contribution and liquidity.

III. Effect of Higher Flats Elasticity on Maximum Contribution

ACMA has asserted its "belief" that the elasticity of Standard Flats is considerably higher than reported by the Postal Service filing on January 22, 2013, with Flats perhaps having an elasticity of as much as -1.35. ACMA asserts that belief, presumably, to imply that a further increase in the price of Flats somehow could cause a reduction in Postal Service's total contribution and liquidity, which in turn would be the basis for moderating price increases on Flats. As shown here, however, the Valpak model exposes the fallacy of ACMA's assessment. Assuming a higher elasticity for Flats is seen to have little effect on the price of Flats that maximizes available contribution.

The following results are obtained by (i) setting the elasticity of Flats at -1.35 in the Base Case, while (ii) leaving the elasticity of all other products unchanged, and (iii) not assuming any exogenous trend for Flats or any other product in the Standard Mail Base Case.

When the elasticity of flats is increased to -1.35, and elasticities of all other products are left unchanged, the maximum contribution actually *increases* from $192,4678 to $221,524, assuming that 100 percent of allowable revenue is utilized. This higher maximum unconstrained contribution is achieved by the price adjustments shown in Table III-1. The increase in the price of Flats in Table III-1, $0.05198, is just slightly higher than the increase in price in Table II-1 ($0.05168).

Appendix 18

Table III-1

Price Adjustments for Maximum Standard Mail Contribution
Base Case with Higher Flats Elasticity (-1.35)

	Price Adjustment (1)	Marginal Contribution/ Dollar of Allowable Revenue (2)
• HD & Sat Letters	$0.00000	$0.628
• HD & Sat Flats & Parcels	$0.00000	$0.639
• Carrier Route	$0.00000	$0.824
• Letters	$0.00000	$0.809
• Flats	$0.05198	$1.007
• Parcels	$0.06713	$1.007

The higher elasticity assumed for Flats substantially increases contribution because each increment in price drives out a larger volume of money-losing Flats volume than before. The price-induced reduction in Flats volume, shown in Table III-2, *infra*, almost triples, increasing to about 18 percent of Base Year volume. Because the higher elasticity assumed here changes the Flats tradeoff schedule, for optimum contribution the price of Parcels also decreases, from $0.07300 in Table II-1 to $0.06713 in Table III-1, while the price-induced reduction in the volume of Parcels decreases to 6,814 (from, the previous reduction of 7,671 in Table II-2). If ACMA believes that under these conditions a higher contribution somehow will result from moderating price increases on deeply underwater Flats, it needs to explain why this is so.

Table III-2

Reduction in Standard Mail Volume, Price-Induced
Base Case with Higher Flats Elasticity

Product (1)	Change in Volume (2)
HD & Sat Letters	78,340
HD & Sat Flats	165,735
Carrier Route	128,417
Letters	403,572
Flats	-949,993
Parcels	-6,840
TOTAL	-180,770

Tradeoff comparisons. An assumed higher elasticity of Flats impacts the Flats tradeoff schedule. In fact, an elasticity of -1.35 results in the very first increment in price of Flats ($0.001) producing an additional contribution of $1.373 for each dollar of allowable revenue, significantly higher than in the Base Case. The economic effect of the higher elasticity for Flats is that each incremental price increase drives out more money-losing volume, which in turn helps increase contribution because Flats are so far underwater. In terms of contribution, each incremental utilization of allowable revenue used to increase the price of Flats yields more "bang for the buck." At price increases shown in Table III-1 for Flats and Parcels, the additional contribution for each dollar of allowable revenue declines to just under $1.007 as shown in Table III-1 (and also as can be seen under tab "Tradeoffs Compared" when the elasticity for Flats is changed to -1.35 in Table 1 of the Valpak Model).

