TESTIMONY BEFORE THE
PRESIDENT'S COMMISSION ON THE POSTAL SERVICE

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Thank you for the opportunity to appear before this Commission and share with you the results of our research on universal service and the monopoly. My colleagues from the technical staff of the Postal Rate Commission (PRC) and I have been studying these topics and related matters for more than a decade. Our conclusions cast grave doubt on much of what passes for conventional wisdom in discussions of universal service and the monopoly. Copies of our studies have been provided to you in Tab A of the Briefing Book submitted to the members of the Presidential Commission by the PRC. Our papers are also available on the PRC's web site (www.prc.gov). My testimony reflects my personal views only and does not necessarily reflect the official views of the Postal Rate Commission.

The conventional view is that a monopoly is necessary to preserve universal service. Proponents of this position reason that a monopoly is required to sustain a cross-subsidy from profitable operations in urban areas to money-losing services in rural areas. If profits earned in urban areas are not protected by the monopoly, "cream skimmers" will undercut uniform prices and capture so much urban volume that the Postal Service will be left unable to afford delivery to rural areas and universal service would be lost. Moreover, the thinking continues, without the monopoly, the nation would lose the benefits of scale economies in delivery operations where fixed costs are high.

Although this economic rationale for the postal monopoly is widely accepted, our findings indicate that it is fundamentally mistaken. In brief, out major findings are as follows:

The cost of universal service is a surprisingly small portion of the Postal Service's $70 billion budget. In 1999, losses on unprofitable routes were $2.6 billion; about half of the losses were sustained on just ten percent of the routes. The cost of

the 10,000 smallest post offices (out of a total of 28,000) was $567 million. Six-day-a-week delivery is also frequently cited as a universal service requirement. An upper bound on the savings from eliminating a delivery day is $1.9 billion (the daily fixed cost of residential delivery).

There is no urban to rural cross-subsidy. Analyses of revenues and costs by route show that routes serving rural areas are, in total, quite profitable. Overall, because the Postal Service is required to break even (i.e., earn no net profit), a large number of routes are necessarily unprofitable. However, the proportion of unprofitable routes in the U.S. is approximately the same for urban and rural areas. Volume, not population density or urban character, is the major determinant of profits on delivery routes in the U.S.

The Postal Service does not have a complete letter-mail monopoly. Extensive competition exists in mail processing and transportation due to worksharing discounts. Far more of the postal value chain is in the private sector in the U.S. than in any other country. Without worksharing, Postal Service costs would be 25 percent higher. Worksharing has significantly lowered the cost of mail to the nation.

The monopoly is not necessary to preserve universal service. An analysis of the competitive upstream market shows that only 16 percent of the mail would be susceptible to diversion for delivery by competitors of the Postal Service. Thus, for the foreseeable future, it would be difficult for competitors to accumulate sufficient volume to achieve unit costs below those of the U.S. Postal Service. The experience of countries that have abolished their monopolies confirms this finding. Moreover, posts in those countries have had very large cost reductions as a result of liberalization.

The costs of the monopoly exceed its benefits. In 1993, the Postal Service estimated its wage premium to be $9 billion (i.e., the total amount by which postal wages exceeded wages comparable for comparable jobs in the private sector). We calculated the scale benefits of having a single provider, as opposed to a duopoly, for delivery to be $6 billion.

Each of these points is developed further in the remainder of this testimony with extracts from the relevant papers that we have prepared.[1]

> *The cost of universal service is a surprisingly small portion of the Postal Service's $70 billion budget. In 1999, losses on unprofitable routes were $2.6 billion; about half of the losses were sustained on just ten percent of the routes. The cost of the 10,000 smallest post offices (out of a total of 28,000) was $567 million. Six-day-a-week delivery is also frequently cited as a universal service requirement. An upper bound on the savings from eliminating a delivery day is $1.9 billion (the daily fixed cost of residential delivery).*[2]

Today, the concept of universal service extends beyond ubiquity. It includes six-day-a-week delivery, reasonable access to retail services, uniform and affordable prices, being the parcel carrier of last resort, collecting mail on a regular schedule, etc.

If financial pressures were great enough, certain features of what is now considered the USO would likely be changed. Financial pressures could arise for several reasons including the loss of volume to direct or indirect competition.

John Panzar has stated that the cost of the universal service is the cost of the services that would not be provided in a competitive environment.[3] This is the concept of the cost of the USO that we use in this paper. We examine the aspects of universal service that management might consider changing in response to a financial exigency that could be brought about by a competitive environment.

This paper estimates cost savings of three modifications in the delivery function: elimination of the unprofitable routes, reduction of the number of delivery days, and expansion of the use of curbside boxes. It examines, but rejects as part of the USO costs, the savings from curtailing the expansion of the delivery function by not adding new delivery points. Two other modifications are also estimated: a reduction in counter

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1 For the most part, the text is verbatim extractions from the referenced papers. For ease of reading, footnotes and table numbering is changed to be sequential in this testimony.

2 This section contains excerpts from Cohen, et al., (2003), "The Cost of Universal Service in the U.S. and Its Impact on Competition."

3 *See* Panzar, (2001).

service by closing small post offices and a reduction in transportation costs by eliminating air transportation of parcel post to the Alaska bush.

Unprofitable Delivery Routes

We define the profit of a delivery route as the revenue from the mail delivered on the route, minus the total cost of operating the route, minus the attributable upstream cost of the mail delivered on the route.[4] Net profits from delivery routes are a relatively small portion of total costs in a breakeven post. This is intuitive because unprofitable routes offset a large portion of the profit from profitable routes.[5] Table 1 displays the delivery profits (losses) by semi decile of the 230 thousand delivery routes of the U.S. Postal Service.

Table 1
Annual Route Profits (Losses) by Semi Decile
(FY 99, $ Millions)

Profits		Losses	
1	$2,224	12	(13)
2	1,007	13	(72)
3	772	14	(131)
4	640	15	(193)
5	523	16	(254)
6	423	17	(317)
7	329	18	(391)
8	261	19	(503)
9	182	20	(742)
10	113		
11	46		
Total Profits	6,520	Total Losses	(2,615)
Net Profits	3,905		

It can be seen that approximately 45 percent of routes are loss making and the total losses are $2.6 billion (or 4.2 percent of total cost). Jettisoning the loss making

[4] Profits from box section or non-delivered mail can be similarly calculated.

[5] Most delivery profits are in non-delivered mail because it involves no delivery cost. The sum of the profits from delivered mail plus non-delivered mail equals the upstream institutional cost in a breakeven post.

routes would allow the USPS to reduce its costs and hence its rates by this amount.[6,7] Because the value of the network is positively correlated with the number of points served, few customers would think it worthwhile to trade a rate reduction of this small magnitude for the inability to reach 45 percent of the population.

Rather than abandon service to all unprofitable routes it would be better from a business standpoint to curtail delivery frequency on the loss making routes until they are at least breakeven. A post that delivers 6 days per week could reduce service on each loss making routes just enough so that it was no longer unprofitable. Each route would be reduced to 5, 4, 3, 2 or 1 day per week according to the size of the loss on particular routes.[8] In this way there would be no loss making routes. This would result in about the same $2.6 billion saving. It would, however, probably cause a political problem for a government owned postal service because profits on a route depend for the most part on volume, which in turn is highly correlated with the income of patrons served on the route. Reducing delivery frequency for unprofitable routes would involve relatively poor people getting less frequent delivery than relatively rich people. Nevertheless, this would be a smaller political problem than abandoning these routes altogether. Arguably, reducing service frequency on loss making routes would be an economically rational approach to lowering costs, especially when direct competitors provide no service to those routes.[9] The estimates of savings from reducing delivery frequency are upper bounds because no allowance has been made for additional costs that might be incurred.

Expansion of the Delivery Network

The cost of serving the ever-expanding number of new delivery points (including the cost of new equipment and local post offices) is an often-cited financial problem for

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6 People on these routes would probably have a lower propensity to mail leading to some reduction in volume. Thus, the $2.6 billion figure represents an upper bound.

