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Implications of Declining Mail Volumes for the Financial Sustainability of the Postal Service

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Introduction

Annual mail volume peaked in 2006 at 213 billion pieces. Since then, the number of mail pieces has declined substantially. Amid the background noise of the economic downturn, determining how much of this volume loss represents long-term electronic diversion is difficult, but Boston Consulting Group (BCG) projects that these declines will continue. BCG estimates mail volume will fall to 150 billion pieces over the next 10 years.[1] Such a sustained volume decline is unprecedented.

The U.S. Postal Service has never operated in an environment of persistently declining mail volumes, and the last time annual mail volume was below 150 billion pieces was 1986. The critical question is whether today's Postal Service can remain solvent at much lower volume levels.

The Postal Service is not currently profitable, although the financial picture is obscured by the amounts improperly taken by the Office of Personnel Management to fund benefit prepayments.[2] The U.S. Postal Service Office of Inspector General (OIG) asked the George Mason University School of Public Policy (GMU) to examine the financial sustainability of the Postal Service under various volume scenarios. GMU's work is described in the following paper *Implications of Declining Volumes for the Financial Sustainability of the Postal Service*.

The George Mason Model

The GMU research team created a flexible model that can do two critical things. First, it assesses the financial position of the Postal Service at any volume level. Second, it shows how applying different cost reduction alternatives can affect that financial assessment. For example, the researchers examined how alternatives such as optimizing the retail network, implementing 5-day delivery, and increasing productivity would reduce the gap between the Postal Service's costs and revenues at various volume levels.[3] Users of the model can also mix and match alternatives into "what if" scenarios.

The research team used the model to analyze how volume levels of 150, 125, 100, and 75 billion pieces per year would affect the Postal Service's financial sustainability. They

[1] The Boston Consulting Group, Inc., *Projecting US Mail Volumes to 2020*, March 2, 2010.
[2] See OIG reports *The Postal Service's Share of CSRS Pension Responsibility*. Report Number RARC-WP-10-001, January 20, 2010, and *Federal Employees Retirement System Overfunding,* Report Number FT-MA-10-001, August 16, 2010.
[3] See Sections 11(a), (d) and (f) of the following paper.

show that if mail volume declines and no other action is taken, price increases in excess of inflation will be necessary to avoid insolvency. The risk is that price increases will tip the Postal Service into a death spiral, where price increases drive out customers necessitating further price increases. But GMU's evidence suggests that this threat may not be that severe. Modern economies can support higher price levels. Many posts in developed countries maintain profitable mail businesses while delivering fewer pieces and charging up to 86 percent more than the Postal Service. This is an encouraging sign, and the study finds that the Postal Service is financially sustainable down to volumes of 100 billion per year.

Options for Adapting to Volume Declines

We believe the model offers an objective framework to organize the debate about how to respond to the current crisis. The available solutions fall into three broad options:

1. *Let the market dictate.* Increase prices to the levels the market would bear to make the Postal Service break even as suggested by the GMU study. This option requires price increases above the levels allowed by the Postal Accountability and Enhancement Act.

2. *Introduce substantial changes to the Postal Service's cost and revenue structure.* Allow the Postal Service to implement its 10-year action plan announced in March 2010, giving the Postal Service the flexibility to cut delivery days, pursue new products, optimize its network, and undertake other initiatives.[4]

3. *Aggressively correct CSRS and FERS overpayments.* Reform the Postal Service's prefunding of its health and pension obligations by returning the amounts the Postal Service has overpaid and by allowing it to adopt the same funding targets commonly used in the private sector — 80 percent for pensions and 30 percent for retiree health care. This option can maintain the PAEA price cap.[5]

GMU's analysis provides hope that the Postal Service can survive the anticipated volume declines as long it is allowed to act on the options available for financial sustainability.

[4] U.S. Postal Service, *Ensuring a Viable Postal Service for America: An Action Plan for the Future*, March 2, 2010.
[5] Analysis in Appendix A of the GMU study shows that if prefunding reform is combined with an effort to streamline Postal Service's retail network and modest Total Factor Productivity (TFP) growth, maintaining the PAEA price cap is possible at a volume of 150 billion pieces per year.

IMPLICATIONS OF DECLINING MAIL VOLUMES FOR THE FINANCIAL SUSTAINABILITY OF THE POSTAL SERVICE

SEPTEMBER 2010

PREPARED UNDER CONTRACT TO THE
U.S. POSTAL SERVICE OFFICE OF INSPECTOR GENERAL

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1. Introduction

The recent decline in mail volume has given rise to concerns about the Postal Service's long-term financial sustainability. Mail volume peaked in 2006 at 213 billion pieces and then fell to 177 billion pieces over the next three years. The Postal Service's latest volume estimate for 2010 is 170 billion pieces. If mail volume were to drop much further, the Postal Service could enter a graveyard spiral of continuous price increases and volume declines. On the other hand, the Postal Service could reach a new price-cost equilibrium. The primary purpose of this paper is to show how further large declines in mail volume would increase the Postal Service's per piece (unit) costs and prices and how this would affect its financial sustainability. The paper's estimates of cost, price and sustainability are for volumes ranging from 150 billion down to 75 billion pieces. It assumes that prices would be increased annually to bring about financial breakeven.[1] The paper also examines the strategic planning implications of volumes declining to these levels.

This analysis employs the Cost Rollforward Model developed by the Postal Service and used by it and the Postal Regulatory Commission (PRC) to forecast costs in all rate proceedings conducted under the 1970 Postal Reorganization Act since R80-1.[2] The model has been used again by the Postal Service in its July 6, 2010 exigent rate filing with the PRC. In addition to its use in rate cases, we understand that the model is used by the Postal Service for internal analyses. For the purposes of this study, major enhancements had to be made to the Cost Rollforward Model, and we are calling the enhanced model the "GMU Enhanced Rollforward Model." These enhancements, which include the ability to calculate new breakeven volumes and prices that reflect price elasticities, are discussed in Appendix B, along with documentation of the input data for the GMU Model.

[1] This paper does not predict volumes; it simply explores the implications of declining volumes if they were to occur.

[2] The model has undergone continuous improvements since it was first introduced.

2. Major Findings

- Many posts in developed countries in Europe and Japan have higher prices than in the United States. Their prices are as much as 86 percent higher when expressed in purchasing power parity. The mailing operations of these posts are almost all profitable. Thus, developed economies support these high postal prices.

- Our criterion for the financial sustainability of the Postal Service is that it will remain sustainable as long as its prices remain somewhat lower than the highest postal prices observed in other developed countries and its revenues cover its costs. Using the GMU Enhanced Rollforward Model, we have estimated the increase in USPS prices that would be needed to achieve breakeven at 150, 125, 100 and 75 billion pieces. Down to 100 billion, the price increase over inflation needed to breakeven financially would increase prices to a level that is substantially lower than the highest prices that we have observed in developed countries. Therefore we find that the Postal Service would be financially sustainable down to 100 billion pieces. Our criterion for sustainability does not tell us whether the Service would be sustainable below 100 billion pieces.

- Assuming that volume continues to decline to the levels examined in this paper, the current Postal Accountability and Enhancement Act (PAEA) price caps will not permit the Postal Service to remain financially sustainable.

- It is expected that the variable cost of the Postal Service will decline along with volume and that, between 125 and 100 billion pieces, fixed costs will grow to become more than half of total cost. These should become a focus of management's attention. Reducing fixed costs would moderate but not eliminate the above-inflation price increases required to breakeven.

- At lower volume levels, the decline in First-Class volumes, and especially single-piece First Class, will mean that the Postal Service will essentially cease being a two-way communications medium and will evolve into a broadcast medium. This would have very important implications for its basic structure including the processing, transportation and retail networks.

- Revenue losses due to declining volumes will have profound implications for repaying debt and shouldering other legacy costs such as prefunding annuitant health benefits and the prior year portion of workers' compensation benefits. In addition, continuing losses and expenses not related to "moving the mail" from Periodicals and other loss-making categories of mail, operating 36,000 retail outlets, Alaska bypass mail, and other money losing activities will become an increasing burden.

- As prices increase in a declining volume scenario, reduced rates for nonprofit mail (which are cross-subsidies from regular mail) will become increasingly burdensome for regular mail users who will be experiencing significantly higher rates.

- As volume declines, the mail processing, transportation and retail functions will shrink considerably but delivery will shrink much less, leaving it larger than the other major functions combined. This has obvious implications for strategic planning. The network will have to be redesigned and R&D should concentrate on delivery. Further, the in-office portion of delivery will shrink with volume, but the street portion will remain largely intact. This means that industrial engineering R&D for street time cost reductions should become a priority.

3. Fixed and Variable Cost

When the Postal Service's volume declines it can be expected that its variable costs and total cost will decline.[3] Notwithstanding this decrease in total cost, the average cost per piece (average unit cost) will increase because the fixed costs will be spread over fewer pieces.

The GMU Enhanced Rollforward Model uses volume as an input and calculates the resulting total cost of the Postal Service by determining the variable costs that result from the input volume while holding fixed costs constant. Thus, it is a short term model in economic parlance. When volume declines by a large amount over time, economists expect fixed costs to decline as

[3] The decline in variable cost may lag the volume decline by a year or so, because it is difficult to cut work hours over a short period of time. The Postal Service appears to have done a remarkable job in cutting variable cost during the very large volume decline associated with the recent recession. For example, volume declined 13.5 percent in 2009 and work hours declined 8.8 percent against an anticipated decline in variable costs of 8.1 percent.

well.[4] Since we will be looking at the effects of large volume declines, we explored developing a model that allowed for changes in fixed costs (or what economists call a long run cost model). We were unable to estimate the fixed cost changes over the long run by examining historical postal cost data because the attribution methodology (that defines variable and fixed costs) has continually been refined over the years, thus preventing comparison between current costs and costs from previous periods. Thus, a short run model like the GMU Enhanced Rollforward Model calculates an upper bound on the increase in unit cost and prices that would result from a large decline in volume. We have compensated for the lack of fixed cost changes in the model by conducting sensitivity analyses to see the effect of fixed cost changes. We can say *a priori* that any decrease in fixed costs would partially offset the unit cost and price increases that would occur as volume declined.

4. Volume History

Figure 1 shows that since 1925 volume has grown almost nine fold to the peak year of 2006. Since then, volume has declined by 17 percent through 2009 and the decline has continued into 2010.[5] There is uncertainty about how much of the recent decline is related to cyclical events associated with the great recession of 2007-2009 as opposed to the secular trend of substitution that has been noticeable for many years.[6] This uncertainty will not be resolved in the United States until the economy resumes growth for a sustained period. Figure 2 shows the annual change in total volume since 1925. It can be seen that actual volume declines have been

[4] This is what is meant by the expression *all costs are variable in the long run*.

[5] Through Quarter 3 of 2010, volume fell an additional 6.5 billion pieces.

[6] A highly respected postal econometrician at Finland Post recently wrote: "The deep global economic recession experienced in 2009 has lowered letter volumes nearly everywhere in the developed world …. It can be clearly discerned that some of the effects of the economic crisis have been interpreted as substitution. It is, obviously, difficult to separate these matters. At least it can be said of Finland that the drop in letter volume in 2009 (total addressed letters -7%) was almost entirely the result of the economic crisis (GDP volume fell -8%)." He goes on to say that he expects substitution to begin again when the recession ends. See "Does the Level of Price Elasticity Change with the Progression of Substitution?" Heikki Nikali, presented at the CRRI Conference on Postal Delivery Economics, Porvoo, Finland, June 2-5, 2010.

associated with negative growth of the GDP (1930-1933, 1975, 1991, 2001, 2007-2009). The only exception was in 1946 when the nation was shifting from a war to a peace time economy.[7]

Figure 1
Mail Volume, 1925-2010

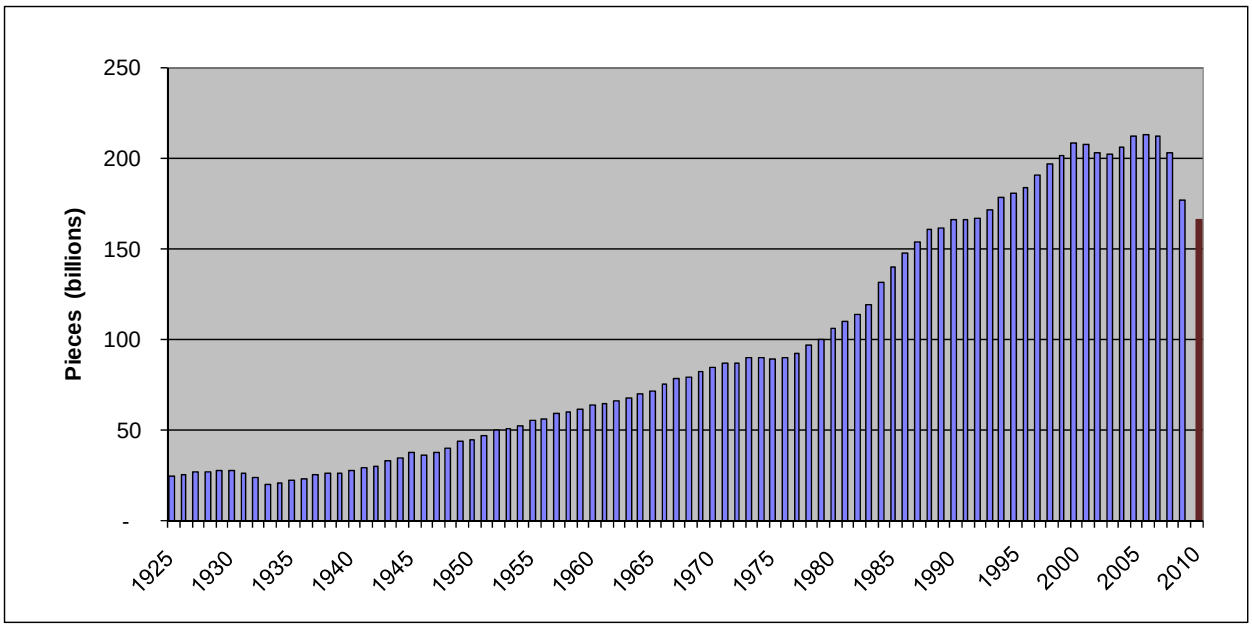
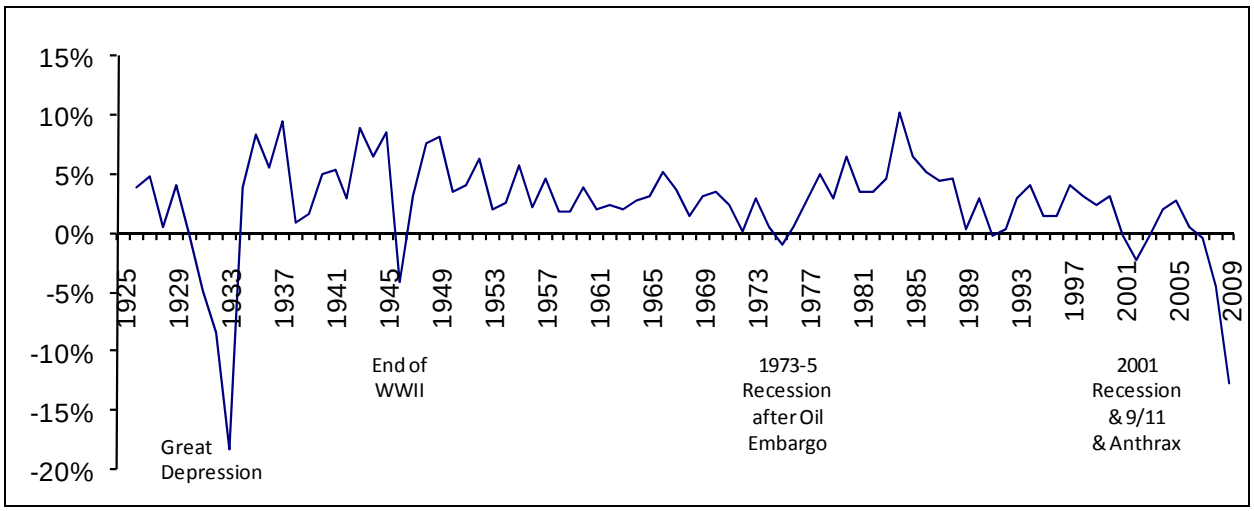


Figure 2
Annual Changes in Mail Volume, 1925-2009



[7] It is worth noting that postal volume did not turn negative during the recessions in the 1940s, 1950s and 1960s. In addition, it did not turn negative in the recession of 1981 when volume was growing very rapidly owing to the introduction of worksharing discounts.

5. Financial Sustainability at Lower Volumes

As noted above, volume declines will mean that the Postal Service's average price will need to increase if the Postal Service is to break even financially. In this section we define "financial sustainability" in terms of the increase in price that would be implied by lower volumes.

U.S. Postal Service unit costs are among the lowest in the industrial world.[8] This cannot be explained by technology because posts in the other developed countries all use similar sorting equipment and operate in a similar fashion.[9] An important part of the explanation lies in economies of scale. All posts in developed countries are characterized by a large amount of fixed costs which in turn are due in large part to the delivery function.[10] When volume increases, the average cost per piece drops as there are more pieces to share the fixed cost burden. The United States has the second highest number of pieces per capita in the world, and this explains to a large degree why its costs and prices are among the lowest.[11] The fact that prices are significantly higher in most other developed countries is an encouraging sign for the financial sustainability of the U.S. Postal Service, because it means that in a modern economy, these prices are affordable. If volumes decline to the levels that we are analyzing and U.S. postal prices increase to achieve breakeven, they will approach the current level of other posts in the developed world. We believe that if U.S. prices do not significantly exceed those prices, then the U.S. Postal Service will remain sustainable at current levels of service.

Table 1 shows the 2007 mail volume per capita for 19 posts in developed countries as a percentage of the U.S per capita volume for 2007. It also presents each post's 2008 price for a first class stamp in 2008 purchasing power parity.[12] The table displays the purchasing power

[8] See "The Role of Scale Economies in the Cost Behavior of Posts," Robert Cohen, *et al.*, Proceedings of Wissenschaftliches Institute fur Kommunikationsdienste GmbH (WIK) 8th Koenigswinter Seminar on "Regulating Postal Markets-Harmonized vs. Country Specific Approaches," February 2004.