Sensitivity analysis. Postal Service Reply Comments in Docket No. ACR2012 note that (i) the Standard Regular elasticity is a joint estimate that applies not only to Flats, but also

to Letters and Parcels, and (ii) the actual elasticity of Flats may differ significantly from the other two products. On this basis, Postal Service Reply Comments also criticize Valpak for producing results using only a single elasticity for all products in each group, and not performing a sensitivity analysis. With minimal effort, the Revised Valpak Model now can be used to explore the effect of different elasticities for a single product such as Flats over a wide range that is both lower and higher than the Postal Service estimated elasticity of -0.437.

Consideration of the possibility that Flats have a *more inelastic* — or less elastic — demand requires only a brief comment. First, considering the secular decline in Flats volume over the last eight years, no empirical evidence suggests a lower elasticity to be the case. Second, if demand is more inelastic than -0.437, then clearly there is no reason to moderate the price of Flats in the face of the huge losses that the Postal Service continues to incur on the Flats product, along with the reduction in liquidity caused by those losses.

ACMA's Reply Comments clearly imply a belief that even though Flats are deeply underwater, a higher elasticity somehow provides a rationale to moderate price increases. Similarly, the Postal Service's Reply Comments in Docket No. R2013-1 seem to imply the same conclusion. To respond to these criticisms, the Valpak model has been used to conduct a sensitivity analysis to ascertain how different estimates of elasticity for Flats affect optimum pricing and contribution. The results are shown here in Table III-3. As this table shows, the prices that achieve maximum contribution are not very sensitive to changes in elasticity; see columns 3 and 4. For example, when elasticity doubles, from -0.75 to -1.50, contribution *increases* by 11.8 percent, while the optimum price adjustment for Flats does not change.

Table III-3

Price Adjustments for Maximum Standard Mail Contribution
Flats Elasticity Sensitivity Analysis

Elasticity (1)	Max. Contribution Available Under the Price Cap (2)	Prices to Achieve Maximum Contribution Flats (3)	Parcels (4)
-0.437	192,467	$0.05168	$0.07300
-0.750	202,422	$0.0519355	$0.06800
-1.000	210,382	$0.0519355	$0.06800
-1.250	218,341	$0.0519355	$0.06800
-1.500	226,300	$0.0519355	$0.06800

IV. Effect of Secular Decline in Flats Volume

Postal Service Reply Comments expressly state that the more rapid secular decline in the volume of Flats relative to other Standard Mail products supports moderating price increases for Flats. The original single-period risk assessment model of Christensen Associates, as well as its later multi-period model, seemingly were designed to support this position. According to Christensen Associates, it was the *divergence* between the secular trends for Flats versus All Other that supported their conclusion, not the absolute level of the trends.

For purposes of the discussion here, we assume an 8.0 percent secular decline in the volume of Flats, and no secular trend for any other product, *i.e.*, the *divergence* in trend is 8.0 percent. This divergence is similar to that in the Christensen Associates model. The elasticity of Flats is that which was reported in the January 22, 2013 filing (-0.437) — *i.e.*, the Base Case.

Appendix 22

The immediate effect of the secular decline in the volume of Flats is to reduce the volume of Flats. Even before any prices are changed, the secular decline increases contribution because of the fact that Flats are an underwater product — *i.e.*, the more the volume of the underwater Flats product decreases, then *ceteris paribus* the greater will be the increase in contribution.

In this model, the assumed secular trend of -8.0 percent reduces the volume of Flats by 475,171 before any price-induced change in volume occurs.[17] With the secular trend for Flats set equal to -8.0 percent, the contribution maximizing price adjustments are shown in Table IV-1.

[17] In the real world, a secular trend occurs progressively over the course of 12 months, not all at the outset.

