



School of Public Policy

Study on Universal Postal Service and the Postal Monopoly

Appendix F

Section 1

**Efforts to Calculate the Cost of the USO and the
Value of the Postal Monopoly in the US and Abroad**

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1 Executive Summary

Introduction

The concepts for calculating a ‘cost of universal service obligations’ were first developed in the 1990s. Since 2000, empirical efforts were made in a number of countries to quantify the cost of these obligations in the postal sector. We have carried out research on such efforts and have identified nine approaches: eight in European countries, and one in Australia. This chapter summarizes the results of our analysis of these approaches.

With regards to the purpose of the net cost calculations, a first result is that only very few methodologies were applied to justify actual compensation paid to postal operators. The results of USO cost calculations were generally used to inform liberalization policies, by assessing whether substantial costs results (or would result) from universal service obligations in a liberalized market.

With regard to the methodologies adopted to calculate USO costs, we found two broadly distinct categories of approaches:

The first category, which includes most of the earlier efforts, is based on product accounts. The approaches of this category assess the profitability of individual postal products, or aggregate product groups, or ‘mail paths’ – combination of products, types of customers (e.g. business or residential), different areas where mail is posted or delivered, or other features. Most approaches of this category do not explicitly determine a ‘reference scenario’, i.e. they do not discuss explicitly how the postal operator would change service levels if the USO was withdrawn. In these approaches, the cost of the USO is calculated as the sum of deficits of loss-making products (or product groups or mail paths). An implicit assumption of these methodologies is that all products (or product groups or mail paths) that deliver negative results would be discontinued by the postal operator if there was no universal service obligation.

The second, more recent, category of approaches analyzes the cost of alternative service levels: It considers which elements of the USO the postal operator would alter, or discontinue, in the absence of a USO. Hence, a ‘reference scenario’ is specified in these approaches. Generally, the second category of approaches can be considered to conform

to the theoretical concept of the “profitability approach” which was developed (separately) by John Panzar and Helmuth Crémer.¹

In recent quantitative applications, there is a trend towards the second category. There appears to be wide consensus that the relevant approach towards measuring the cost of the USO is to compare the additional profits postal operators could achieve if there were no USOs imposed on these operators. The crucial element of all these approaches is the determination of levels of service the postal operators would provide if the USO were relaxed. Based on our review of international USO costing methodologies, we conclude that USO costs, if there are any, are most likely to be related to three areas. Absent a USO, postal operators may increase profits by

- (1) Reducing the frequency of delivery from five or six deliveries per week to less frequent services. Such service alterations appear most important in areas with high unit cost for delivery, e.g. in the most rural areas.
- (2) Reducing the number of postal offices, and substituting traditional postal offices for contracted agencies.
- (3) Removing non-commercial price schemes and ‘social prices.’ In particular, postal operators may stop delivering mail for the blind without a charge. (Regular postage might be introduced for services for the blind. Alternatively, the services could continue to be offered free in return for a government subsidy.)

Calculations in recent models did not find a relevant cost related to requirements to provide nationwide service at a uniform rate. (But note that many European postal operators are not barred from charging non-uniform rates to bulk mailers.)

As a separate task for this study, the authors searched for methodologies that calculate the “values of the postal monopoly.” Despite an extensive review of literature, and direct questions posed to many postal regulators worldwide, we are not aware of any serious

¹ See Crémer, H., Grimaud, A. und J.-J. Laffont (2000): “The Cost of Universal Service in the Postal Sector”. In: M.A. Crew und P.R. Kleindorfer (ed.): *Current Directions in Postal Reform*, Kluwer Academic Publishers, Boston, MA, S. 47-68; and J. Panzar (2001): “Funding universal service obligations: the costs of liberalization”. In: M.A. Crew und P.R. Kleindorfer (ed.): *Future Directions in Postal Reform*, Kluwer Academic Publishers, Boston, MA, S. 101-15.

effort made internationally to estimate the value of the postal monopoly.² However, the fact that postal operators around the world have been arguing strongly in favor of maintaining their monopolies suggests that there is a substantial value to this monopoly.³

The remainder of this section briefly summarizes the nine USO costing methodologies that were reviewed for this report.

Australia / Australia Post

In Australia, the postal legislation requires that Australia Post periodically publishes the cost of the “Community Service Obligation” (CSO). In Australian usage, the CSO is the part of the postal universal service obligation that would not be provided by commercial companies under the prevailing conditions. First, Australia Post considers revenues and avoided costs of ‘mail paths’. The methodology implicitly assumes that loss-making mail paths would be stopped in the absence of the USO. Second, Australia Post adds resulting losses of facilities (after hypothetically discontinuing loss-making mail paths) and, third, a percentage of overhead costs. In FY 2006/2007, the cost of the CSO accounted for about 2.5 % of total operating expenses, and was funded by internal cross-subsidy.

Belgium / BIPT (postal regulator)

Belgian postal legislation requires that the regulatory authority BIPT (Belgian Institute for Postal services and Telecommunications) periodically calculates the cost of universal service provision. The results could be used to justify external funding (by a universal service fund). The BIPT methodology relies on the profitability reported for Belgian Post’s product accounts. The cost of the universal service obligation (called “unfair burden” by Belgian legislation⁴) is calculated as the accumulated losses of all universal

² However, chapter 6.1 presents conceptual approaches to valuing monopolies, and a method based on assigning a value to the prohibition on competition in the delivery of letters and access to mailboxes for the USPS.

³ The value of a monopoly need not necessarily be limited to economic profits. British economist John Hicks noted in 1935: “The best of all monopoly profits is a quiet life.”

⁴ Belgian postal legislation calls this loss a “charge inéquitable” (Arrêté royal du 11 Janvier 2006 mettant en application le titre IV (Réforme de la Régie des Postes) de la loi du 21 mars 1991 portant réforme de certaines entreprises publiques économiques, Article 16). This legal term is translated by BIPT as “unfair burden”. The objective of the methodology presented by BIPT is to calculate a number for this legal term. Any number produced by the BIPT model is automatically considered an “unfair burden”.

service products, minus the profits from reserved products. The financial figures are derived directly from the product accounts of the postal operator. However, no reference scenario was developed explicitly, and fully distributed costs do not appear as an appropriate cost concept to estimate which costs could be avoided if the USO were relaxed.

No results of the calculations have been published to date. The state has made no extra payment for compensating the Belgian Post for the universal postal service, and no compensation fund has been established so far.

Denmark / Danish Competition Authority

The Danish competition authority (DCA) has calculated the cost of the USO. There was no clear objective for this undertaking and Danish postal legislation does not address the issue of the cost of the USO. There is no external funding to support the universal service obligation. The DCA focuses on revenue and costs of regulated product groups which are further classified by delivery area (rural and urban). The cost of the universal service obligation is calculated as the total loss of all universal service products minus profits from ten product groups (five product groups multiplied by two delivery areas: rural and urban). The model assumes that, in the reference scenario, delivery would entirely be discontinued in some areas, and does not consider alteration in the frequency of service. In addition, the cost of providing services for blind people is added to the USO cost.

The model is based on data from the regulatory accounts of Post Danmark. We conclude that the costs reported per product group are not a good proxy for avoided cost. The approach of the DCA implicitly assumes that all loss-making product groups (i.e. delivery in rural areas) would be discontinued if there was no USO.

The Danish competition authority estimates the cost of the USO at about 700m DKR (US\$ 149m), or about 7% of Post Danmark's operating expenses in 2005.

Denmark / Copenhagen Economics

The Danish Chamber of Commerce commissioned the firm Copenhagen Economics (CE) in 2007 to estimate the cost of the USO to the incumbent, Post Danmark. Copenhagen Economics (CE) uses specific elements of the universal service obligation as starting

point for the estimation of the cost of the USO. The study analyzes elements of the USO which may unduly restrict the commercial flexibility of Post Danmark. The CE's approach is threefold: First, CE identifies services or service elements which Post Danmark would provide at lower service levels, or discontinue, in absence of the USO. Second, CE estimates the cost of relevant increments, i.e. of those USO elements which restrict the commercial flexibility of Post Danmark. Third, CE estimates the revenues that would be lost if Post Danmark reduced the service level or stopped selected services. The study considers "first round" revenue effects only. However, longer-term effects are reportedly considered in developing a "realistic" alternative business model.

If there was no USO, CE concludes that the incumbent would likely stop providing nationwide Saturday delivery and would charge for services for the blind. Given limitations of the data available from Post Danmark, CE estimates the costs avoided and the revenues lost in case of stopping Saturday delivery, and the cost of providing free services for the blind to about DKK 150m (US\$ 32m) or 1.5% of Post Danmark's operating costs in 2005. Finally, CE argues that this USO cost should be balanced with (un-quantified) benefits from being the designated universal service provider.

France / La Poste

The branch network of the French La Poste is subject to two sets of obligations: the universal service obligation and regional planning requirements. The cost related to regional planning requirements is compensated by tax reductions while the cost of the USO is subsidized internally from reserved services. La Poste periodically calculates the cost resulting from both obligations. Based on econometric modeling and using the existing branch network as starting point, La Poste determines costs and revenues of the profit-maximizing "commercial" branch network the company would operate in the absence of any obligations. The econometric model partially takes the commercial environment of La Poste into account (e.g. competition with other financial companies, reflected by the probability of shifting demands).

The cost of the USO results from the (net) cost difference to the branch network fulfilling the specific density requirements defined by the USO. The cost difference from the "USO" branch network and the current one then determines the cost resulting from

the regional planning requirements. La Poste has not published any results from its calculations of the extra costs of the branch network.

Norway / Norway Post

According to Norwegian legislation, if Norway Post provides evidence that the elements of the universal service obligation result in additional costs which are not covered by revenues, the Norwegian government can “purchase” these services from Norway Post.⁵ This has happened for several years until 2005. These subsidies (“state purchases”) for universal service ended in 2005. Norway Post’s model was used to inform the Norwegian State on the cost of the relevant increments to be covered by the profit of monopoly services and/or by state subsidy.⁶

Norway Post’s approach is guided by the question: What would be a plausible strategy for Norway Post in absence of the USO? What ‘strategic’ service level would be offered? This strategic service level is driven by commercial considerations and uses the elements of the USO as starting point. The reference scenario (in absence of a USO) is characterized by local reductions in the service quality – essentially with regard to delivery frequency. Norway Post assumes that these cutbacks in service for a few areas have only a negligible effect on sales. For the same reason, the potential benefits resulting from nationwide service provision would not be significantly reduced. For 2006 Norway Post reported as net loss of providing unprofitable postal services of NOK 253m (US\$ 50m), or about 2.3% of total operating costs.

Switzerland / Swiss Post

Swiss Post proposed an approach to calculate the universal service burden for three activities: ‘Acceptance and sales’, ‘Transport from and to the retail outlets’, and ‘Delivery route’ (the pure route without any delivery stops). While the first and the

⁵ Norway Post’s license (Art. 4.2) allows for targeted subsidies from the state budget. These targeted subsidies are called “state purchases” by Norwegian authorities (“statlig kjøp av bedriftsøkonomisk ulønnsomme tjenester”, i.e. state purchase of unprofitable services by the State).

⁶ See Konesjon til Posten Norge AS 2007-2010, Article 4.2.

second activity are related to the number of retail outlets (branch network) the third activity essentially comprises the fixed cost of the delivery activity.

In the reference scenario for the activities 'Acceptance and sales' and 'Transport' Swiss Post would run 600 outlets instead of about 2,500 outlets. Swiss Post assumes that demand (and thus variable costs) would completely shift to the remaining outlets so that the cost of the USO results from the fixed costs allocated to the "closed" offices. In delivery, Swiss Post assumed it would deliver only to 70% of Swiss households. In sum, Swiss Post's approach resulted in USO costs which amount to about CHF 500m (US\$ 460m) or nearly 8 % of Swiss Post's operating costs in 2007.

The Swiss regulator rejected the calculation for transportation and delivery activities, but endorsed the model to calculate USO costs for the retail network. In discussion between Swiss Post and the regulator, the benchmark for the retail network was determined to be 1,700 outlets (of which 1,000 are franchise agencies). The USO cost estimation for the retail network, approved by the regulator in 2008, was CHF 200m (US\$ 184m), approximately 3 % of Swiss Post's operating costs. This estimate is related to fiscal year 2007.

United Kingdom / Postcomm

In 2001, against the background of discussions on the market opening, Postcomm assessed the costs and benefits of the current universal service provision. Postcomm's approach relied significantly on Royal Mail data. Using revenue and cost data for more than 20,000 mail paths, Postcomm calculated profits and losses at different levels of aggregation. At the level of each mail path, Royal Mail has determined long-run marginal costs which are used by Postcomm as proxy for avoidable costs. The data only allows for considering "first-round" cost and revenue effects, i.e., the direct cost and revenue effects of discontinuing specific mail paths.

Postcomm calculates that at the lowest level of aggregation the total net avoided cost account for GBP 81m (US\$ 181m) or about 1.5 % of Royal Mail's operating costs in fiscal year 1999/00 (domestic mail and distribution business). At higher levels of aggregation (e.g. at the product level) net avoided costs would be significantly lower.

United Kingdom / Frontier Economics

In October 2007, Postcomm commissioned Frontier Economics to analyze the impact of changes to elements of the universal service obligation on Royal Mail.

In contrast to the previous estimation of USO costs, Frontier Economics calculated the difference between the profits associated with the provision of a service under the given set of universal service obligations, as compared to the profits with an alternative set of universal service obligations. The model further made assumptions about the level of competition. Frontier Economics' approach considers cost effects of changes in Royal Mail's operations and volumes (operational cost model), demand effects, and effects on the competitive position of Royal Mail (market share).

The study analyzed the impact of three important changes to Royal Mail's current universal service on the company's profitability. These changes were 1) lower routing time targets for first class mail; 2) the end of postal service on Saturdays, and 3) the introduction of a single two-day service instead of a first and a second class service.

Frontier Economics concludes that from all universal service elements considered in the study, only the obligation to maintain Saturday collections and deliveries impose a significant constraint on Royal Mail. The additional profits from abolishing Saturday service were estimated to GBP 271m or approximately 4% of operating cost.

2 Efforts to Calculate the Cost of the USO

2.1 Introduction

The concept of a ‘cost of universal service obligations’ was conceptually developed in the 1990ies. Since 2000, empirical efforts were taken in a number of countries to quantify the cost of these obligations in the postal sector. We have carried out research on such efforts and have identified nine approaches: eight in European countries, and one in Australia.⁷ This chapter summarizes the results of our analysis these approaches.