7 Eliminating the most unprofitable 10 percent of routes would save $1.2 billion or about two percent of total cost.

8 A few routes would receive delivery less frequently than once a week.

9 Most analyses of post liberalization competition presume that entrants would focus on the most profitable routes or areas and avoid loss-making routes.

the Postal Service. In order to avoid these expansion costs, the size of the delivery network could be frozen or a charge applied for new access to offset costs due to growth.

The USPS estimated that the cost of new delivery stops in 2003 was $176 million or two-tenth of one percent of total costs.[10] This cost does not take into consideration any new revenue that would offset some or all of the cost increases due to new delivery points.[11] Thus, there may not be any net savings from curtailing expansion and whatever savings are achieved would be small relative to the growth of costs due to inflation. Consequently, the cost savings from denying service to new delivery points would seem not to be worth the potential reduction in value of the network or lost revenue. It is likely that competitors would seek this business and thus it does not fall under the Panzar definition of the USO. Thus, it is not included in the list of potential savings summarized below.

Reducing the Number of Delivery Days on All Residential Routes

Reducing delivery frequency might be part of the response of the Postal Service to a financial exigency. The authors have not conducted a detailed study of the cost savings achievable from reducing the number of delivery days. We have calculated the fixed cost of delivery and assumed that a portion could be saved by reducing delivery frequency on all non-business routes. The latest estimates by the Postal Service are that a little more than half of total delivery costs are fixed.[12] If delivery frequency were reduced by half, variable cost would not change but fixed cost would be cut in half.[13] The savings from reducing delivery days on non-business routes are shown in Table 2.[14] For example, cutting delivery frequency from six days per week to three

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[10] *See* PRC Docket No. R2001-1, Tr. 11c/4763-64.

[11] New stops represent the growth in population and household formations. Both generate additional volume and revenue.

[12] The actual amount of fixed delivery cost is estimated to be $11.34 billion in FY 99 based on data submitted by the Postal Service in Docket No. R2000-1.

[13] The portion of fixed cost on days on which delivery is discontinued can be saved. None of the variable costs can be saved.

[14] Business routes have 5-day-a-week delivery and that is not modified in this analysis.

would be $5.7 billion or 9.1 percent of total FY 99 costs.[15] Again, this is, in fact, an upper bound on the savings since the analysis has not taken into account costs that might be incurred in order to accommodate reduced delivery frequency.

Table 2
Cost Savings from Reducing Delivery Days on Non-Business Routes (FY 99)

	Cost Savings	Percent of Total Costs
5 days	$1.9 billion	3.0
4 days	3.8	6.1
3 days	5.7	9.1
2 days	7.6	12.1
1 day	9.5	15.2

While many posts in industrialized countries deliver six days a week, several deliver only five days without apparent problems (Australia, Austria, Canada, Finland, Greece, Ireland, Luxembourg, Portugal, Spain and Sweden). Sweden Post's competitor, City Mail, delivers every third business day. Thus, six-day-a-week delivery may not be necessary to retain volume.

[15] If loss-making routes are first eliminated, the fixed delivery costs are reduced to $5.2 billion and the potential savings from reducing delivery frequency on the remaining routes decreases from approximately $1.891 billion to $861 million per delivery day in FY 99.

Conversion of Park & Loop Routes to Curb Routes

The distribution of the various types of delivery for the USPS in FY 99 were:

City Carriers (166,743)	
Foot	11.5%
Park & Loop[a]	70.6
Curb	17.8
Rural Carriers (63,552)	
Roadside	100

[a] "Park and loop" refers to a route where the carrier parks his or her vehicle and serves a group of houses on foot, returns to the vehicle and drives to another location, and so on.

Foot routes and park and loop routes involve delivery to the door while curb delivery is to a box placed by the street in front of the residence and roadside delivery is to a box placed alongside a road that is traveled by a rural carrier.[16] In the mid-1970's the Postal Service stopped serving new housing developments with park and loop routes. Since then new housing developments have been served by curb routes. The increasing use of cluster boxes is a continuation of the trend to more efficient delivery.

Table 3 displays the possible savings from converting all park and loop routes to curb routes. The savings of $778 million, is 1.2 percent of total costs. Again, this is an upper bound since we have not factored in the additional vehicle costs and we do not know the number of routes where curb delivery is not practical.

[16] Since not all roads are traveled by rural carriers, it is the responsibility of residents served by rural carriers to place a mailbox along the line of travel.

Table 3
Savings from Conversion of All Park & Loop Routes to Curb Routes (FY 99)

	Volume Delivered	43 billion pieces
X	Time Per Piece Saved [a]	1.78 seconds
=	Total Time Saved	21.4 million hours
	Savings	$778 million

[a] An econometrically estimated translog model of street time was used to calculate the average delivery time per piece saved when park & loop routes are converted to curb routes. The model is presented in Bernard, et al., (2003).

Obviously, mail recipients prefer the convenience of delivery to the door versus curb delivery (and they do not have to pay for the extra cost). The disparity of treatment of different mail recipients is clear, however. It would be difficult but not impossible to force change in this area, especially if the Postal Service were to give the recipient the option of being charged for delivery to the door but not to the curb.

Closing Small Post Offices

Providing reasonable access to postal counters is part of the universal service obligation of all posts in industrial countries. In 1901, the U.S. had 77,000 post offices and the number has been in decline ever since. Today the Postal Service has about 28,000 post offices, 6,000 stations and branches[17], 3,000 contract stations and branches, and 1,500 community (franchised) post offices. All told the USPS currently has about 38,000 facilities with counters. The Postal Service had been closing some small post offices each year until it imposed a moratorium on closings in 1998. It has recently lifted this moratorium. Many small offices have few transactions and many average less than ten transactions daily.

[17] Branches and stations are subunits of large post offices and have counters.

The authors cannot identify which offices would be eliminated under the hypothesis of this paper, and thus cannot quantify the potential savings exactly. We can, however, put an upper bound on the savings. The 10,127 smallest offices[18] cost the post office $567 million annually in FY 99. Including personnel and facility costs. This is seven-tenth of one percent of total postal costs.

The General Accounting Office recommended the closing of 7,000 small offices in a report written in 1982.[19] This was about 70 percent of the small offices at the time. Closing this number would produce annual savings of $397 million or 0.6% of total costs.

Alaska Air Subsidy

The USPS has two general parcel classifications; Priority Mail[20], which is entitled to air transportation and parcel post, which is entitled to surface transportation only. Because the bush country of Alaska has no roads, virtually all mail is transported to and from the bush by air.[21] Although it is a ground service, parcel post is available to the Alaskan bush because of the use of air transportation.

It turns out that parcel post is the lowest priced way to transport goods to the bush because its rates don't reflect the cost of air transportation. This has caused the Postal Service to become the principle means of transporting virtually all merchandise to the bush that is mailable (no more than 70 lbs. and 108 inches in length and girth). Much of the material never enters a post office before being transported.[22] Local airlines maintain industrial size freezers, refrigerators and warehouses where groceries and other goods are brought and stored and then have postage applied before being placed directly on airplanes and flown to the bush as parcel post.

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[18] These are the CAG K & L offices. The largest offices in terms of revenue are in CAG A, the next largest are CAG B and so on. "CAG" stands for "cost accounting group."

[19] "Replacing Post Offices with Alternative Services: A Debated but Unresolved Issue," General Accounting Office, September 2, 1982.

[20] Priority mail includes all First-Class mail that weighs over 13 ounces (368 grams) and up to 70 pounds (32 kilos). It includes letters, flats and parcels.

[21] A few communities in the bush are reachable by water transportation.

[22] This is called "bypass mail".

The Postal Rate Commission in its R90-1 decision found that the reason the Postal Service flies parcel post to the bush is because of its universal service obligation.[23] UPS ground service, for example, is not available to the Alaskan bush. The amount of the air service cost of parcel post in FY 99 was $99 million or two-tenth of one percent of total costs. This is the upper bound amount that the Postal Service could save if it were to discontinue parcel post service to the Alaska bush.[24,25] It should be kept in mind that Priority Mail service would still be available to the bush as is UPS Blue Label (air) parcel service.