[9] One difference is that in Europe and Japan many carriers use bicycles instead of automobiles because in their urban environments it is a cost effective mode of delivery.

[10] The time it takes a carrier to move between stops is fixed since it is independent of the volume.

[11] Switzerland mails more pieces per inhabitant. Other factors include labor costs, service performance, post offices per capita, profit levels and miscellaneous costs such as prefunding retiree health care.

[12] The Big Mac comparison is a common and informal way to compare the purchasing power of a currency in another country. If, for example, a Big Mac cost four euros in France and three dollars in the United States, the dollar would have the purchasing power of 1.33 euros in France.

parity price in dollars. Purchasing power parity is the preferred way to compare prices between countries with different currencies.[13]

Table 1
International Comparison of the Price of a First-Class Stamp

Country	Prices in Purchasing Power Parity (U.S. $)	Per Capita Volume as a % of U.S. Per Capita Volume	EBIT Margin 2007*	EBIT Margin 2008*
New Zealand	0.32	33%	5.8%	4.6%
Australia	0.37	32**	na	na
Spain	0.41	20	na	na
US	**0.42**	**100**	**(6.8)**	**(3.7)**
Netherland	0.49	49	5.6	5.7
Luxembourg	0.53	57	na	na
Great Britain	0.54	46	0	0.9
Ireland	0.56	24	na	na
Sweden	0.59	49	6.3	3.6
Belgium	0.59	na	na	na
France	0.60	42	5.9	2.6
Austria	0.62	43	11.5	10.1
Germany	0.64	35	3.1	3.4
Denmark	0.64	40	na	na
Portugal	0.67	16	na	na
Japan	0.69	25	na	na
Italy	0.71	14	0.7	(0.3)
Finland	0.72	57	5.2	4.4
Norway	0.78	53	0.3	(0.4)

Note: The first unit of postage in these countries is 20 grams vs. 28 grams (1 ounce) in the United States.

* Mail operations only. EBIT margin is EBIT (earnings before interest and taxes) divided by revenue.
** Australia 2008 volume
na not available

[13] Exchange rates often vary widely over time. Purchasing power parities, however, remain remarkably constant over time between countries that do not have large inflation rates. For example, they changed by less than 1 cent over 2007, 2008 and 2009 between the United States, Germany and France. The purchasing power parity data used in Table 1 are from the *OECD Statistical Abstracts, Table 4, PPPs and exchange rates*.

The countries in the table are listed in the order of their purchasing power parity price. It can be seen that these countries all have much lower volume per capita than the United States and in most cases they have less than half the per capita volume. The purchasing power parity prices of the 15 posts with higher prices than the USPS range from 17 percent higher than the U.S. price to 86 percent higher. The last two columns show the EBIT[14] profit margin (operating earnings) for each post's mailing operations in 2007 and 2008.[15] Of the 11 posts for which EBIT data is available, two were unprofitable for one year and the United States was unprofitable for both years. This is important because it shows that unlike the United States, the prices in effect in these countries are not below cost.

As noted, 15 of the posts in the table have a First-Class stamp price in purchasing power parity that is greater than the U.S. price. Five have prices between 50 and 59 cents, six have prices between 60 and 69 cents, and three have prices higher than 70 cents. Obviously, economies in industrialized counties will support these prices. We take this to mean that the U.S. Postal Service would remain sustainable if its prices did not exceed this range by a significant amount. In this paper we will use the criterion that the Postal Service will remain financially sustainable as long as its stamp price does not exceed 69 cents in 2008 dollars. This means that it should not increase more than about 65 percent. In the interest of being conservative, we have drawn a line at 69 cents while the data would arguably support a higher figure. This criterion tells us at what price levels the Postal Service would be financially sustainable. It does not, however, give us a threshold for when price levels would become financially unsustainable.

6. The Volume Mix Used in the Study

In addition to total volume, an explicit volume mix (by product) is required to operate the Enhanced GMU Model.[16] The Boston Consulting Group (BCG) estimated that the USPS would

[14] EBIT is an indicator of a company's profitability, calculated as revenue minus expenses, excluding tax and interest. EBIT is also referred to as "operating earnings." Many posts in the developed world have several businesses or are owned by firms that have several businesses. The EBIT margins shown are for the mailing operation only.

[15] The volumes, prices and EBIT margins are from *The Evolution of the European Postal Market since 1997, Annex, Country Fiches*, August 2009, ITA Consulting GmbH and WIK Consult GmbH. This paper was done for the European Commission. The table displays data for all developed countries that were included in that paper.

[16] A volume mix is the percentage of total volume that each product represents.

have 150 billion pieces for 2020.[17] BCG studied the volume trends of the classes of mail and forecast the following specific volume mix by class for 2020: First-Class Mail dropping 37 percent, advertising mail growing slightly and parcels growing about 4 percent per year. The growth in parcel volume would have a significant impact on revenue and net income because of their high revenue per piece and their high per piece contribution to overhead. This would mitigate somewhat the impact on postal finances from the First-Class volume decline. We extrapolate the BCG volume mix to arrive at a mix for 125, 100 and 75 billion pieces. We also show the sensitivity of postal costs to a different volume mix estimate.

If First-Class Mail volume declines 37 percent when total volume drops to 150 billion pieces in 2020, it would mean that there would be even further future declines in First-Class Mail and especially single piece as total volume approaches 100 billion pieces. Thus the Postal Service would become almost entirely a broadcast medium with little single-piece volume that today makes it a communication exchange medium. This transition would have profound implications for the basic structure of the Postal Service affecting service levels, transportation, retail, and mail processing facilities and hours of operation.[18] It would also argue for less frequent delivery. All of these changes would reduce expenditures and make prices more affordable. These observations serve to reinforce the point made in Section 3 about short run and long run cost models.

7. The GMU Enhanced Rollforward Model

The version of the model used in this analysis is based on the-public version of the Cost Rollforward Model that was used in the R2006-1 rate proceeding at the PRC. We have updated the model by substituting products for subclasses as the Postal Service has changed the Cost and Revenue Analysis (CRA) report reflecting the concepts used in the PAEA.

[17] See "Projecting Mail Volumes to 2020," Boston Consulting Group, March 2, 2010, http://www.usps.com/strategicplanning/_pdf/BCG_Narrative.pdf.

[18] With little single-piece volume, the Postal Service would need to do little outgoing sorting. The imperative to sort mail on the evening shift would diminish and the Postal Service could shift much of its operations to the day shift, which would affect transportation designed around the last dispatch of value. It would permit more consolidation for transportation. Much less air transport would be needed. Facilities could be more easily consolidated because there would be less emphasis on speed of delivery.

The model projects future costs from base year costs reflecting changes due to

- Volume by product
- Cost level (labor and other resources)
- Efficiencies due to cost reduction programs
- Nonvolume workload (e.g., number of post offices and number of delivery stops)
- Servicewide costs (depreciation, workers' compensation, escrow requirements, etc.)

The model accepts these factors as inputs and applies them to the Postal Service cost system of 18 cost segments and about 170 cost components. The segments are listed below along with an example of a component that belongs to each segment:

Table 2
Cost Segments and Example Components

Segment	Example of Component
1 – Postmasters	Postmasters EAS 23 and below
2 – Supervisors and Technical Personnel	Higher Level Supervisors
3 – Clerks and Mail handlers, CAG A-J	Mail Processing
4 – Clerks, CAG K	Clerks, CAG K
6 – City Delivery Carriers, In- Office	In-Office Direct Labor
7 – City Delivery Carriers, Street	Network Travel
8 – Vehicle Service Drivers	Vehicle Service Drivers
10 – Rural Carriers	Equipment and Maintenance Allowance
11 – Custodial Maintenance	Equipment Maintenance
12 – Motor Vehicle Service	Supplies and Materials
13 – Miscellaneous Operating Costs	Carfare and Tolls
14 – Purchased Transportation	Highway
15 – Building Occupancy	Rents
16 – Supplies and Services	Equipment
17 – Research & Development	R&D
18 – Administration and Regional Operations	Headquarters
19 – General Management Systems	Supplies &Services
20 – Other Accrued Expenses	Equipment Depreciation

See Appendix B for a detailed description of the GMU Model, including the Cost Rollforward Model and its enhancements developed for this paper.

8. The Base Year – FY 2009

In this study the base year for the GMU Enhanced Rollforward Model is FY 2009. This means that the Postal Service volumes, costs and revenues from the CRA for that year are the starting point. In FY 2009 the Service incurred a loss of $3.8 billion or 5.6 percent of revenue. We first increase prices by 5.6 percent to allow for breakeven in 2009. This initial price increase causes volumes, costs and revenues to decline because of the effect of price elasticity.[19] Thus, it is again necessary to increase prices to achieve breakeven.[20] We then arrive at the *adjusted volume, cost, revenue and price increase.* It can be seen in Table 3 that a 6.5 percent increase in the average revenue per piece would have been required to achieve breakeven in 2009.[21] In all cases we go through this two-step process in estimating the price increase necessary to break even, first raising rates and calculating the effects of elasticity on volumes and costs and then raising rates for a second time.

Table 3
Base Year Volumes, Cost and Revenue and Adjusted Base Year Volume, Cost and Revenue after Allowing for a Price Increase to Breakeven
(2009 dollars)

Item	Initial Value	After Mailer Response to Price Increase
Volume	177.5 B	173.0 B
Cost	$71.9 B	$70.7 B
Revenue	$68.1 B	$70.7 B
Profit/(Loss)	($ 3.8 B)	($ 0.001 B)
Price Increase Required to Break Even	5.6%	6.5%

[19] The own price elasticities for market dominant products are from the January 20, 2010 submission to the PRC by the Postal Service, and the competitive product elasticities were furnished on a confidential basis to the Office of Inspector General by the Postal Service.

[20] This iteration is similar to that in the rate proceedings conducted under the old Postal Reorganization Act where future costs were forecast by the model and then an initial price increase was calculated so that revenues and costs would be equal. This increase causes volumes and costs to decline and so a second price increase is introduced. Theoretically this iteration could continue as the ultimate breakeven price is approached. As a practical matter the iteration is stopped when the costs and revenue are in virtual balance.

[21] In a sense this means that our estimation of future price increases required by future decreases in volume starts in a hole because this amount must be added to any price increase needed to offset the losses that would result from a further decrease in volume from 2009 levels.

9. The Base Case

The base case is for a volume forecast of 150, 125, 100 and 75 billion pieces in the year 2020 using the BCG mix. The base case assumes Consumer Price Index (CPI)-based changes for labor cost and other cost levels beyond 2009, and consequently our cost results are in real 2009 dollars. Similarly, CPI-based price increases are assumed to occur each year, so revenues are also in real 2009 dollars. In addition, there are no allowances for improvements in efficiency. However, we incorporate the costs of changes to the nonvolume workload measures including the number of delivery stops and the number of post offices. Delivery stops are growing with household formations, and the number of post offices has been slowly declining. Nonvolume-related costs have been projected to the year 2020 and are discounted to FY 2009 levels assuming an average annual CPI increase of 3.0 percent.

The most significant change from the 2009 CRA is the treatment of retiree health care costs. The Postal Service pays the employer's share of health care premiums for Postal Service retirees. Historically, the Postal Service has made these premium payments when they came due on a "pay-as-you-go" basis. The PAEA required the prefunding of these payments. Under the PAEA, the Postal Service is required to make substantial prefunding payments of more than $5 billion annually through FY 2016 to a fund for retiree health benefits while it continues to pay for current retirees. After FY 2016, payments for current retirees will come from this fund, and the Postal Service will prefund the cost of retiree health care benefits that employees earn each year and make amortization payments for any unfunded liability.

The Postal Service succeeded in making the prefunding payments due in 2007 and 2008, but because of the Postal Service's financial difficulties, Congress substantially reduced the payment required in 2009 by $4 billion. A similar reduction may be approved this year. In developing the model we debated how much to assume the Postal Service would spend for retiree health care in the future. Given its current financial situation, it seems unlikely the Postal Service will be able to meet the PAEA's schedule, but it is not yet clear what will happen.[22] We considered

[22] The Office of Inspector General has asserted that the Postal Service has been overcharged for its pension payments by $75 billion, and the overpayment could potentially be used to cover unfunded retiree health care liability. A subsequent PRC analysis agreed that the Postal Service had been overcharged but estimated the amount at $50 to $55 billion using a different methodology.

assuming the Postal Service would continue to fund on a pay-as-you-go basis, but such a change would require legislation. Ultimately, because of the uncertainty, we decided to assume the Postal Service would continue to make payments as required according to the transition assumed by the PAEA. We used the estimated 2020 payment provided by the Office of Personnel Management to the Government Accountability Office.[23] This payment, a combination of current employee costs and an amortization payment, is assumed to be $7.3 billion in 2020,[24] not much more than the projected pay-as-you-go payment of $6.4 billion. The sensitivity of our retiree health care assumption is examined below.

The base case also includes a change in the model from the way it was normally run in rate cases for what are called longer run costs.[25] These are costs such as floor space that are allocated to mail categories based on volume but whose total costs are not expected to change in the short term. Since this analysis is focused on long-term cost changes, we allow these costs to vary with volume in total as well as by mail category. Thus, the model recognizes three kinds of costs: short run variable, longer run variable and fixed costs.

a. Base case results

The model results for the base case are shown in Table 4 and in Figure 3. For 150 billion pieces, the table shows that volume would drop to 136.8 billion pieces as a result of the elasticity response to increased prices and costs and revenues would drop to $67 billion in 2009 dollars after the required price increase. Real (or inflation adjusted) prices would have to increase by 24.3 percent or 2 percent annually. It appears that at the volume levels of 150, 125 and 100 billion pieces, the Postal Service would be financially sustainable according to the criterion set forth above. It can be seen in Figure 3 that below 100 billion pieces, the required rate increases slope sharply upward. At 75 billion pieces, it would require more than doubling prices. Our criterion does not tell us whether the Service would be financially sustainable at that level.[26] The

[23] U.S. Government Accountability Office, *USPS Strategies and Options,* Report No. GAO-10-455, April 2010, http://www.gao.gov/new.items/d10455.pdf.

[24] These costs are also discounted to FY 2009 levels assuming an average annual CPI increase of 3.0 percent.

[25] These are also called "PESSA" costs in cost model jargon. This acronym stands for property, equipment, supplies, services, and administrative.

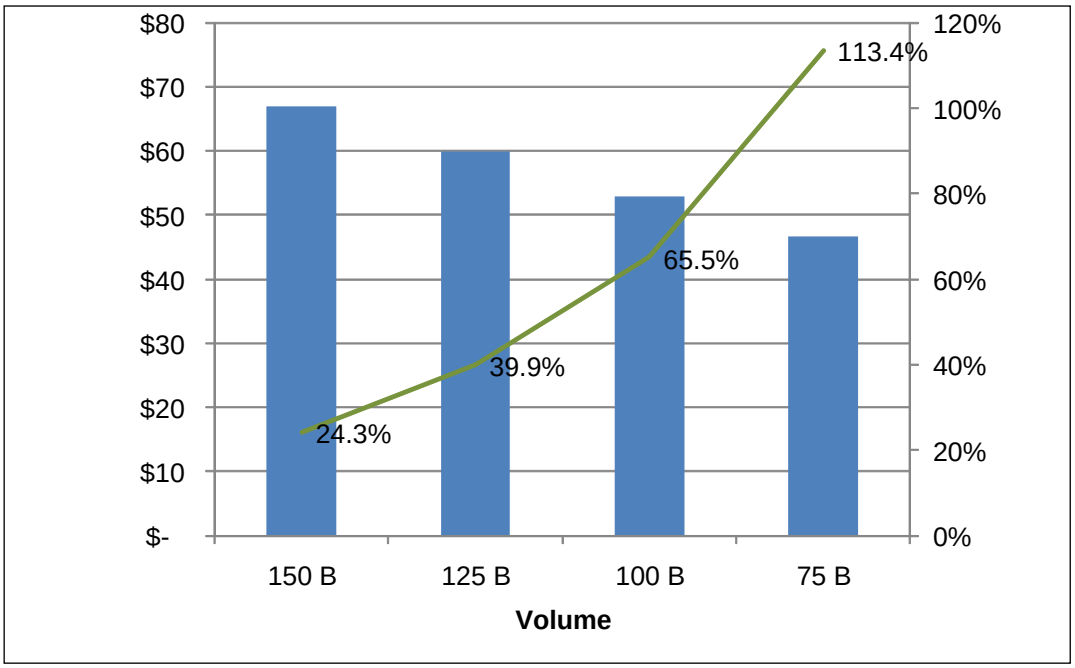
[26] It should be noted that Postal Service rate increases for major subclasses have been as high as 33 percent in the past.

table also shows the number of work years that would be used at each volume level. In 2009 the Postal Service would use 704,000 work years in a breakeven scenario, and it can be seen that the number of workers will decline substantially if volume drops to the levels examined. They would drop even further if the Service manages to reduce some of its fixed costs.

Table 4
Cost Model Results for the Base Case
(billions)

Initial Volume	Volume after Price Increase	Cost & Revenue (2009 Dollars)	Breakeven Revenue Increase Required Above CPI	Annual Revenue Increase Required Above CPI	Number of Work Years (000)
150	136.8	$67.1	24.3%	2.0%	636
125	108.6	60.0	39.9	3.1	564
100	81.3	53.1	65.5	4.7	495
75	55.5	46.7	113.4	7.1	429

Figure 3
Cost Model Results for the Base Case



As Table 4 shows, if volume declines, even to 150 billion pieces, there will have to be real price increases (i.e., prices must be increased above inflation). This means that the PAEA price cap will not allow the Postal Service to be financially sustainable through rates alone if volumes decline.[27] Keeping the inflation level cap for price increases with declining volumes would mean that direct or indirect tax payer subsidies would be required or unprecedented cost cutting would be needed for financial sustainability.

b. Year when volume level is reached

The annual price increase required depends on the year the volume level will be reached. We have arbitrarily assumed that year would be 2020. However, the model is essentially atemporal. So the target year could be 2030, 2040, etc. If the target year was later than 2020, the annual change required for breakeven price increases would decline.