The objective of this chapter is to analyze and compare the different methodologies as well as their results. In order to compare the different approaches, we have sought to clarify, for each of the approaches. The following questions:

1. What was the purpose of the calculations? Was there a legal mandate for the calculation and has it been used to justify financial compensation?
2. Which services or service elements were considered in the calculations? Did they relate to the entirety of the universal service obligation, or to specific parts of it?
3. Which cost concepts were used for the calculations?
4. What ‘reference scenario’ was used? How was the incumbent assumed to alter its services if the USO was with withdrawn?
5. Which cost changes were considered in the calculations? How were revenues estimated to changes as services levels change?
6. What were the results calculated for of the cost of the USO? (To facilitate comparisons, USO costs are stated relative to the incumbents total operating expenditure.)

2.2 Australia / Australia Post

In Australia the postal legislation requires that Australian Post periodically publishes the cost of the “Community Service Obligation” (CSO). In Australian usage, the CSO is the

⁷ Methodologies used in the United States are discussed in Appendix E.1

part of the postal universal service obligation that would not be provided by commercial companies under the prevailing conditions.⁸

The Australian Postal Corporation Act of 1989 (last amended 2007) requires that

“Australia Post shall make the letter service available at a single uniform rate of postage for the carriage within Australia, by ordinary post, of letters that are standard postal articles.

Australia Post shall ensure:

(a) that, in view of the social importance of the letter service, the service is reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business; and

(b) that the performance standards (including delivery times) for the letter service reasonably meet the social, industrial and commercial needs of the Australian community.”

Specific performance standards (number and density of retail outlets, delivery frequency, and routing time targets) are defined in the Australian Postal Corporation Regulations 1998. The methodology to assess the cost of CSO is partly determined by a government direction (see NCC 1998, 184) which requires the application of an avoidable cost approach.

In accordance with government direction, Australia Post calculates the cost of the letter delivery CSO using the avoidable cost methodology. The avoidable cost methodology counts costs as CSO cost if Australia Post did not have to provide the unprofitable components of the letter delivery service. The net cost is the cost avoided less the revenue earned on the service (the revenue should be less than the cost avoided if the service is to be a CSO).

First, Australia Post calculates the appropriate share of ‘mail path’ costs that should be included in the CSO cost. A ‘mail path’ is the path followed by a letter from its point of origin from various Australia Post facilities (such as sorting centers, retail outlets, and destination delivery offices). Australia Post collects data on the costs incurred and revenues earned by her about 4,500 facilities. These figures are then allocated to mail paths using traffic indicators, which estimate how much mail flows through each facility.

⁸ For a documentation of Australia Post’s costing methodology, see National Competition Council (1998): “Review of the Australian Postal Corporation Act”, Vol. 2, p184ff.

On this basis, the costs and revenues of facilities can be allocated to mail paths. For each mail path, costs are compared to revenue. If the cost exceeds the revenue, then the excess is included in CSO cost.

Second, the model examines the costs of facilities used to provide CSO services. If, in the absence of revenue from the CSO mail paths, a facility would not generate sufficient revenue to cover its costs and make a specified return on its capital base, then the loss is added to the CSO costs.⁹

Third, Australia Post attributed a proportional share of total (state and national) overhead costs – i.e. head office costs – to the. For example, if 4 percent of Australia Post mail is carried on CSO mail paths, then 4 percent of state and national overhead costs are included in the CSO costs.

For 2006/07, Australia Post reported CSO costs of AUS\$ 97.3m (US\$ 90m) which accounted for about 2.5 % of operating expenses of the corporation. The amount is not externally funded but financed by internal cross-subsidy.¹⁰

Conclusion

The methodology implicitly assumes that all loss-making mail paths and facilities would be discontinued if the services obligation was relaxed. The calculation method reveals that the approach is static: Only “first round” cost and revenue effects of discontinuing mail paths and facilities are taken into account. Additionally, the approach is based on actual costs which may include costs due to inefficiencies in service provision.

2.3 Belgium/ BIPT (postal regulator)

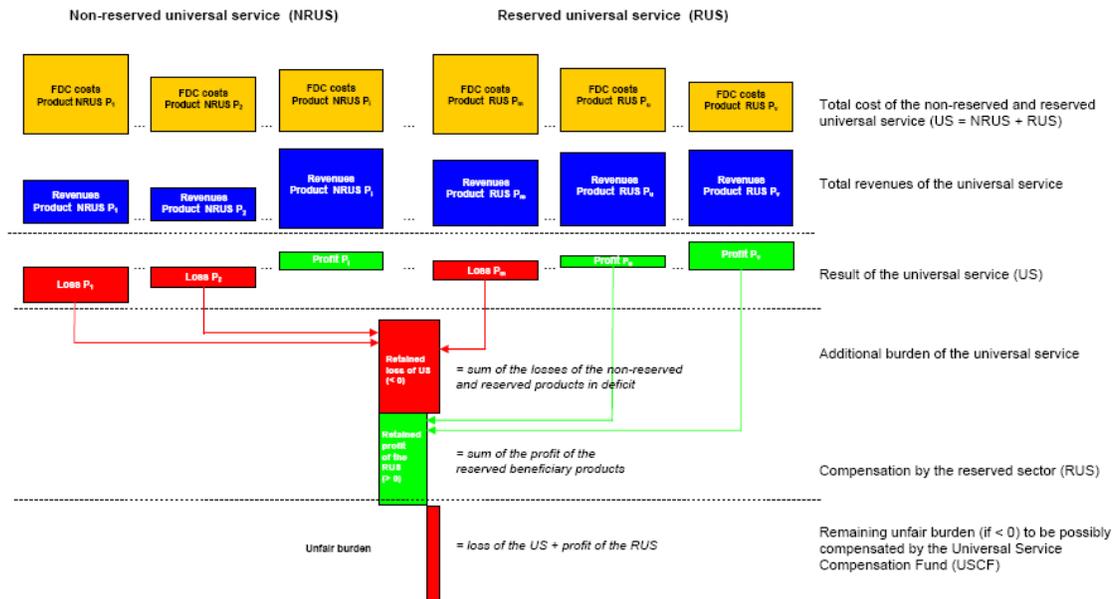
Since 2006 Belgian postal legislation¹¹ requires that the national regulatory authority (Belgian Institute for Postal services and Telecommunications, BIPT) annually calculates the cost of universal service provision. The results could be used to justify external

⁹ For example, if a facility earns \$1,000, but mail on CSO mail paths accounts for \$40, the facility is treated as earning \$960. If the facility costs more than \$960 in operating and capital costs, then the excess of costs over earnings is counted toward the CSO.

¹⁰ See Australia Post, Annual report 2006/07, p. 112.

funding. However, such a universal service fund has not been established to date. BIPT has published a methodology paper which describes the main features of the approach (BIPT 2006).

The services/products of the Belgian national postal operator La Poste/De Post are classified into four categories: 1) reserved universal postal services; 2) universal postal services open to competition, 3) public services which are not postal services, and 4) other services.¹² About 1,200 products have been categorized, about 700 of which were classified as universal postal service products. La Poste/De Post has implemented an activity cost based system. Every year, La Poste/De Post must submit directly and indirectly allocated costs and revenues per product, plus (unallocated) overhead costs.



Source: BIPT 2006.

To calculate the fully distributed cost, the BIPT model distributes the overhead costs to products using distribution keys defined by the European Postal Directive¹³. The model

¹¹ Arrêté royal du 11 janvier 2006 mettant en application le titre IV (Réforme de la Régie des Postes) de la loi du 21 mars 1991 portant réforme de certaines entreprises publiques économiques.

¹² La Poste/De Post is separately compensated by the state for losses of public services.

¹³ Art. 14, 3 of the European Postal Directive requires that costs have to be allocated based on the principle of cost causation. It defines that “a) costs which can be directly assigned to a particular service shall be so

calculates the profit/loss for every product by comparing fully distributed costs and product revenues. According to BIPT's methodology, the 'cost of universal service' corresponds to the sum of losses of all universal service products, minus profits from reserved postal services. If a loss still remains this is considered as the "unfair burden"¹⁴ of universal postal service (see the figure above).

No quantitative results have been published to date. So far, the state has made no extra payment for compensating the Belgian Post for the universal postal service nor has a compensation fund has been established.

Discussion

The calculation is based on fully distributed cost, and uses cost and revenue data provided by Belgian Post. The cost of the universal service obligation is calculated as the accumulated losses of all universal service products, minus the profits from reserved products. The financial figures are derived directly from the product accounts of the postal operator. The value added of the BIPT model is the allocation of overhead cost to products according to the guidelines of the Postal Directive. The approach implicitly assumes that all loss-making universal service products would be discontinued without the USO. Only the "first round" cost and revenue effect are considered. Additionally, the approach is based on actual costs which may include inefficiencies. However, fully distributed costs do not appear as an appropriate cost concept to estimate which costs could be avoided if the USO was relaxed..

assigned; b) common costs, that is costs which cannot be directly assigned to a particular service, shall be allocated as follows: c) whenever possible, common costs shall be allocated on the basis of direct analysis of the origin of the costs themselves; d) when direct analysis is not possible, common cost categories shall be allocated on the basis of an indirect linkage to another cost category or group of cost categories for which a direct assignment or allocation is possible; the indirect linkage shall be based on comparable cost structures; when neither direct nor indirect measures of cost allocation can be found, *the cost category shall be allocated on the basis of a general allocator computed by using the ratio of all expenses directly or indirectly assigned or allocated, on the one hand, to each of the reserved services and, on the other hand, to the other services.*"

¹⁴ Belgian postal legislation calls this loss a "charge inéquitable" (Arrêté royal du 11 Janvier 2006 mettant en application le titre IV (Réforme de la Régie des Postes) de la loi du 21 mars 1991 portant réforme de certaines entreprises publiques économiques, Article 16). This legal term is translated by BIPT as "unfair burden". The objective of the methodology presented by BIPT is to calculate a number for this legal term. Any number produced by the BIPT model is automatically considered an "unfair burden".

2.4 Denmark / Danish competition authority (2007)

The Danish competition authority (DCA, “Konkurrencestyrelsen”) reported in their 2007 Competition Report on the Danish postal market. DCA presented an estimation of the cost of Post Danmark’s universal service obligation for the financial year 2005 (see Konkurrencestyrelsen 2007, 115). There is no without legal requirement to carry out such calculations. Danish postal legislation does not address the issue of the cost of the USO; and external funding is not foreseen.

The competition authority calculates the cost of the USO based on the regulatory cost and revenue accounting data submitted by Post Danmark. It contains cost data of five product groups (letter items below and above 50g¹⁵, periodicals, parcels, and daily newspapers) which are further disaggregated on the elements of the postal pipeline (collection, sorting, transport, and delivery) plus post offices, sale’s business, and overhead costs. Finally, product group costs and revenues are further disaggregated by delivery area: rural and urban. Cost analysis reveals that delivery costs per mail item significantly vary between rural and urban delivery areas while the other cost elements of the postal pipeline are broadly invariant with regard to the population density.

The competition authority then calculated the profit or loss of the five product groups for items delivered in rural and items delivered in urban areas, separately. Additionally, the authority estimated the cost of providing free services for blind people. Finally, they summed up profits and losses per product group. In the authority’s view the overall loss is a reasonable estimate for the cost of the USO which is—in their view—primarily caused by the uniform tariff requirement for USO products.

Product group	Profit and loss		
	Rural areas	Urban areas	Total
Mail items below 50g	[..]	[..]	[..]
Mail items above 50g	[..]	[..]	[..]
Periodicals	[..]	[..]	[..]
Parcels	[..]	[..]	[..]
Dailies	[..]	[..]	[..]

¹⁵ Addressed mail items below 50g are reserved for the incumbent postal operator, i.e. for Post Danmark (monopoly services).

Free services for blind			[..]
Underfunding			[..]

Source: Website of Danish competition authority (www.ks.dk)

The calculation of the Danish competition authority resulted in an estimate for the cost of the USO of about 700m DKR (US\$ 149m) or about 7% of Post Danmark's operating expenses in 2005. However, the authority concluded that this cost would not constitute an unfair burden and expects that due to more pricing flexibility, Post Danmark will be able to decrease this cost after full market opening.

Conclusions

The Danish competition authority regarded the uniform tariff requirement as a key factor for the cost of the USO. Therefore, the methodology focuses on cost coverage of regulatory product accounts per delivery area (urban/rural). The cost of the universal service obligation is calculated as the total loss of all universal service products minus profits from ten product groups (five product groups multiplied by two delivery areas: rural and urban). The model assumes that, in the reference scenario, delivery would entirely be discontinued in some areas, and does not consider alteration in the frequency of service. In addition, the cost of providing services for blind people is added to the USO cost.

The financial data is derived from the regulatory accounts of the postal operator. Only the "first round" cost and revenue effects are considered. However, it is questionable whether the cost reported per product group is a good proxy for avoided cost: Most activities are jointly used by more than one product (especially delivery). The approach of the DCA implicitly assumes that all loss-making product groups (i.e. delivery of mail below 50 grams in rural areas) would be discontinued without the USO. In practice however, stopping the provision of one product group would increase the cost allocated to the remaining product groups.

2.5 Denmark / Copenhagen Economics (2007)

Consulting firm Copenhagen Economics (CE) was charged by the Danish Chamber of Commerce to prepare a study of the cost of the USO to Post Danmark. This study is generally regarded a response to the previous study prepared by the Danish competition authority. The Danish chamber of commerce presented the study in 2007. CE's approach is threefold:

- First, CE identifies services or service elements which Post Danmark would provide at lower service levels, or discontinue, in absence of the USO.
- Second, CE estimates the costs of the relevant increments i.e. of those elements of the USO which restrict the commercial flexibility of Post Danmark.
- Third, CE estimates the revenues that would be lost if Post Danmark reduced the service level or stopped selected services.

CE systematically analyzes which universal service requirements actually constitute a constraint in the business of Post Danmark. The study concludes that the following USO requirements could potentially be regarded as relevant constraints to Post Danmark's business:

- Nationwide delivery of postal items
- Delivery frequency: Six days per week
- Other elements of the USO: free services for blind people, routing time targets, liability requirements (for registered letters), requirements related to postal outlets and street mailboxes.

The following key questions—to be answered for every element of the USO separately—have guided CE's analysis:

Indicator	Interpretation
Does Post Danmark voluntarily offer more than required by the USO?	If Post Danmark delivers more than required, the requirement is not restrictive.
Do the competitors offer more than required from Post Danmark by the USO?	If the competitors deliver more than required from Post Danmark by the USO, the requirement is hardly restrictive. The market will provide universal service for free.