Summation of Potential Savings

Table 4 presents a summary of the potential savings from modifying the USO in response to a financial exigency caused by competition. This in effect is an application of the Panzar definition of the cost of the USO. We use three-day a week delivery for reduction in frequency of delivery since we think this is the largest reduction likely. We use the GAO recommendation of closing 7,000 small post offices to arrive at the savings for this category.

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[23] The Commission calculated the difference between the cost of air transportation and ordinary highway costs (as if roads existed). This amount is removed by the Commission from parcel post attributable costs (which are borne only by parcel post mailers) and charged to institutional costs (which are borne by all mailers). *See* PRC Docket No. R90-1, Opinion & Recommended Decision, Vol. 1, pp. III-95-237, 1991.

[24] It is an upper bound since no allowance is being made for lost revenue.

[25] It should be noted that mail (primarily parcel post) subsidizes passenger travel to and from the bush. This is the same role that mail played with stagecoach lines in the early days of the republic and that it later played in the early days of the air transportation. *See* Campbell, (2002).

Table 4
Summary of Potential Savings

	Savings ($ billions)	Percent of Total Costs
Eliminating Losses on Unprofitable Delivery Routes[a]	2.62	4.2
Reducing Delivery to 3 Days per Week		
Before Eliminating Unprofitable Routes[b]	5.67	9.1
After Eliminating Unprofitable Routes	2.58	4.1
Converting All Park & Loop Routes to Curb	0.78	1.2
Closing 7,000 Small Post Offices	0.40	0.6
Eliminating Air Parcel Post Service to Alaska	0.10	0.2

[a] Losses for unprofitable routes could be eliminated by reducing delivery frequency on unprofitable routes until costs are aligned with revenues, or by eliminating service to unprofitable routes.

[b] Reducing delivery to 3 days on all delivery routes produces more net savings than the combination of eliminating unprofitable routes and then reducing delivery to 3 days on the remaining routes. This occurs because reducing delivery to 3 days on unprofitable routes makes them profitable as a group.

Effect on Efficiency from Competition in Other Posts

In order to put the potential savings from modifying the USO into context, we examine some actual efficiency gains in posts that have lost their monopolies or expected to lose them.

New Zealand Post began to prepare for liberalization in 1988 and was actually liberalized in 1999. From 1988 to 2001, it reduced employment by about 40 percent. We understand that New Zealand Post has lost almost no market share and it continues its USO.

Sweden liberalized its market in 1993 and City Mail emerged as a competitor, along with many small operators. To date, City Mail has gained about a 30 percent share of its "niche," but Sweden Post has lost only about five percent of its total market. Sweden Post has reduced its employment by about 30 percent. It continues its universal service obligations, but it has abandoned uniform prices for bulk mail. It now

charges different rates for bulk mail according to the area of the country where it is delivered.

Deutsche Post had expected to lose its monopoly by 2001. In contemplation of this, and its pending privatization, Deutsche Post reduced its employment by about 37 percent between 1990 and 1999.

Royal Mail anticipates the first stage of liberalization in 2003. In preparation, it has announced plans to cut employment by 15 to 20 percent by 2005.
These figures are summarized in Table 5.

Table 5
Impact of Liberalization on Operators' Efficiency

	Reduction in Work Force	Over Time Period
New Zealand	40%	1988 – 2001
Sweden	30	1990 – 2000
Germany	37	1990 – 1999
Great Britain	15 – 20	2002 – 2005

Compared to potential cost savings from reductions in their USO, these posts have achieved, or planned to achieve far greater gains by reducing employment.

> *There is no urban to rural cross-subsidy. Analyses of revenues and costs by route show that routes serving rural areas are, in total, quite profitable. Overall, because the Postal Service is required to break even (i.e., earn no net profit), a large number of routes are necessarily unprofitable. However, the proportion of unprofitable routes in the U.S. is approximately the same for urban and rural areas. Volume, not population density or urban character, is the major determinant of profits on delivery routes in the U.S.*[26]

Delivery routes serving rural areas as a group are profitable as are the routes serving urban areas. Consequently, there is no cross-subsidy of service to rural areas by urban area delivery. This is demonstrated by the data in Table 6. The profit for rural

[26] This section contains excerpts from Cohen, et al., (2003), "Delivery Cost Heterogeneity and Vulnerability to Entry." Similar results were documented for FY 89 by an earlier study. *See* Cohen, et al., (1993).

areas in FY 99 was $175 million. The definition of rural area used here is actually a "most rural" subset of rural households as defined by the Census Bureau. So called "rural carrier routes" serve urban and rural areas. In our study we ordered all rural carrier routes by the number of boxes per mile on each route.[27] We then selected the 60 percent of routes that serve the fewest boxes per mile and considered that these routes clearly serve rural areas.[28] It turns out that only 13.3 percent of households are included in that group of rural routes.[29] This is far less than the 22 percent of the households classified by the Census Bureau as being in rural areas.[30] Because rural routes become more profitable as boxes per mile increase, we have clearly selected the most rural of rural routes and thus understated the profits earned from delivering to all rural areas and correspondingly overstated the profits earned from delivering to urban areas.

Table 6

Rural and Urban Areas Compared \a
(FY 99)

	Routes				Profits		Delivery	
	Profitable	Unprofitable	Total	Percent of Total	(Losses) ($ Millions	Percent of Total	Points (Millions)	Percent of Total
Rural Areas	20,225	17,886	38,111	16.6%	175	4.5%	14.7	13.3%
Percent	53.1%	46.9%	100.0%					
Urban Areas	108,593	83,561	192,154	83.4%	3,730	95.5%	95.8	86.7%
Percent	56.5%	43.5%	100.0%					
Total	**128,818**	**101,447**	**230,265**	**100.0%**	**3,905**	**100.0%**	**110.5**	100.0%

a/ For the purpose of this table, it is assumed that 60 percent of the least dense rural carrier routes serve rural areas and the remaining 40 percent of rural carrer routes along with all city routes serve urban areas.

Table 6 shows that 47 percent of the routes serving our sample of rural areas of the U.S. are unprofitable and 44 percent of the routes serving remaining (presumably) urban areas are unprofitable. The major reason for this near balance is the fact that

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27 We take the number of boxes per mile as a proxy for population density.

28 The remaining 40 percent of rural routes were combined with city delivery routes to calculate profits from urban areas.

29 We assume that each box serves one household.

30 U.S. Census Bureau, http://factfinder.census.gov/.

roadside delivery by rural carriers is frequently more efficient than park and loop delivery by city carriers.[31] At any rate, it is to be expected that in a breakeven post about half the routes would be unprofitable.

In the U.S. delivery is made to buildings and also to curbside mailboxes (in cities and suburbs) and to rural roadside mailboxes. Mailbox delivery allows the carrier to place mail in the mailbox directly from the vehicle. In addition, in U.S. rural areas carriers serve mailboxes located on principal roads only, so residents who do not live on the carrier's line of travel must place their mailboxes on that road. This requirement frequently results in roadside boxes being clustered where the carrier's line of travel intersects secondary roads not on the line of travel. Boxes grouped in clusters are less expensive to serve than if they were spread out along the road.

The U.S. Postal Service also makes extensive use of kiosks for delivery.[32] Kiosks allow more efficient delivery because the carrier makes only one stop to deliver to several addresses (commercial or residential). Kiosk delivery requires recipients to walk some distance from their homes or offices to the kiosk to collect their mail. Eight and a half million addresses, or seven percent of the all addresses, are served via kiosks.

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[31] *See* Bernard, et al., (2003).

[32] Kiosks are free standing structures containing locked mailboxes (as few as three or four and as many as sixty or so). They are called "neighborhood delivery centralized box units."