Appendix 23

Table IV-1

Price Adjustments for Maximum Standard Mail Contribution
Base Case with Secular Decline in Flats Volume

	Price Adjustment (1)	Marginal Contribution/ Dollar of Allowable Revenue (2)
• HD & Sat Letters	$0.00000	$0.608
• HD & Sat Flats & Parcels	$0.00000	$0.619
• Carrier Route	$0.00000	$0.799
• Letters	$0.00000	$0.795
• Flats	$0.04777	$0.913
• Parcels	$0.14951	$0.913

At a contribution maximizing price adjustment of $0.04777 for Flats, there is a further price-induced decline in volume of 278,559. This "double effect" on reducing volume is shown in Table IV-2. It also increases contribution (and liquidity) by $215,011, which exceeds the previous "unconstrained" maximum contribution of $192,468 with no secular decline in volume.

Table IV-2

Reduction in Standard Mail Volume, Price- and Trend-Induced
Base Case with 8.0 Percent Secular Decline in Flats Volume

Product (1)	Reduction in Volume (2)
Flats, trend-induced	475,171
Flats, price-induced	330,500
Parcels	21,147

Tradeoff comparisons. The assumed change in the secular trend for Flats impacts the Flats tradeoff schedule. The very first increment in price of Flats ($0.001) under this assumption produces an additional contribution of $1.013 for each dollar of allowable revenue, which is about 8 percent less than $1.101 when no secular trend affects Base Year volume. This decline in the tradeoff schedule reflects the fact that for any increase in the price of Flats the Postal Service can expect to realize incremental income for only 92 percent of the Base Year Volume.

The change in the tradeoff schedule also increases the optimum price of underwater Parcels relative to Flats. The optimum price increase for Parcels goes from $0.07417, to

$0.14951. A negative secular trend between zero and -12.0 percent does indeed moderate the optimum price increase for Flats, from $0.05162 to $0.04777, as the Postal Service has opined. It should be noted, though, that this moderation is justified only if the declining trend does in fact continue — *i.e.*, any amelioration of the trend would necessitate a higher price adjustment on Flats for maximum contribution. Moreover, this slight moderation in the optimum price adjustment for Flats does not in any way support imposition of the artificial price constraint (5 percent above CPI) discussed in Section II-B, *supra*. At the optimum prices shown in Table IV-1, *supra*, Flats and Parcels each produce approximately $0.930 marginal increase in contribution per dollar of allowable revenue.

In order for the tradeoff schedule to decline to the point where the gain in contribution from an initial price increase of $0.001 on Flats would be less than the gain in contribution obtainable from other products such as Carrier Route and Letters, Flats would need to experience a secular decline of 28 percent or more, which reflects the fact that Flats are so far underwater.[18] In other words, at a secular rate of decline of 30 percent, the problem of underwater Flats could be said to "fix itself" without any price-induced decline in volume.

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[18] At a secular decline of 28 percent, the marginal contribution from a rate increase on Flats, Carrier Route, and Letters is about equal, just under $0.80.

Table IV-3

Price Adjustments for Maximum Standard Mail Contribution
Sensitivity Analysis for Secular Decline in Flats Volume
Base Case Assumption for Elasticity

Secular Decline in Flats Volume (1)	Maximum Contribution (2)	Price to Achieve Maximum Contribution Flats (3)	Parcels (4)
0.0%	342,447	$0.05163	$0.07417
2.0%	346,814	$0.050811	$0.09000
4.0%	351,296	$0.0499424	$0.10700
6.0%	355,896	$0.04887	$0.12798
8.0%	360,597	$0.04777	$0.14951
10.0%	365,442	$0.04683	$0.16800
12.0%	370,384	$0.04600	$0.18414

Sensitivity analysis. The Revised Valpak Model has been used to investigate the result of varying rates of secular decline in the Flats product, from 2.0 to 12.0 percent. The results are shown in Table IV-3. As can be seen from column 2, the higher the rate of secular decline the greater the level of contribution (and liquidity) that can be obtained within the price cap.