3. Do postal operators in other countries offer more than required by the USO in Denmark, although the requirements in their own USO are lower?	If postal operators in countries with lower requirements voluntarily offer a service, the obligation to offer such service is hardly a burden for Post Danmark.
Which constraints would Post Danmark in all events have as a dominant company under the Danish Competition Act?	Post Danmark will probably be dominant according to the Competition Act, which means that only the USO requirements exceeding the requirements stipulated in the Competition Act must be included.
What are the pros and cons of offering the service?	Provides a qualitative analysis of the pros and cons of voluntarily offering a USO service.

Source: Copenhagen Economics 2008

In there was no USO, CE concludes that the incumbent would likely stop providing nationwide Saturday delivery and would charge for services for the blind. The other elements would not unreasonably restrict the business flexibility of Post Danmark and, thus, would not create a “burden” resulting from the USO in CE’s view.

Given limitations of the data available from Post Danmark, CE estimates the costs avoided and the revenues lost in case of stopping Saturday delivery. CE adds the cost of providing free services for of blind people and estimates the cost of the USO to about DKK 150m (US\$ 32m) or 1.5% of Post Danmark’s operating costs in 2007. Finally, CE argues that this figure should be balanced with (un-quantified) benefits from being the designated universal service provider. CE lists the following advantages:

- Post Danmark has a dominant position in the letter mail market and is ubiquitous due to its nationwide retail and delivery network.
- Post Danmark has built up a valuable brand and a reputation as high quality postal operator. This reputation is additionally enforced by state-controlled quality of service and by the exclusive right to issue stamps with “Danmark”.
- Universal services provided by Post Danmark are exempt from value-added taxes.
- Post Danmark has a well-established postal infrastructure (post office boxes, address database).

Conclusions

Copenhagen Economics (CE) uses specific elements of the universal service obligation as the starting point for the estimation of the cost of the USO. The study identifies

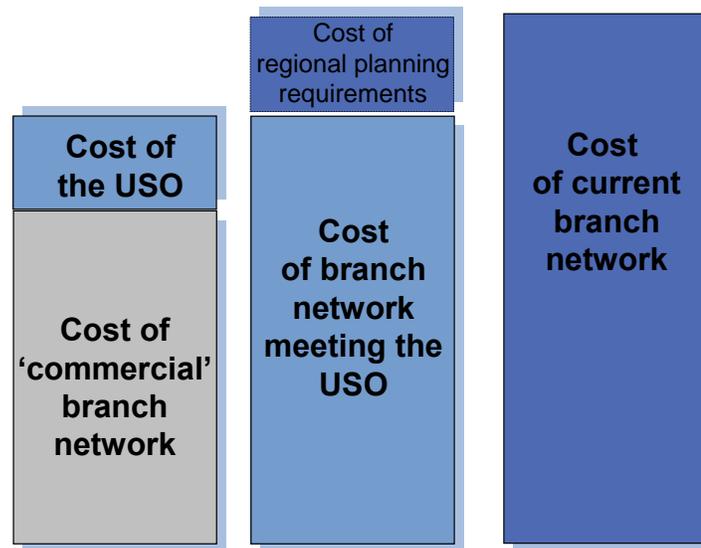
elements of the USO which may unduly restrict the commercial flexibility of Post Danmark. Consequently, it takes into account the commercial environment and actual service provision in relation to USO requirements. The study concludes that nationwide 6-day delivery and free services for the blind incur a USO cost. Due to a lack of detailed cost accounting data CE makes estimations of lost revenues and avoided costs. They consider “first round” revenue effects only. However, longer term effects are reportedly considered in developing a “realistic” alternative business model.

2.6 France / La Poste

The branch network of French incumbent La Poste is subject to two sets of obligations: a universal service obligation and regional planning requirements. La Poste is compensated for the second set of requirements by tax reductions. For this reason, La Poste developed a methodology to identify the cost of the branch network effected by the USO and effected by the regional planning requirements. Based on econometric modeling La Poste determines costs and revenues of the profit-maximizing “commercial” branch network the company would operate in the absence of any obligations. The number of retail outlets reflects the maximum (global) contribution to profit. The econometric model partially takes the commercial environment of La Poste into account (e.g. competition with other financial companies reflected by the switching probability of demand). Cost information is based on actual cost of the branch network. The cost of the USO results from the cost difference between the branch network fulfilling the specific density requirements defined by the USO and the “commercial” network. The cost difference from the “USO” branch network and the current one then determines the cost resulting from the regional planning requirements.

La Poste has developed a model to estimate the cost of the USO that solely addresses the cost of maintaining a network of retail outlets (and does not address other elements of the USO). French incumbent La Poste faces two different requirements relevant to retail outlets: the universal postal service, and regional planning requirements. Both sets define

via density criteria the scope of the branch network.¹⁶ While (additional) branch costs related to the USO shall be financed by revenues from reserved mail services, La Poste is separately compensated for meeting the regional planning requirements (by reductions in property taxes). In order to transparently allocate the costs to the different parts of the branch network La Poste established a method which estimates the counter costs resulting from the USO and the ones resulting from the other public obligations (the regional planning requirements).



La Poste implemented a complex, combined bottom-up and top-down approach (see Garcia et al. 2002). The size of the 'commercial branch network' is determined assuming a profit-maximizing postal and financial company. The determination is based on assumptions on cost and demand, and operational data for existing retail outlets.

¹⁶ French postal legislation requires that "post-office branches providing public access to services covered by the universal service, other than bulk mail, and to information about these services must be so located that at least 99% of the national population and at least 95% of the population of each département is less than 10 kilometres from a post-office branch and all communes with over 10,000 inhabitants have at least one post-office branch per 20,000 inhabitants." (Decree No. 2007-29 of 5 January 2007 on the universal postal service and the rights and obligations of La Poste and amending the Post and Electronic Communications Code, Art. R. 1-1.). Postal legislation defines with regard to regional planning that "Other than in exceptional circumstances, these requirements do not permit more than 10% of a département's population to be further than five kilometres, or more than twenty minutes' car drive under normal driving conditions for the area concerned, from the closest La Poste counter." (LAW n° 90-568 of July 2nd 1990, amended by Law No. 2005-516 of 20 May 2005, relative to the organization of La Poste and France Telecom public service, Art. 6 I)

Cost considerations include a modelling element to estimate the labour cost of a re-dimensioned branch network. Labour cost is driven by the number of manned counters. The number of manned counters is affected by total demand for postal, financial, and other retail transactions and by quality of service requirements defined as average queuing time of customers.¹⁷ Other costs are added which relate to general overhead, occupancy, and back office activities.

The demand (i.e. number of transactions and the related contribution to total revenues) is estimated by taking the probability of losing customers (and thus revenue). After removing a retail outlet, La Poste assumes that to some extent customers would switch to the adjacent post office. The switching rate depends on distance to the next post office and on the degree of competition (European Commission 2005, 23). In the model, total demand of an area depends on socio-demographic factors.¹⁸

The final size of the commercial branch network is determined in a multi-step procedure. The commercial branch network is apparently designed in a way that—at the end of the optimization procedure—postal and financial revenues correspond to the actual (current) contribution of the retail network to overall revenues. Hence, the costs of the remaining ‘non-commercial’ outlets are the costs resulting from the public obligations. These costs are then allocated to the two sets of requirements: first, the cost related to the postal USO is determined by assessing the number and location of branches necessary to meet the legally defined density requirements. Second, the difference between the current branch network and the “USO network” (i.e. commercial network plus “USO branches”) determines the cost of the relevant increment resulting from the regional planning requirements.¹⁹ So far, results are not public available.

¹⁷ La Poste models the cost function based on a waiting queue model (Erlang law). This model determines the number of manned counters provided that x % of customers wait less than y minutes in the retail outlet.

¹⁸ Econometric demand analysis revealed that the demand for financial services depends on the number of households while the demand for postal services is driven by the number of businesses with less than 10 employees (Garcia et al. 2002, 14).

¹⁹ The allocation of the costs of the relevant increments to the different sets of obligations is not described in detail.

2.7 Norway / Norway Post

Norwegian postal legislation generally prohibits cross subsidization between reserved and non-reserved postal services (see Konesjon til Posten Norge AS 2007-2010). If Norway Post provides evidence that the elements of the universal service obligation result in costs which are not covered, cross subsidization from the reserved services is permitted. If the surplus of the reserved area is not sufficient, the Norwegian state can “purchase” these services from Norway Post.^{20,21} This has happened for several years until 2005. State subsidies of universal service (called “state purchases” by Norwegian authorities) ended in 2005. Norway Post’s model was used to inform the Norwegian State on the cost of the relevant increments to be covered by the profit of monopoly services and/or by state subsidy.²²

The current USO model was developed in 2001. Two goals should be achieved: First, the model should be as simple as possible to facilitate communication and to reduce data sensitivity. Second, the model should explicitly identify which services should be purchased (and paid for) by the State. Additionally, the model should inform postal policy with regard to potential changes in design of the USO.

The starting point of the Norwegian approach is the question what would be a plausible strategy for Norway Post in absence of the USO—what ‘strategic’ service level would be offered (Bergum 2001). This (counterfactual) strategic service level is based on a continuation of Norway Post’s current commercial strategy which should be soundly adjusted for the scenario without USO. Bergum (2008) argues that the alternative commercial strategy needs to be credible. Consequently, it should not be in conflict with the strategy already communicated to the owner (the Norwegian government) and the general public. For this reason, Norway Post assumes that the alternative commercial

²⁰ Since the 1990ies Norway Post has calculated the cost of USO; initially, based on a complex calculation model based on the NAC approach (see Bergum 2002). This approach was replaced by a more pragmatic method in 2001 which is described in this section.

²¹ Norway Post’s license (Art. 4.2) allows for targeted subsidies from the state budget. These targeted subsidies are called “state purchases” by Norwegian authorities (“statlig kjøp av bedriftsøkonomisk ulønnsomme tjenester”, i.e. state purchase of unprofitable services by the State).

²² See Konesjon til Posten Norge AS 2007-2010, Article 4.2.

strategy would generally be a continuation of the current strategy which is characterized by high quality of services (including routing time of letters) and customer proximity (nationwide presence).

Bergum (2008) outlines which services Norway Post would adjust or abandon in a scenario without USO:

“Taking into account the rise in electronic communications and other postal substitutes, Norway Post defined its alternative commercial strategy in the absence of a USO as follows. First, in the most rural areas delivery frequency would be reduced from current levels of six deliveries per week. Fifteen percent of the households would likely receive mail five days per week, and another 5 percent would receive mail only twice a week. Second, mobile post office services would be reduced by half. Third, services to the blind would not be offered for free, and some extra services related to insured and registered mail would not be offered at all post offices. Fourth, uniform national rates would not apply to mail and parcels sent to and from Svalbard, an archipelago with about 2,200 inhabitants lying well inside the Arctic Circle far from mainland. [...] The definition of the alternative strategy has later been somewhat modified, mainly stating that banking services would not be offered, but that the number of mobile post offices would be kept roughly the same.”

Thus, Norway Post would generally continue providing basic postal services nationwide. According to Bergum (2008) the methodology is accepted by government as a basis for yearly payments by the State. Norway Post annually estimates the cost of the USO for the next financing year so that the Norwegian parliament can take it into account in the decision on the next year's national budget. For 2006 Norway Post reported NOK 253m (US\$ 50m) or about 2.3% of their operating costs as net loss of providing unprofitable postal services (Norway Post, Annual Report 2006, 41). No funds were allocated for government procurements in 2006, 2007 or 2008 (see Norway Post, Annual Report 2007).

Conclusions

Norway Post's approach is guided by the question: What would be a plausible strategy for Norway Post in absence of the USO? What 'strategic' service level would be offered? This strategic service level is driven by commercial considerations and uses the elements of the USO as starting point. The reference scenario (in absence of a USO) is characterized by local reductions in the service quality – essentially with regard to delivery frequency. Norway Post assumes that these cutbacks in service for few areas

have only a negligible effect on sales. For the same reason, the potential benefits resulting from nationwide service provision would not be significantly reduced. Norway Post annually estimates the cost of the USO for the next financing year (based on budget costs) so that the Norwegian parliament can take it into account in the decision on the next year's national budget. Having received such subsidies for several years, the government ceased to subsidize Norway Post in 2006.

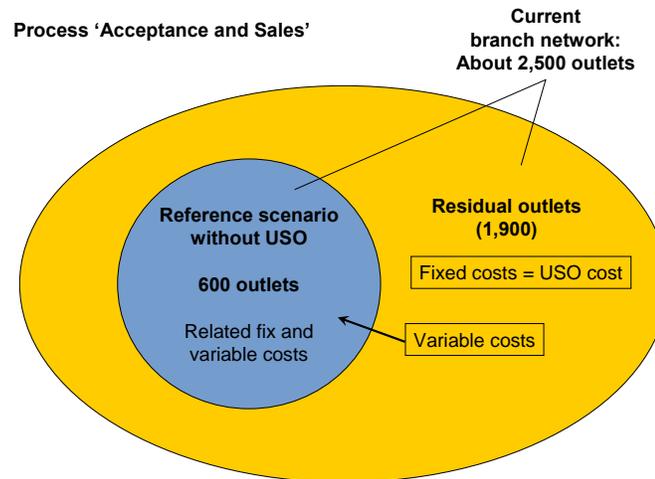
2.8 Switzerland / Swiss Post

Swiss postal legislation requires Swiss Post to calculate annually the so-called "*Infrastrukturbeitrag*" ("infrastructure contribution") which is a financial contribution to the costs of the branch network of Swiss Post. This cost is covered by internal cross-subsidies, from the surplus of reserved postal services (no external funding). In the past this contribution resulted from the difference between revenues and costs of Swiss Post's business unit *Poststellen und Verkauf* [post offices and sales]. The revenues of *Poststellen und Verkauf* consist mainly of transfer payments from other business units of Swiss Post (Mail, Logistics, and Financial Services) which are based on the number of transactions (e.g. acceptance of a registered letter). In 2004 PostReg required that the transfer payments shall cover total variable cost and the fix cost related to the operationally necessary branch network (PostReg 2004).

In response to PostReg's requirement Swiss Post proposed an approach to calculate the universal service burden in order to replace the calculation of the "infrastructure contribution". Swiss Post defines the universal service burden as the additional costs emerging from the universal service obligation (see WIK-Consult/BDO 2007). As starting point Swiss Post derived a reference scenario (in absence of the USO) with respect to three processes: 'Acceptance and sales', 'Transport from and to the retail outlets', and 'Delivery route'²³. While the first and the second activity are related to the number of retail outlets (branch network) the third activity essentially describes the fixed

²³ Delivery route means the pure round the postman has to go without any stop to deliver mail items. This route starts and ends at the delivery office.

cost of the delivery activity.²⁴ The reference scenario addressed the questions how many branches Swiss Post would need and how many households would receive delivery (coverage).