The Postal Service does not have a complete letter-mail monopoly. Extensive competition exists in mail processing and transportation due to worksharing discounts. Far more of the postal value chain is in the private sector in the U.S. than in any other country. Without worksharing, Postal Service costs would be 25 percent higher. Worksharing has significantly lowered the cost of mail to the nation.[33]

Background

The United States letter monopoly is among the least liberal in the world because it is not subject to price or weight limitations.[34,35] The U.S., however, allows worksharing, which has grown steadily and substantially over time. As a result, much of the value chain is now in the hands of mailers and third-party consolidators, and, due to worksharing, the U.S. has the most liberalized postal market in the industrialized world. Because even total liberalization of the monopoly may not be effective in creating postal competition (e.g., Sweden and New Zealand), worksharing may be a more effective way to introduce competition into a postal market.[36]

In the 1970's, the Service embraced worksharing discounts in part because it felt it would be a beneficiary, in part because it made good economic sense, and in part because presort discounts were seen as a means to palliate rate increases.[37] During the latter part of the seventies and early eighties, the U.S. was experiencing high inflation and rate increases were sizable. Worksharing was the one thing that mailers, the Postal Service, and the Rate Commission could all agree to.

Starting with the modest proposal of a half-cent discount for First-Class presort in 1973, the worksharing program blossomed to include presort and barcode discounts for virtually every class of mail and dropshipping for most. One of the most surprising and unanticipated results of presort discounts in First-Class was the emergence of one or

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[33] This section contains excerpts from Cohen et al., (2002), "The Impact of Using Worksharing to Liberalize a Postal Market."

[34] There is an exception for urgent mail that requires overnight delivery and has a price twice the applicable First-Class postage with a minimum of $3.00.

[35] The so called "mailbox law" prohibits delivery to a mailbox by anyone but the Postal Service.

[36] *See* Cohen et al., (2000).

[37] The Postal Service proposed presort discounts for Periodicals in PRC Docket R77-1.

more third-party consolidators (called presort service bureaus) in almost every sizable city in the U.S. They produce about one-third of all presorted First-Class mail. They pick up mail on a scheduled basis from mailers who either don't want to be bothered with presorting themselves or who have insufficient volume for presorting. Service bureaus barcode and sort mail and frequently bring it directly to the airport mail facility for outgoing dispatch (bypassing the originating office).

Description of Worksharing Activities

Worksharing is essentially an unbundling of the postal value chain that allows mailers to select the activities they wish to purchase from the Postal Service with the proviso that the Postal Service always performs the delivery function. The selection of activities purchased depends in large part on (i) the volume and ZIP code density of the mailing (ii) the distance to the delivery point from the place of manufacture, and (iii) mailer cost.

Presortation

To receive a discount for presorting, a mailer or consolidator must present its mail in bulk.[38] The mail must be faced, not require cancellation, and letters and flats must be presented in containers or in packages that are on pallets or in sacks. The Postal Service generally offers four levels of discounts: 3-digit (ZIP code sortation), 5-digit, carrier route (including sorting to the carrier's walk sequence) and basic or residual.[39] Periodicals and advertising mail have two additional levels of presort; high density and saturation. High density generally requires a minimum of 125 pieces per carrier route; saturation generally requires at least three quarters of the addresses on a carrier route receive the mailing.

[38] A bulk mailing implies a minimum quantity, which differs from class to class. The bulk category of First-Class requires a minimum of 500 pieces and advertising mail requires a minimum of 200 pieces. In addition, the mailing must meet the makeup requirements for that class as stated in the Domestic Classification Schedule of the Rate Commission and in the Domestic Mail Manual of the Postal Service.

[39] As an efficiency measure, minimum volumes are required for each level of presort; volumes not meeting the minimum for 3-digit are submitted as basic.

Pre-Barcoding

Barcoded mail is sometimes referred to by the Postal Service as automation mail. Most letters and flats processed by the Postal Service are barcoded by the mailer or presort service bureaus. Automation discounts for First-Class, Periodicals and advertising mail require mail to be encoded with the street address and city, state, and ZIP code information.[40] To qualify for automation discounts, the addresses must be extremely accurate and contain all required information (e.g. apartment numbers and street directionals). Mailing lists used for automation mail must be checked against a USPS address database to verify that the addressee still resides at the address on the list.[41,42] Barcode discounts for parcels require only the ZIP code to be encoded.

Barcodes on letters are used by the Postal Service to sort them to the walk sequence of carriers. This is called Delivery Point Sequencing. The Service is now involved in a program to walk sequence flats. The cost avoidance for presorted letter mail is based partly on the delivery sequence operation.

Dropshipping

Parcels and Periodicals have zone rates (based on transportation costs which reflect distance). Mailers have always been able to transport zone rated mail to a post office closer to the destination to save on postal transportation charges. This is frequently called zone skipping.

The term "dropshipping" will be used here to mean mailer transport to enter mail more deeply in the sorting network, thereby bypassing handling operations. Zone rate differentials traditionally reflect only transportation costs, but drop shipment discounts

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[40] The term advertising mail, as used here, is all mail that the Postal Service now calls the Standard subclass and was formerly called Standard A or third-class mail.

[41] Fifteen percent of the U.S. population moves annually. *See* Table No. 28, Current Population Reports, U.S. Census Bureau, 1999. Thus, undeliverable as addressed mail is a considerable problem for the U.S. Postal Service.

[42] Third-party consolidators can correct out-of-date addresses in a mailing by using an optical character reader and a software program called FASTforward that checks names and addresses against a national database.

reflect both handling and transportation savings.[43] The ultimate dropshipment discount is for mail entered at the carrier delivery facility (destination delivery unit - DDU).[44] Mailers of bulk categories (except for First-Class) make extensive use of dropshipping which not only saves costs but it also results in improved service.[45]

Worksharing Volumes and Cost Savings

The 1999 presorted and barcoded volumes and associated cost savings to the Postal Service are displayed in Table 7. Dropship volumes and associated cost savings are displayed in Table 8. In 1999 the total cost savings from all worksharing activities was $15.3 billion or nearly one quarter of total USPS costs of $62.2 billion.

If the Postal Service had no worksharing discounts and instead performed all work on its total volume in 1999, its costs would have been $77.5 billion. We do not know the cost to the mailers for worksharing. In many cases the cost of presorting is quite low because much of the work is the computerized sorting of mailing lists.[46] It is reasonable to conclude, however, that the net savings to mailers and to the U.S. economy are quite substantial.

Table 7 shows that almost half of First-Class letters and cards are presorted. Given the rates of growth of workshared and single-piece First-Class mail, the volume of the former will exceed the volume of the latter in one to two years. Carrier route presort amounts to only one percent of First-Class mail. This is because (i) the amount of First-Class mail that can be sorted to the carrier route level by First-Class mailers and consolidators is inherently small, and (ii) the Postal Service provides these discounts only in the areas where they have no delivery point sequence machinery in place.[47]

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[43] Advertising mail makes the most extensive use of dropshipping. On average 21 percent of the advertising mail dropship cost avoidance is from handling and 79 percent is from transportation.

[44] ADVO Corp., the world's largest mailer, enters about 80 million pieces weekly into about 4000 delivery units all over the U.S.

[45] The deeper into the sorting network mail is dropshipped, the faster it is delivered and the narrower is the window for its delivery.

[46] In the case of barcoding there are costs to prepare mailing lists in proper format, insuring properly coded addresses, and maintaining current addresses. In the case of dropshipping, the mailer has additional transportation costs but presumably little additional handling cost.

[47] Few mailers besides utilities and government agencies have enough First-Class mail to presort to carrier route.

The *basic* categories of Periodicals and advertising mail receive discounts for barcoding only. *Basic* is a small component of each (8 percent and 10 percent respectively). Advertising mail accounts for nearly sixty percent of the total cost savings for all presorted and barcoded mail.

Single piece parcels are sent largely by households and small businesses. Almost all bulk parcel shippers presort and barcode.