10. Strategic Planning Implications

a. Reduced income

As volume declines, total revenue will decline in parallel. In addition the average revenue per piece will increase (assuming breakeven prices are charged). Table 5 shows the adjusted (taking into account price elasticities) breakeven revenue/income at the volumes examined and average revenue per piece in 2009 dollars. Declining revenue will have profound implications for repaying debt and shouldering legacy costs such as prefunding annuitant health benefits and the prior years' portion of workers' compensation benefits. The base case assumptions for the GMU Model do not include the repayment of debt, but they do include paying for retiree health benefits. In addition, continuing losses and expenses not related to "moving the mail" from Periodicals and other loss-making categories, operating 36,000 retail outlets, Alaska bypass mail, etc. will become an increasing burden. Finally, reduced rates for nonprofit mail are cross-subsidies from ordinary mail and funding these cross-subsidies will become increasingly burdensome for ordinary mail because of their average price increase.

[27] Totally unexpected efficiencies (not involving a reduction in the Universal Service Obligation) such as a large increase in Total Factor Productivity could be achieved which would obviate the need for above inflation increases. This is deemed highly unlikely in the face of large decreases in volume.

Table 5
Base Case Adjusted Total Revenue/Income and Average Revenue per Piece
(2009 dollars)

Initial Volume	2009 177.5 B	150 B	125 B	100 B	75 B
Adjusted* Breakeven Revenue/Income	$70.7 B	$67.1 B	$60.0 B	$53.1 B	$46.7 B
Adjusted* Average Revenue per Piece	40.9¢	49.0¢	55.2¢	65.3¢	84.2¢

***** After taking into account price elasticities and raising prices to breakeven

b. Major functions

Declining volumes will have a significant impact on the relative cost of the major functions as shown in Table 6. It can be seen that mail processing declines almost proportionately with volume. Transportation has more fixed cost, so it does not decline as much. As volume declines, delivery will decline comparatively slowly as it is mostly fixed. The remaining costs will grow as a percentage of total costs as the major functions shrink. This has important implications for the network configuration and related transportation, the organization of delivery routes, investment and R&D expenditures.[28]

Table 6
Base Case Adjusted Function Cost
(2009 dollars)

Initial Volume	2009 177.5 B	150 B	125 B	100 B	75 B
Mail Processing	$ 21.2 B	$ 16.4 B	$ 12.7 B	$ 9.3 B	$ 6.4 B
Transportation	5.9	5.4	4.1	3.0	2.1
Delivery	28.8	25.8	23.4	21.2	19.3
Retail-Window Service	3.8	3.4	3.1	2.8	2.6

[28] For example, as volume drops, variable costs on delivery routes will drop, allowing each carrier to cover more stops. As mail processing activity declines, facilities will be consolidated so that they continue to have a critical mass. This in turn will reduce the amount of transportation runs that are needed. As single-piece volumes decline, less window service will be needed. Finally, as mail processing, transportation and window service decline, there will be much less need to conduct R&D in these areas.

c. Fixed costs and the USO

Almost half of the Postal Service's fixed costs are in the Postmaster segment (6.4 percent) and the street portion of the City and Rural Delivery segments (39 percent). They are the main costs underlying the Universal Service Obligation (USO) of access to window service and delivery frequency. Thus, reducing these fixed costs means reducing the USO which is politically unpopular and requires the explicit (or at least implicit) approval of Congress. The authors have pointed out in a previous paper that a profit maximizing U.S. Postal Service would be able to save about $6 billion annually if it were allowed to reduce delivery to three days per week and substitute rural carrier retail service for the 8,600 CAG K&L post offices.[29] This is about 13 percent of the estimated $53 billion in revenue that the Postal Service would require to breakeven at 100 billion pieces. Reducing the USO burden of the Postal Service would greatly lessen the impact of declining volumes on rate payers. The fixed costs that underlie the USO are conceptually easy but politically very difficult to cut.

d. Street time

Delivery includes both the largely variable in-office and the largely fixed street components. As volume declines, the in-office portion drops because it is almost all variable. In contrast, the street portion is largely fixed and so it becomes a larger percentage of delivery costs. This means that street time will become by far the largest function. This in turn means that it should become the focus of research on how to reduce its cost. Improved delivery vehicles could help, but it seems mostly to be an industrial engineering problem.

Table 7
Base Case Street Time vs. In-Office Time

Initial Volume	2009 177.5 B	150 B	125 B	100 B	75 B
In-office	29%	27%	25%	23%	20%
Street	71%	73%	75%	77%	80%

[29] See "Estimates of the Current Cost of the USO in the U.S.," Robert Cohen and Charles McBride, *Study on Universal Service and the Postal Monopoly*, George Mason University School of Public Policy, November 30, 2008 http://digilib.gmu.edu:8080/dspace/handle/1920/3477. The CAG (cost ascertainment group) level of a post office indicates how much revenue it generates. CAG K&L post offices bring in the smallest amount of revenue.

11. Sensitivity Analyses

In every complex analysis about events which have not taken place, assumptions have to be made about the value of variables used in the analysis. In this section, we present the sensitivity of the base case results to different values of the most important variables so that their relative importance can be seen. In addition, the reader may be interested in seeing the base case results with different values for these variables, and the sensitivity analyses should allow this.

a. Total factor productivity

In spite of the fact that volume has experienced an overall decline of 12 percent during the recent decade (ending in 2009), total factor productivity (TFP) improved at an average annual rate of 1.1 percent or 10.7 percent cumulatively. It is unclear if improvements in TFP will continue at this rate, especially if volume continues to decline. In the previous decade, the average annual growth of TFP was only 0.2 percent for a cumulative total of 2.1 percent.[30] This small increase occurred during a decade of steadily improving volume.[31]

In this study, TFP is assumed to remain unchanged in the base case. To see how sensitive the base case result is to this assumption, TFP is allowed to increase and decline by a total of 3 percent[32] over the period from 2009 to 2020. The results are shown in Table 8.

Table 8
Sensitivity of Base Case Result to
Cumulative 3 Percent Negative and Positive Changes in Cumulative TFP

Initial Volume (billions)	-3% TFP Costs ($ 2009)	-3% TFP Breakeven Increase Above CPI	Base Case Costs ($ 2009)	Base Case Breakeven Increase Above CPI	+3% TFP Costs ($ 2009)	+3% TFP Breakeven Increase Above CPI
150	$68.5	28.7%	$67.1	24.3%	$65.7	19.9%
125	61.2	44.9	60.0	39.9	58.7	34.8
100	54.3	71.6	53.1	65.5	51.9	59.3
75	47.8	121.6	46.7	113.4	45.6	105.2

[30] The cumulative total increase for TFP in the 1980s was 0.3 percent and in the 1970s it was 6.9 percent.

[31] Cumulative volume growth was 26 percent for the decade. Volume was negative during this decade only in 1991 in response to a 25 percent rate increase.

[32] This is 0.296 percent compounded annually over the period.

Obviously, the growth of TFP would be very important to the financial sustainability under these reduced volume scenarios. If it were to decline even at the low compound rate that we have used, the breakeven price increase becomes much larger, but the Postal Service remains financially sustainable under our criterion for the 150 and 125 billion piece cases. The 100 billion piece case falls outside of the range specified in our criterion of sustainability by a small margin, but the 75 billion piece case falls outside the range by a large margin. In contrast, improving TFP by a total of 3 percent over the 11-year forecasting period would greatly reduce the price increases that would be required for the Service to break even financially.

b. Fixed costs

Forty percent of total Postal Service costs were fixed in 2009. The GMU Enhanced Rollforward Model reduces variable costs as volume declines and does not change the fixed costs. Consequently, fixed costs grow as a percentage of total costs. It is likely that management would make strong efforts to reduce fixed costs if volume declined to the levels modeled in this paper. It was noted above that 40 percent of all fixed costs are in the street portion of the delivery function. These costs are difficult, but not impossible, to reduce. Administrative and higher level supervision are also fixed, and most postmaster costs are largely fixed. To show the sensitivity of the base case results to reductions in fixed cost, we reduce them by a cumulative 10 percent. The results are shown in Table 9 below.

Table 9
Sensitivity of Base Case Result to
Cumulative 10 Percent Reduction in Fixed Costs

Initial Volume (billions)	Base Case Costs ($ 2009)	Base Case Breakeven Increase Above CPI	Fixed Cost as a Percent of Total Cost	Costs with 10% Fixed Cost Reduction ($ 2009)	Breakeven Increase Above CPI with 10% Fixed Cost Reduction
150	$67.1	24.3%	40.3%	$65.0	17.9%
125	60.0	39.9	45.3	57.8	31.6
100	53.0	65.1	51.6	50.8	54.0
75	46.7	113.4	59.2	44.3	96.0

It can be seen that the reduced fixed costs become a larger portion of total cost as volume falls. Thus, the effect on the required price increase also increases as volume declines. At 100 billion pieces the required price increase drops by 21 percentage points when fixed costs are reduced by 10 percent.

c. Own price elasticity

A recent paper by the econometrician Heikki Nikali of Finland Post concludes that the further substitution has progressed, the lower price sensitivity will be.[33] *Lower* elasticities would, of course, lower the required rate increases in our base case. Nevertheless we examine the sensitivity of the base case results to *higher* elasticities in Table 10. It can be seen that if elasticities were 50 percent higher than the ones we used, the price increases required by the 100 and 75 billion piece scenarios would both be greater than our financial sustainability criterion.

Table 10
Sensitivity of Base Case Result to a
50 Percent Decrease and Increase in Price Elasticities

Initial Volume (billions)	Base Case Breakeven Increase Above CPI	Breakeven Increase Above CPI with 50% Decrease in Price Elasticities	Breakeven Increase Above CPI with 50% Increase in Price Elasticities
150	24.3%	23.5%	28.0%
125	39.9	37.8	47.7
100	65.1	60.2	82.3
75	113.4	99.9	151.9

d. Retail function cost

The Postal Service retail function represents 11 percent of total costs or $6.5 billion in 2009. The U.S. Postal Service Office of Inspector General (OIG) recently published a paper on the Postal Service's retail function that finds that substantial savings could be obtained without

[33] Op. cit.

degrading service.[34] Consequently, we examine the sensitivity of the base case results to savings in the retail function. Table 11 shows that a 33 percent reduction in retail costs at 150 billion pieces could reduce the required breakeven price increase by 4.5 percentage points. At 75 billion pieces the breakeven price could be reduced by 12 percentage points. This raises the issue of whether there is a need for much retail presence at the lower volume levels, since they represent scenarios in which there would be very little single piece letter mail. We have seen that UPS and FedEx can accommodate household parcels by using a combination of their own retail stores, retail store agents and drop boxes. Moreover, the USPS has begun to use letter carriers to accept Priority Mail parcels on their delivery rounds. Thus it would seem that very substantial savings in the retail function could be obtained at the lower levels of volume that we have examined.

Table 11
Sensitivity of Base Case Result to
a 33 Percent Reduction in Retail Costs

Initial Volume (billions)	Base Case Breakeven Increase Above CPI	Breakeven Increase Above CPI with 33% Reduction in Retail Costs
150	24.3%	19.8%
125	39.9	34.1
100	65.5	57.5
75	113.4	101.4

e. Mail processing variability

There has been a long running technical disagreement between the Postal Service and the PRC over the impact of volume changes on mail processing costs. Essentially the dispute boils down to the degree of economies of scale that exist in the mail processing function. The Postal Service has done analyses that show that mail processing costs grow about 8.3 percent when volume increases 10 percent (a volume variability of 83 percent). The PRC claims that cost grows about 9.7 percent when volume increases 10 percent (a volume variability of 97 percent). In short, the Postal Service finds that the mail processing function has about 13 percent fixed costs and the

[34] U.S. Postal Service Office of Inspector General, "Analyzing the Postal Service's Retail Network Using an Objective Modeling Approach," Report No. RARC-WP-10-004, June 14, 2010.

PRC finds that fixed costs are only about 3 percent. Interestingly, this disagreement is based on econometric analyses using data obtained during periods when volume was increasing. It would seem that their respective findings should be the same whether volume is increasing or declining. The more costs are fixed, the less costs will drop when volume declines.

The Postal Service and the PRC have agreed to use a method for calculating the volume variability percentage for mail processing that produces a result that hovers around 94 percent, and this percentage is what the GMU Enhanced Cost Rollforward Model uses for the base case. However, to test the sensitivity of the base case results we compare them to the results using the Postal Service's 83 percent figure. Table 12 below shows the breakeven price increases for the 83 percent variability case in comparison with the base case.

Table 12
Sensitivity of Base Case Result to
83 Percent Variability in Mail Processing

Initial Volume (billions)	Base Case Breakeven Increase Above CPI	Breakeven Increase Above CPI with 83% Mail Processing Variability
150	24.3%	24.9%
125	39.9	41.4
100	65.5	68.6
75	113.4	119.6

f. Delivery frequency

A number of posts in the developed world deliver only five days a week. In this country Congress controls the number of days a week that the Postal Service must deliver through an appropriations rider that has been approved continually since 1983. Postal management has proposed that the Postal Service be allowed to reduce delivery frequency by one day per week and estimates that it would produce $3.1 billion in annual savings.[35] So far, Congress has not acquiesced. In this section we examine the sensitivity of the base case results to the estimated

[35] The GMU study on Universal Service cited above calculated that the savings from reduced delivery frequency would be about two thirds of Postal Service management's estimate.

savings from reducing delivery frequency. Table 13 shows that the required breakeven price increase is reduced considerably as compared to the base case. It is reduced by about 30 percent at 150 billion pieces.

Table 13
Sensitivity of Base Case Result to
Five Day a Week Delivery

Initial Volume (billions)	Base Case Breakeven Increase Above CPI	Breakeven Increase Above CPI with 5 Day a Week Delivery
150	24.3%	17.5%
125	39.9	31.0
100	65.5	53.3
75	113.4	94.9

g. Salaries

The base case assumes that the Postal Service's average productive hourly wage is unchanged in real (inflation-adjusted) terms. This comports with recent history, and given the financial difficulties facing the Service, it is not an unreasonable assumption. The recent history is presented in Table 14. The outsized increase in 2009 was due to oil prices skyrocketing in 2008 which caused the CPI to increase significantly through July. It just so happens that July is the end of the period that determines the cost-of-living adjustment (COLA) that went into effect not long after the beginning of FY 2009.

Table 14
Postal Service Average Productive Hourly Wage

Year	Nominal Increase	Real Increase
2005	3.1%	-0.3%
2006	3.8	0.0
2007	1.8	-0.4
2008	2.4	-2.3
2009	5.7	6.6

Depending on the craft, salaries make up about 70 to 75 percent of the productive hourly wage. Table 15 presents the sensitivity of the base case assumption to a cumulative change of plus 3 percent and minus 3 percent in employee salaries. At most of the volume levels, the effect is less than 10 percent of the base case breakeven volume increase. Even with a 3 percent cumulative increase, the 100 billion case is above our criterion by only a small margin.

Table 15
Sensitivity of Base Case Result to Cumulative 3 Percent Positive and Negative Changes in Postal Service Salaries

Initial Volume (billions)	+3% Breakeven Increase Above CPI	Base Case Breakeven Increase Above CPI	-3% Breakeven Increase Above CPI
150	27.3%	24.3%	21.3%
125	43.3	39.9	36.4
100	69.7	65.5	61.2
75	119.0	113.4	107.9

h. Time period over which volume decline takes place

The base case assumes that the volume levels examined in this study would obtain in 2020. It is probably unrealistic that volumes would drop so rapidly, especially for the 100 and 75 billion piece volume levels. The nonvolume work load measures, especially carrier stops which grow with household formations, must be estimated for a particular year as must retiree health care costs. We have estimated the base case for the year 2030 to show the effect of time on the base case results by projecting nonvolume workload costs and retiree health care cost to that year. Table 16 presents the results. It can be seen that changing the time period has little effect on the costs or breakeven rate increase.[36] Thus, the model is virtually atemporal and independent of the number of years that it would take to achieve the volume levels examined. *However, the annualized price increase would be reduced due to the longer forecast period.*

[36] In part, this is due to the coincidence that the increase in nonvolume workload costs in 2030 was almost exactly matched by a retiree health care cost decrease in 2030.

Table 16
Sensitivity of Base Case Result to
Changing the Forecast Year from 2020 to 2030

Initial Volume (billions)	Base Case Costs ($ 2009)	Base Case 2020 Breakeven Increase Above CPI	Costs in 2030 ($ 2009)	2030 Breakeven Increase Above CPI
150	$67.0	24.3%	$67.1	24.3%
125	60.0	39.9	60.0	39.9
100	53.1	65.5	53.1	65.5
75	46.7	113.4	46.7	113.5

i. Retiree health care costs

As noted earlier, we assumed in the base case that the 2020 retiree health care costs would be $7.3 billion in 2020 dollars as estimated in GAO Report GAO-10-455, April 2010.[37] We estimate this payment is a combination of the normal health care costs of about $4.3 billion and an amortization amount of about $3 billion. Given the Postal Service's current financial condition, there is considerable uncertainty about possible legislative changes that would affect future health care payments. We tested the sensitivity of our results to an alternative scenario, in which we assumed that the Postal Service had no remaining health care liability in 2020. Thus the Postal Service would only pay its projected normal health care costs of $4.3 billion.

We examine the sensitivity of the base case results to the lower retiree health care payment case in Table 17 below. It can be seen that the assumed retiree health care reduction would keep the required breakeven price increases at the 150, 125 and 100 billion volume levels below our financial sustainability criterion.

[37] As described in the base case section, we convert the 2020 retiree health care costs to 2009 dollars using an assumed 3.0 percent annual inflation rate.

Table 17
Sensitivity of Base Case Result to
a $3 Billion Reduction in Retiree Health Care Costs

Initial Volume (billions)	Base Case Breakeven Increase Above CPI	Breakeven Increase Above CPI with $3 B Decrease in Retiree Health Care Costs
150	24.3%	19.8%
125	39.9	34.1
100	65.5	57.5
75	113.4	101.4

The OIG suggested additional cases related to prefunding retiree benefits. We examine these in Appendix A.

j. Volume mix

In addition to widespread concerns about total volume declines in the postal community, there have also been major concerns that a disproportionate amount of the decline would take place in First-Class Mail, which has a higher current profit per piece than any other major category of mail.