The figure above illustrates the calculation procedure for the process 'Acceptance and sales'. In the reference scenario Swiss Post would run (in sum) 600 outlets compared to about 2,500 outlets in 2006.²⁵ The figure of 600 outlets was determined by consulting the Swiss Post's three key business units: Mail, Logistics (incl. parcel services) and Financial Services. Each business unit reported an estimation of how many outlets it would need to manage the business. The business area Financial Services used the average number of bank counters of selected financial companies as a benchmark. All other business units reported they would need less than 600 branches.

Swiss Post assumed that total demand of the current 1,900 outlets would switch to these 600 outlets, i.e. no revenue would be lost. For this reason the universal service burden exclusively would arise from the fixed costs of the 1,900 outlets while the variable costs would be relocated to the 600 outlets. The cost data of the branch network was taken from Swiss Post's internal cost accounts. Swiss Post selected 600 outlets

²⁴ Swiss Post considers the costs of the other delivery activities as variable costs.

²⁵ It should be noted that more than 90 % of the outlets are directly driven by Swiss Post with own personnel

according to the number of transactions.²⁶ They would basically be located in densely populated areas.

Then Swiss Post estimated the avoided transport costs resulting from the reduction of the branch network from 2,500 to 600 outlets based on an operations research model.

In delivery, Swiss Post focused on (fixed) costs related to the pure round the postman would have to go without any stops to deliver mail items. The costs related to other elements of the delivery activity were considered as variable. As a benchmark for the 'reference case', Swiss Post referred to delivery organizations that distribute newspapers and magazines early in the morning.. These organizations covered about 70% of Swiss households in 2005. In the reference scenario, Swiss Post assumed it would equally reduce coverage to 70% of Swiss households, those located in high density areas. For these households, Swiss Post estimated the average delivery cost per household. Swiss Post used this cost figure as benchmark for delivery costs to the 30% remaining households. The cost difference between unit costs in the 'profitable areas' (70% of population) and 'non-profitable areas' (30% of population) was considered as cost of the USO.²⁷ In sum, Swiss Post estimated the cost of the USO would amount to about CHF 500m (\$ 501m) or nearly 8 % of its operating costs in 2007 (see BDO/WIK-Consult 2007, 60).

After a review of Swiss Post's approach, the Swiss regulator accepted only the approach related to the activity "Acceptance and sales". However, the regulator criticized the benchmark used for the 'commercial network'. In particular, the regulator held the

²⁶ Swiss Post arranged the outlets according to the number of transactions per type (mail, parcel, or financial transaction), calculated the simple average of these ranks per outlet, and re-ranked the outlets according to this average rank.²⁶ The 600 retail outlets with the highest score were then selected.

²⁷ A delivery route consists of x delivery segments where buildings (and households) are located at. Swiss Post has measured the average delivery time per household at the level of each delivery segment. Then, it has arranged the households according to the average delivery time and ranked in 5%-percentiles in ascending order. The first 70% of the households are categorized as located in high-density areas while the remaining 30% are classified as located in low-density areas. Swiss Post then calculates the average delivery time per household of the first 70% households as benchmark for the residual 30%. Finally, it subtracts this benchmark from the actual average delivery time per household, and multiplies the result with the total number of households living in "low-density" areas. Swiss Post classifies the resulting cost difference as additional cost resulting from the USO. However, this figure does obviously not correspond to the cost that Swiss Post would avoid when not providing delivery services to the 30 % of households living in "low-density" areas.

view that transformation of post offices to agencies should be included in the reference scenario. In the view of the regulator, the number of 600 post offices was not credible, and at odds with the general business strategy of Swiss Post. Based on separate benchmark analysis of Swiss industries (retail, banking, gas stations) and national postal operators in Europe, the regulator and Swiss Post agreed on an alternative benchmark for the size of the branch network for the reference case. This would have 1,700 outlets: 700 with Swiss Post's personnel and 1,000 postal agencies. The difference in fixed costs between the current branch network and the hypothetical commercial network amounts to ca. CHF 200m (US\$ 200m) or about 3 % of Swiss Post's operational expenses in 2007.

Discussion

Swiss Post proposed an approach to calculate the universal service burden in order to replace the calculation of the *Infrastrukturbeitrag* ("the USO cost related to the retail network"). The universal service burden is considered as the additional costs emerging from the universal service obligation. Swiss Post explicitly derives a reference scenario for the branch network: The Company would reduce the number of outlets from currently 2,500 to 600 (revised to 1,700 in the agreement between Swiss Post and the regulator). However, Swiss Post did not consider any revenue effects resulting from this reduction but assumed that total demand for mail, parcel, and financial services would switch to the adjacent outlet. Consequently, Swiss Post estimated that total fixed cost of the redundant retail outlets could be avoided in the reference scenario.

For the delivery reference case, Swiss Post proposed reducing services to 70% of Swiss households. The methodology for this calculation was rejected by the Swiss regulator.

2.9 United Kingdom / Postcomm (2001)

In UK sector-specific postal regulation started with the Postal Act of 2000. The key duties of the British postal regulator Postcomm are to safeguard the provision of the universal postal service and—subject to the first duty—to promote effective competition. By doing this Postcomm must have regard to the need to ensure that—i.a.—Royal Mail is able to finance the activities required by its license. Postcomm published a discussion

document in 2001 on the assessment of costs and benefits of current universal service provision. The purpose of Postcomm's assessment was to provide an initial analysis of the potential costs and benefits that might be associated with Royal Mail's provision of the universal postal service in the current market environment.

Royal Mail²⁸ had provided data to Postcomm at a highly disaggregated mail path ("route") level. A single mail path defines a service across a combination of attributes. Royal Mail's data are differentiated by six dimensions. These dimensions are further disaggregated by a number of sub-categories. The dimensions (and the number of sub-categories within these dimensions) include: the distance between collection and delivery point (x3); the type of product or service purchased, e.g. First Class Stamped Mail, Second Class Stamped Mail, Metered Mail (x22); the size or format of the item posted (x4); the type of recipient, i.e. residential or business (x2); the density of delivery area, e.g. rural or urban (x5); and the weight of the item posted (x11). There were 29,040 such potential routes of which 20,340 had volumes in 1999/2000.²⁹

Royal Mail has provided an estimate for average revenues and a proxy for avoidable costs for each combination of sub-categories. As a proxy to long-run avoided costs, Royal Mail has provided Postcomm with estimates for its long run marginal costs (LRMCs)³⁰ associated with a variety of services. These LRMCs are intended to reflect the costs that Royal Mail would incur (or avoid) as a result of discrete changes in volumes.

LRMCs for mail paths have been derived by taking the marginal activity costs relevant to a particular dimension of a mail path (e.g. distance) and allocating those marginal activity costs across the sub-categories of the dimension (e.g. across the three distance sub-categories). These costs are then attributed to a particular product in proportion to the

²⁸ At that time Royal Mail Holdings had been called Consignia Holdings, in November 2002 Consignia was renamed to Royal Mail.

²⁹ In 2007 Postcomm commissioned LECG to assess the USO burden of Royal Mail by applying a similar methodology. This calculation was based on data of more than 40,000 routes (Francey 2007).

³⁰ The cost incurred in processing additional volumes of mail, assuming that levels of efficiency and service are maintained and that changes are made to all resources that need to be changed in order to achieve this. The assessment is typically made over a 3 to 5 year time horizon. (Royal Mail 2007, 29)

allocation of that product's volume across the components of the route dimension. Finally, Royal Mail submitted average unit costs for mail items of each of the mail paths.

Royal Mail provided data for costs, revenues, and profits for approximately 20,000 mail paths. The calculation implicitly assumed that Royal Mail would (and could) discontinue every mail path whose revenues did not cover its LRMCs. Postcomm has used the data provided by Royal Mail to estimate the cost of the USO at different levels of aggregation.

Postcomm estimated that at the lowest level of aggregation (~20,000 mail paths) the total net avoided cost would account for GBP 81m (US\$ 181m) or about 1.5 % of Royal Mail's operating costs in the business year 1999/00. At higher levels of aggregation, the net avoided costs would be significantly lower.

Discussion

The British regulator Postcomm used extremely disaggregated data based on more than 20,000 "mail paths". Hence, the estimation is based on costs and revenues per mail path. However, Postcomm criticized that the product portfolio would not necessarily reflect the USO because the services were usually provided above the minimum required by Postal Act. Additionally, Postcomm had serious doubts that withdrawing some highly disaggregated "loss-making" mail paths was commercially viable and could be realized in practice. The withdrawal might not be possible without also withdrawing profitable mail items. Furthermore, due to joint production the cost of remaining mail paths may increase. These second-round cost effects were not considered in the approach. Moreover, Postcomm detected that the level of the "USO burden" depends on the aggregation level of the mail paths: The lower the aggregation level the higher the "burden". Finally, Postcomm pointed out that the approach did not consider any wider benefits from being the sole universal service provider.

2.10 United Kingdom / Frontier Economics (2008)

In October 2007 Postcomm commissioned Frontier Economics to analyze the impact of changes to elements of the universal service obligation on Royal Mail. In contrast to the previous estimation of USO costs, Frontier Economics calculated the difference between

the profits associated with the provision of a service under the given set of universal service obligations, as compared to the profits with an alternative set of universal service obligations. The model further made assumptions about the level of competition (see Frontier Economics 2008, 75). By this way, Frontier Economics assesses which of the selected universal service elements significantly constrain Royal Mail. The following regulated elements of the universal service are considered in detail.³¹

1. First class quality of service: The current target (93% next day delivery) would be relaxed to 90% and 85%.
2. Collection and delivery times: The current (unregulated) delivery times would be changed up to two hours earlier or later.
3. Collections and deliveries per week: (From six day service down to five weekly deliveries).
4. Class of mail: The currently required first class (D+1) and second class (D+3) services would be replaced by a single D+2 mail class requirement.

Frontier Economics did not explicitly develop a reference scenario. I.e. the report did not make any assumptions about the changes expected from Royal Mail if the USO was relaxed. Alternatively, the report investigates the effect of individual parts of the USO on Royal Mail's profitability. Therefore, Frontier Economics' results are not directly comparable with those of other studies. Even though Frontier, for example, calculates the impact of reducing the number of weekly deliveries on Royal Mail's profitability, the report does not discuss the probability of reasonableness of such service reductions for Royal.

Frontier Economics' approach considers cost effects driven by changes in Royal Mail's operations and volume (cost model), demand effects (demand), and effects on the competitive position of Royal Mail (market share). The subsequent figure summarizes the model architecture and the key questions to be answered in each of the elements:

³¹ See Frontier Economics 2008, Table 7. Frontier Economics further considers changes in the delivery and collection times and the evening packet delivery service. Both elements are not specifically regulated in the USO. Additionally, Frontier Economics briefly discusses the removal of bulk mail services priced at a

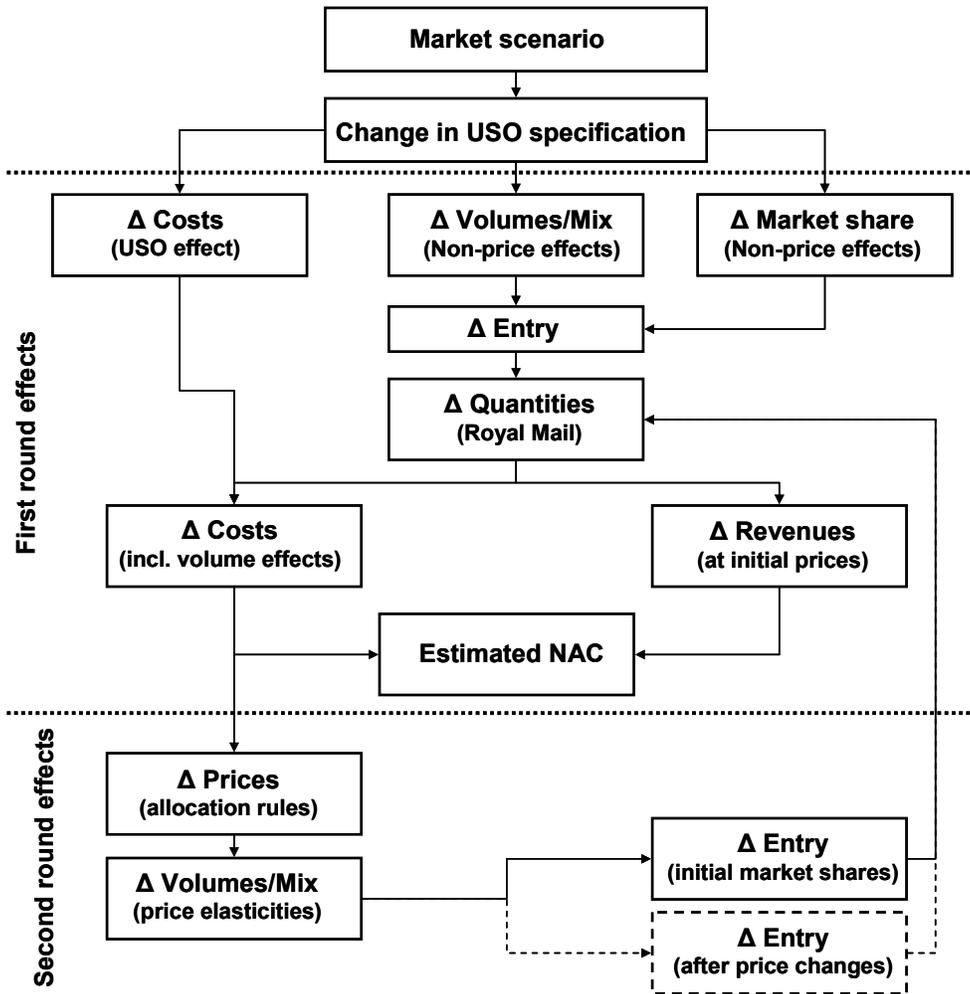
Cost model	Demand	Market share
Which operational activities would change? If volumes change, what happens to cost?	How will overall volume vary with a new service specification? What will happen to product mix—across USO and non-USO products?	Will volumes move to more or less contestable products? Will Royal Mail become more or less attractive relative to other operators?

Source: Frontier Economics (2008, Figure 1)

Further, Frontier Economics separates first round and second round effects: The first round assesses changes in volumes and costs before considering any possible price changes and results in an estimation of the net avoided cost (NAC). The second round primarily focuses on price effects (without impact on the level of estimated net avoidable cost estimated in the first round³²) which further effect volume (via price elasticities) and costs of Royal Mail's operations.

uniform tariff from USO but they have not applied their approach to calculate the NAC (see Frontier Economics 2008, 66).