Table 7

Presorted and Barcoded Mail[a]

	Volume (billions)	Percent of Total Mail	Cost Savings to the USPS ($ millions)
First-Class			
Single-Piece	57	28	N/A
Non-barcoded Presort	5	2	43
Barcoded Presort			
Basic	5	3	409
3-Digit	22	11	1,918
5-Digit	12	6	1,248
Carrier Route	1	1	138
Total First-Class	102	51	3,755
Publications			
Basic[b]	1		8
3-Digit	2	1	125
5-Digit	3	2	380
Carrier Route	5	2	923
Total Publications	10	5	1,436
Advertising Mail			
Basic[b]	9	4	272
3/5-Digit	41	20	2,679
Carrier Route	36	18	4,613
Total Advertising Mail	86	42	7,564
Package Services			
Single-Piece			
Barcoded Presort	1		136
Total Package Services	1	1	136
Other Mail	3	1	
Total All Mail	202	100	12,891

a: FY 1999 volumes; cost savings from PRC Docket No. R2000-1.
b: Savings from barcode only.

In Table 8 no dropshipped volume is shown for First-Class because no such discount is available. An unknown amount of First-Class is dropshipped for service reasons. For all classes of mail it is difficult to assemble the density to make it economically feasible to dropship at the DDU level.

Table 8

Dropshipped Mail[a]

	Volume (billions)	Percent of Total Mail	Cost Savings to the USPS ($ millions)
First-Class Mail			
Nondropshipped	**102**	**51**	
Total First-Class Mail	**102**	**51**	
Publications			
Nondropshipped	**7**	**3**	
DSCF	**3**	**2**	**64**
DDU	**0**	**0**	**7**
Total Publications	**10**	**5**	**71**
Advertising Mail			
Nondropshipped	**32**	**16**	
BMC	**19**	**10**	**509**
DSCF	**27**	**13**	**895**
DDU	**8**	**4**	**329**
Total Advertising Mail	**86**	**42**	**1733**
Package Services			
Nondropshipped	**1**	**0**	**0**
BMC	**0**	**0**	**475**
DSCF	**0**	**0**	**44**
DDU	**0**	**0**	**93**
Total Package Services	**1**	**1**	**612**
Other Mail	**3**	**1**	
Total All Mail	**202**	**100**	**2416**

a: FY 1999 volumes; cost savings from PRC Docket No. R2000-1.

The Impact of Worksharing on Employment

If the Postal Service had to perform all the worksharing functions performed by the private sector, mail processing labor costs would have increased from $14.7 to $22.7 billion in 1999. This translates into a workforce increase of 187 thousand, taking

the Postal Service from 907 thousand to 1.1 million employee work years (a 22 percent increase). The U.S. Postal Service is one of the largest civilian bureaucracies in the world. By reducing its size, worksharing has likely made it more efficient and less difficult to manage.

> *The monopoly is not necessary to preserve universal service. An analysis of the competitive upstream market shows that only 16 percent of the mail would be susceptible to diversion for delivery by competitors of the Postal Service. Thus, for the foreseeable future, it would be difficult for competitors to accumulate sufficient volume to achieve unit costs below those of the U.S. Postal Service. The experience of countries that have abolished their monopolies confirms this finding. Moreover, posts in those countries have had very large cost reductions as a result of liberalization.*[48]

The standard argument for the monopoly is that it is needed in order to maintain universal service at uniform prices. The argument is most often expressed in terms of an assumed urban/rural cross subsidy. An earlier paper by the authors[49] has shown that there is no urban/rural cross subsidy in the United States. Collectively, rural routes are profitable.[50]

Many city and rural routes are unprofitable, however. Thus, a plausible argument remains that in order to provide universal service, at uniform prices, a monopoly is needed to allow cross subsidy of unprofitable routes by profitable ones. Implicit in the argument is that the Postal Service must charge prices for delivery on profitable routes that are so far above cost that successful entry by a competitor is inevitable, and that once entry takes place, the incumbent would have to sacrifice universal service in order to survive.

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[48] This section contains excerpts from Cohen et al., (2000), "Universal Service without a Monopoly." The results described here are based in FY 97 and have been shown to still exist in FY 99 as noted above in the calculation of the cost of the USO. See Cohen et al., (2003).

[49] *See* Cohen et al., (1993).

[50] The paper divided routes served by rural carriers into quintiles based on population density. All quintiles except the least dense were profitable. Only 2.5 percent of all U.S. households are in this quintile. The loss on this quintile was $121 million or 0.3 percent of the $39 billion in postal costs for that year.

On the other hand, the incumbent provider, even without monopoly protection, has great economies of scale (and scope) owing to the fact that over half of the costs in the delivery function are fixed. The ability to spread fixed costs over large volumes make incumbents formidable competitors. If an incumbent's scale economies (i.e., volumes and fixed cost of delivery) are large enough; it may well be that the incumbent can cross subsidize money-losing routes and still have lower costs than a potential cream skimmer. Under these circumstances, the incumbent is a *de facto* monopoly capable of sustaining the universal service obligation. A recent paper by the authors quantified the difficulties an entrant would have in competing with the U.S. Postal Service.[51]

Even if cream skimming entrants were able to compete successfully with the incumbent by virtue of lower wages or more efficient operations, there is a question of how much mail would be available to these entrants, We show that only a limited portion of the market is contestable and, consequently, the incumbent can maintain the USO even with successful entry. We also show that this conclusion holds even if substantial portions of First-Class Mail are diverted to electronic funds transfer (EFT).

Comparative Advantage of an Entrant

An entrant's frequency of delivery would involve a tradeoff between cost minimization and service levels necessary to secure market share. Reducing frequency *vis-à-vis* the incumbent allows the entrant to reduce its fixed delivery costs, but it also reduces the entrant's attractiveness to time value mailers. Speed of delivery is important to mailers of a large percentage of First-Class letters, periodicals published weekly or more frequently, and some advertising mail. The authors are not aware of studies of First-Class and advertising mail that would allow their partition according to time sensitivity. Absent such studies, we will assume that entrants will adopt a twice a week delivery frequency. This assumption is consistent with the behavior of the only known large-scale competitor for an established incumbent, City Mail.[52]

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[51] *See* Cohen et al., (1999).

[52] City mail now delivers every third business day.

The argument supporting the monopoly is based on an entrant's comparative advantage as a consequence of the incumbent cross subsidizing its delivery routes. An entrant would target profitable routes only, while reducing its fixed cost by delivering less frequently than the incumbent. Even with less volume, it is argued the entrant would be able to undercut the incumbent's average cost of delivery. Thus, the argument rests on the comparative advantage the incumbent would have in the delivery function. The contestable market would, however, be determined by the economics of upstream mail processing and transportation.

Contestable Mail

Without competitive upstream activity, only the few mailers who can presort their mail to the routes serviced by the entrant and who are in proximity to the areas served by entrants could supply them with mail. Fortunately for prospective entrants, the Postal Service has unbundled upstream sorting and transportation with a whole range of discounts for barcoding, presorting and dropshipping[53]. These discounts are based largely on avoided costs. The response by mailers and third party consolidators has been substantial, and they have essentially become upstream competitors of the Postal Service. They presort as deeply as practical and transport mail as close to the delivery point as practical, given the available incentives. Consequently, a significant amount of mail could be made available to entrants without great additional effort. To help quantify this mail, Table 9 displays volumes of single piece and presorted First-Class, publications and advertising mail.[54]

Much of the carrier route volume which is produced in proximity to entrants could be delivered by them without additional upstream activity. Mail which is produced at points distant from the entrant must be transported to the entrant. Table 10 displays the distribution of carrier route presorted advertising mail by entry point as a result of

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[53] No dropship incentives are available for First-Class Mail. Not all discounts pass through 100 percent of cost savings due to rate design considerations.

[54] Single piece First-Class and presort mail without barcodes must be barcoded by the Postal Service in order to sort the mail by machine to the walk sequence of the carrier. Currently only letter mail is walk sequenced by machine. The Postal Service will be introducing machines to walk sequence flat mail in the next few years.

dropship incentives. We can see that Sectional Center Facility (SCF) and Delivery Distribution Unit (DDU) carrier route presorted mail would be available to entrants along with a small fraction of the Bulk Mail Center (BMC) and nondropshipped volume.[55] We estimate that 75 percent of carrier route advertising mail would be available to entrants.