For each of the different rates of secular decline shown in Table IV-3, column 1, the reduction in volume is shown in Table IV-4. The trend-induced decline in volume is seen to go up sharply (Table IV-4, column 2). At the same time, moderation in the contribution-maximizing price for flats tempers the price-induced reduction in volume. Finally, the increase in the contribution-maximizing price for Parcels increases the price-induced loss in volume of Parcels.

None of the results here provide a basis for moderating the price increase for Flats.

Table IV-4

Reduction in Standard Mail Volume, Price- and Trend-Induced
Sensitivity Analysis for Secular Decline in Flats Volume
Base Case Assumption for Elasticity

Secular Decline in Flats Volume (1)	Flats Decline, Trend Induced (2)	Flats Decline, Price Induced (3)	Parcels Decline, Price Induced (4)
0.0%	0	305,804	7,593
2.0%	118,793	299,598	10,075
4.0%	237,585	293,589	12,480
6.0%	356,378	286,169	15,447
8.0%	475,171	278,559	18,492
10.0%	593,364	272,055	21,108
12.0%	712,756	266,313	23,391

V. Effect of Higher Flats Elasticity and Declining Secular Trend

As indicated previously, the Revised Valpak Model enables users to change simultaneously two or more parameters. A potential problem that arises when two or more changes are made simultaneously, of course, is analyzing or tracing effects to their cause. For purposes of illustration, we here combine the higher elasticity of -1.35 for Flats discussed in Section III, *supra*, with a secular decline of -8.0 percent, discussed in Section IV, *supra*.

Under these assumed conditions, the price adjustments that optimize contribution are shown in Table V-1, *infra*. It so happens that these price adjustments do not differ greatly from the prices in Table IV-1, *supra*, which reflects only the secular decline in volume. Maximum contribution increases to $242,830.

Table V-1

Price Adjustments for Maximum Standard Mail Contribution
Base Case with Secular Decline in Flats Volume & Higher Flats Elasticity

	Price Adjustment (1)	Marginal Contribution/ Dollar of Allowable Revenue (2)
• HD & Sat Letters	$0.00000	$0.608
• HD & Sat Flats & Parcels	$0.00000	$0.619
• Carrier Route	$0.00000	$0.799
• Letters	$0.00000	$0.795
• Flats	$0.04860	$0.946
• Parcels	$0.13326	$0.946

A declining secular trend and higher elasticity have a "double whammy" effect on volume, as shown in Table V-2. The volume of Flats declines by almost 23 percent from the Base Year. Neither the elasticity nor the secular trend of parcels is changed in this scenario. Consequently, the volume of Parcels is affected only indirectly by the changes to Flats, and the volume of Parcels declines only slightly from the volume in Table IV-2, *supra*.

Table V-2

Reduction in Standard Mail Volume, Price- and Trend-Induced
Base Case with Secular Decline in Flats Volume & Higher Flats Elasticity

Product (1)	Reduction in Volume (2)
Flats, trend-induced	475,171
Flats, price-induced	877,791
Parcels	16,194

Tradeoff comparisons. The assumed change in the secular trend for Flats impacts the tradeoff schedule for Flats by reducing the tradeoffs at every price increment. At the same time, the assumed increase in elasticity has the opposite effect, *i.e.,* the tradeoffs at every price increment are increased, *ceteris paribus*. Thus the net effect on tradeoffs from the indicated changes in these two parameters is somewhat offsetting. As can be seen from Table V-1, column 2, the marginal payoff from price adjustments to Flats and Parcels exceeds that of the other products.

VI. Summary of Results for One-period Model

Basic economics, as well as common sense, both indicate that when a product is losing money because the product's variable unit cost exceeds the price, profitability and liquidity will increase as volume of the product declines. Taking this a step further, if price adjustments are to be imposed up to the level of the price cap, with consequent price-induced effects on volume, then as a rule such price adjustments should be focused on the least profitable products, which is what most private sector firms would do if faced with a liquidity crisis.