³² Frontier Economics assumes that the full net avoidable costs is passed through to customers in the form of lower prices by mimicking a price control that allows Royal Mail a constant level of profits.



Source: Frontier Economics (2008, Figure 2)

The model estimates two sets of costs, revenues and volumes: the costs, revenues and volumes that Royal Mail would carry under the existing universal service specification, and the costs, revenues and volumes that Royal Mail would be expected to carry if the service specification changed (Frontier Economics 2008, 21).

Frontier Economics analyses the impact of changes in universal service elements under three alternative market scenarios. The first scenario uses actual volumes, revenues and market shares (2006-07); the second scenario uses forecasted market volumes under the assumption of intensified “access” competition (2009-10, ‘access’ scenario market shares); the last scenario uses forecasted market volumes under the assumption of intensified end-to-end competition (2009-10, ‘end to end entry’ scenario market shares).

Frontier Economics makes extensive use of Royal Mail data to populate the model with volume and operational information. Cost effects are estimated based on an operational cost model. This model is based on Royal Mail's structure of the logistical network (actual locations and number of collection hubs, mail centers and delivery offices, actual volumes transported between the locations) and shall estimate the factor input and related cost at the level of the elements of the postal pipeline (collection, transport between collection hubs/delivery offices and mail centers, transport between mail centers, in-office and street delivery activities). Demand effects are estimated using econometric evidence (based on data provided by Royal Mail), market research³³, and interviews with large mailers.

The key results of Frontier's report to Postcomm:

1. First class quality of service down to 85%: Very small first round NAC resulting from cost savings in air transport (GBP 76m). The impact on the market share is neutral.
2. No Saturday collection and delivery: Generally, revenue effects are limited while Royal Mail could realize considerable cost savings. The first round NAC amounts to GBP 271m or about 4 % of Royal Mail's operating costs in their mail business in 2006/07.³⁴
3. On single class of mail (D+2) instead of first and second class (D+1 and D+3) mail: Frontier Economics estimates a negative NAC due to high losses in market share and, consequently, lower revenues. Cost savings might be higher if Royal Mail restructured its logistical network (reduction of mail centers and delivery offices). Frontier Economics concludes that Royal Mail is likely to maintain a next day service even without a formal universal service requirement (Frontier Economics 2008, 63).

Frontier Economics concludes that from all universal service elements considered in the study, only the obligation to maintain Saturday collections and deliveries impose a

³³ Customer surveys (business customers, small and medium-sized enterprises, residential) are regularly commissioned and published by Postcomm (see www.psc.gov.uk/competition/business-customer-survey.html).

³⁴ See Royal Mail, Regulatory Financial Statements 2006/07, p. 11, Total Mails operating costs: GBP 6.64b.

significant constraint on Royal Mail. The additional profits from abolishing Saturday service were estimated to GBP 271m or approximately 4% of operating cost.

2.11 Conclusions

With regards to the purpose of the net cost calculations, a first result is that only very few methodologies were applied to justify actual compensation paid to postal operators. The results of USO cost calculations were generally used to inform liberalization policies, by assessing whether substantial costs results (or would result) from universal service obligations in a liberalized market.

The table on page 38 summarizes our analysis of international efforts to calculate the USO. As regards the methodologies adopted to calculate USO costs, we found two broadly distinct categories of approaches:

The first category, that includes most of the earlier efforts, is based on product accounts. The approaches of this category assess the profitability of individual postal products, or aggregate product groups, or ‘mail paths’ – combination of products, types of customers (e.g. business or residential), different areas where mail is postal or delivered, or other features. Most approaches of this category do not explicitly determine a ‘reference scenario’, i.e. they do not discuss explicitly how the postal operator would change service levels if the USO was withdrawn. In these approaches, the cost of the USO is calculated as the sum of deficits of loss-making products (or product groups or mail paths). An implicit assumption of these methodologies is that all products (or product groups or mail paths) that deliver negative results would be discontinued by the postal operator if there was no universal service obligation.

The second, more recent, category of approaches analyses the cost of alternative service levels: It is questioned which elements of the USO the postal operator would alter, or discontinue, in absence of a USO. Hence, a ‘reference scenario’ is specified in these approaches. Generally, the second category of approaches can be considered to

conform to the theoretical concept of the “profitability approach” which was developed (separately) by John Panzar and Helmuth Crémer.³⁵

In recent quantitative applications, there is a trend towards the second category. There appears to be wide consensus that the relevant approach towards measuring the cost of the USO is to compare the additional profits postal operators could achieve if there were no USOs imposed on these operators. The crucial element of all these approaches is the determination of a services level the postal operators would provide if the USO was relaxed. Based on our review of international USO costing methodologies, we conclude that USO costs, if there are any, are most likely to be related to three areas. Absent a USO, postal operators may increase profits by

- (1) Reducing the frequency of delivery from five or six deliveries per week to less frequent services. Such service alterations appear most important in areas with high unit cost for delivery, e.g. in the most rural areas.
- (2) Reducing the number of postal offices, and substituting traditional postal offices for contracted agencies.
- (3) Removing non-commercial price schemes and ‘social prices’. In particular, postal operators may stop delivering mail for the blind without a charge. (Regular postage might be introduced for services for the blind. Alternatively, the services could continue to be offered free in return for a government subsidy.)

The recent models did not find a relevant cost related to requirements to provide nationwide service at a uniform rate.³⁶

³⁵ See Crémer, H., Grimaud, A. and J.-J. Laffont (2000): “The Cost of Universal Service in the Postal Sector”. In: M.A. Crew and P.R. Kleindorfer (Hrg.): *Current Directions in Postal Reform*, Kluwer Academic Publishers, Boston, MA, S. 47-68; and J. Panzar (2001): “Funding universal service obligations: the costs of liberalization”. In: M.A. Crew and P.R. Kleindorfer (Hrg.): *Future Directions in Postal Reform*, Kluwer Academic Publishers, Boston, MA, S. 101-15.

³⁶ Note that many European postal operators are not barred from charging non-uniform rates to bulk mailers.

Table: Summary of international efforts to calculate the USO

Country Model developed by	Australia Australia Post	Belgium BIPT (postal regulator)	Denmark Danish competition authority	Denmark Copenhagen Economics for Chamber of Commerce	France La Poste	Norway Norway Post	Switzerland Swiss Post	U.K. Postcomm (postal regulator)	U.K. Frontier Economics for regulator Postcomm
Purpose	Legal reporting requirement	Legal requirement to calculate	Inform policy	Inform policy	Reporting required by regulator	Determine amount of subsidy (until 2005)	Legal reporting requirement	Inform policy	Inform policy
Model category	Product accounts (partly)	Product accounts	Product accounts	USO elements	USO elements	USO elements	USO elements	Product accounts	USO elements
Services / USO elements considered	"Mail paths" Facilities (essentially post offices) Percentage of overhead costs	Product accounts for all universal service products (about 700)	Product groups per delivery area (rural/urban) Free services to the blind	Nationwide delivery Delivery frequency Routing time targets	Post offices	Delivery frequency Post offices Free services to the blind	Post offices Nationwide delivery	"Mail paths" (about 20,000)	Delivery frequency Routing time targets Single class of mail (only D+2 service)
Reference scenario (no USO) established?	No	No	No	Yes	Yes	Yes	Partly (only for post offices)	No	No (Separate calculations for various changes in service levels)
Cost concept	Avoidable Costs	Fully Distributed Costs	Unclear	Avoidable Costs	Avoidable Costs	Avoidable Costs	Avoidable Costs (only for post offices)	Avoidable Costs	Avoidable Costs
Result of calculation	FY 2006: AUS\$ 97.3m (US\$ 90m) 2.5% of op. ex.	Not published	FY 2005: DKK 700m (US\$ 149m) 7% of op. ex.	FY 2005: DKK 150m (US\$ 32m) 1.5% of op. ex.	Not published	FY 2006: NOK 253m (US\$ 50m) 2.3% of op. ex.	FY 2007: CHF 500m (US\$ 501m) 7.8% of op. ex.	FY 1999/00: GBP 91m (US\$ 181m) 1.5% of op. ex.	FY 2006/07: Saturday service: GBP 271m (US\$ 542m) 4% of op. ex.
External funding?	No	No but possible	No	No	No but possible	Yes, until 2005	No but possible	No	No

3 Efforts to Calculate the Value of the Postal Monopolies

3.1 Introduction

The authors have carried out extensive research for methodologies that calculate the “values of the postal monopoly”. Despite a thorough review of literature, and direct questions posed to many postal regulators worldwide, we are not aware of any serious effort made internationally to estimate the value of the postal monopoly.

3.2 Postal monopoly

Ubiquitous collection and delivery of postal items at uniform tariffs, and additional requirements in service standards (e.g. nationwide counter service) are constituent elements of the postal universal service. This may result in a decoupling of the direct relationship between the cost to offer the service and the price paid for it. Consequently, postage price does not necessarily reflect the actual cost of the service. In order to safeguard the financial stability of the postal operator, services priced under cost have to be cross subsidized by services being priced above cost.

The system of cross subsidy has traditionally been maintained by restricting entry to the postal market by means of a postal monopoly. In EU postal legislation, the scope of the mail monopoly is closely linked to the maintenance of the universal postal service. Currently, the reserved area may include only items of domestic and incoming cross-border correspondence which weigh less than 50 grams and for which the transportation charge is less than two and a half times the public tariff for an item in the lowest weight step of the fastest standard category of service. Within these limits, postal services for domestic and incoming cross border correspondence may be reserved for the USP only “to the extent necessary to ensure the maintenance of universal service”.³⁷

³⁷ The reserved area may be extended in two respects. First, the reserved area may include direct mail falling within the same price and weight limits but again, only “to the extent necessary to ensure the maintenance of universal service”. Second, the reserved area may include outgoing cross-border mail falling within the same price and weight limits but only “to the extent necessary to ensure the maintenance of universal service, for example, when certain sectors of postal activity have already been liberalized or because of the specific characteristics peculiar to the postal services in a Member State”.

Beneath this ceiling of the potentially reservable area, the Postal Directive's repeated insistence that a reservation may be introduced only "to the extent necessary to ensure the maintenance of universal service" implies a duty to adjust the reserved area to the economic requirements of universal service. This provision of the Directive has been more honored in the breach than in the observance.³⁸ No EU Member State has prepared a study that relates the scope of the reserved area to the need to maintain universal service. The only substantive studies undertaken by Member States (SE, UK) have concluded that no reserved area is needed to maintain universal service once the USP has been given a reasonable opportunity to adjust to competitive conditions. UK Postcomm's analysis indicates

"that the financial position of Royal Mail and hence its ability to provide the universal service is more vulnerable to inefficiency and a lack of innovation than to market share loss from competition. Postcomm has no doubt that the best way to encourage Royal Mail to become more efficient and innovative is by introducing the rigors of competition. In this way, competition is a means to safeguarding the universal service" (UK Postcomm 2002, 29).

By end of 2010, postal monopolies will expire in most EU Member States. This decision implicitly reflects the common understanding in the EU that safeguarding the postal universal service does not necessarily require a postal monopoly.

The fact that postal operators around the world have been arguing strongly in favor of keeping their monopolies suggests that there must be substantial value to this monopoly.³⁹ However, we are not aware of any serious effort made internationally to estimate the values of postal monopolies.

3.3 Mailbox monopoly

The mailbox monopoly in the United States appears to be unique. Consequently, there are no precedents of calculations for determining the value of the mailbox monopoly.

³⁸ See WIK-Consult 2004, 45-

³⁹ The value of a monopoly need not necessarily be limited to financial profit. British economist John Hicks noted in 1935: "The best of all monopoly profits is a quiet life".

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School of Public Policy

Study on Universal Postal Service and the Postal Monopoly

Appendix F

Section 2

**Methodologies for Costing the USO and Valuating the
Letter and Mailbox Monopolies**

John C. Panzar

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1 Introduction

The Postal Accountability and Enhancement Act (PAEA) requires the Postal Regulatory Commission (PRC) to provide to Congress an in depth report on the origins and implications of the monopoly protections enjoyed by the United States Postal Service and the impact of the Universal Service Obligations (USO) that are uniquely placed upon it. As detailed in other parts of this study, there are substantial historical and legal dimensions to these issues. Here, we focus on the methodological issues that arise when one attempts to quantify the economic magnitudes of the values of the letter and mailbox monopolies enjoyed by the Postal Service as well as the cost to the Postal Service of meeting its USO requirements. More specifically, we seek to understand how to quantify the following concepts involving the Postal Service:

- **COST OF THE USO:** What is the cost to the Postal Service of maintaining the current level of mandated USO services?
- **VALUE OF THE LETTER MONOPOLY:** What is the value to the Postal Service of the prohibition on competition in the delivery of letters?
- **VALUE OF THE MAILBOX MONOPOLY:** What is the value to the Postal Service of the prohibition on the use of customers' mailboxes by competitors?

Due to liberalization initiatives in Europe, there have been a large number of studies attempting to quantify USO costs in various countries.¹ Our methodology has important similarities and differences with those employed elsewhere. However, the overarching distinguishing feature of our methodological approach is that it is specifically tailored to the current, post PAEA, situation of the Postal Service. This regulatory environment has no close parallel elsewhere. Therefore, the questions our methodology has been developed to address differ substantially from those used in studies designed for use in other countries.

¹ List of citations. See also Appendix F1 of this study.

The importance of the post-PAEA status quo in our analysis results from the fact that the questions addressed are inherently *counterfactual*. That is, they necessarily require the comparison of a status quo situation with some specified hypothetical alternative: e.g., a situation in which the Postal Service no longer enjoyed its mailbox monopoly. Obviously, the nature of the desired calculation may be quite different when the status quo situation involves PAEA style price cap regulation or the “cost plus” form of regulation previously practiced by the PRC.

Our methodological discussion begins with determining the costs associated with the Postal Service’s USO. This is the exercise with the closest parallels internationally because no other country has a mailbox monopoly and many other countries are in the process of eliminating their letter monopolies. However, as we shall see, the principles of counterfactual analysis we develop for USO costing carry over to the monopoly valuation exercises discussed later.

2 Basic Issues

2.1 Defining the status quo benchmark

Our analysis is predicated on the assumption that the determination of USO costs and the valuation of the Letter and Mailbox monopolies is made possible by a comparison of a hypothetical market outcome with the current situation of the Postal Service. This status quo benchmark includes all of the provisions of PAEA: e.g., the regulatory regime, the framework of postal wage determination, etc. This does not mean that we will not occasionally provide calculations indicative of what might happen if one hypothetical situation were replaced by another; e.g., what the effects might be of following the elimination of the USO with liberalization. For the most part, however, we avoid such flights of fancy. It is difficult enough to deal with one counterfactual at a time.