Table 9
Presortation Levels of Mail
(1997)

	Volume (billions)	Percent of Total Mail
First-Class		
Single Piece	57.2	30.0
Presort (without barcodes)	6.2	3.3
Barcoded Mail		
Basic	4.8	2.5
3-Digit	20.4	10.7
5-Digit	9.6	5.0
Carrier Route	1.5	0.8
Publications		
Basic	0.8	0.4
3-Digit	1.9	1.0
5-Digit	3.1	1.6
Carrier Route	4.6	2.4
Advertising Mail		
Basic	5.8	4.6
3/5-Digit	33.9	17.8
Carrier Route	34.4	18.0
Other Mail	3.7	1.9
Total	190.9	100.0

Source: 1997 Revenue, Pieces, and Weight (RPW) Report

Dropship incentives do not reflect all the costs saved in publications mail.[56] We assume that if they did, the distribution of dropshipped carrier route publications mail would resemble that of carrier route advertising mail which has an incentive structure

[55] BMC dropshipped mail and nondropshipped mail would be available to entrants who happened to be located nearby.

[56] Rate design for publications mail reflects dropship incentives only *for* the advertising weight (as opposed to the editorial weight) of the publication.

that is more cost based. Because 75 percent of carrier route advertising mail would be available to entrants, we assume that 75 percent of carrier route publications mail would be available to entrants.

Table 10
Distribution of FY 97 ECR Mail
By Drop Entry Point

	Piece Volumes (billions)	Percent Distribution of Piece Volume
Non-Dropshipped	3.8	12.2
BMC Entry	6.2	19.6
SCF Entry	14.8	47.1
DDU Entry	6.7	21.1
Total	31.5	100.0

Source: USPS 1997 Billing Determinants, 0-6, page 2 of 5

Bulk Mail Center (BMC) - 21 nationwide
Section Center Facility (SCF) - 500 nationwide
Delivery Distribution Unit (ODU) - 24,000 nationwide

The amount of First-Class Mail presorted to carrier route in Table 9 reflects the fact that discounts are offered only in the relatively few locations where the Postal Service has decided not to install delivery walk sequencing automation.[57] With cost based incentives, entrants should be able to persuade mailers and third party consolidators to sort 5-digit mail to the carrier route level. On the other hand, much of this mail is time sensitive. Sorting First-Class Mail to the carrier route level for entrants would force consolidators and some mailers to separate their mail into two processing streams (time sensitive and not so time sensitive). Dividing mail into two streams, in turn, would cause the depth of sort of both streams to suffer. In addition, mail for those routes not served by entrants would have to be handed over to the Postal Service which would provide only the 5-digit discount. Thus, the extra effort required to sort mail to routes not served by entrants would not be fully recompensed. Under these

[57] These are the areas which have too few routes to earn a satisfactory return on investment for the automation

circumstances, we estimate that in addition to carrier route First-Class, half of 5-digit First-Class Mail would be available to entrants.

Not all contestable mail is delivered on residential routes. Some of it is delivered on business and mixed routes and much is picked up at post offices (especially by large volume recipients). Table 11 displays contestable volumes delivered on residential routes only.

Table 11
Contestable Volumes
(billions)

First-Class	4.6
Publications Mail	3.0
Advertising Mail	22.0
Total	29.6

This is 15.5 percent of total mail volume. The limited amount of contestable mail may make entry a marginal proposition.

Limits on the Expansion of the Contestable Market

The discount offered by the Postal Service can be looked on as the price it pays mailers and third party consolidators for sorting and transportation. In order to increase the volume of carrier route and dropshipped mail, the Postal Service would have to pay a higher price. An entrant likewise would have to pay a higher price to secure more of this mail. This would increase the entrant's cost relative to the Postal Service and make the entrant less competitive.

Another approach to boosting contestable volume would be for entrants themselves to engage in upstream processing. However, we have seen that a relatively large mailer and third party consolidator infrastructure already exists, which in effect competes with the Postal Service to provide upstream services. For an entrant to increase the size of the contestable market it must not only have lower costs than the Postal Service, it must also have lower costs than the existing competitive sector.

The basic problem of postal sorting is that eventually mail must be sorted and transported to about 220,000 delivery routes which are located all over the U.S. Very large national mailings, large to medium regional mailings and medium to small local

mailings may contain enough volume to be sorted efficiently to carrier route, bundled and transported to the SCF or DDU level. We might think of these as single source mailings direct to multiple routes. Most mailings, however, are not large enough to be efficiently sorted and transported to the carrier routes on which they are to be delivered. We might think of them collectively as multi-source mailings with indirect connections to carrier routes. They account for all the single piece and most of the bulk mail. Multi-source mailings must be aggregated for efficient sorting and transportation within the sorting/transportation network. The hierarchy of this network is:

BMCs[a]	21
3-digit areas	900
5-digit areas	24,000
Carrier routes	220,000

[a] Preferential mail (First-Class and publications bypass BMCs)

The Postal Service has determined that ten pieces is the minimum practical bundle size for carrier route mail.[58] The minimum quantity to qualify for 5-digit or 3-digit presort ranges between 125 and 150 pieces depending on shape and class. Basic presort contains residual pieces, none of which qualify for 3-digit presort discounts.

An entrant taking on the aggregation function on a national basis would have to aggregate mail and then sort to 220,000 carrier routes. It would need a nationwide network of sorting facilities with a scheduled transportation infrastructure to maintain reasonable service standards. This would be a formidable undertaking for an entrant.

To provide upstream processing and transportation outside the local area would to a great extent involve duplicating the Postal Service's network. Modern postal processing is increasingly capital intensive, employing specialized optical character readers, barcode sorters, barcode printers, and specialized container handling equipment. Proper utilization of barcodes requires complex software. The incumbent has had years to invest in plant, equipment, software and procedures, and has much human capital at its disposal. Because of the large capital requirements, and the likely

[58] Six pieces for publications mail

high cost of capital for an entrant, a competitor would have little competitive advantage even if its labor costs were somewhat lower. Moreover, a large amount of the equipment used in modern postal sortation would not be readily salable nor would the development cost of the necessary software be recoverable if an entrant tried to exit the upstream business. It could well be that a failed entrant would sacrifice most of its investment. In addition, startup costs would be large while the entrant was gaining enough market share to breakeven.

A sensible question at this point would be if upstream competition on a national scale is too difficult, why not compete on a smaller regional basis? The answer is that we already have much competition on a regional basis. Every city of size in the U.S. has at least one and frequently several consolidators that presort mail. Most of the mail they handle is First-Class, but publications and advertising mail are natural extensions. The U.S. economy is very price sensitive. The fact that these aggressive entrepreneurs do not process more mail is evidence that it is either too difficult to gather more mail or that they would not have a cost advantage over the Postal Service.

Regional sorting capability would present other problems. Only so much mail destined for a region originates in that region. Thus, the volume available would be limited. Secondly, much of the mail originating in a region is exported. A regional operator would have to turn that mail over to the Postal Service in exchange for the worksharing discount. If the regional competitor offered prices to the mailer lower than the Postal Service, it would lose money on this mail.

We conclude that it is not likely that the volume of contestable mail would expand beyond the amounts shown in Table 11. These are the figures we use in the following sections.

Competitive Routes, Contestable Mail and the USO

Entrants would have to decide on which routes to compete. They would, of course, select routes where they had the greatest chance of success. Likely they would also limit the number of routes in order to limit startup losses and risk. We think it plausible that entrants would compete on routes with above average contestable volume. We will refer to these as competitive routes. There are 84 thousand

competitive routes. They deliver 67 percent of the contestable mail. Contestable mail constitutes 27 percent of all mail on competitive routes.[59] If all contestable mail on competitive routes were delivered by entrants, they would deliver only 10 percent of total mail.