To examine the sensitivity of our results to alternative volume mixes (especially with respect to First-Class Mail), we compared the base case BCG mix results with two other volume mix cases. The first is the base case with the FY 2009 CRA volume mix, scaled for the 150, 125, 100 and 75 billion piece total volumes. This case has considerably more First-Class Mail than the BCG mix because of the BCG assumption that First Class would decline by about 4 percent annually in the FY 2009-2020 period. As an example, for the 150 billion piece BCG mix case and the corresponding FY 2009 CRA mix case, First-Class volumes would be 49 billion and 65 billion pieces respectively. The second case is more extreme in that it assumes a 50 percent cut in First-Class volume for the 150 to 75 billion subcases, with the BCG mix for the remaining mail

classes scaled up by a constant factor to attain the desired total volume.[38] In this second scenario, First-Class volume would only be 24 billion pieces. Results for these cases are shown in Table 18 below.

Table 18
Sensitivity of Base Case Result to
Changes in 2020 Mail Mix

Initial Volume (billions)	BCG Mail Mix Breakeven Increase Above CPI	FY 2009 CRA Mail Mix Breakeven Increase Above CPI	50% Cut in BCG First-Class Breakeven Increase Above CPI
150	24.3%	22.4%	31.5%
125	39.9	38.6	47.6
100	65.5	65.0	74.4
75	113.4	113.9	124.6

It can be seen that using the FY 2009 CRA mail mix results in only minor changes in the 2020 breakeven price increases, even though First-Class volumes are 25 percent higher than in the BCG (base case) mix. Furthermore, even in the extreme case of assuming a 50 percent cut in First-Class Mail, breakeven percentages only increase by about 7 to 11 percentage points for all volume levels. While these results may not seem to agree with intuition, the explanation is straightforward. Higher First-Class volumes in a mix mean that the breakeven price increases will be lower in all classes than otherwise. However, with little First-Class Mail in a mix, breakeven prices in the other classes of mail will have to rise enough so that they too will be high-profit products. The own price elasticities in the other classes, while generally higher than those of First-Class Mail, are not so high that sufficient additional profit cannot be achieved by raising their prices.

[38] This case is not intended to be realistic, but simply to investigate how sensitive the results are to the level of First-Class volumes.

12. Conclusions

Until now the Cost Rollforward Model has been used in rate cases to forecast costs based on increasing volumes. The model is also a good vehicle for modeling the effects of declining volumes on costs. It can be enhanced so that it forecasts breakeven price increases using own price elasticities. Using the enhanced model we find that with substantial volume declines the Postal Service will not be able to break even without raising prices above the rate of the CPI. If volumes drop to the levels examined in this paper, the Postal Service will not only shrink, but especially with declining First-Class single-piece volume, it will be transformed into a distribution medium as opposed to being a two-way communications medium. This will have important implications for all of its major functions including delivery, mail processing, transportation and window service. Finally and most importantly, the Postal Service should remain financially sustainable at least down to 100 billion pieces if it is allowed to raise prices above the CPI to levels that prevail in other developed countries.

Biography of Authors

Robert H. Cohen

Mr. Cohen has spent more than 35 years involved in quantitative analyses of the U.S. and foreign post offices. He served as the Director of the Office of Rates, Analysis and Planning at the Postal Rate Commission from 1978 to 2005, and was the General Manager of the Mail Classification Research Division at the U.S. Postal Service from 1974 to 1978. Prior to that, he was the Program Director for Postal Studies at the Institute for Defense Analysis from 1966 to 1974. He has also been a coauthor (with Commission staff) of a number of papers involving policy and quantitative analyses relevant to postal costs. Most recently he authored a study on the value of the Postal Service mail monopoly and he coauthored a study of the cost of the Universal Service Obligation with Mr. McBride for the Postal Regulatory Commission. Mr. Cohen holds an M.A. in Philosophy and Logic from the City University of New York, and a B.A. in Philosophy and Mathematics from the University of Michigan.

Charles C. McBride

Dr. McBride is currently an independent postal consultant. He has worked in developing and implementing quantitative models of postal operations for more than 35 years. At the Postal Rate Commission from 1980 to 1990, he coordinated the development of volume, cost and revenue forecasting models for several major rate cases, and he implemented new analytical procedures for modeling carrier street time, workers' compensation costs and postal productivity. At the Postal Service from 1990 to 2001, he led a Service-wide effort to reform the then one-hundred-year-old mail classification schedule and served as main policy witness for the project during hearings at the Postal Rate Commission. More recently as a consultant, he developed a new Excel spreadsheet-based cost forecasting model for use by the PRC and the parties in major rate cases. Dr. McBride holds Bachelors and Masters Degrees in Electrical Engineering and Operations Research, respectively, from the Massachusetts Institute of Technology and a Ph.D. in Mathematical Statistics from the George Washington University.

Appendix A

OIG Sensitivity Analyses

A-1. Introduction

The OIG requested that we perform two additional sensitivity analyses to explore the effects of OIG proposed reforms. The first case illustrates the result of adopting the OIG's proposal to use a more businesslike method of prefunding retiree benefits. The second case shows what would be necessary to break even under the PAEA price cap.

A-2. Sensitivity Analyses

a. Health Care and Pension Prefunding Reform

The OIG has argued that the Postal Service has been overcharged for its Civil Service Retirement System (CSRS) pension payment by $75 billion. It suggests that this overpayment should primarily be used to fund retiree health care benefits.[1] A recent OIG audit also found the Postal Service's FERS pension fund is overfunded by $5.5 billion.[2] The audit recommended that the Postal Service pursue legislative action to reduce its pension contributions until this surplus is eliminated.

In addition, the Postal Service faces a 100 percent target for funding its retiree and health benefits. The OIG maintains that the target rates common in the private sector — 80 percent for pensions and 30 percent for retiree health benefits — are more appropriate. It advocates that the Postal Service should stop paying into its health and pension funds until these targets are reached. Legislation would be required to implement this proposal. If the proposal were adopted, the OIG estimates that the Postal Service would not have to make any retiree health or FERS payments until after 2020.[3]

Stopping the 2020 retiree health payment would save the Postal Service $7.3 billion in 2020 dollars. The OIG estimates that ending the FERS payment would save roughly $4.3 billion in

[1] U.S. Postal Service Office of Inspector General, "The Postal Service's Share of CSRS Pension Responsibility," Report No. RARC-WP-10-001, January 20, 2010.

[2] U.S. Postal Service Office of Inspector General, "Federal Employees Retirement System Overfunding," Report No. FT-MA-10-001, August 16, 2010.

[3] Currently, the Postal Service does not have to make any CSRS payments.

2020. In 2009 dollars, the total reduction is $8.2 billion from the base case. We examine the sensitivity of the base case results to stopping these payments in Table A-1 below.

The necessary price increases are below our sustainability criterion in all cases. The breakeven price increase at 150 billion pieces would be only 6.8 percent. This is an annual increase of only 0.6 percent above CPI.

Table A-1
Sensitivity of Base Case Result to
OIG Retiree Health Care and Pension Proposal

Initial Volume (billions)	Base Case Breakeven Increase Above CPI	Breakeven Increase Above CPI Health and Pension Proposal	Annual Increase Above CPI Health and Pension Proposal
150	24.3%	6.8%	0.6%
125	39.9	17.3%	1.5%
100	65.5	34.3%	2.7%
75	113.4	66.2%	4.7%

b. Breakeven case

The OIG also requested that we combine the retiree health care and pension proposal with the OIG's proposal for retail savings described in the body of the paper and TFP growth in order to develop a breakeven option. The case assumes that the Postal Service will be able to increase TFP by a cumulative 2.1 percent over 10 years. This is a modest increase equivalent to the cumulative increase in TFP from 1990 to 1999. From 2000 to 2009, Postal Service TFP grew by 10.7 percent.

The results for this case appear in Table A-2 below. At 150 billion pieces, no increase above CPI is necessary. Even at 100 billion pieces, the necessary price increase is only 23.4 percent above inflation, which is equivalent to an annual increase above CPI of less than 2 percent per year.

Table A-2
Sensitivity of Base Case Result to Breakeven Case

Initial Volume (billions)	Base Case Breakeven Increase Above CPI	Breakeven Increase Above CPI Breakeven Proposal	Annual Increase Above CPI Breakeven Proposal
150	24.3%	0.0%	0.0%
125	39.9	8.9%	0.8%
100	65.5	23.4%	1.9%
75	113.4	50.4%	3.8%

Appendix B

Description of GMU Enhanced Rollforward Model

Contents

B-1. Background and Purpose

The GMU Enhanced Rollforward Model was developed for use in the OIG study of the Postal Service's future financial sustainability. It provides the means for calculating future costs, revenues, and volumes for the various "what-if" scenarios described in the main paper. The model relies heavily on the Cost Rollforward Model developed by the Postal Service in the late 1970's. However, it extends the capability of the Cost Rollforward Model by adding the ability to 1) calculate new prices for mail and special service categories that allow revenues to match estimated costs for a future year; 2) estimate the effect of those price increases on volumes for the future year; and 3) calculate new breakeven costs and revenues for that year based on the new prices and volumes. Finally, a new user interface was developed to provide a convenient means for running scenarios with different inputs and storing the summary results for a large number of scenarios in the same workbook.

This appendix presents the results for all scenarios (cases) used in this study and the sources for the input data. It also describes the GMU Enhanced Rollforward Model and how it was used to estimate financial results for the scenarios described in the main paper. Finally, it provides instructions for using the model to allow the OIG staff to investigate a wide variety of other scenarios by adding new cases or changing the inputs for the current cases.

The GMU Model programs are written in the Excel-based Visual Basic for Applications (VBA) programming language, which uses Excel workbooks and worksheets as model inputs and outputs. It is designed for use by analysts who are familiar with Excel and at least somewhat familiar with the standard public Postal Service reporting systems, such as the annual Cost Segments and Components, CRA and RPW (Revenue, Pieces and Weight) Reports. Some familiarity with a standard programming language such as Basic, Fortran, or C would be useful if changes in the VBA code are desired, but knowledge of computer programming languages is not required to use this model.

It should be noted that any forecast of the Postal Service's financial condition 11 years in the future is subject to many uncertainties, including future economic conditions, further

improvements in and increased usage of technological substitutes, and future legislative changes. The value of this study lies in the results comparing future USPS financial results assuming a variety of "what-if" future conditions.

This Appendix does not contain information that is considered confidential by the Postal Service. However, the various Excel input and output workbooks used as inputs to or outputs from the GMU Model, as well as the GMUModel.xls file itself, are considered confidential because they contain product-specific figures for the Postal Service's competitive products. These Excel workbooks have been provided to the OIG in computer-based format only.

B-2. Overview of GMU Enhanced Rollforward Model

a. Cost Rollforward Model

The Cost Rollforward Model was originally developed by the Postal Service for use in its testimony for PRC omnibus rate cases, starting in the R80-1 rate proceeding. This forecasting model produces detailed forecasts by "Cost Segment" (18 broad categories of postal costs, such as Postmasters and Rural Carriers) and more detailed "Cost Components" (about 170 cost sub-categories such as "Postmasters EAS 23 and Below" and "Rural Carrier Equipment Maintenance Allowance"). Several forecasting steps (called effects) are used to "roll forward" the cost components from one fiscal year to the next. These effects include: cost level changes, mail volume changes, nonvolume workload changes (such as delivery points or number of post offices), cost reduction programs, and several categories of system-wide cost changes (such as workers' compensation and retiree health care costs).

The first version of the Postal Service Cost Rollforward Model was written for a mainframe computer system in the Cobol programming language. This early version of the model was very difficult for the PRC staff and the parties to understand, modify, and use. For the R80-1 rate proceeding, one of the authors of this paper converted the USPS Cobol Cost Rollforward Model to the more common Fortran computer language, which made it possible for the PRC staff and others to replicate the Postal Service cost forecast and to make changes in the inputs for the

model based on results of the formal discovery process. In later years, the PRC version of the model was again rewritten by one of the authors, first in the C programming language and then in the Excel-based VBA language, both of which could be run on early IBM PCs. The PRC Excel version of the model introduced in 2003 and first used in the R2005-1 rate case made it possible to use simple spreadsheets for the inputs and outputs of the Cost Rollforward Model, which made the mechanics of the forecasting process much more accessible. In 2005, the Postal Service followed suit by converting its 30-year-old Cobol-based model to the Excel/VBA language for use in the R2005-1 rate proceeding.

In spite of the many versions of the Cost Rollforward Model that have been created and used over time, the basic algorithms for forecasting costs starting with a "base year" (with known data) to a near-term future "test year" have remained virtually unchanged. Also, all versions of the model produce identical results given the same input data. This is remarkable, since the model has been subjected to intensive review and critiques by the PRC staff and the parties over a long period of time. We believe this long history of successful use justifies using the Cost Rollforward Model as the foundation of the GMU Forecasting Model. In this paper, we use the PRC Excel/VBA version of the Cost Rollforward Model from the R2006-1 omnibus rate proceeding.[1]

b. Adjusting Volumes, Revenues, and Costs for Price Elasticity Effects

For this study, substantial volume declines are anticipated in the future. This means that real costs would drop, but real revenues would drop even more, resulting in the need for substantial price increases to achieve financial breakeven.[2] The Cost Rollforward Model described above calculates future costs resulting from a specified set of forecasted mail and special service category volumes. However, we also need to calculate a set of future rates by category that would allow the Postal Service to achieve financial "breakeven" in a given future year.

[1] A companion model has been used in rate cases called the "CRA Model." This model updates the distribution of longer run costs in the output cost matrix created by the Cost Rollforward Model. It was not necessary to use this model in this study because the longer-run costs are considered volume variable over the 11-year forecast period.

[2] Revenues and volume-variable costs decline proportionally with volume, but fixed costs stay the same, causing costs to exceed revenues.

Determining breakeven prices requires several steps. First, the future real (FY 2009 dollars) revenues that would result from the future volumes at current rates[3] are calculated. The percentage increase in prices[4] required to produce revenues that equal forecasted costs is also calculated at this point in the process. These steps result in what we call "initial" or "unadjusted" volumes, revenues, costs, and the estimated price increases required to break even. In reality, these initial price increases would not be sufficient to break even because of price elasticity effects – that is, volumes would decrease further due to higher prices, which would cause a further revenue shortfall.

To calculate the price elasticity effects, several new VBA modules and worksheets were added to the GMU Forecasting Model along with those required by the Cost Rollforward Model. The calculation procedure is an iterative process that starts with a set of own price elasticity values[5] for each mail/special service category (product) provided by the Postal Service to the PRC[6] each year; in our case, for FY 2009.

Using the initial set of required price increases for each product and the corresponding price elasticities, a starting volume estimate is calculated for each product.[7] Assuming unit volume variable (attributable[8]) costs stay the same, new total attributable costs and revenues are calculated, and the difference between them is the estimate of fixed costs for that stage of the

[3] The rates in effect during FY 2009 are used as current rates for this study.

[4] For this study, the same percentage price increase is assumed to apply to each mail and special service category. This approximation seems reasonable given that the future time period of interest is at least 10 years from the present time. For this study, the same percentage price increase is assumed to apply to each mail and special service category. This approximation seems reasonable given that the future time period of interest is at least 10 years from the present time. However, it is likely that price increases would vary by category over time.

[5] In past rate cases through R2006-1, a more complex volume forecasting process was used that involved product price cross-elasticities. However, in the ongoing R2010-4 rate proceeding, the Postal Service has simplified its volume forecasting process by not considering cross-elasticity effects between product prices. We feel this makes our use of a simpler own price elasticity approach reasonable.

[6] The own price elasticities for market dominant products are from the January 20, 2010 submission to the PRC by the Postal Service; the competitive product elasticities were furnished on a confidential basis to the OIG by the Postal Service.

[7] It should be noted that the model does not calculate a volume forecast in the usual sense, where many input variables other than price are used. Rather, it takes an existing volume forecast that is based on all the input variables, and adjusts it only for price changes.

[8] Most attributable costs are considered volume variable.

process. If this estimate of fixed costs exceeds the initial value of fixed costs by more than a predefined small amount (about 1 part in 200,000), a new (lower) percentage price increase for the next stage is calculated using a calculus technique for determining solutions of nonlinear equations called Newton's Method.[9] If the estimate of fixed costs is too low, a new (higher) percentage price increase is used. This process continues until the required value of fixed costs agrees with the estimated value within the given tolerance. Experience with this method has shown that the process converges within the required tolerance in about 5 to 15 iterations.

There is one more factor to consider. Unit attributable costs will not actually stay constant as volumes change, because not all attributable costs vary directly with volume. In addition, changing one mail category volume and leaving the others constant results in changes in attributable costs not only for the changed-volume category, but also for all other categories, although by smaller amounts. Thus, the Cost Rollforward Model must be run again with the new volumes and prices to calculate new unit costs. Given the new unit costs, the Newton's method technique is used to find new prices and volumes that converge to achieve the original value of fixed costs. Then the Cost Rollforward Model is run yet again to start another iteration of the process, then the Newton's method approach is used, and so on, until breakeven revenues and costs with the correct fixed costs are achieved within a specified error tolerance. Five iterations of this process produce breakeven revenues and costs to an accuracy of about 1 part in 200,000. This final set of product costs, revenues, and volumes are called "price-adjusted" or simply "adjusted" values.

c. GMU Model Workbook and Its Worksheets

The GMU Model consists of a single workbook (GMUModel.xls) with about 30 worksheets and 20 VBA program "modules" that read the inputs, calculate the outputs, and prepare detailed case summaries in spreadsheet format. Table B-1 below provides a brief overview of the various GMU Model worksheets and their purpose. Further details on each worksheet are provided in the next section.

[9] See the Wikipedia reference for this method at http://en.wikipedia.org/wiki/Newton's_method.