2.2 Specifying the relevant counterfactual(s)

Determining the “cost” of a particular obligation or the “value” of some monopoly franchise requires a comparison between two situations: one with and one without the obligation or monopoly position in question. By definition, at least one of these

situations will be *counterfactual*. That is, it will require assumptions about how the firm would behave in some hypothetical situation. Often (but not always) the other situation of interest involves the firm's current, status quo situation.

To take a concrete example, suppose that one were interested in evaluating the impact of removing the requirement that the Postal Service deliver six days per week to most residential addresses. The starting point for the comparison would naturally be the current operations of the Postal Service, which reflect the six day per week constraint. But, how does one specify the counterfactual alternative to which the status quo is to be compared? There are multiple aspects to this decision. First, one must determine whether there are any other constraints on Postal Service operations that are also being relaxed; e.g., expanding curbside or cluster delivery options, etc. Next, it is necessary to make some assumption about how the counterfactual level of delivery frequency will be determined. For example, one might assume that the change to be evaluated would be that of moving to the *requirement* of a three day per week delivery frequency. Alternatively, one might wish to make a comparison of the status quo with what an unconstrained Postal Service would choose to do. In that case, it would first be necessary to specify what delivery frequency the Postal Service would choose to make if it were totally unconstrained with respect to delivery frequency. The end result might also be a counterfactual situation with three day per week delivery, but the nature of the conceptual exercise is quite different. The latter case necessarily calls for an additional layer of speculation.²

2.2.1 The important role of PAEA Price Caps

It will be come clear that the counterfactual profit comparisons discussed in Section 5, below, clearly depend upon the extent of PRC regulation that would remain if the Mailbox and/or Letter monopolies were removed. At one extreme, one could take the position that the removal of both monopolies would be accompanied by the removal of *any* regulation of the Postal Service: i.e., liberalization *and* price deregulation. This does

² The possibilities for alternative scenarios can obviously expand quite rapidly if one is required to take a position on what an unconstrained Postal Service might choose to do. For example, does one assume that the Postal Service acts to maximize profits?

not seem to us to be a likely scenario for the U.S. anytime soon. Judging from the experience in Sweden, the UK and, even, New Zealand, it seems likely that some form of price cap regulation would accompany even full liberalization. Therefore our analysis will conduct the relevant profit comparisons under the assumption that PAEA Price Cap regulation of the Postal Service remains in place.

This assumption plays an important role throughout our analysis. Whenever one specifies a counterfactual market outcome from which to make a profit comparison, it is necessary to take into account the likely response of the Postal Service to the changed situation. These predicted responses will typically be quite different under post-PAEA Price Cap regulation than under the previous PRC regulatory regime because of the pricing flexibility granted to the Postal Service under PAEA. For example, the Postal Service can respond much more quickly to the threat of entry in the post-PAEA environment. In addition, the Postal Service's contribution losses from the required price cuts may sometimes be at least partially offset by price increases elsewhere without violating the constraint imposed by its price/revenue cap. In general, when PAEA Price Caps are part of the hypothetical liberalized market equilibrium, the impact on Postal Service profits will tend to be less than under the pre-PAEA regulatory regime.

2.3 How are “costs” and “value” to be measured?

Once one has carefully specified the relevant counterfactuals to be compared, one must decide exactly what measurable aspects of the two situations are to be compared. For example, when the purpose of the exercise in question is to measure “USO costs,” it is tempting to assume that the relevant magnitudes for comparison are Postal Service expenditures in the two situations, with and without the USO constraint. However, this comparison would *not* answer the question: The question “What is the economic impact of the USO on the Postal Service?” should be addressed by measuring the increase in Postal Service *profits* that would occur if the USO constraint under discussion were eliminated. This is the most relevant magnitude to measure because it identifies the amount that USO can be said to “burden” the Postal Service. This *profitability cost*

measure of the cost of the USO has therefore won widespread theoretical support.³ Attempts have also been made to calculate USO profitability costs in practice.⁴

The profitability impact is more obviously the relevant magnitude to quantify when assessing the economic value of a monopoly position held by the Postal Service. In this case, the primary methodological issue is to make clear that the differences to be measured or estimated are *Postal Service* profits with and without the monopoly protection in question. That is, we are not attempting to estimate the amount of money that could be raised by auctioning off a letter or mailbox monopoly to the highest bidder. Our calculations are anchored to the existing realities of Postal Service obligations: labor rules, pension obligations, etc.

Our emphasis on profitability measures of USO costs and monopoly values underscores the importance of keeping in mind that the starting point of our analyses is the post-PAEA postal environment in the U. S. Of particular importance is the price cap regulation to which PAEA subjects the Postal Service. Specifically, the fact that this price cap regime is *not* designed to regularly adjust prices so that the Postal Service is held to a “breakeven” level of economic profits. Under a regulatory regime that imposed a breakeven constraint on a more or less continuing basis, the profitability cost of any USO provision would be zero, by definition. If a change in the structure of the USO constraint were to increase postal profits, the regulator would respond by lowering prices to restore budget balance. Another, more complicated approach would be required to properly measure USO costs and monopoly values in such a situation.⁵

³ The profitability approach was introduced in Cremer, H., Grimaud, A., and Laffont, JJ., “The Cost of Universal Service in the Postal Sector” in *Current Directions In Postal Reform*, Crew, M., and Kleindorfer, P., (eds.), Kluwer, 2000 and Panzar, J., “A Methodology for Measuring the Costs of Universal Service,” *Information Economics and Policy*, 12 3 September, 2000.

⁴ See Appendix F1 for examples.

⁵ For a discussion, Panzar, J., “Funding Universal Service Obligations: The Costs of Liberalization,” in *Future Directions in Postal Reform* in Crew, M., and Kleindorfer, P., (eds.), Kluwer, 2001.

3 A Heuristic Framework

Figure 1 provides a useful heuristic framework for visualizing the types of calculations required to obtain profitability measures of USO costs and monopoly valuations. The horizontal axis measures “quality of service”. The vertical axis measures “the degree of monopoly.” Of course, neither concept can be measured as a continuous variable along a single dimension. As discussed elsewhere in our study, the USO of the Postal Service involves various dimensions of service quality and any changes might involve a quite complicated set of options. Similarly, the extent of the Postal Service monopoly is, itself, a complicated notion, not easily quantified. Nevertheless, the diagram is a useful abstraction. Movements to the right involve a more stringent USO involving a higher quality of service. Similarly, upward movement denotes a greater degree of monopoly restrictions.

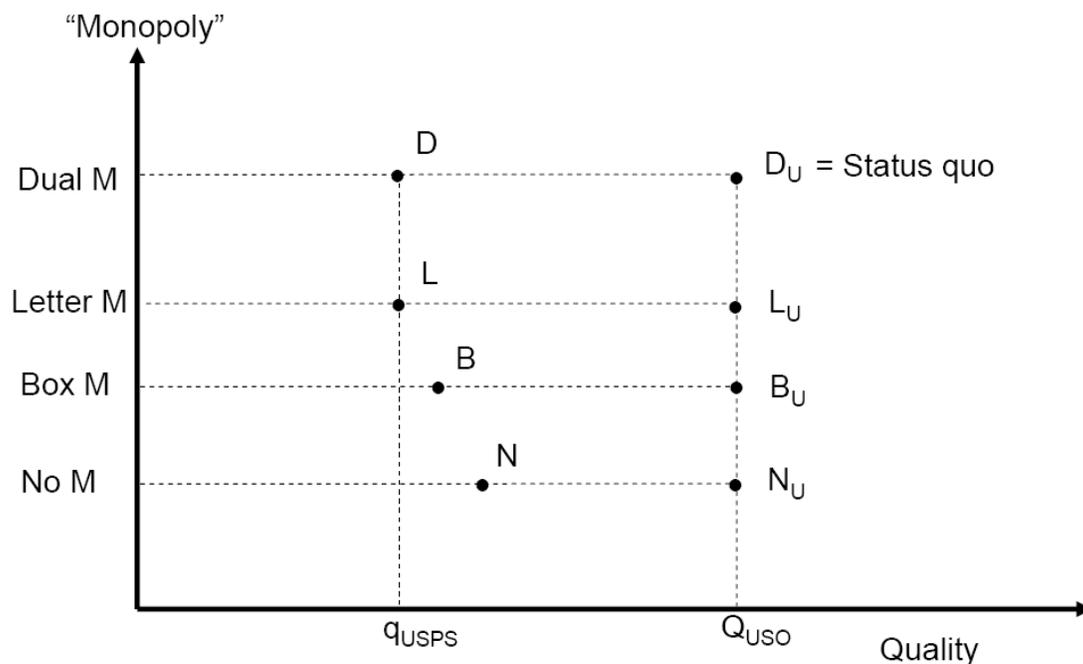


Figure 1: Heuristic Framework

With these conventions in mind, the diagram can be used to “locate” the postal policy options of interest. We begin with the status quo situation, at the point labeled D_U . The Postal Service is assumed to enjoy both the mailbox monopoly and the letter monopoly

and to be bound by current statutory and procedural USO descriptions symbolized by the level Q_{USO} . From that starting point, removing *only* the mailbox monopoly while maintaining existing USO requirements would result in a vertical movement to L_U . Similarly, removing *only* the letter monopoly under existing USO requirements would be represented by the point B_U . Finally, the point N_U depicts the operating situation of a Postal Service without any monopoly protections but subject to existing USO requirements.

Next, consider changes in the level of mandated service quality/USO requirements.⁶ First consider a reduction in a status quo USO obligation e.g., from six days per week to three days per week. If monopoly protections remained the same, this would be depicted in the diagram as a horizontal movement from the status quo D_U (with quality level Q_{USO}) to the point D , which is associated with a lower quality of service level, q_{USPS} .⁷ Providing the same level of service quality in the absence of the mailbox monopoly would result in hypothetical Postal Service operations at L .

The last two points on the diagram depict hypothetical Postal Service operations without the letter monopoly. Point B reflects a situation in which the Postal Service, with only a mailbox monopoly, is allowed to operate under a less severe USO requirement than Q_{USO} . Point N illustrates the analogous situation under full market liberalization.⁸

There is an important third dimension to Figure 1 that is not shown. Associated with each point in the {"Monopoly", "Quality"} plain is a level of profit that can be earned by the Postal Service under those competitive conditions and USO requirements. Diagrammatically, these profit levels would be measured as the "height" above the page.

⁶ Elsewhere, we use "quality of service" as one of seven components of universal service and universal service obligations. Here, the term "quality" is used to encompass all such obligations.

⁷ As noted earlier, one may either view the USO/quality level q_{USPS} as being specified by Congress or a regulatory authority or as the unconstrained choice of the Postal Service.

⁸ Again, the quality/USO standard may be a result of Postal Service decisions or regulatory constraint. However, in competitive scenarios one must also consider the possibility that market forces may dictate a higher than legally required level of service quality. This is the situation depicted in the diagram at points B and N . That is, the diagram assumes that competition would force a hypothetical Postal Service protected by only a mailbox monopoly to operate at a higher level of service quality than q_{USPS} ; the quality outcome in a liberalized market would be higher yet.

We shall not attempt to depict profit levels on a 3D diagram, but it is important to remember that it is *profit differences* that are the quantitative magnitudes of interest.

4 Costing the USO

We are now in a position to illustrate how to apply this conceptual framework to the problem of measuring the quantitative impact of a policy decision such as a change in the stringency of the USO. As noted above, the first step in such an analysis is to identify the relevant counterfactual. That is, one must begin by specifying the situations that are to be compared. This step sounds obvious, but is often controversial and always requires a thorough understanding of the context of the policy issues involved. Once one has identified the operating scenarios relevant for comparison, it remains to carefully specify how the Postal Service profit levels in the two situations are to be measured and compared. As discussed above, of all the operational magnitudes that might differ between the two situations, the *profit* difference is the one that most accurately reflects the cost of the USO requirement at issue.

4.1 *The USO is a set of constraints*

At the most basic level, the USO consists of a *set of constraints* imposed on the Postal Service's economic decisions relating to the products and services it provides. These may take the form of quality of service constraints and/or pricing constraints. Examples of quality of service constraints include the provision of six days per week delivery and rural service at 1983 levels. Examples of pricing constraints include uniform pricing for letters and books; reduced rates for non-profit mail; and free mail for the blind.

As we have emphasized, it is of fundamental importance to identify the qualitative type of the comparison to be made: i.e., D_U to D versus N_U to N . However, substantial modeling decisions must be made even after resolving such conceptual issues. Remember, there are many dimensions of service quality that make up the USO and a complete counterfactual comparison must specify alternative standards for *all* of them. There is likely to be substantial controversy over what alternative levels are "reasonable." The only practicable solution would seem to be to specify particularly salient values for

the important dimensions and perform the calculations for as many of the relevant combinations as possible.

4.2 The relevant counterfactuals for costing the USO

Our earlier discussion identified eight different stylized Postal Service operating scenarios. In principle, one could compare each of the alternatives involving the status quo level of the USO (i.e., points D_U , L_U , B_U , and N_U) with any of the points involving a relaxed USO requirement (i.e., points D , L , B , and N). However, it should be clear that most such comparisons can be ruled out on *a priori* grounds. For example, a comparison of the operating outcomes between D_U and L would confound two effects: the relaxation of the status quo USO standard and the elimination of the mailbox monopoly. Thus it makes sense to consider comparing only the results of *horizontal* movements: i.e., D_U to D , L_U to L , B_U to B , or N_U to N .

Depending upon circumstances, any of these horizontal comparisons might be of interest. However, we argue that the hypothetical movement from D_U to D is most relevant in the post-PAEA U.S. postal environment. Since PAEA did not remove either the Letter or mailbox monopoly, it seems most reasonable that any counterfactual analysis involving the USO should be conducted under the assumption that those monopoly protections remain in place. In contrast, in a liberalized postal environment such as that emerging in Europe, the comparison of interest would be between N_U and N . (Of course, our methodological approach is applicable to that comparison as well.)