Accordingly, if entry took place on all competitive routes and if entrants captured all the contestable volume on those routes, the Postal Service would lose at most 10 percent of its total mail. The 1997 overhead contribution from this lost" mail would have been $1.6 billion.[60] This was 2.7 percent of total revenues in 1997 and 7.9 percent of total overhead[61] in that year. Recovering the lost overhead would have required an average 2.9 percent price increase on all remaining mail. By way of comparison, four of the nine postal rate increases between 1971 and 1998 have exceeded three percent in real terms.

The own price elasticity of noncontestable mail is much less than the contestable mail. The weighted average own price elasticity of contestable mail is minus 0.49, while the weighted average own price elasticity of the remaining mail is minus 0.30.[62] Thus, the volume response to price increases would not be expected to have much impact on the competitive scenario.

It does not seem, therefore, that the loss of all the contestable mail would threaten the Postal Service's ability to carry out its obligations under the USO. Furthermore, if faced with competition we could expect the Postal Service to improve its productivity as we have seen in Sweden, Germany, and New Zealand. It could well be that under competition, Postal Service costs would decrease more than revenues, even if the Service lost all of its contestable volume.

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[59] The actual volume captured by City Mail in the areas it serves (20 percent) is well within the range of contestable mail in the U.S.

[60] This is calculated as revenue minus delivery costs and attributable upstream costs.

[61] Total revenue in 1997 was $58.3 billion; institutional costs were $20.2 billion.

[62] The volume weighted price elasticities were calculated using own price elasticities developed by Postal Service witnesses George S. Tolley (USPS-T-6), Thomas E. Thress (USPS-T-7) and Gerald L. Musgrave (USPS-T-8) in Docket No. R97-1. The source of volume figures, used as weights, is the RPW Report for FY 97.

Faced with competition, the Postal Service would probably respond by offering discounts to selected, very large mailers of contestable mail. Such discounts would emulate the behavior of most other postal administrations which already offer discounts selectively, even though they maintain legal monopolies. The Service would be attempting to prevent the loss of profitable volume and to prevent entrants from achieving enough volume for them to breakeven. If selective discounts were not sufficient, the Service could broaden its approach and lower the rates for all contestable mail. The rate floor would be unit incremental costs. Its weighted average for contestable mail was about 7.2 cents in 1997.[63] A regulator would presumably allow this approach in order to ensure that only efficient entry occurred (i.e., where an entrant's average cost was below the incumbent's unit incremental cost).

As prices for contestable mail fall towards incremental costs, prices for *de facto* monopoly mail would rise to make up the lost institutional contribution. As long as the Postal Service retains enough low elasticity mail over which it has a *de facto* monopoly, it will remain able to perform its universal service obligations. Under these conditions there would be little chance of a death spiral (where prices increase in response to volume losses to competitors, causing further price increases and volume loses). Moreover, the concept of the USO is not immutable.[64] As the financial base to support the USO shrinks, the obligations of the Postal Service may also decline.[65]

The above analysis was conducted with FY 99 data. An earlier analysis with FY 89 data produced similar results and explored in greater depth the market share that a competitor would have to capture to be competitive for various levels of increased efficiency relative to the Postal Service. The following material is an extract from that material.[66]

Table 12 displays mean daily route statistics for routes when divided into quartiles reflecting their volumes of carrier route mail. We see a wide divergence in

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[63] This is the unit attributable delivery cost plus local processing costs for FY 97.

[64] Twice a day delivery was the norm until the early 1950s and door delivery was the norm until the 1970s.

[65] *See* Rawnsley and Lazur (1999).

[66] *See* Cohen et. al (1999)

carrier route volume among the quartiles. The range is from 1,263 pieces to 87 pieces with an average of 551. The first quartile routes have more than twice the volume of carrier route mail as the second quartile. In fact, the first quartile has more than half of all carrier route volume delivered on residential routes. Thus, the first quartile of routes are much more attractive targets for cream skimmers than the other routes. We again see a monotonic behavior of the other variables across quartiles.[67]

Table 12
Selected Averages for Residential Routes
When Routes Are Sorted by Volume of Carrier Route Mail per Route

					Volume (pieces)			
	Profit	Cost (cents) Per (possible)			All	Carrier	Pieces Per (possible)	
Quartile	(dollars)	Piece	Delivery	Stop	Mail	Route	Delivery	Stop
1	152	8.7	45.4	68.0	3,051	1,263	5.2	7.8
2	42	12.3	54.3	74.3	2,154	570	4.4	6.0
3	3	14.6	53.3	75.5	1,819	282	3.6	5.2
4	(35)	17.8	55.1	77.1	1,490	87	3.1	4.3
All Routes	41	12.5	51.7	73.6	2,128	551	4.1	5.9

	Deliveries		Stops		Carrier Rt % of	Percentages By Route Type		
Quartile	Possible	Actual	Possible	Actual	All Mail	Foot	Park & Loop	Curb
1	584	558	391	384	41.4	10	63	28
2	489	446	358	342	26.5	13	66	20
3	499	425	352	321	15.5	16	66	18
4	482	384	344	296	5.8	18	67	14
All Routes	514	453	361	336	25.9	14	66	20

Cream Skimmers Cost Per Piece

Table 13 has four matrices, each reflecting a different percentage of available volume assumed to be captured by cream skimmers. Each matrix presents cream skimmer unit or per piece costs based on frequency of delivery and relative efficiency of the cream skimmer. We measure relative efficiency in terms of cream skimmers cost relative to the Postal Service's cost.

[67] The only deviation from the monotonic behavior in Table 12 occurs for deliveries per route between quartiles 2 and 3.

Table 13
Cream Skimmer's Cost per Piece in Cents as a Function of Efficiency Relative to Postal Service, Days of Delivery and Percent of Carrier Route Mail

100% OF CARRIER ROUTE VOLUME CAPTURED

Delivery Days	Cost Relative to Postal Service					
	120%	100%	80%	60%	40%	20%
6	15.7	13.1	10.4	7.8	5.2	2.6
5	13.8	11.5	9.2	6.9	4.6	2.3
4	12.0	10.0	8.0	6.0	4.0	2.0
3	10.1	8.4	6.7	5.1	3.4	1.7
2	8.3	6.9	5.5	4.1	2.8	1.4
1	6.4	5.4	4.3	3.2	2.1	1.1

75% OF CARRIER ROUTE VOLUME CAPTURED

Delivery Days	Cost Relative to Postal Service					
	120%	100%	80%	60%	40%	20%
6	19.4	16.1	12.9	9.7	6.5	3.2
5	16.9	14.1	11.3	8.4	5.6	2.8
4	14.4	12.0	9.6	7.2	4.8	2.4
3	12.0	10.0	8.0	6.0	4.0	2.0
2	9.5	7.9	6.3	4.8	3.2	1.6
1	7.0	5.9	4.7	3.5	2.3	1.2

50% OF CARRIER ROUTE VOLUME CAPTURED

Delivery Days	Cost Relative to Postal Service					
	120%	100%	80%	60%	40%	20%
6	26.7	22.3	17.8	13.4	8.9	4.5
5	23.0	19.2	15.4	11.5	7.7	3.8
4	19.4	16.1	12.9	9.7	6.5	3.2
3	15.7	13.1	10.4	7.8	5.2	2.6
2	12.0	10.0	8.0	6.0	4.0	2.0
1	8.3	6.9	5.5	4.1	2.8	1.4

25% OF CARRIER ROUTE VOLUME CAPTURED

Delivery Days	Cost Relative to Postal Service					
	120%	100%	80%	60%	40%	20%
6	48.9	40.7	32.6	24.4	16.3	8.1
5	41.5	34.6	27.7	20.8	13.8	6.9
4	34.1	28.4	22.7	17.1	11.4	5.7
3	26.7	22.3	17.8	13.4	8.9	4.5
2	19.4	16.1	12.9	9.7	6.5	3.2
1	12.0	10.0	8.0	6.0	4.0	2.0

The shaded cell in the top matrix, 13.1 cents, is the Postal Service cost per piece for delivering only carrier route presorted mail in the least expensive quartile. This number is derived from the 8.7 cent cost of the Postal Service delivering all mail in the least expensive quartile shown in Table 12. If only the carrier route mail is delivered, the average delivered volume decreases from 3,051 to 1,263 in this quartile. The variable costs drop as the volume drops, but the fixed costs are spread over less volume which increases the fixed costs proportionately. The result is an increase in the unit costs to 13.1 cents shown in Table 13. Going down that column, the costs per

piece are displayed assuming a cream skimmer had the same cost as the U.S. Postal Service, but delivers fewer days per week. The costs decrease by the amount of fixed costs in delivery. The variable cost remains the same because the volume does not change. Most other national postal administrations would have a greater percentage of fixed costs because they have fewer pieces per possible delivery.[68]

The columns display cream skimmers' costs as a function of U.S. Postal Service efficiency, expressed as a percentage of the Postal Service's delivery cost per piece. The 120 percent column displays the cream skimmer's per piece cost if its cost were 120 percent of the U.S. Postal Service.[69] The 60 percent column displays the cream skimmer's per piece cost if its cost were 60 percent of the U.S. Postal Service.