Table B-1. Descriptions of GMUModel.xls Worksheets

Worksheet Name	Worksheet Description	Notes	Sources
Cases	Summary model inputs & outputs	See Tables 2 and 3 for details	User, Model
Case0-Case20	Output data from GMU Sustainability Study	See Section 2 for details	Model
uspsdat09	Input data for Roll Forward Model	Start directory, names of mail products & cost segments	User, Provided
compinfo	Input data for Roll Forward Model	Model cost component numbers	User
volume	Input file for GMU Model	Product volumes, prices & elasticities	User
sidecalcs	Side calculations for GMU Model	Miscellaneous calculations	User
masterby09	Descriptions of USPS FY 09 cost components	Contains subtotal columns not used in GMU Model	Provided

It should be noted that the 21 tabs in the GMUModel.xls workbook that are currently reserved for case summaries can be changed as desired. The user can eliminate as many of these tabs as desired if a given application does not require so many cases. In the current version, the Case 20 tab is left blank as a placeholder for another case. Also, more Case tabs can be added to the workbook if desired. The best way to accomplish this is to select an existing Case worksheet tab, and use the copy worksheet command to create another Case sheet. The name of the new tab must be changed to fit the Case# format, with no repeated case numbers.

d. Description of Columns in User Interface Worksheet "Cases"

A more convenient method for specifying scenarios for the GMU Model and storing the results in an organized manner was also developed for this study. This required the creation of several new VBA modules and a new "Cases" user interface worksheet, which were added to the GMU Model workbook. An overview of the contents and sources (user-provided or calculated by the model) for the various columns in the "Cases" worksheet is provided in Table B-2 below.

e. Creating or Changing Model Case Inputs

Table B-2 shows that cases with new volumes, prices, and elasticities for each product can be created on the "Cases" sheet simply by specifying particular columns in the "volumes" worksheet. Other types of changes are accomplished through the use of a "factor file," such as the In14Y.xls factor file used to define the base case factors used in this paper. The contents of the In14Y.xls file are shown in Table B-4 in the next section. For purposes of this study, the

most important items in the factor files are the numerical values (shown in bold in Table B-4) in the various rows.

Table B-2. Column Descriptions for "Cases" Sheet

Column	Column Title	Column Description	Source
A	(Subcase) Title	Case Number & Subcase Letter (e.g., 10b)	User
B	(Subcase) Description	Brief Description of Subcase	User
C	Factor File	Name of Input Factor File for Subcase	User
D	Output File	Name of Output File for Subcase	User
E	Initial Volume	Unadjusted Total Volume	Model
F	Initial Cost	Calculation of Unadjusted Total Cost	Model
G	Initial Revenue	Calculation of Unadjusted Total Revenue	Model
H	Initial Profit	Calculation of Unadjusted Total Profit	Model
I	Initial Breakeven %	Calculation of Unadjusted Breakeven Price %	Model
J	Blank	Empty Column	NA
K	Start File	Name of FY 2009 Base Year File	User
L	Volume Column	"volume" Sheet Column Number (e.g., 2102)	User
M	Revenue/Piece Column	"volume" Sheet Column Number (e.g., 2108)	User
N	Save	"y" or "n" for Save Case to Summary File	User
O	Elasticity Column	"volume" Sheet Column Number (e.g., 2127)	User
P	Adjusted Volume	Calculation of Adjusted Total Volume	Model
Q	Adjusted Cost	Calculation of Adjusted Total Cost	Model
R	Adjusted Revenue	Calculation of Adjusted Total Revenue	Model
S	Adjusted Profit	Calculation of Adjusted Total Profit	Model
T	Adjusted Breakeven %	Calculation of Adjusted Breakeven Price %	Model
U	Adjusted Workyears	Calculation of Adjusted Workyears	Model
V	Adjusted Annual Breakeven %	Calculation of Adjusted Annualized Breakeven Price %	Model
W	Date & Time	Date & Time of Most Recent Model Run	Model

Besides the volume, price, and elasticity column inputs, other calculations by the PRC version of the Cost Rollforward Model (and the GMU Enhanced Rollforward Model) are specified by factor files for each forecasting effect in each forecasting period, each of which contain a series of "control string" commands.[10] Each control string command calls a specific subroutine to make a particular calculation on a specified set of input and output cost components. For

[10] In past PRC rate cases, factor files with over 300 rows were used to reflect a detailed near-term USPS forecast of changes in each cost component and forecasting effect. This study uses a much longer forecasting time period and focuses on major changes, so this level of detail was not appropriate. The major changes are reflected in the mail volume effect in the factor files for each scenario. Changes for the nonvolume workload effect are also estimated. All other "what-if" changes are reflected in the other programs effect. As a result, factor files for this study contain about 50 rows.

example, consider the following control string command that is part of the nonvolume workload effect section of the forecast (see row 24 of Table B-4, In14Y.xls Factor File):

cl 1 1:1 -0.009

The two-letter command code "cl" means that a cost level change is to be performed on one or more cost components, in this case the component 1:1.[11] The amount of the change for the component is given by multiplying the current values for all mail products in the cost component by the numerical constant –0.009. [12]

For purposes of using the GMU Model, knowledge of the specifics of these control strings and factor files is not necessary.[13] For one reason, the factor files for other cases in this study are very similar to In14Y.xls, but have at least one different numerical factor in the existing control string lines, or a few different control string lines and factors. For another reason, 12 other factor files are included with the study documentation for use in creating other cases, and each factor file can serve as a template for making similar changes for new cases.

f. Output Cost/Revenue Matrix Files

The output files produced by the GMU Model are similar in structure to the annual USPS Cost Segments and Components Report and nearly identical to the PRC cost model matrix files. They are "matrices" in the sense that the columns are cost components and the rows are product categories. There are separate worksheets for each cost segment that include each cost component in that segment and one summary worksheet for the total of all cost segments. The summary sheet also contains columns showing unadjusted and adjusted rates, revenues, and contribution, as well as adjusted total workyears. The rows of each worksheet are the 38 FY 2009 USPS product categories, plus rows for total attributable costs, total "Other" (fixed) costs, and total costs. The last row for each cost component (in the GMU Model only) is the percentage of total costs that are attributable. The cost components used in the GMU Model are

[11] The designation of a particular cost component is given by a cost segment number from 1-20, followed by a colon, followed by a number from 1-2000, which is the Postal Service Cost component number. Thus, the component "18:199" is USPS Cost Component 199, and is included in Cost Segment 18 costs.

[12] If a whole number rather than a decimal less than one is entered in the control string, the model interprets it as the entire amount of the change.

[13] For those who are interested, more detailed information on the VBA language, factor files, and control strings can be found in "Documentation of Excel Rollforward Cost Model" by Charles C. McBride, February, 2004. This reference document was prepared for the Postal Rate Commission.

the most detailed available from the USPS Cost Rollforward Model (as of R2006-1) and do not include subtotals. A listing of all cost component titles and USPS identifiers is provided in the "masterby09" worksheet contained in the GMUModel.xls workbook.

g. The FY 2009 Base Year File

The FY 2009 base year file used in this study as the starting point for all forecasting cases is called Out1P.xls, and is in the GMU/PRC matrix format discussed above. This matrix was created by converting a 1600-row by 200-column USPS-format cost matrix filed earlier this year in the R2010-4 rate case before the PRC.[14] This conversion was accomplished by using a GMU Model utility module (included in the GMUModel.xls workbook) called "ConvertUSPSMatrix."

h. Running the Model

The first step in preparing a new series of model runs is to create a new directory (or sub-directory). Then copy the files GMUModel.xls, template.xls, Out1P.xls, and the various input factor files provided with this documentation to this same directory. **Next, open the GMUModel.xls workbook, select the "uspsdat09" worksheet, and replace the directory name in cell D1 with the new directory name.**

Now select the "Cases" worksheet and create one or more new case rows by filling in the user input columns shown in Table B-2 above.[15] A convenient way to start this process is to copy an existing case row (or set of rows) to another row (or rows) on the Cases worksheet, then change any input columns that are different. (An example explaining in more detail how a new case is created is shown in section B-3 below.) Note that each case row includes the name of an output file.[16] Then enter the desired starting and ending case rows for the run in cells B3 and B4, respectively. Next, select Run Macros from the Excel command menu, then select and run the macro "ProcessUCommands." After a good deal of on-screen activity, the macro should finish with the "Cases" sheet on screen and the various results columns filled in. Besides the

[14] This base year cost matrix was the "B" version of USPS cost model worksheets, and so it includes the longer-run and short-run attributable costs.

[15] Note that most of the cases for this study require that five rows be entered at a time, each with a different volume level from a different "volume" sheet column. It is not necessary to set up cases in this manner; for example, single row-cases can be set up.

[16] To cut down the number of saved output files, the same output file name can be used for different subcases if desired.

information shown in the case row, more detailed information on the case run can be found in the appropriate "Case#" worksheet, where "#" is between 0 and 19. The time required to run each case row varies from 2-5 minutes, depending on the user's PC processor speed.

B-3. Documentation of Sustainability Study Case Results

In this section, the study case results are presented along with documentation of the inputs for each case. Input data include volume, price, or elasticity columns from the "volume" worksheet and numerical values included in the rows of the various factor files. Sources for both types of input data are presented below.

a. Description of Base Case

As described in the main paper, the base case is used as the standard of comparison with other "what-if" scenarios. It uses the base year (FY 2009) as the starting point and FY 2020 as the end point. The basic volume forecast used is the BCG forecast announced by the Postal Service in March 2010. It uses the prices in effect in the base year; we assume that there would be annual CPI-based price increases between FY 2009 and FY 2020, so the real 2009 prices would be the same as in 2009. The FY 2009 product own price elasticities developed by the Postal Service and filed with the PRC earlier this year are used to calculate the effect of raising FY 2009 prices to achieve financial breakeven in FY 2020. Five different volume levels (subcases) are used for the base case as well as the other "what-if" cases: 177.5, 150, 125, 100, and 75 billion pieces. The 177.5 billion-piece scenario assumes the FY 2020 volumes would be the same in FY 2009. This scenario is considered too optimistic and is not discussed in the main paper; it is used primarily for model "debugging" purposes.

For reference purposes, the column names and sources of data for the "volume" worksheet are shown in Table B-3 below. Note that several of the columns in the "volume" worksheet were left blank for future use. The base-case input volume columns are found in the columns labeled 2116-2120. The price column is 2108 and the elasticity column is 2127. All three columns are used as part of the specification of the base case inputs on rows the "Cases" worksheet of GMUModel.xls.

The base case also assumes that there would be increases in the following nonvolume workload measures from 2009-2020: city delivery points (0.43%), rural delivery points (7.22%), contract stations (-2.96%), and post offices (-0.90%). A separate factor (3.61%) is also included for the Rural Carrier Equipment Maintenance Allowance component. These projections are based on extending the FY 2006-09 growth trends to 2020, and are documented at cells A46:M50 of the "volume" worksheet. Retiree health costs in 2020 assuming continuation of the current law ($4.62 billion in FY 2009 dollars[17]) are also included in the base case, and are documented at cells A60:O65 of the "volume" worksheet.

These input values are included in the base case by using a "factor file" as discussed above. For illustration, the complete factor file (In14Y.xls) for the base case is shown in Table B-4 below. This table "wraps" the longer rows in the spreadsheet for easier viewing. The actual row numbers in the In14Y.xls worksheet are shown in the first column of Table B-4. The numerical factors discussed above are highlighted in bold in the table.

The third column in the factor file contains the two-letter control strings discussed in section B-1. For example, the "ef" control string shown on row 1 of the factor file specifies the beginning of a new forecasting "effect" and the second column on that row contains the name of the effect. The "mv" and "mz" control strings adjust the cost components listed on the row for the volume change effect. The "rc" control string specifies how the indirect cost components are to be changed based on changes in the direct cost components. In the Cost Rollforward Model, indirect costs are normally calculated for the mail volume and nonvolume workload effects. The "cl" string is used to specify a multiplier for all products (and fixed costs) in a cost component column. The "nv" string is used to specify a multiplier for fixed costs of a cost component only.

[17] This is the deflated value of $7.3 billion in 2020 dollars.

Table B-3. Column Descriptions for "volume" Worksheet

Excel Column	Model Column #	Column Title	Source
A	-	PRC Product Number	PRC
B	-	Product Name	USPS
C	-	USPS Product Number	USPS
D	2101	FY 08 Volumes	FY 08 RPW - 203B pcs
E	2102	FY 09 Volumes	FY 09 RPW - 177.5B pcs
F	2103	FY20 Prop150	FY 09 Volumes scaled to 150B pcs
G	2104	Blank	NA
H	2105	FY20 Prop125	FY 09 Volumes scaled to 125B pieces
I	2106	FY20 Prop100	FY 09 Volumes scaled to 100B pieces
J	2107	FY20 Prop75	FY 09 Volumes scaled to 150B pieces
K	2108	FY09 Rev/Pc ($/Pc)	FY 09 RPW
L	2109	FY09 Rev	FY 09 RPW
M	2110	FY08 Rev	FY 08 RPW
N	2111	FY08 Rev/Pc	FY 08 RPW
O-R	2112-15	Blank	NA
S	2116	FY20 BCG150	FY 20 150B Piece Volume from BCG Briefing
T	2117	FY20 BCG177	FY 20 BCG Volumes scaled to 177.5B pcs
U	2118	FY20 BCG125	FY 20 BCG Volumes scaled to 125B pcs
V	2119	FY20 BCG100	FY 20 BCG Volumes scaled to 100B pcs
W	2120	FY20 BCG75	FY 20 BCG Volumes scaled to 75B pcs
X	2121	FY09 Rev/Pc (cents/pc)	FY 09 RPW
Y-AC	2122-26	Blank	NA
AD	2127	FY09 Elasticities	USPS Demand Analysis Report filed 1/20/10 at PRC
AE-AJ	2128-32	Blank	NA
AJ	2133	mod BCG 177	FY 20 Detailed Volumes scaled to 177.5B pcs
AK	2134	mod BCG 150	FY 20 Detailed version of FY20 150B BCG mix
AL	2135	mod BCG 125	FY 20 Detailed BCG Volumes scaled to 125B pcs
AM	2136	mod BCG 100	FY 20 Detailed BCG Volumes scaled to 100B pcs
AN	2137	mod BCG 75	FY 20 Detailed BCG Volumes scaled to 75B pcs
AO	2138	Elas 1.25	FY 09 Elasticities scaled by 1.25
AP	2139	Elas 1.50	FY 09 Elasticities scaled by 1.50
AQ	2140	Elas 1.75	FY 09 Elasticities scaled by 1.75
AR	2141	Elas 2.00	FY 09 Elasticities scaled by 2.00
AS-AU	2142-44	Blank	NA
AV	2145	Elas 0.50	FY 09 Elasticities scaled by 0.50
AW	2146	Blank	NA
AX	2147	Model RP	Temp FY 20 Price-Adjusted Rev/Pc
AY	2148	Model Vol	Temp FY 20 Price-Adjusted Volume
AZ	2149	Mod BCG150	FY 20 !50B BCG mix, 50% cut in FC
BA	2150	Mod BCG177	FY 20 BCG mix, 50% cut in FC, scaled to 177.5B
BB	2151	Mod BCG125	FY 20 BCG mix, 50% cut in FC, scaled to 125B
BC	2152	Mod BCG100	FY 20 BCG mix, 50% cut in FC, scaled to 100B
BD	2153	Mod BCG75	FY 20 BCG mix, 50% cut in FC, scaled to 75B

Table B-4. Listing of Base Year Factor File In14Y.xls

Row#												
1	**mail volume change**	ef	MV	n								
2		mv	28	1:1	2:677	3:35	3:40	3:66	3:421	3:41	4:42	6:43
			7:46	8:57	10:69	10:70	11:75	12:543	12:549	14:142	14:681	14:143
			14:144	14:145	14:146	16:180	16:181	16:248	16:184	20:239	20:240	
3	PESSA components	mv	21	2:427	2:428	3:429	11:74	11:79	11:81	14:681	15:165	15:166
			15:167	16:176	18:194	18:440	18:439	18:436	18:286	20:230	20:232	20:236
			20:237	20:587	18:71							
4		mz	1	18:208								
5		rc	2	2:4	2:31	1	3:35					
6		rc	1	2:7	1	3:40						
7		rc	7	2:14	7:50	12:83	12:92	12:101	13:128	13:137	1	7:46
8		rc	7	2:18	7:53	12:86	12:95	12:104	13:131	13:140	1	7:54
9		rc	4	2:675	12:545	12:550	12:568	1	8:57			
10		rc	1	6:44	1	6:43						
11		rc	2	2:676	3:423	2	3:35	3:227				
12		rc	3	2:674	12:548	12:556	2	10:69	10:70			
13		rc	1	6:604	3	6:43	7:46	7:54				
14		rc	4	2:13	12:100	13:127	13:136	3	6:43	6:44	6:604	
15		rc	1	2:17	2	7:50	7:53					
16		rc	1	2:32	7	3:40	6:43	6:44	7:46	7:50	7:53	7:54
17		rc	1	3:470	7	3:35	3:227	3:40	3:41	3:421	3:423	3:66
18		rc	1	2:678	15	3:35	3:40	3:66	3:421	3:423	3:470	3:41
			3:227	6:43	6:44	6:604	7:54	7:46	7:50	7:53		
19		rc	1	2:601	14	2:4	2:677	2:7	2:13	2:14	2:17	2:18
			2:674	2:675	2:31	2:32	2:676	2:678	2:33			
20		rc	2	2:30	3:422	40	2:4	2:7	2:677	2:13	2:14	2:17
			2:18	2:674	2:675	2:31	2:32	2:676	2:678	2:33	3:35	3:40
			3:66	3:421	3:423	3:470	3:41	3:227	4:42	6:43	6:604	7:46
			7:50	7:53	7:54	8:57	10:69	10:70	6:44	11:75	12:83	12:86
			12:543	12:545	12:548	12:89						
21		rc	4	2:9	2:29	3:228	16:177	48	1:1	1:2	2:4	2:677
			2:7	2:13	2:14	2:17	2:18	2:674	2:675	2:30	2:31	2:601
			2:676	2:678	2:33	3:35	3:40	3:66	3:421	3:422	3:423	3:470
			3:41	3:227	4:42	6:43	6:44	6:604	7:46	7:50	7:53	7:54
			8:57	10:69	10:70	11:74	11:75	11:79	12:83	12:86	12:543	12:545
			12:548	12:89	18:194	2:32						
22		rc	4	18:199	18:200	18:204	18:64	59	1:1	1:2	2:4	2:677
			2:7	2:13	2:14	2:17	2:18	2:674	2:675	2:30	2:31	2:601
			2:676	2:678	2:33	3:35	3:40	3:66	3:421	3:422	3:423	3:470
			3:41	3:227	4:42	6:43	6:44	6:604	7:46	7:50	7:53	7:54
			8:57	10:69	10:70	11:74	11:75	11:79	12:83	12:86	12:543	12:545
			12:548	12:89	18:194	2:32	2:9	2:29	3:228	13:110	13:114	16:173
			18:191	18:192	18:193	18:195	19:219					
23	**nonvolume workload**	ef	NV	n								
24		cl	1	1:1	**-0.0090**							
25		nv	2	7:54	7:46	**0.0043**						
26		nv	2	10:69	10:70	**0.0722**						
27		nv	1	10:73	**0.0361**							
28		nv	3	11:74	11:81	11:79	0					
29		nv	1	13:111	**-0.0296**							