4.3 USO costs result from carefully specified profit comparisons

As discussed earlier, there is a level of Postal Service profit associated with each point combination of USO constraint and level of protected monopoly. Determining the profitability cost of changing any specified USO constraint therefore requires comparing the level of Postal Service profitability in two situations. In Figure 1, levels of Postal Service profitability were only implicit, making it difficult to visualize the required comparison. Figure 2 remedies this problem by directly plotting the relationship between Postal Service profitability and the stringency of the USO. However, since Figure 2 is only a two dimensional diagram, this still requires an expositional compromise. The

relationship between Postal Service profits and service quality can only be depicted if a particular level of monopoly protection is assumed. In the diagram, the curve, Profit (Q; Dual M), illustrates such a hypothetical relationship under the assumption that both the Mailbox and Letter monopolies enjoyed by the Postal Service remain in place. Alternatively, if one were interested in USO profit comparisons in a liberalized market, it would be useful to plot a curve such as Profit (Q; No M). This curve depicts a hypothetical relationship between Postal Service profits and service quality in the absence of any monopoly protections. Comparing these two hypothetical curves, we see that they reflect the plausible relationships discussed above. First, in either case, the level of quality associated with the status quo USO constraint results in a lower level of Postal Service profits than would be possible if the level of quality were reduced. Second, Postal Service profit opportunities are lower in the absence of monopoly restrictions. That is, the Profit (Q; Dual M) curve lies above the Profit (Q; No M) curve for all levels of Q.

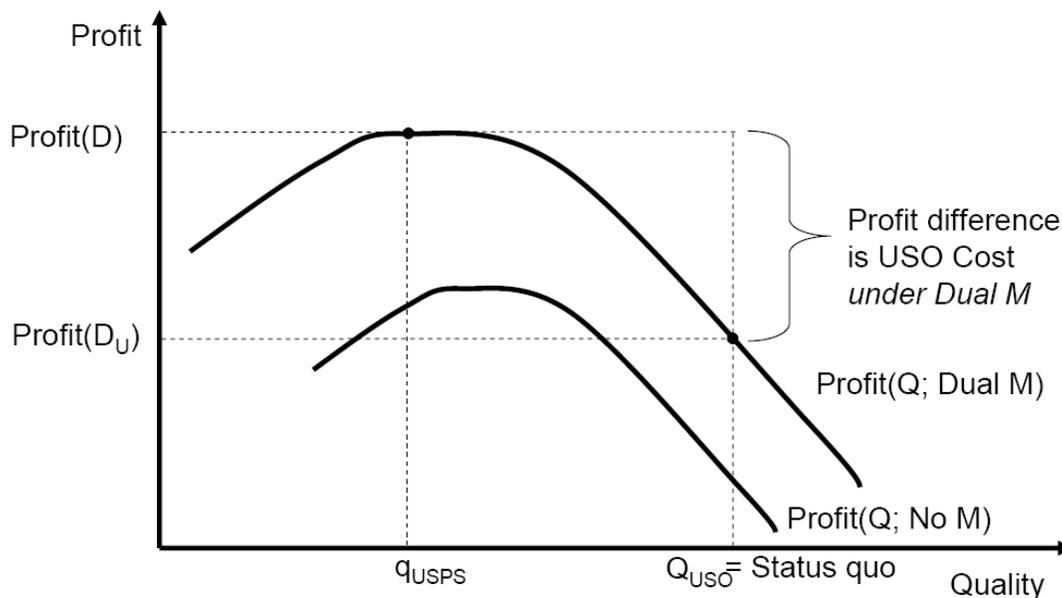


Figure 2: Profitability and USO

We are now able to use Figure 2 to illustrate the calculation of USO profitability costs. We begin by identifying the service quality level associated with the status quo level of USO requirements, Q_{USO} . Next, we determine the associated level of Postal Service profitability under the current level of monopoly protection. This is the amount indicated

by the Profit (Q; Dual M) curve: i.e., Profit (Q_{USO} ; Dual M) = Profit (D_U). We then compare this status quo level of Postal Service profits with the level that would be achieved if the status quo USO requirements were removed or relaxed so that the quality of service level provided fell to q_{USPS} .⁹ This profit level is given by the height of the Profit (Q; Dual M) curve evaluated at that counterfactual level of output: i.e., Profit (q_{USPS} ; Dual M) = Profit (D). The difference between these two profit levels results in the profitability measure of removing the USO in the current monopoly environment:

$$\begin{aligned} \text{COST}_{USO}(Q_{USO} \text{ to } q_{USPS}; \text{Dual M}) &= \text{Profit}(Q_{USO}; \text{Dual M}) - \text{Profit}(q_{USPS}; \text{Dual M}) \\ &= \text{Profit}(D_U) - \text{Profit}(D) \end{aligned}$$

This measure of the USO cost will be the primary focus of our quantitative analysis because we believe that it is the most relevant measure for the current post-PAEA regulatory environment in the U.S. However, as we indicated earlier, our basic methodology can also be used to quantify USO costs in a liberalized environment such as that emerging in the European Union (EU). It is useful to illustrate this procedure with a simple diagram as well. Figure 3 replicates Figure 2, but shifts the focus to the conceptual measure of USO costs in a liberalized environment.

⁹ As discussed earlier, this counterfactual level of service quality can have two interpretations. First, it may be viewed as the level of service quality chosen by the Postal Service in the absence of *any* USO requirements imposed upon it. For example, if the current six day per week residential delivery obligation were eliminated and delivery frequency was left entirely to the discretion of the Postal Service, it might freely chose to deliver 3 days per week. Instead, one could view a counterfactual three day per week delivery requirement as resulting from an alternative quality of service standard typically imposed upon a price-cap regulated enterprise. In Figure 2, q_{USPS} is one of the quality levels that maximizes profit for a monopoly Postal Service, so either interpretation would be consistent with the diagram.

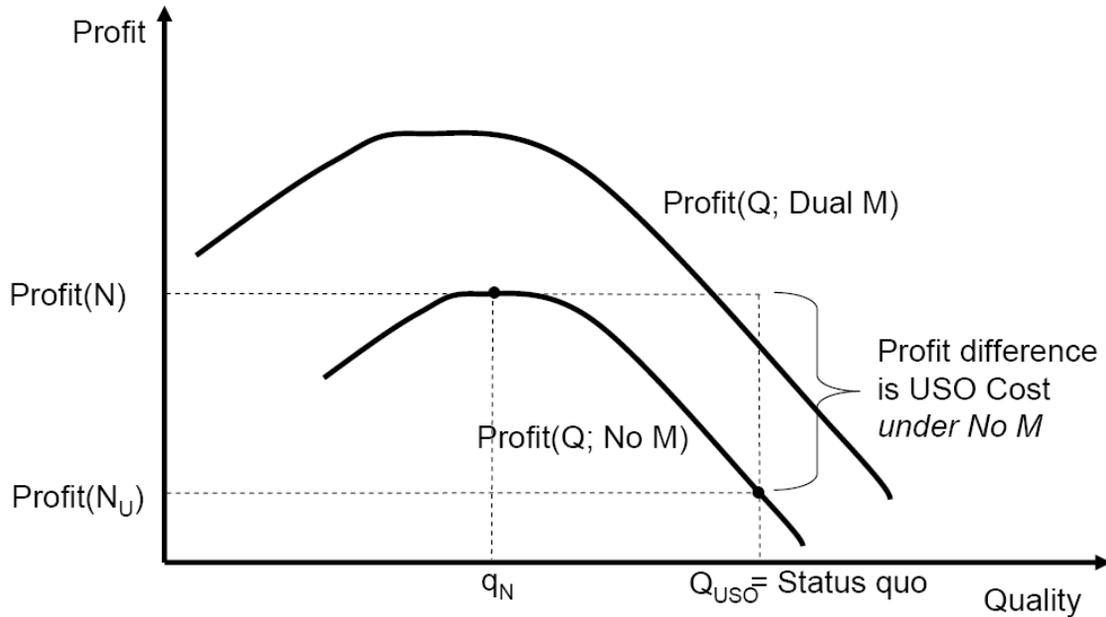


Figure 3: Profitability and USO in a liberalized environment

As before, the first step is to use the Profit (Q; No M) curve to determine the level of profit that the Postal Service would earn under the status quo USO requirement, but *without* the protection of either the mailbox monopoly or the letter monopoly. This level is given by Profit (Q_{USO}; No M) = Profit (N_U). An important difference between this measurement and the one carried out above is that the starting point for USO costing itself requires a counterfactual valuation. That is, it already entails a change from the status quo operating point D_U . Leaving this difficulty aside for the moment, we proceed as above. The next step is to determine the level of service quality that the Postal Service would provide in a liberalized environment. Here, it is also important to be clear about how q_N , the resulting level of service quality is determined. It is possible that this level may result from the binding of certain residual quality of service constraints imposed on the incumbent by its regulator. However, it is also quite possible to argue for using a q_N that would be chosen by the Postal Service in order to be competitive. However, it is not the particular value of q_N that drives the analysis, but the associated level of profit.¹⁰ Under liberalization, this is given by Profit (q_N ; No M) = Profit (N). Finally, the USO

¹⁰ As was the case in Figure 2, Figure 3 depicts a situation in which the summits of the “profit hills” are relatively flat, so the amount of the USO costs are not crucially affected by the choices of counterfactual levels of service quality.

cost under liberalization is obtained by taking the difference between these two counterfactual profit levels:

$$\begin{aligned} \text{COST}_{\text{USO}}(Q_{\text{USO}} \text{ to } q_{\text{N}}; \text{No M}) &= \text{Profit}(Q_{\text{USO}}; \text{No M}) - \text{Profit}(q_{\text{N}}; \text{No M}) \\ &= \text{Profit}(N_{\text{U}}) - \text{Profit}(N) \end{aligned}$$

4.4 Decomposing profit changes into cost and revenue effects.

The previous subsection has detailed the conceptual methodology for measuring USO costs in terms of profitability costs. Unfortunately, the profit curves used in the diagrammatic analyses are not observable to the analyst. Therefore, in order to estimate the profitability costs associated with various USO obligations, we must, of necessity, attempt to estimate changes in profitability by breaking down Postal Service profit into its two constituent parts: costs and revenues.

We demonstrate this approach in terms of our primary focus, the comparison of Postal Service monopoly profit levels with and without the current USO. We begin by rewriting the relevant profit levels in terms of revenues and costs:

$$\begin{aligned} \text{PROFIT}(D) - \text{PROFIT}(D_{\text{U}}) &= [\text{Rev}(D) - \text{Cost}(D)] - [\text{Rev}(D_{\text{U}}) - \text{Cost}(D_{\text{U}})] \\ &= [\text{Cost}(D) - \text{Cost}(D_{\text{U}})] + [\text{Rev}(D) - \text{R}(D_{\text{U}})] \\ &= \text{cost savings} + \text{foregone revenues} \end{aligned}$$

This identity makes it possible to break-up the required calculations into two parts: the cost and revenue changes resulting from relaxation of the status quo USO requirement. This simple restatement also clearly indicates the importance of focusing on profitability costs. Otherwise, one might be tempted to interpret Postal Service cost savings as measuring the “cost” of the status quo USO.

4.4.1 Decomposing cost savings resulting from quality of service changes

To illustrate the methodology, we assume that Postal Service costs are a function of volumes (V) and service quality (Q); e.g., delivery frequency. Then any cost savings resulting from a relaxed USO result from changes in V, Q, or both. To more readily separate these effects, suppose costs have fixed (F) and marginal components (c) that

may vary with quality: i.e., $\text{Cost}(V,Q) = F(Q) + c(Q)V$. Then it is straightforward to decompose the cost impact of a quality reduction into two parts: a “quality effect” and a “quantity effect:”

$$\text{Cost}(D) - \text{Cost}(D_U) = \{F(D) - F(D_U) + [(c(D) - c(D_U))V(D)]\} + c(D_U)[(V(D) - V(D_U))]$$

The terms in curly brackets on the right hand side of the above equation measures the “quality effect.” It indicates the change in costs that would occur if the quality of service changed as hypothesized, but Postal Service volumes remained at their initial level. In contrast, the last term on the right hand side of the equation measures the added cost of providing additional volumes at the new quality of service level. This conceptual separation may facilitate estimation. It may prove easier to approximate the impact of service quality changes holding volume constant and then, in a separate step, add in the effect of adding (or subtracting) volume at the new level of unit costs.

4.4.2 Decomposing revenue changes resulting from quality of service changes

The relaxation of an existing USO constraint may have a direct effect on revenues; for example, through the elimination of a discount for mail purchases of non profit organizations. The revenue effect may also be indirect, resulting from volume changes at a given price; e.g., if volume were projected to fall should delivery frequency be reduced from six days per week to three days per week. In either case, it may aid estimation to decompose the resulting revenue change into a price effect (P) and a volume effect (V):

$$\text{Rev}(D) - \text{Rev}(D_U) = P(D)[V(D) - V(D_U)] + V(D_U)[P(D) - P(D_U)]$$

The first term on the right hand side of the above equation reflects the change in revenues resulting from a quality-induced change in volume at a given price. The second term captures the revenue effects of any price changes at the status quo volume level.

This breakdown makes it easier to track the revenue impact of any USO relaxation. If the change effects service quality, but not price, then the revenue impact is directly measured by “pricing out” the resulting change in volume. This is a natural approach for calculating the effect of decreasing delivery frequency: i.e., the revenue impact would equal the volume decrease multiplied by an unchanged price. At the other extreme, the removal of a particular discount for a service with an inelastic demand would result in a

revenue change closely approximated by multiplying the price change by the (approximately) constant volume.

It is important to recognize that any analysis involving the “price effects” associated with the relaxation of a USO pricing constraint must take cognizance of the impact on PAEA price caps. Thus, while the natural response of the Postal Service to the removal of a mandated discount may be to raise the price to the level of “similar” services, such an upward adjustment may not be permitted under the relevant price cap. This means that the simple “re-pricing” calculations described above may best be viewed as an upper bound on the true USO cost. In the extreme case, in which raising one price literally means lowering another, the USO costs of such discounts may be zero, *given* the continuing presence of PAEA price cap regulation.

4.5 Thoughts on measuring the impact of uniform pricing requirements

Over the years, the Postal Service has been limited in the extent to which it can vary its prices across its service areas.¹¹ Such *uniform pricing* provisions are viewed as important components of the incumbent post’s USO in many jurisdictions.¹² The term *uniform pricing constraint* is used to describe two related, but distinct, types of restrictions. The first, and most general, interpretation is that a uniform national rate is required for certain categories of mail. This condition is certainly satisfied by the Postal Service’s pricing of single piece mail. However, it is doubtful that this uniformity is actually required by law in the U.S.¹³ The second, less restrictive, interpretation is that *zonal*, or distance-based, prices are allowed, but the *rate schedule* must be geographically uniform. For example, if the Postal Service introduces “in town” and “out of town” rates, uniform pricing would require that the two rates be the same throughout the country. Similarly, any “over two thousand mile” rate would have to be the same for pieces mailed in Boston destined for Los Angeles or mailed in the Maine woods and destined for the Olympic Peninsula.