Table VI-1

Standard Mail Contribution from the Above Scenarios

Section		
II-A.	Base Case Unconstrained Maximum	$192,467
II-B.	Base Case with Constrained Increases on Flats	$123,700
III.	Higher Flats Elasticity (-1.35)	$221,524
IV.	Declining Flats Secular Trend (-8.0 percent)	$215,011
V.	Flats Higher Elasticity & Declining Secular Trend	$243,830

Since the Postal Service is now selling assets (*e.g.*, post offices) and struggling to find sufficient cash to pay its bills, it would appear that the Postal Service needs to reduce its net loss by obtaining all the contribution that is available to it under the price cap. The different contributions resulting from each of the preceding scenarios is shown in Table VI-1. None of the results identified here indicate that the Postal Service gains anything from moderating prices increases on Flats so long as they are underwater. Both arguments that have been proffered with the intent of moderating price adjustments on Flats — *i.e.*, Flats have higher elasticity, and Flats are subject to a declining secular trend — do not alter the conclusion that higher contribution can be obtained if price increases are focused on Flats, and the decline of Flats volume is accelerated.[19]

[19] Since the price cap restrains allowable revenue, enables price adjustments on profitable products to be less than they would be otherwise. Such moderation helps to retain contribution that otherwise would be lost.

Appendix 31

Instructions for Using the Revised Valpak Model

The text is based on the model designated 2012_Dynamic One Period Contribution Model. In that file, refer to green tab Max Contribution. The descriptive text and data within the rectangle bounded by cells A5: I16 are from the then most recent CRA Report,[20] except for the volume data, which were updated in Docket No. R2013-1 to reflect the hybrid 12 month period covering the last three quarters of FY 2012 and the first quarter of FY 2011.. These data can be updated (manually) as and when more recent data become available.

Default Settings. In the Base Case scenario, the default settings for user-specified parameters, which can be changed manually at user's discretion, are as follows:

1. CPI price cap (cell D21) = 2.000%. The increase in Allowable Revenue is computed in cell D23, and for convenience is repeated in cell O52.

2. Assumed rate of cost increase (cell D22) during the forecast period = 2.000%.

3. Elasticities and Trends for the six products in Standard Mail are as follows:

	Elasticity	Trend
HD & Sat Ltrs	-0.704	0.00%
HD & Sat Flats	-0.704	0.00%
Carrier Route	-0.704	0.00%
Letters	-0.437	0.00%
Flats	-0.437	0.00%
NFMs & Parcels	-0.437	0.00%

Optimizing Process. The optimizing process proceeds in the following iterative manner.

[20] The FY 2013 CRA is expected to be filed on December 29, 2013 as part of the Annual Compliance Review.

Step 1. Manually change price adjustments for each product in cells C38-C43 until the allowable revenue computed in cell T45 (and copied to Cell O51) is equal to the maximum allowable revenue shown in cell O52. The gross contribution resulting from this set of price adjustments is computed in cell P45, and the net contribution is computed in cell O48. Let P_1 refer to the set of initial price adjustments in cells C38-C43.

Step 2. Refer to the product tradeoff schedules. These are shown in Column L under the tabs for each respective product, and also reproduced together under tab Tradeoffs for ease of comparison. For each product price adjustment entered in P_1, look up the contribution tradeoff. For product(s) with the highest contribution per dollar of allowable revenue, increase the price adjustment in cells C38-C43, and reduce the price adjustment for products with the lowest contribution per dollar of allowable revenue. The adjustments should be changed up and down by amounts that leave the total allowable revenue in cell O51 unchanged (thereby remaining on the allowable revenue frontier established by the CPI price cap).

Step 3. Repeat steps 1 and 2 as often as necessary until all tradeoffs per dollar of allowable revenue are equal. At that point, no further increase in contribution can be achieved; *i.e.*, for the given initial parameters, price adjustments will have achieved the maximum contribution available within the price cap.