Table B-4 (continued). Listing of Base Year Factor File In14Y.xls

Row#												
30		nv	1	13:112	0							
31		nv	1	15:165	0							
32		cl	1	15:234	0							
33		nv	4	15:166	15:167	16:176	18:194	0				
34		rc	2	2:4	2:31	1	3:35					
35		rc	1	2:7	1	3:40						
36		rc	7	2:14	7:50	12:83	12:92	12:101	13:128	13:137	1	7:46
37		rc	7	2:18	7:53	12:86	12:95	12:104	13:131	13:140	1	7:54
38		rc	4	2:675	12:545	12:550	12:568	1	8:57			
39		rc	1	6:44	1	6:43						
40		rc	2	2:676	3:423	2	3:35	3:227				
41		rc	3	2:674	12:548	12:556	2	10:69	10:70			
42		rc	1	6:604	3	6:43	7:46	7:54				
43		rc	4	2:13	12:100	13:127	13:136	3	6:43	6:44	6:604	
44		rc	1	2:17	2	7:50	7:53					
45		rc	1	2:32	7	3:40	6:43	6:44	7:46	7:50	7:53	7:54
46		rc	1	3:470	7	3:35	3:227	3:40	3:41	3:421	3:423	3:66
47		rc	1	2:678	15	3:35	3:40	3:66	3:421	3:423	3:470	3:41
			3:227	6:43	6:44	6:604	7:54	7:46	7:50	7:53		
48		rc	1	2:601	14	2:4	2:677	2:7	2:13	2:14	2:17	2:18
			2:674	2:675	2:31	2:32	2:676	2:678	2:33			
49		rc	2	2:30	3:422	40	2:4	2:7	2:677	2:13	2:14	2:17
			2:18	2:674	2:675	2:31	2:32	2:676	2:678	2:33	3:35	3:40
			3:66	3:421	3:423	3:470	3:41	3:227	4:42	6:43	6:604	7:46
			7:50	7:53	7:54	8:57	10:69	10:70	6:44	11:75	12:83	12:86
			12:543	12:545	12:548	12:89						
50		rc	4	2:9	2:29	3:228	16:177	48	1:1	1:2	2:4	2:677
			2:7	2:13	2:14	2:17	2:18	2:674	2:675	2:30	2:31	2:601
			2:676	2:678	2:33	3:35	3:40	3:66	3:421	3:422	3:423	3:470
			3:41	3:227	4:42	6:43	6:44	6:604	7:46	7:50	7:53	7:54
			8:57	10:69	10:70	11:74	11:75	11:79	12:83	12:86	12:543	12:545
			12:548	12:89	18:194	2:32						
51		rc	4	18:199	18:200	18:204	18:64	59	1:1	1:2	2:4	2:677
			2:7	2:13	2:14	2:17	2:18	2:674	2:675	2:30	2:31	2:601
			2:676	2:678	2:33	3:35	3:40	3:66	3:421	3:422	3:423	3:470
			3:41	3:227	4:42	6:43	6:44	6:604	7:46	7:50	7:53	7:54
			8:57	10:69	10:70	11:74	11:75	11:79	12:83	12:86	12:543	12:545
			12:548	12:89	18:194	2:32	2:9	2:29	3:228	13:110	13:114	16:173
			18:191	18:192	18:193	18:195	19:219					
52	**other programs**	ef	OP	n								
53		cl	1	18:208	**1883675**							
54	** end **	**										

The changes in the base-case nonvolume workload factors are shown in row 24-27 and 29. The cost component identifiers are listed in the format segment#:component#; for example, the cost component "1:1" is cost component number 1 in cost segment 1. The name of each cost component can be found in the "masterby09" worksheet of GMUModel.xls; for example, component number 1 is "Postmasters EAS 23 & below." Row 24 specifies the nonvolume multiplier due to the change in the number of post offices for Postmasters EAS 23 & below. Row 25 specifies the multiplier for city delivery carriers (components 7:54 and 7:56) due to changes in city delivery points, while row 26 is used for the change in rural carrier delivery points (components 10:69 and 10:70). Similarly, row 27 is used for the nonvolume workload change for "Rural Carrier Equipment Maintenance Allowance" (component 10:73) and row 29 accomplishes the same function for "Contract Stations" (component 13:111).

The change in the base-case retiree health benefits cost component (18:208) is shown on row 53 of the In14Y.xls worksheet. Note that this change is $1.88 billion FY 2009 dollars while the total value for this component was listed above at $4.62 billion. This happens because the $1.88 billion is the change amount from the FY 2009 value. When added to the FY 2009 amount for this component, the total should be $4.62 billion.

Note that there are rows in the In14Y.xls factor file that have "0" as the factor, which has no effect on the rollforward forecast. These rows are included simply as placeholders in the event that other cost components are added for a particular cost forecasting effect.

An additional factor file, In14V.xls, is used in the iterative recalculation of volumes, costs, and revenues for all cases in this paper. This file contains the control string commands necessary to update the cost calculations for the new volumes calculated at each stage of the iteration process. It also contains several more control string commands that calculate USPS employee workyears based on the revised costs.

b. Description of Other Cases

Case 0: FY 2009. This case calculates the unadjusted and adjusted breakeven price increases for FY 2009, which had a deficit of $3.80 billion. The FY 2009 volume, price, and elasticity columns in the "volume" worksheet are 2102, 2108, and 2127 respectively. The In00.xls factor

file rows 2-18 use the "xf" control string to convert the adjusted USPS labor costs in each labor cost segment to workyears, then uses the "xt" control string in row 19 to calculate the adjusted total workyears for FY 2009. The "xf" control string multiplies a given number of input cost components by a given factor, then sums them and stores the results in the output component. The "xt" control string adds the total rows for a specified set of input cost components and stores the result in the output cost component.

Cases 2-3: 2020 TFP Changes. These two cases calculate the unadjusted and adjusted breakeven costs and prices assuming, respectively, a cumulative 3 percent decrease and a 3 percent increase in total factor productivity (TFP) over the 11- year forecast period. Both cases use the same volume, price, and elasticity columns as the base case (2116-20, 2108, and 2127). Case 2 uses the factor file In15N1.xls and case 3 uses the factor file In15N2.xls. Both factor files are the same as the base-case factor file In14y.xls except for the addition of an additional row (Row 53). For Case 2, Row 53 specifies that TFP is decreased by 3 percent, and so all cost components (in all segments) are increased by a factor of 3 percent. Conversely, Case 3 assumes an increase in TFP of 3 percent, so all cost components are decreased by 3 percent. Both changes are accomplished by using the "ca" control string, which multiplies all cost components in segments 1-20 by the same constant.

Case 4: Later Year for BCG Volume Declines. This case is included to examine an alternative scenario in which the base-case product volume declines are delayed from 2020 to 2030. The nonvolume workload and retiree health care costs are extrapolated to 2030, but the 2030 product volumes would be the same as predicted for 2020.[18] This case, like many others, uses the base-case volume, price, and elasticity data. The 2030 nonvolume workload changes are shown at lines 24-29 of the input factor file In10.xls, and the 2030 retiree health care cost changes as of 2030 are shown at line 49 of the same file.

Cases 5-7: Alternative Volume Mixes. These three cases are designed to show the effect of changing the product-level volume mix with the same subcase total volumes. All three cases use the same base-case factor file In14Y.xls and the same elasticity column, 2127. They differ only in the volume columns. Case 5 uses the base-case BCG mix except that all First-Class

[18] The retiree health care calculations are documented at cells c95:y100 of the "volume" worksheet. The source for the retiree health care information is GAO Report GAO-10-455, April 2010. The calculations for the 2030 nonvolume workload-related costs are shown at cells a46:m50 of the "volume" worksheet. These extrapolations use the nonvolume-workload data reported in the FY 2009 Annual Report of the Postal Service.

product volumes are reduced by 50 percent, and the other products are scaled up to reach the correct total volume. The Case 5 "volume" worksheet columns are 2150, 2149, 2151, 2152, and 2153 for the five total volume subcases (177.5, 150, 125, 100, and 75 billion pieces). Case 6 uses a more detailed product-level version of the BCG mix, and uses the "volume" worksheet columns 2133-2136. Finally, Case 6 assumes that the product mix in 2020 is the same as in 2009. It uses the "volume" columns 2102-3 and 2105-07.

Cases 8-9: Alternative Mail Processing Variability Levels**.** The subject of the proper variability for mail processing has been an ongoing controversy between the PRC and the Postal Service up through the R2006-1 rate case. The base case in this study uses a value of about 94 percent, which is close to the value that the PRC has favored. To see how changes in this factor affect the overall results, Case 8 assumes a 100 percent variability level, and Case 9 assumes an 83 percent value, which is close to the historical Postal Service position. Both cases use the base-case set of subcase volumes, prices and elasticities. The different variability levels are found at line 2 of the two input factor files for these cases, In16N1.xls and In16N2.xls. In each case, the product costs and fixed costs of the mail processing cost component (3:35) are scaled to achieve a particular value by using the "vf" control string.

Cases 10 and 11: Alternative Own Price Elasticities. These cases are used to explore the effect of lower and higher own price elasticity values on the results. One would expect a higher elasticity value to result in a lower volume with the same price increase, and vice versa. Thus higher price elasticities would be expected to result in higher breakeven prices. Both cases use the base-case initial volumes and prices, and the base-case factor file In14Y.xls. Case 10 uses the base-case product elasticities multiplied by 50 percent ("volume" column 2145), and Case 11 uses a multiplier of 150 percent ("volume" column 2139).

Case 12: OIG Retail Cost Reduction. This case was based on an earlier OIG-sponsored study[19] of the savings that could be achieved by optimizing the locations of retail facilities (including small post offices). The study roughly suggests a one-third reduction in retail units. It is estimated that the "piggybacked" total cost of small offices and window service in larger offices is about $6.5 billion, and a rough estimate of savings from applying the study to reduce these costs results in a savings of about $2.1 billion. Case 12 uses the base-case volume

[19] U.S. Postal Service Office of Inspector General, "Analyzing the Postal Service's Retail Network Using an Objective Modeling Approach," Report No. RARC-WP-10-004, June 14, 2010.

columns, prices, and elasticities. It uses the factor file In12a.xls, which is the same as the base-case file In14Y.xls, except for the "cl" control string at line 54. The reduction factor is the estimated piggybacked retail cost savings from the small-office postmasters and window service cost components.

Case 13: OIG FERS and Retiree Health Care #2. This case uses the combination of two large retiree cost reductions that would require legislative changes to make the reductions possible. For this case, it is assumed that the Postal Service would be allowed to recover its overpayments to the CSRS fund as well as to reduce the amount the Postal Service must pay toward its FERS employees' pension each year. The OIG has calculated that these additional funds would allow the Postal Service to eliminate its 2020 FERS payment to OPM and also to eliminate its 2020 retiree health care payment. The OIG estimates the FERS cost would be roughly $4.3 billion in 2020. In 2009 dollars, this is about $3.0 billion, and is shown in the "cl" control string at line 53 of the In22.xls factor file. The 2020 retire health reduction would be $7.3 billion in 2020 dollars. Compared to the base case, the reduction is $5.2 billion in 2009 dollars. Compared with the actual 2009 payment, the reduction is $3.4 billion. It is shown at line 54 of the In22.xls factor file. This retiree health care option is called OIG #2, because Case 17 is used to investigate another retiree health care scenario (#1) using a different assumption.

Cases 14-15: USPS Employee Salary Changes. These two cases were included to investigate the effects of a positive (Case 14) and negative (Case 15) 3 percent change in postal salary levels over the FY 2009-2020 period. Both cases use the base-case volume, price, and elasticity data. The salary change factors are found at lines 2-5 of the two input factor files for these cases, In17a.xls and In17b.xls. Each of these four lines uses a "cl" control string for a subset of the USPS employee cost components, with a change factor of 0.03 for Case 14 and a change factor of –0.03 for Case 15.

Case 16: 10 percent Reduction in Fixed Costs. In this case, it is assumed that all fixed costs can be cut by 10 percent by 2020. This case uses the base-case volume, price, and elasticity data. The fixed cost change factor is located at line 57 of the input factor file In18.xls. The "na" control string is used to reduce the fixed costs in all cost components in all cost segments.

Case 17: OIG Retiree Health Care Costs #1. In the base-case scenario, we assumed that the retiree health care costs would include both the normal health care cost and an amortization amount. In this alternative case (designated #1 because Cases 13 and 19 use a different method to estimate retiree health cost reduction), we assumed that the Postal Service had no remaining health care liability in 2020 and would not have to make an amortization payment. In 2009 dollars, this would mean that the 2020 retiree health care costs would be reduced by almost $2 billion, which is about $290 million less than the FY 2009 amount.[20] This case uses the base-case volume, price, and elasticity data. The retiree health care cost change amount is located at line 53 of the input factor file In19.xls. The "cl" control string is used to reduce the retiree health care costs (component 18:208) by the required amount.

Case 18: Reduction of Delivery Frequency to Five Days. Earlier this year, the Postal Service filed a case with the PRC in which it estimates that about $3.1 billion (annually) could be saved if the delivery frequency for most delivery points was cut from six days per week to five. Most of this reduction will occur in the fixed costs of delivery. This alternative case is used to estimate the effect of that change on 2020 breakeven price increases. This case uses the base-case volume, price, and elasticity data. The delivery cost change command is located at line 55 of the input factor file In11.xls. The "cl" control string is used to reduce the total fixed delivery costs for the city and rural carrier components by the required amount.

Case 19: Breakeven OIG Case. This case combines two previous OIG cases, which include savings from retail costs, FERS cost payments, and retiree health care (#2) costs, and adds a 2.1 percent annual improvement in TFP. This case uses the base-case volume, price, and elasticity data and the factor file In21.xls. Cost reductions from the four sources are shown at lines 52-55 of factor file In21.xls.

c. Example of Creating a New Case

In this section, we will describe in more detail how a new case or set of cases is most easily created. We will build a sample case that involves cutting the Domestic Air and Domestic Alaska Air cost components by $500 million. Let's assume that this will be called Case 20.

[20] These calculations are documented at cells c95:y100 of the "volume" worksheet. The source for this information is GAO Report GAO-10-455, April 2010. In 2020 dollars, we assume the normal cost payment is $4.3 billion and the amortization payment is $3.0 billion.

First, copy all five rows of the base case to a different set of rows on the worksheet or to replace an existing set of rows. For the new case rows, change the case designators and the output file names to reflect the new case number (20). If the new rows are replacing existing ones, this step is not necessary. Now select the desired "volume" worksheet column numbers for the new initial product volumes, prices, and elasticities and enter these numbers in the appropriate columns of the new case rows. For this case, we will assume that the same base-case product volumes, prices, and elasticities are used, so this step will not be necessary.

Now a decision must be made about whether a new factor file is needed for the new case or an existing one can be used instead. A new factor file will not be necessary if the new case simply uses different initial product volumes, prices, or elasticities, and does not specify other changes from the base case or another existing case. However, for this sample case, we want to make numerical changes to two specific cost components, so these must be entered via a new factor file.

The easiest way to create a new factor file is to copy an existing factor file (perhaps the base-case In14Y.xls factor file) to another workbook with a different name than any of the other factor files. Let's say the new workbook is called In09.xls, which at this point is identical to the In14Y.xls file. Usually, these numerical changes involve use of the "cl" control string, and many examples of its use have been discussed in the previous section. Now the user must determine which specific cost components need to be changed. The USPS list of cost component names and numbers can be found on the "masterby09" sheet in the GMUModel.xls workbook, and from that sheet, we see that the desired USPS column numbers are 142 and 681 in cost segment 14. Since many of the "masterby09" components are subtotals rather than the low-level cost segments we need, we must now check column A and B of the "compinfo" worksheet to see if these two numbers are on the GMU Model cost component list. They are, so we can construct the following "cl" control string command to implement this change:

```
cl      2       14:142          14:681          -500000
```

This control string should be placed on a new row inserted immediately after row 53, and then the new In09.xls factor file should be saved and closed.

At this point, we only need to insert the name of the new factor file on each of the new Case 20 rows, and then run the model as described in Section B-2d above. New Start and End rows for the new case rows should first be entered at cells B3 and B4 of the "Cases" worksheet.

d. Summary of Case Results for Sustainability Study

Tables B-5a to B-5f below show the contents of the "Cases" summary worksheet for this sustainability study. These tables include user inputs and GMU Model outputs for the 20 cases used in the study. The format for this worksheet is presented in Table B-2 above. The input data and sources for each case are described above in subsections a and b.