For all mail the Postal Service city carrier cost (fixed and variable) is 12.5 cents per piece. (See Table 12, cost per piece all routes.) This is the cost for the delivery function. Each postal product has a variable cost for mail processing, transportation and delivery. Each product also has an average incremental (avoidable) cost. In the case of advertising carrier route mail, the average incremental cost is about seven cents.[70] If threatened by cream skimmers, the Postal Service could respond by lowering its price towards average incremental costs. If the Postal Service maintained uniform prices but had competition only in selected areas, it would sacrifice revenue in those areas without competition. These circumstances would probably call for selective discounts (with average incremental costs as a floor) to large volume mailers[71] who

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[68] *See* Cohen & Chu, "A Measure of Scale Economies for Postal Systems," Managing Change in the Postal and Delivery Industries, Ed. Crew & Kleindorfer, Kluwer Academic Publishers, 1997.

[69] This could result from either higher labor cost or lower productivity or some combination of both.

[70] The variable cost of carrier route advertising mail comes predominantly from the delivery function (in-office and out-of-office). The delivery function is about 50 percent variable. Thus, the variable cost of the advertising carrier route mail product can be much lower than the average (fixed and variable) cost of delivery. The average incremental cost of advertising carrier route mail is only slightly higher than the variable cost since we estimate it here to consist of variable costs plus single subclass stop costs for 1996.

[71] Except for a customer with a very high elasticity of demand, there is no reason for a monopoly to grant volume based discounts since customers have no alternative supplier. We understand this was the case with UPS, which had a virtual monopoly in surface parcel delivery in the U.S., and did not give discounts to surface parcel customers until Roadway Package Service began to target its most lucrative customers in the 1980s. UPS then began offering discounts to certain large volume customers.

would otherwise become customers of cream skimmers. Thus, cream skimmers would most likely have to have costs no higher than approximately seven cents per piece in order to compete on a cost basis alone.[72]

The Postal Service's productive hourly wage of more than $25 may make it likely that cream skimmers could obtain some cost advantage on that basis alone. We do not know how reducing the frequency of delivery would affect demand for alternative delivery. A two-day frequency could satisfy a three-day window, but would miss many delivery dates for time value publications. It should also be noted that some customers may not be willing to leave the Postal Service for a variety of reasons including the sense of security of dealing with a government agency.

If a cream skimmer were to capture only 25 percent of the available market, it would have difficulty succeeding. At that level of market penetration, its costs would have to be 40 percent of the Postal Service's at a two-day frequency in order to be below Postal Service incremental costs. With 50 percent of the average volume at a two-day frequency, a cream skimmer's costs would have to be 60 percent or less of the Postal Service's in order to remain below the Service's average incremental costs.

> *The costs of the monopoly exceed its benefits. In 1993, the Postal Service estimated its wage premium to be $9 billion (i.e., the total amount by which postal wages exceeded wages comparable for comparable jobs in the private sector). We calculated the scale benefits of having a single provider, as opposed to a duopoly, for delivery to be $6 billion.*

Our next paper, "A Measure of Scale Economies for Postal System,"[73] analyzed the question. Does the postal monopoly make mail more or less affordable? In a nonsubsidized postal service, the customer benefits when returns to scale are maximized by having a single firm (a monopoly) provide delivery. On the other hand, monopolies harm consumers when they protect technically inefficient behavior and allow economic rents to be extracted. This paper sets up a framework to examine the

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[72] Some mailers currently use cream skimmers because of service considerations.

[73] *See* Robert Cohen and Edward Chu, (1997).

question. Do the economies of scale in the delivery function exceed the technical inefficiencies and economic rents of the postal monopoly?

Recent empirical research confirms the widely held belief that economies of scale exist in the delivery of mail. Other functional components of the Postal Service are presumed here not to exhibit significant scale economies, although that has not been demonstrated.

Carrier street time has been extensively studied by the Postal Service. Conceptually it can be broken into components shown in Table 14. Route time is the time required to walk or drive a route, but making no deviations to deliver mail.

Access time is the time it takes a carrier to deviate from the route to make a delivery. Load time is the time it takes a carrier to put the mail in the receptacle. Route time is fixed and load time is 100 percent variable with volume. Access is partly fixed and partly variable. Analysis of extensive delivery data shows that a 10 percent increase in current volume would increase access cost by 0.6 percent.

Table 14
Carrier Street Time (1993)

Function	Cost	Percentage of Total
Route time	2,950	29.3
Access time	5,205	51.7
Elemental load time	1,912	19.0

We measured the scale economies in the Postal Service by comparing the cost of providing delivery by a single firm with that of two equally efficient firms. We began with the total cost of delivery by the USPS. Next we determined the cost of delivery if performed by both the incumbent and a second firm assumed to be equally efficient We assumed that the two firms share the market equally, each delivering a random half of the mail. We assumed each firm services the entire country each delivery day. Each firm would have the same route time costs. The number of accesses by the two firms would be greater than the total experienced by the incumbent alone because some delivery points will receive mail from both firms on the same day. Each firm would have half the load time of the incumbent because each delivers half the mail.

Summarizing our analytical results, route time would double, load time would not change, and access cost would increase. Using a Postal Service empirically based model, access cost would grow by 61 percent. Under the duopoly scenario described, total street time cost would increase from $10 billion (the cost for the monopoly deliverers) to $16 billion. Thus, $6 billion[74] represents the benefits from scale economies in delivery.[75]

But labor costs also must be taken into account when comparing a monopoly and duopoly. In 1993, the average postal worker under collective bargaining received $35,001 in pay and allowances plus $7,713 in fringe benefits. That compares with the median annual earnings (without fringe benefits) in 1993 of $24,076 for all full-time workers in the United States. Michael B. Wachter of the University of Pennsylvania and his colleagues concluded that in 1993 there was a wage- and fringe-benefit premium for the postal bargaining labor force of 29.5 percent with respect to comparable workers in the private sector.[76] That amounted to $9 billion in 1993. Thus, the monopoly rents, $9 billion, exceed the benefits of scale in the delivery system, $6 billion, by $3 billion.[77]

Technical efficiency in the USPS has not been analyzed. To the degree that the Postal Service is technically inefficient, those costs should be added to the $9 billion in rents in order to compare the costs and benefits of the delivery monopoly.

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[74] These figures use FY 93 data.

[75] If the USPS were more efficient the current sheet cost of $10 billion would be less and the resulting calculation of duopoly street cost would be less. Similarly. if the USPS were less efficient, the benefits of the scale economies would be greater.

[76] Wachter et al., (1995). Dr. Wachter has done a number of studies on the Postal Service's labor costs under contract to the USPS. Critics of previous Wachter studies claim that they ignore the fact that the Postal Service pays minorities the same as it pays white males. The critics argue that it is the Postal Service's minority employees (not white male employees) who earn more than their private-sector equivalent, and that situation only means that the Postal Service does not discriminate.

[77] Wachter's wage premium for the delivery network alone, however, amounts to only *$*2.3 billion, which is much less than the value of the scale benefits in delivery.

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