Table B-5a. GMU Sustainability Study Case Results

A	B	C	D	E	F	G	H	I	K	L	M	N	O
Start Row	**40**												
End Row	**41**												
		Factor	**Output**	Initial	Initial	Initial	Initial	Init BrkEv	**Start**	**Volume**	**Rev/Pc**		**Elas**
Case #	**Description**	**File**	**File (adj)**	Volume	Cost	Revenue	Profit	Rev/Pc %	**File**	**Col**	**Col**	**Save**	**Col**
0a	FY09 CRA	In00.xls	Out0a.xls	177,518,739	71,910,570	68,112,742	-3,797,828	5.6%	Out1P.xls	2102	2108	y	2127
1a	Base case, 177.5B BCG mix	In14Y.xls	Out1a.xls	177,518,739	77,775,716	69,934,526	-7,841,190	11.2%	Out1P.xls	2117	2108	y	2127
1b	Base case: 150B BCG mix	In14Y.xls	Out1b.xls	150,000,000	70,962,465	59,200,339	-11,762,126	19.9%	Out1P.xls	2116	2108		2127
1c	Base case: 125B BCG mix	In14Y.xls	Out1c.xls	125,000,000	64,716,724	49,333,616	-15,383,108	31.2%	Out1P.xls	2118	2108		2127
1d	Base case: 100B BCG mix	In14Y.xls	Out1d.xls	100,000,000	58,470,983	39,466,893	-19,004,090	48.2%	Out1P.xls	2119	2108		2127
1e	Base case: 75B BCG mix	In14Y.xls	Out1e.xls	75,000,000	52,225,241	29,600,170	-22,625,072	76.4%	Out1P.xls	2120	2108		2127
2a	Case1a, -3% FY09-20 TFP	In15N1.xls	Out2a.xls	177,518,739	80,052,477	69,934,526	-10,117,951	14.5%	Out1P.xls	2117	2108	y	2127
2b	Case1b, -3% FY09-20 TFP	In15N1.xls	Out2b.xls	150,000,000	73,033,813	59,200,339	-13,833,473	23.4%	Out1P.xls	2116	2108		2127
2c	Case1c -3% FY09-20 TFP	In15N1.xls	Out2a.xls	125,000,000	66,599,337	49,333,616	-17,265,721	35.0%	Out1P.xls	2118	2108		2127
2d	Case1d, -3% FY09-20 TFP	In15N1.xls	Out2a.xls	100,000,000	60,164,861	39,466,893	-20,697,968	52.4%	Out1P.xls	2119	2108		2127
2e	Case1e, -3% FY09-20 TFP	In15N1.xls	Out2a.xls	75,000,000	53,730,385	29,600,170	-24,130,216	81.5%	Out1P.xls	2120	2108		2127
3a	Case1a, +3% FY09-20 TFP	In15N2.xls	Out3a.xls	177,518,739	75,498,955	69,934,526	-5,564,429	8.0%	Out1P.xls	2117	2108	y	2127
3b	Case1b, +3% FY09-20 TFP	In15N2.xls	Out3b.xls	150,000,000	68,889,144	59,200,339	-9,688,805	16.4%	Out1P.xls	2116	2108		2127
3c	Case1c +3% FY09-20 TFP	In15N2.xls	Out3a.xls	125,000,000	62,829,492	49,333,616	-13,495,876	27.4%	Out1P.xls	2118	2108		2127
3d	Case1d, +3% FY09-20 TFP	In15N2.xls	Out3a.xls	100,000,000	56,769,840	39,466,893	-17,302,948	43.8%	Out1P.xls	2119	2108		2127
3e	Case1e, +3% FY09-20 TFP	In15N2.xls	Out3a.xls	75,000,000	50,710,188	29,600,170	-21,110,019	71.3%	Out1P.xls	2120	2108		2127
4a	Case 1a w/2030 costs, 2020 volume	In10.xls	Out4a.xls	177,518,739	77,783,916	69,934,526	-7,849,390	11.2%	Out1P.xls	2117	2108	y	2127
4b	Case 1b w/2030 costs, 2020 volume	In10.xls	Out4b.xls	150,000,000	70,970,205	59,200,339	-11,769,866	19.9%	Out1P.xls	2116	2108		2127
4c	Case 1c w/2030 costs, 2020 volume	In10.xls	Out4a.xls	125,000,000	64,723,626	49,333,616	-15,390,010	31.2%	Out1P.xls	2118	2108		2127
4d	Case 1d w/2030 costs, 2020 volume	In10.xls	Out4a.xls	100,000,000	58,477,047	39,466,893	-19,010,154	48.2%	Out1P.xls	2119	2108		2127
4e	Case 1e w/2030 costs, 2020 volume	In10.xls	Out4a.xls	75,000,000	52,230,467	29,600,170	-22,630,298	76.5%	Out1P.xls	2120	2108		2127
5a	Case 1a, BCG mix w/FCM cut 50%	In14Y.xls	Out5a.xls	177,518,739	80,631,937	68,844,148	-11,787,790	17.1%	Out1P.xls	2150	2108	y	2127
5b	Case 1b, BCG mix w/FCM cut 50%	In14Y.xls	Out5b.xls	150,000,000	73,323,744	58,172,012	-15,151,733	26.0%	Out1P.xls	2149	2108		2127
5c	Case 1c, BCG mix w/FCM cut 50%	In14Y.xls	Out5c.xls	125,000,000	66,684,457	48,476,676	-18,207,780	37.6%	Out1P.xls	2151	2108		2127
5d	Case 1d, BCG mix w/FCM cut 50%	In14Y.xls	Out5c.xls	100,000,000	60,045,169	38,781,341	-21,263,828	54.8%	Out1P.xls	2152	2108		2127
5e	Case 1e, BCG mix w/FCM cut 50%	In14Y.xls	Out5c.xls	75,000,000	53,405,881	29,086,006	-24,319,875	83.6%	Out1P.xls	2153	2108		2127
6a	Case 1a with modified BCG mix	In14Y.xls	Out6a.xls	177,518,739	75,238,687	67,637,378	-7,601,309	11.2%	Out1P.xls	2133	2108	y	2127
6b	Case 1b with modified BCG mix	In14Y.xls	Out6b.xls	150,000,000	68,766,549	57,152,314	-11,614,235	20.3%	Out1P.xls	2134	2108		2127
6c	Case 1c with modified BCG mix	In14Y.xls	Out6a.xls	125,000,000	62,886,794	47,626,928	-15,259,866	32.0%	Out1P.xls	2135	2108		2127
6d	Case 1d with modified BCG mix	In14Y.xls	Out6a.xls	100,000,000	57,007,039	38,101,543	-18,905,496	49.6%	Out1P.xls	2136	2108		2127
6e	Case 1e with modified BCG mix	In14Y.xls	Out6a.xls	75,000,000	51,127,284	28,576,157	-22,551,127	78.9%	Out1P.xls	2137	2108		2127

Table B-5b. GMU Sustainability Case Results (continued)

A	B	P	Q	R	S	T	U	V	W
Start Row	**40**								
End Row	**41**								
		Adj	Adj	Adj	Adj	Adj BrkEv	Adj	Adj Ann BE	Date and Time
Case #	**Description**	Volume	Revenue	Cost	Profit	Rev/Pc %	Workyrs	Rev/Pc %	of Run
0a	FY09 CRA	173,043,620	70,739,413	70,739,516	-104	6.5%	715,130		8/22/2010 16:16
1a	Base case, 177.5B BCG mix	168,300,797	75,058,152	75,058,546	-394	13.2%	717,160	1.1%	8/26/2010 10:17
1b	Base case: 150B BCG mix	136,762,136	67,076,664	67,076,842	-178	24.3%	636,342	2.0%	8/13/2010 9:38
1c	Base case: 125B BCG mix	108,616,144	59,953,001	59,953,182	-181	39.9%	564,229	3.1%	8/13/2010 9:42
1d	Base case: 100B BCG mix	81,337,533	53,113,067	53,113,332	-264	65.5%	494,640	4.7%	8/13/2010 9:46
1e	Base case: 75B BCG mix	55,459,184	46,712,152	46,712,480	-328	113.4%	429,003	7.1%	8/13/2010 9:50
2a	Case1a, -3% FY09-20 TFP	165,922,725	76,541,377	76,541,861	-484	17.1%	732,076	1.4%	8/24/2010 20:29
2b	Case1b, -3% FY09-20 TFP	134,825,875	68,459,038	68,459,236	-198	28.7%	650,100	2.3%	8/13/2010 11:07
2c	Case1c -3% FY09-20 TFP	107,082,814	61,248,541	61,248,728	-187	44.9%	576,987	3.4%	8/13/2010 11:12
2d	Case1d, -3% FY09-20 TFP	80,202,018	54,326,429	54,326,710	-281	71.6%	506,442	5.0%	8/13/2010 11:17
2e	Case1e, -3% FY09-20 TFP	54,706,655	47,848,653	47,848,961	-308	121.6%	439,904	7.5%	8/13/2010 11:22
3a	Case1a, +3% FY09-20 TFP	170,803,791	73,572,917	73,573,217	-300	9.3%	702,211	0.8%	8/13/2010 11:54
3b	Case1b, +3% FY09-20 TFP	138,802,806	65,691,478	65,691,634	-156	19.9%	622,564	1.7%	8/13/2010 11:58
3c	Case1c +3% FY09-20 TFP	110,234,944	58,653,313	58,653,485	-173	34.8%	551,464	2.8%	8/13/2010 12:03
3d	Case1d, +3% FY09-20 TFP	82,538,530	51,894,097	51,894,360	-263	59.3%	482,837	4.3%	8/13/2010 12:07
3e	Case1e, +3% FY09-20 TFP	56,256,319	45,568,587	45,568,938	-351	105.2%	418,103	6.8%	8/13/2010 11:46
4a	Case 1a w/2030 costs, 2020 volume	168,291,399	75,063,872	75,064,224	-352	13.2%	721,659	0.6%	8/28/2010 11:19
4b	Case 1b w/2030 costs, 2020 volume	136,753,932	67,082,378	67,082,535	-157	24.3%	640,853	1.0%	8/28/2010 11:22
4c	Case 1c w/2030 costs, 2020 volume	108,609,365	59,958,588	59,958,745	-158	39.9%	568,752	1.6%	8/28/2010 11:36
4d	Case 1d w/2030 costs, 2020 volume	81,332,179	53,118,647	53,118,894	-247	65.5%	499,174	2.4%	8/28/2010 11:40
4e	Case 1e w/2030 costs, 2020 volume	55,455,251	46,717,945	46,718,228	-282	113.5%	433,548	3.7%	8/28/2010 11:43
5a	Case 1a, BCG mix w/FCM cut 50%	163,534,692	76,009,253	76,009,398	-145	19.8%	719,392	1.7%	8/14/2010 10:02
5b	Case 1b, BCG mix w/FCM cut 50%	132,742,635	67,670,409	67,670,571	-162	31.5%	636,856	2.5%	8/14/2010 10:06
5c	Case 1c, BCG mix w/FCM cut 50%	105,331,907	60,310,761	60,311,012	-251	47.6%	563,733	3.6%	8/14/2010 10:10
5d	Case 1d, BCG mix w/FCM cut 50%	78,776,554	53,266,664	53,266,884	-220	74.4%	493,352	5.2%	8/14/2010 10:15
5e	Case 1e, BCG mix w/FCM cut 50%	53,622,276	46,713,849	46,713,984	-135	124.6%	427,296	7.6%	8/14/2010 9:53
6a	Case 1a with modified BCG mix	168,155,375	72,538,503	72,538,943	-440	13.2%	694,388	1.1%	8/16/2010 22:34
6b	Case 1b with modified BCG mix	136,318,869	64,858,050	64,858,189	-139	24.9%	616,324	2.0%	8/16/2010 22:37
6c	Case 1c with modified BCG mix	108,029,165	58,091,782	58,092,011	-229	41.1%	547,284	3.2%	8/13/2010 22:27
6d	Case 1d with modified BCG mix	80,680,215	51,628,664	51,628,878	-214	68.0%	480,963	4.8%	8/13/2010 22:32
6e	Case 1e with modified BCG mix	54,834,736	45,627,162	45,627,294	-132	118.4%	418,843	7.4%	8/13/2010 22:38

Table B-5c. GMU Sustainability Study Case Results (continued)

A	B	C	D	E	F	G	H	I	K	L	M	N	O
Start Row	**40**												
End Row	**41**												
		Factor	**Output**	Initial	Initial	Initial	Initial	Init BrkEv	**Start**	**Volume**	**Rev/Pc**	**Save**	**Elas**
Case #	**Description**	**File**	**File (adj)**	Volume	Cost	Revenue	Profit	Rev/Pc %	**File**	**Col**	**Col**		**Col**
7a	Case 1a with FY09 mix	In14Y.xls	Out7a.xls	177,518,739	74,116,401	68,112,742	-6,003,659	8.8%	Out1P.xls	2102	2108	y	2127
7b	Case 1b with FY09 mix	In14Y.xls	Out7b.xls	150,000,000	67,818,238	57,553,988	-10,264,251	17.8%	Out1P.xls	2103	2108		2127
7c	Case 1c with FY09 mix	In14Y.xls	Out7a.xls	125,000,000	62,096,535	47,961,656	-14,134,879	29.5%	Out1P.xls	2105	2108		2127
7d	Case 1d with FY09 mix	In14Y.xls	Out7a.xls	100,000,000	56,374,832	38,369,325	-18,005,507	46.9%	Out1P.xls	2106	2108		2127
7e	Case 1e with FY09 mix	In14Y.xls	Out7a.xls	75,000,000	50,653,128	28,776,994	-21,876,135	76.0%	Out1P.xls	2107	2108		2127
8a	Case 1a w/100% Mail Proc var %	In16N1.xls	Out8a.xls	177,518,739	77,824,959	69,934,526	-7,890,433	11.3%	Out1P.xls	2117	2108	y	2127
8b	Case 1b w/100% Mail Proc var %	In16N1.xls	Out8b.xls	150,000,000	70,889,517	59,200,339	-11,689,178	19.7%	Out1P.xls	2116	2108		2127
8c	Case 1c w/100% Mail Proc var %	In16N1.xls	Out8a.xls	125,000,000	64,531,711	49,333,616	-15,198,095	30.8%	Out1P.xls	2118	2108		2127
8d	Case 1d w/100% Mail Proc var %	In16N1.xls	Out8a.xls	100,000,000	58,173,904	39,466,893	-18,707,011	47.4%	Out1P.xls	2119	2108		2127
8e	Case 1e w/100% Mail Proc var %	In16N1.xls	Out8a.xls	75,000,000	51,816,098	29,600,170	-22,215,928	75.1%	Out1P.xls	2120	2108		2127
9a	Case 1a w/83% Mail Proc var %	In0N2.xls	Out9a.xls	177,518,739	71,910,570	69,934,526	-1,976,043	2.8%	Out1P.xls	2117	2108	y	2127
9b	Case 1b w/83% Mail Proc var %	In16N2.xls	Out9b.xls	150,000,000	71,108,505	59,200,339	-11,908,166	20.1%	Out1P.xls	2116	2108		2127
9c	Case 1c w/83% Mail Proc var %	In16N2.xls	Out9a.xls	125,000,000	65,087,163	49,333,616	-15,753,547	31.9%	Out1P.xls	2118	2108		2127
9d	Case 1d w/83% Mail Proc var %	In16N2.xls	Out9a.xls	100,000,000	59,065,820	39,466,893	-19,598,927	49.7%	Out1P.xls	2119	2108		2127
9e	Case 1e w/83% Mail Proc var %	In16N2.xls	Out9a.xls	75,000,000	53,044,478	29,600,170	-23,444,308	79.2%	Out1P.xls	2120	2108		2127
10a	Case 1a with 0.50 x elasticity	In14Y.xls	Out10a.xls	177,518,739	77,775,253	69,934,526	-7,840,727	11.2%	Out1P.xls	2117	2108	y	2145
10b	Case 1b with 0.50 x elasticity	In14Y.xls	Out10b.xls	150,000,000	70,962,465	59,200,339	-11,762,126	19.9%	Out1P.xls	2116	2108		2145
10c	Case 1c with 0.50 x elasticity	In14Y.xls	Out10a.xls	125,000,000	64,716,724	49,333,616	-15,383,108	31.2%	Out1P.xls	2118	2108		2145
10d	Case 1d with 0.50 x elasticity	In14Y.xls	Out10a.xls	100,000,000	58,470,983	39,466,893	-19,004,090	48.2%	Out1P.xls	2119	2108		2145
10e	Case 1e with 0.50 x elasticity	In14Y.xls	Out10a.xls	75,000,000	52,225,241	29,600,170	-22,625,072	76.4%	Out1P.xls	2120	2108		2145
11a	Case 1a with 1.50 x elasticity	In14Y.xls	Out11a.xls	177,518,739	77,775,253	69,934,526	-7,840,727	11.2%	Out1P.xls	2117	2108	y	2139
11b	Case 1b with 1.50 x elasticity	In14Y.xls	Out11b.xls	150,000,000	70,962,465	59,200,339	-11,762,126	19.9%	Out1P.xls	2116	2108		2139
11c	Case 1c with 1.50 x elasticity	In14Y.xls	Out11a.xls	125,000,000	64,716,724	49,333,616	-15,383,108	31.2%	Out1P.xls	2118	2108		2139
11d	Case 1d with 1.50 x elasticity	In14Y.xls	Out11a.xls	100,000,000	58,470,983	39,466,893	-19,004,090	48.2%	Out1P.xls	2119	2108		2139
11e	Case 1e with 1.50 x elasticity	In14Y.xls	Out11a.xls	75,000,000	52,225,241	29,600,170	-22,625,072	76.4%	Out1P.xls	2120	2108		2139
12a	Case 1a with OIG retail reduction	In12a.xls	Out12a.xls	177,518,739	75,675,716	69,934,526	-5,741,190	8.2%	Out1P.xls	2117	2108	y	2127
12b	Case 1b with OIG retail reduction	In12a.xls	Out12b.xls	150,000,000	68,861,479	59,200,339	-9,661,139	16.3%	Out1P.xls	2116	2108		2127
12c	Case 1c with OIG retail reduction	In12a.xls	Out12c.xls	125,000,000	62,614,415	49,333,616	-13,280,799	26.9%	Out1P.xls	2118	2108		2127
12d	Case 1d with OIG retail reduction	In12a.xls	Out12c.xls	100,000,000	56,367,351	39,466,893	-16,900,458	42.8%	Out1P.xls	2119	2108		2127
12e	Case 1e with OIG retail reduction	In12a.xls	Out12c.xls	75,000,000	50,120,287	29,600,170	-20,520,117	69.3%	Out1P.xls	2120	2108		2127

Table B-5d. GMU Sustainability Study Case Results (continued)

A	B	P	Q	R	S	T	U	V	W
Start Row	**40**								
End Row	**41**								
		Adj	Adj	Adj	Adj	Adj BE	Adj	Adj Ann	Date and Time
Case #	**Description**	Volume	Revenue	Cost	Profit	Rev/Pc %	Workyrs	Rev/Pc %	of Run
7a	Case 1a with FY09 mix	170,412,039	72,395,709	72,396,011	-301	10.7%	703,049	0.9%	8/13/2010 22:43
7b	Case 1b with FY09 mix	138,420,972	65,029,528	65,029,643	-116	22.4%	625,820	1.9%	8/13/2010 22:49
7c	Case 1c with FY09 mix	109,992,860	58,503,909	58,504,120	-211	38.6%	557,215	3.0%	8/13/2010 22:54
7d	Case 1d with FY09 mix	82,479,491	52,213,479	52,213,669	-190	65.0%	490,826	4.7%	8/13/2010 23:00
7e	Case 1e with FY09 mix	56,389,119	46,279,040	46,279,262	-222	113.9%	427,831	7.2%	8/13/2010 21:03
8a	Case 1a w/100% Mail Proc var %	168,295,117	75,061,609	75,061,997	-389	13.2%	717,211	1.1%	8/13/2010 23:05
8b	Case 1b w/100% Mail Proc var %	136,899,913	66,980,880	66,981,053	-172	24.0%	634,759	2.0%	8/14/2010 2:21
8c	Case 1c w/100% Mail Proc var %	108,852,993	59,758,589	59,758,765	-176	39.1%	561,102	3.0%	8/14/2010 2:25
8d	Case 1d w/100% Mail Proc var %	81,629,611	52,810,701	52,810,964	-262	63.9%	489,906	4.6%	8/14/2010 2:28
8e	Case 1e w/100% Mail Proc var %	55,747,600	46,291,451	46,291,790	-339	110.4%	422,600	7.0%	8/14/2010 2:31
9a	Case 1a w/83% Mail Proc var %	174,885,107	71,304,914	71,305,070	-155	3.5%	709,345	0.3%	8/14/2010 2:34
9b	Case 1b w/83% Mail Proc var %	136,481,695	67,272,667	67,272,839	-172	24.9%	639,604	2.0%	8/14/2010 2:38
9c	Case 1c w/83% Mail Proc var %	108,137,828	60,350,200	60,350,388	-189	41.4%	570,670	3.2%	8/14/2010 2:41
9d	Case 1d w/83% Mail Proc var %	80,752,970	53,730,053	53,730,339	-285	68.6%	504,371	4.9%	8/14/2010 2:45
9e	Case 1e w/83% Mail Proc var %	54,888,485	47,568,771	47,569,076	-305	119.6%	442,127	7.4%	8/13/2010 16:24
10a	Case 1a with 0.50 x elasticity	171,519,765	76,378,634	76,378,791	-158	13.0%	727,835	1.1%	8/14/2010 10:53
10b	Case 1b with 0.50 x elasticity	141,440,767	68,963,751	68,963,936	-185	23.5%	651,674	1.9%	8/14/2010 10:58
10c	Case 1c with 0.50 x elasticity	114,461,866	62,254,182	62,254,454	-272	37.8%	583,054	3.0%	8/14/2010 11:02
10d	Case 1d with 0.50 x elasticity	88,039,535	55,673,334	55,673,697	-363	60.2%	515,762	4.4%	8/14/2010 11:07
10e	Case 1e with 0.50 x elasticity	62,465,514	49,289,437	49,289,552	-115	99.9%	450,493	6.5%	8/14/2010 11:12
11a	Case 1a with 1.50 x elasticity	161,887,417	73,203,264	73,203,488	-225	14.8%	699,938	1.3%	8/14/2010 2:49
11b	Case 1b with 1.50 x elasticity	127,642,717	64,488,296	64,488,414	-118	28.0%	612,134	2.3%	8/13/2010 15:52
11c	Case 1c with 1.50 x elasticity	97,590,631	56,907,362	56,907,565	-203	47.7%	535,449	3.6%	8/14/2010 2:53
11d	Case 1d with 1.50 x elasticity	69,378,992	49,926,601	49,926,900	-300	82.3%	464,084	5.6%	8/14/2010 2:57
11e	Case 1e with 1.50 x elasticity	44,084,761	43,821,898	43,822,427	-529	151.9%	400,692	8.8%	8/13/2010 15:44
12a	Case 1a with OIG retail reduction	170,629,396	73,673,985	73,674,305	-319	9.6%	693,855	0.8%	8/28/2010 9:10
12b	Case 1b with OIG retail reduction	138,873,696	65,644,621	65,644,781	-160	19.8%	612,760	1.7%	8/28/2010 9:16
12c	Case 1c with OIG retail reduction	110,483,348	58,459,762	58,459,928	-166	34.1%	540,237	2.7%	8/28/2010 9:24
12d	Case 1d with OIG retail reduction	82,900,777	51,538,739	51,539,018	-279	57.5%	470,035	4.2%	8/28/2010 9:30
12e	Case 1e with OIG retail reduction	56,645,499	45,031,548	45,031,939	-391	101.4%	403,506	6.6%	8/28/2010 9:52

Table B-5e. GMU Sustainability Study Case Results (continued)

A	B	C	D	E	F	G	H	I	K	L	M	N	O
Start Row	**40**												
End Row	**41**												
		Factor	**Output**	Initial	Initial	Initial	Initial	Init BrkEv	**Start**	**Volume**	**Rev/Pc**	**Save**	**Elas**
Case #	**Description**	**File**	**File (adj)**	Volume	Cost	Revenue	Profit	Rev/Pc %	**File**	**Col**	**Col**		**Col**
13a	Case 1a w/OIG health #2, FERS	In22.xls	Out13a.xls	177,518,739	69,539,708	69,934,526	394,819	-0.6%	Out1P.xls	2117	2108	y	2127
13b	Case 1b w/OIG health #2, FERS	In22.xls	Out13b.xls	150,000,000	62,725,470	59,200,339	-3,525,131	6.0%	Out1P.xls	2116	2108		2127
13c	Case 1c w/OIG health #2, FERS	In22.xls	Out13a.xls	125,000,000	56,478,406	49,333,616	-7,144,790	14.5%	Out1P.xls	2118	2108		2127
13d	Case 1d w/OIG health #2, FERS	In22.xls	Out13a.xls	100,000,000	50,231,342	39,466,893	-10,764,450	27.3%	Out1P.xls	2119	2108		2127
13e	Case 1e w/OIG health #2, FERS	In22.xls	Out13a.xls	75,000,000	43,984,278	29,600,170	-14,384,109	48.6%	Out1P.xls	2120	2108		2127
14a	Case 1a with +3% USPS salaries	In17a.xls	Out14a.xls	177,518,739	79,345,027	69,934,526	-9,410,500	13.5%	Out1P.xls	2117	2108	y	2127
14b	Case 1b with +3% USPS salaries	In17a.xls	Out14b.xls	150,000,000	72,383,690	59,200,339	-13,183,351	22.3%	Out1P.xls	2116	2108		2127
14c	Case 1c with +3% USPS salaries	In17a.xls	Out14a.xls	125,000,000	66,002,396	49,333,616	-16,668,780	33.8%	Out1P.xls	2118	2108		2127
14d	Case 1d with +3% USPS salaries	In17a.xls	Out14a.xls	100,000,000	59,621,102	39,466,893	-20,154,209	51.1%	Out1P.xls	2119	2108		2127
14e	Case 1e with +3% USPS salaries	In17a.xls	Out14a.xls	75,000,000	53,239,808	29,600,170	-23,639,638	79.9%	Out1P.xls	2120	2108		2127
15a	Case 1a with -3% USPS salaries	In17b.xls	Out15a.xls	177,518,739	76,206,405	69,934,526	-6,271,879	9.0%	Out1P.xls	2117	2108	y	2127
15b	Case 1b with -3% USPS salaries	In17b.xls	Out15b.xls	150,000,000	69,539,267	59,200,339	-10,338,928	17.5%	Out1P.xls	2116	2108		2127
15c	Case 1c with -3% USPS salaries	In17b.xls	Out15a.xls	125,000,000	63,426,433	49,333,616	-14,092,817	28.6%	Out1P.xls	2118	2108		2127
15d	Case 1d with -3% USPS salaries	In17b.xls	Out15a.xls	100,000,000	57,313,599	39,466,893	-17,846,707	45.2%	Out1P.xls	2119	2108		2127
15e	Case 1e with -3% USPS salaries	In17b.xls	Out15a.xls	75,000,000	51,200,766	29,600,170	-21,600,596	73.0%	Out1P.xls	2120	2108		2127
16a	Case 1a with -10% all fixed costs	In18.xls	Out16a.xls	177,518,739	74,863,289	69,934,526	-4,928,763	7.0%	Out1P.xls	2117	2108	y	2127
16b	Case 1b with -10% all fixed costs	In18.xls	Out16b.xls	150,000,000	68,049,052	59,200,339	-8,848,712	14.9%	Out1P.xls	2116	2108		2127
16c	Case 1c with -10% all fixed costs	In18.xls	Out16a.xls	125,000,000	61,801,988	49,333,616	-12,468,372	25.3%	Out1P.xls	2118	2108		2127
16d	Case 1d with -10% all fixed costs	In18.xls	Out16a.xls	100,000,000	55,554,924	39,466,893	-16,088,031	40.8%	Out1P.xls	2119	2108		2127
16e	Case 1e with -10% all fixed costs	In18.xls	Out16a.xls	75,000,000	49,307,860	29,600,170	-19,707,690	66.6%	Out1P.xls	2120	2108		2127
17a	Case 1a w/OIG retiree health #1	In19.xls	Out17a.xls	177,518,739	75,602,932	69,934,526	-5,668,406	8.1%	Out1P.xls	2117	2108	y	2127
17b	Case 1b w/OIG retiree health #1	In19.xls	Out17b.xls	150,000,000	68,790,144	59,200,339	-9,589,805	16.2%	Out1P.xls	2116	2108		2127
17c	Case 1c w/OIG retiree health #1	In19.xls	Out17a.xls	125,000,000	62,544,403	49,333,616	-13,210,787	26.8%	Out1P.xls	2118	2108		2127
17d	Case 1d w/OIG retiree health #1	In19.xls	Out17a.xls	100,000,000	56,298,662	39,466,893	-16,831,769	42.6%	Out1P.xls	2119	2108		2127
17e	Case 1e w/OIG retiree health #1	In19.xls	Out17a.xls	75,000,000	50,052,921	29,600,170	-20,452,751	69.1%	Out1P.xls	2120	2108		2127
18a	Case 1a with 3.1b cut in fix deliv cost	In11.xls	Out18a.xls	177,518,739	74,675,716	69,934,526	-4,741,190	6.8%	Out1P.xls	2117	2108	y	2127
18b	Case 1b with 3.1b cut in fix deliv cost	In11.xls	Out18b.xls	150,000,000	67,861,479	59,200,339	-8,661,139	14.6%	Out1P.xls	2116	2108		2127
18c	Case 1c with 3.1b cut in fix deliv cost	In11.xls	Out18a.xls	125,000,000	61,614,415	49,333,616	-12,280,799	24.9%	Out1P.xls	2118	2108		2127
18d	Case 1d with 3.1b cut in fix deliv cost	In11.xls	Out18a.xls	100,000,000	55,367,351	39,466,893	-15,900,458	40.3%	Out1P.xls	2119	2108		2127
18e	Case 1e with 3.1b cut in fix deliv cost	In11.xls	Out18a.xls	75,000,000	49,120,287	29,600,170	-19,520,117	65.9%	Out1P.xls	2120	2108		2127
19a	Case 1a w/OIG retail, health#2, FERS	In21.xls	Out19a.xls	177,518,739	65,845,975	69,934,526	4,088,551	-5.8%	Out1P.xls	2117	2108	y	2127
19b	Case 1b w/OIG retail, health#2, FERS	In21.xls	Out19b.xls	150,000,000	59,174,836	59,200,339	25,503	0.0%	Out1P.xls	2116	2108		2127
19c	Case 1c w/OIG retail, health#2, FERS	In21.xls	Out19a.xls	125,000,000	53,058,961	49,333,616	-3,725,345	7.6%	Out1P.xls	2118	2108		2127
19d	Case 1d w/OIG retail, health#2, FERS	In21.xls	Out19a.xls	100,000,000	46,943,085	39,466,893	-7,476,192	18.9%	Out1P.xls	2119	2108		2127
19e	Case 1e w/OIG retail, health#2, FERS	In21.xls	Out19a.xls	75,000,000	40,827,210	29,600,170	-11,227,040	37.9%	Out1P.xls	2120	2108		2127

Table B-5f. GMU Sustainability Study Case Results (continued)

A	B	P	Q	R	S	T	U	V	W
Start Row	**40**								
End Row	**41**								
		Adj	Adj	Adj	Adj	Adj BrkEv	Adj	Adj Ann BE	Date and Time
Case #	**Description**	Volume	Revenue	Cost	Profit	Rev/Pc %	Workyrs	Rev/Pc %	of Run
13a	Case 1a w/OIG health #2, FERS	178,010,201	69,686,382	69,686,247	136	-0.6%	743,569	-0.1%	8/27/2010 21:19
13b	Case 1b w/OIG health #2, FERS	145,753,176	61,462,440	61,462,754	-313	6.8%	660,632	0.6%	8/27/2010 21:24
13c	Case 1c w/OIG health #2, FERS	116,743,642	54,043,218	54,043,361	-143	17.3%	585,932	1.5%	8/27/2010 20:49
13d	Case 1d w/OIG health #2, FERS	88,315,128	46,823,419	46,823,584	-165	34.3%	512,982	2.7%	8/27/2010 20:54
13e	Case 1e w/OIG health #2, FERS	60,903,184	39,939,260	39,939,521	-261	66.2%	443,005	4.7%	8/27/2010 20:59
14a	Case 1a with +3% USPS salaries	166,644,418	76,083,531	76,083,973	-442	15.9%	712,692	1.3%	8/14/2010 3:24
14b	Case 1b with +3% USPS salaries	135,418,192	68,028,844	68,029,029	-185	27.3%	632,744	2.2%	8/14/2010 3:29
14c	Case 1c with +3% USPS salaries	107,556,103	60,841,691	60,841,869	-178	43.3%	561,427	3.3%	8/14/2010 3:34
14d	Case 1d with +3% USPS salaries	80,556,876	53,940,635	53,940,905	-270	69.7%	492,610	4.9%	8/14/2010 3:39
14e	Case 1e with +3% USPS salaries	54,945,926	47,481,063	47,481,362	-299	119.0%	427,697	7.4%	8/13/2010 16:50
15a	Case 1a with -3% USPS salaries	170,015,378	74,032,665	74,033,005	-340	10.5%	721,796	0.9%	8/14/2010 3:44
15b	Case 1b with -3% USPS salaries	138,155,708	66,123,053	66,123,205	-151	21.3%	640,081	1.8%	8/14/2010 3:49
15c	Case 1c with -3% USPS salaries	109,717,934	59,061,097	59,061,279	-182	36.4%	567,149	2.9%	8/14/2010 3:55
15d	Case 1d with -3% USPS salaries	82,151,006	52,280,467	52,280,742	-275	61.2%	496,760	4.4%	8/14/2010 4:00
15e	Case 1e with -3% USPS salaries	55,995,274	45,936,507	45,936,866	-359	107.9%	430,369	6.9%	8/13/2010 17:00
16a	Case 1a with -10% all fixed costs	171,605,253	73,112,951	73,113,280	-330	8.1%	697,204	0.7%	8/14/2010 11:25
16b	Case 1b with -10% all fixed costs	139,798,006	65,041,164	65,041,309	-144	17.9%	615,598	1.5%	8/13/2010 21:30
16c	Case 1c with -10% all fixed costs	111,333,062	57,809,066	57,809,223	-157	31.6%	542,539	2.5%	8/14/2010 11:33
16d	Case 1d with -10% all fixed costs	83,637,513	50,832,837	50,833,114	-277	54.0%	471,744	4.0%	8/14/2010 11:38
16e	Case 1e with -10% all fixed costs	57,219,001	44,264,327	44,264,447	-119	96.0%	404,597	6.3%	8/14/2010 14:05
17a	Case 1a w/OIG retiree health #1	170,752,667	73,602,509	73,602,700	-191	9.4%	723,791	0.8%	8/14/2010 4:04
17b	Case 1b w/OIG retiree health #1	139,011,356	65,553,866	65,554,158	-292	19.5%	642,379	1.6%	8/14/2010 4:09
17c	Case 1c w/OIG retiree health #1	110,625,285	58,349,851	58,349,970	-119	33.6%	569,556	2.7%	8/14/2010 4:14
17d	Case 1d w/OIG retiree health #1	83,034,536	51,408,918	51,409,109	-191	56.9%	499,066	4.2%	8/14/2010 4:18
17e	Case 1e w/OIG retiree health #1	56,754,225	44,883,917	44,884,242	-325	100.4%	432,306	6.5%	8/13/2010 20:55
18a	Case 1a with 3.1b cut in fix deliv cost	171,822,836	72,989,343	72,989,662	-319	7.8%	682,214	0.7%	8/14/2010 4:23
18b	Case 1b with 3.1b cut in fix deliv cost	139,998,746	64,911,922	64,912,064	-142	17.5%	600,559	1.5%	8/14/2010 4:28
18c	Case 1c with 3.1b cut in fix deliv cost	111,513,663	57,672,994	57,673,150	-156	31.0%	527,441	2.5%	8/14/2010 4:33
18d	Case 1d with 3.1b cut in fix deliv cost	83,791,519	50,688,059	50,688,336	-277	53.3%	456,568	4.0%	8/14/2010 4:39
18e	Case 1e with 3.1b cut in fix deliv cost	57,338,177	44,108,398	44,108,788	-391	94.9%	389,323	6.3%	8/13/2010 16:36
19a	Case 1a w/OIG retail, health#2, FERS	182,820,786	67,375,062	67,374,777	285	-6.5%	710,407	-0.6%	8/31/2010 21:41
19b	Case 1b w/OIG retail, health#2, FERS	150,032,011	59,184,109	59,184,036	73	0.0%	628,115	0.0%	8/31/2010 21:19
19c	Case 1c w/OIG retail, health#2, FERS	120,485,048	51,772,098	51,772,488	-389	8.9%	553,816	0.8%	8/31/2010 21:24
19d	Case 1d w/OIG retail, health#2, FERS	91,441,713	44,532,803	44,532,927	-125	23.4%	481,012	1.9%	8/31/2010 21:28
19e	Case 1e w/OIG retail, health#2, FERS	63,305,579	37,588,790	37,589,013	-223	50.4%	410,789	3.8%	8/31/2010 21:33