¹¹ See the extensive discussion in Appendix B.

¹² See Appendix E for such international comparisons.

¹³ See Appendix B for a discussion of this issue.

Regardless of which version of the uniform pricing constraint is the subject of analysis, one must begin by carefully specifying the relevant counterfactual market situation assumed to pertain after the removal of the constraint. As discussed above, most of our analyses of USO costs are carried out assuming that USO constraints are removed from the status quo situation. In terms of Figure 1, the postulated change is from point D_U to point D. It should be clear that the profitability cost of the uniform pricing constraint would be relatively minimal in such a situation. In the counterfactual situation without the uniform pricing constraint, the Postal Service would likely choose to adjust prices so as to bring them more in line with costs (where those differ) and/or to better exploit elasticity differences between the now separated markets. Such marginal pricing changes could be expected to yield only moderate profit gains. However, in the case at hand, there is also the constraint that the price adjustments must continue to satisfy the original revenue cap.

The situation is conceptually quite different when attempting to measure the costs imposed by a USO obligation *after* liberalization: i.e., a comparison between Postal Service profits at D and N. In that situation, entrants can be expected to engage in “cherry picking” by undercutting the Postal Service’s uniform price in low cost areas, secure in the knowledge that, even if allowed to respond, the Postal Service cannot compete without lowering price in the (unthreatened) high cost area as well. The result may be a substantial profitability cost associated with the counterfactual situation (at N) in which the Postal Service could selectively match the entrant’s price in the low cost area. However, it is important not to overstate this case. Even if the Postal Service is prevented by a uniform pricing constraint from directly competing with an entrant’s differentiated pricing strategy, it may be able to blunt its impact by introducing Drop Ship discounts for large mailers that have the same effect as would a cost-differentiated delivery pricing strategy.

4.6 Illustrative example: USO costing of delivery frequency requirements

In this subsection we illustrate our profitability cost methodology in the context of a hypothetical reduction in delivery frequency from six days per week to five days per week in the context of an incumbent with a single product and two delivery segments A

and B. We also use the example to contrast the profitability cost measures with those that would result from applying the Net Avoided Cost (NAC) and Entry Pricing methodologies. The “facts” of the case are presented in Table 1. Status quo (D_U) operations are reflected in columns Rev D6 and Costs D6.

Table 1: Cost and Revenue Illustration

Segment	Rev D6	Costs D6	Rev D5	Costs D5	Rev N6	Cost N6
A	85	90	76.5	75	85	90
B	155	150	139.5	125	93	100
Total	240	240	216	200	178	190

That is, under the dual monopoly and a six day per week delivery USO the incumbent receives revenues of 240 and incurs the same amount of costs, so that its economic profits are zero. Columns Rev D5 and Costs D5 reflect the incumbents operating results in the counterfactual situation (D) in which the monopoly operator chooses to deliver only five days per week in the absence of any USO constraint. In that case, the incumbent is assumed to receive 216 in revenue while incurring costs of only 200, thereby earning an economic profit of 16. (Ignore the last two columns of the table for the time being.)

There are two types of USO functions in this example. The first is simply the obligation to deliver to both segments (e.g., regions) whether or not they can cover their costs. The second involves the service quality constraint of six day per week delivery. Beginning with the latter, our profitability measure of delivery frequency USO costs is quite directly calculated in this example: $\text{PROFIT}(D) - \text{PROFIT}(D_U) = 16$. In more complicated situations, it may be more convenient to express this result using the decomposition formula derived above: i.e.,

$$\text{PROFIT}(D) - \text{PROFIT}(D_U) = [\text{Cost}(D) - \text{Cost}(D_U)] + [\text{Rev}(D) - \text{R}(D_U)] = 40 - 24 = 16.$$

We turn now to the ubiquitous delivery component of the USO in this example. Suppose the incumbent were relieved of the obligation to serve Segment A *at a delivery frequency of six days per week*. If it merely abandoned Segment A its profits would

increase by $5 = 90 - 85$.¹⁴ However, this is not the relevant market counterfactual, and 5 is not the correct measure of the profitability cost of ubiquity. Even if relieved of the obligation to serve Segment A at a delivery frequency of six days per week, the incumbent certainly has the *option* of serving Segment A at a frequency of five days per week. If it pursued this option, its Segment A revenues would fall to 76.5 and its Segment A costs would fall to 75; making the segment profitable. The incumbent's total profits after reducing service frequency would be $6.5 = 5 + 1.5$. This is the true profitability cost of the obligation to serve Segment A *at a frequency of six days per week*. However, the USO cost of the obligation to serve Segment A (at least one day per week) is zero because the incumbent would choose to do so voluntarily.

The simplicity and clarity of this characterization of USO profitability cost is in sharp contrast to estimates based upon the Net Avoided Cost (NAC) approach.¹⁵ The NAC measure of USO ubiquity costs would be simply 5, the losses avoided by shutting down the unprofitable delivery segment. The NAC of reducing delivery frequency to five days per week is merely the difference in the firm's costs incurred, with no recognition of the accompanying change in revenues. In this example, that change is 40 ($240 - 200$), which is significantly different from the profitability cost measure of 16.

5 Valuing monopoly positions

In addition to measuring the cost of the Postal Service's USO, PAEA also mandates that the PRC estimate the values of the monopoly positions enjoyed by the Postal Service: i.e., the prohibition on the delivery of letters by alternative carriers (the letter monopoly) and the prohibition on the use of recipient mailboxes by third parties (the mailbox monopoly). Here, it does not seem at all surprising that the appropriate magnitudes to compare are Postal Service profits with and without one or both levels of monopoly protection.

¹⁴ This assumes that the abandonment of delivery to Segment A has no effect on revenues or costs elsewhere in the system.

¹⁵ See Cremer, et. al. for a further critique.

5.1 Specifying the relevant counterfactuals

Referring back to Figure 1, it is again apparent that in each case there are at least two profitability comparisons that could be undertaken, depending upon whether or not it is assumed that the status quo USO requirements remain imposed upon the Postal Service after liberalization. We take the position that consistency argues for valuing monopoly positions for a given level of service quality (USO) constraints. Otherwise the calculation in question would include changes in the USO as well as the degree of monopoly protection. Thus, valuing changes in monopoly positions involve comparing the changes in Postal Service profits resulting from “vertical” movements in Figure 1.

There are two types of consistent monopoly valuation calculations. The first type involves measuring the change in Postal Service profits when the Letter and/or Mailbox monopolies are removed but the status quo USO requirements remain in place. In our opinion, this is the primary focus of the PAEA mandated valuation. Figure 4 illustrates the profitability comparisons involved.

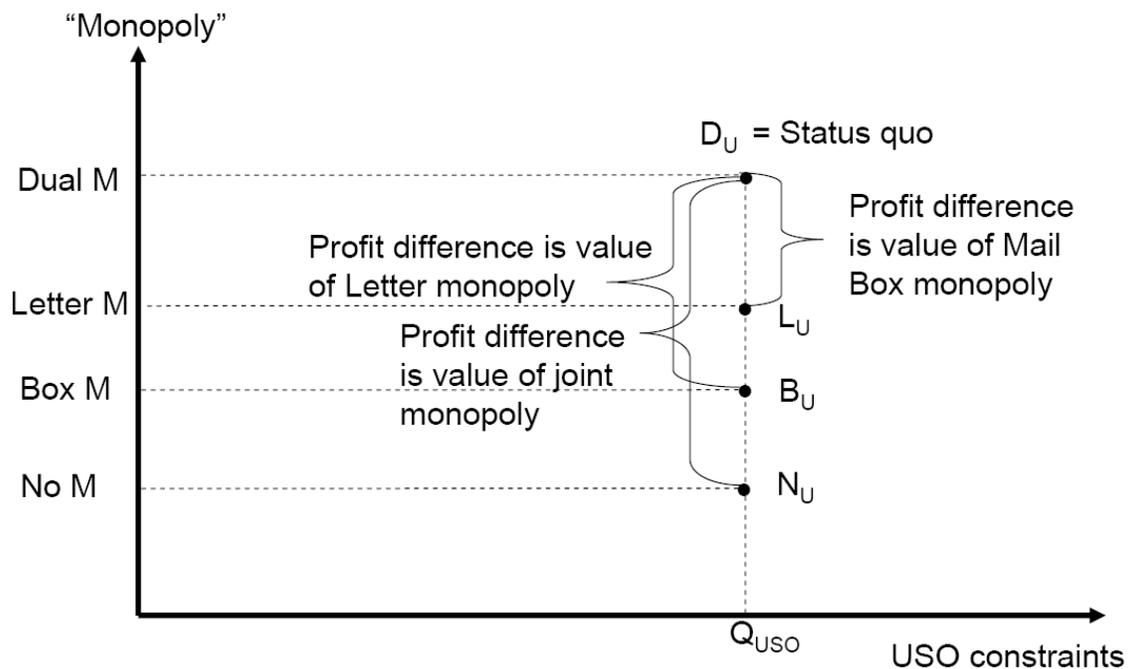


Figure 4: Profitability Comparisons

The value of the mailbox monopoly is equal to the profits of the Postal Service at the status quo point D_U less the profits that the Postal Service would be expected to earn at

the point L_U . There, the Postal Service satisfies the same USO constraint but has only the benefit of the letter monopoly. That is,

$$\text{Value of mailbox monopoly (USO)} = \text{PROFIT}(D_U) - \text{PROFIT}(L_U)$$

Similarly, the value of the letter monopoly is equal to the profits of the Postal Service at the status quo point D_U less the profits that the Postal Service would be expected to earn at the point B_U . There, the Postal Service satisfies the same USO constraint but has only the benefit of the mailbox monopoly. That is,

$$\text{Value of letter monopoly (USO)} = \text{PROFIT}(D_U) - \text{PROFIT}(B_U)$$

Finally, the *combined* value of the Letter and Mailbox monopolies equal to the profits of the Postal Service at the status quo point D_U less the profits that the Postal Service would be expected to earn at the point N_U . There, the Postal Service satisfies the same USO constraint in the absence of any monopoly protection. That is,

$$\text{Value of Dual Monopoly (USO)} = \text{PROFIT}(D_U) - \text{PROFIT}(N_U)$$

It is important to point out that there may well be important interactions between the letter monopoly and the mailbox monopoly. For example, the letter monopoly may be significantly more valuable in the presence of the mailbox monopoly than without it. That is, it may well be the case that

$$\text{PROFIT}(D_U) - \text{PROFIT}(B_U) > \text{PROFIT}(L_U) - \text{PROFIT}(N_U)$$

It is also possible that the mailbox monopoly may be more valuable in the absence of the letter monopoly than when both are present: i.e.,

$$\text{PROFIT}(B_U) - \text{PROFIT}(N_U) > \text{PROFIT}(D_U) - \text{PROFIT}(L_U)$$

Finally, there is certainly no reason to believe that the value of the joint monopoly is equal to the sum of the status quo values of the two individual monopolies: i.e.,

$$\text{PROFIT}(D_U) - \text{PROFIT}(N_U) \neq [\text{PROFIT}(D_U) - \text{PROFIT}(B_U)] + [\text{PROFIT}(D_U) - \text{PROFIT}(L_U)].$$

We do not think it would constitute a policy relevant comparison, but the Letter and Mailbox monopolies can also be consistently valued in the absence of any USO requirement. Referring again to Figure 1, the value of the mailbox monopoly in the absence of the USO is equal to the profits of the Postal Service at point D less the profits

that the Postal Service would be expected to earn at point L. There, the Postal Service operates without a USO constraint but has only the benefit of the letter monopoly. That is,

$$\text{Value of mailbox monopoly (w/o USO)} = \text{PROFIT(D)} - \text{PROFIT(L)}$$

Similarly, the value of the letter monopoly without the USO is equal to the profits of the Postal Service at point D less the profits that the Postal Service would be expected to earn at point B. There, the Postal Service operates without the initial USO constraint but has only the benefit of the mailbox monopoly. That is,

$$\text{Value of letter monopoly (w/o USO)} = \text{PROFIT(D)} - \text{PROFIT(B)}$$

Finally, the *combined* value of the Letter and Mailbox monopolies is equal to the profits of the Postal Service at point D less the profits that the Postal Service would be expected to earn at point N, where the Postal Service is not bound by the USO constraint but operates in the absence of any monopoly protection. That is,

$$\text{Value of Dual Monopoly (w/o USO)} = \text{PROFIT(D)} - \text{PROFIT(N)}.$$

Again, one should not be tempted to “add up” these monopoly valuations. The value of one monopoly taken alone may be greater than or less than its value when combined with the other. Similarly, the sum of the values of removing the monopolies one at a time will not generally be equal to the value of removing both simultaneously.

5.2 Practical aspects of monopoly valuation: the entry pricing approach

The preceding discussion provides a consistent conceptual approach to be used in valuing the Postal Service’s Letter and/or Mailbox monopolies. However, in order to even begin to quantify these magnitudes requires one to forecast what market outcomes would be in a liberalized regime. This is an ambitious undertaking in and of itself. As noted above, there have been many attempts at “USO costing” over the past decade. But, given the focus on liberalization elsewhere in the world, there has not been much (if any) effort devoted to quantifying the value of existing monopoly positions. Fortunately for us, it turns out that one USO costing methodology developed for that purpose, Entry Pricing, is actually far more relevant to monopoly valuation than it is for USO costing.

The essence of the Entry Pricing approach is to attempt to forecast the market shares that entrants would capture under various liberalization scenarios.¹⁶ Forecasting such a hypothetical equilibrium market outcome requires the analyst to make a very large number of assumptions about the capabilities of (as yet unidentified) entrants and the nature of the incumbent's response to the entrants' strategies. In any practical application of entry pricing, many (if not most) of the needed assumptions will be controversial. Therefore, it is important that the analysis clearly identify the key assumptions that drive the results. It is also very important to perform as much "sensitivity analysis" as is practical.

5.3 Constructing scenarios for valuing the letter monopoly

Entry pricing models used to attempt to measure USO costs begin by attempting to estimate the shares obtained by entrants in various postal markets. Such share estimates are sometimes "derived" using assumptions about the cost conditions facing potential entrants. They can also be assumed directly, as model parameters. Regardless of whether such volume losses are directly parameterized or indirectly derived on the basis of other assumptions, they are not of interest in and of themselves. Rather, it is the effect of entry on the *contributions* that the Postal Service receives from the markets in questions.

The relationship between contribution losses and volume losses depends crucially on the regulatory environment in which the incumbent operates. First, suppose the incumbent were not permitted to lower prices in response to entry. In that case, since entrants would presumably target high margin services, the loss of volume would be directly related to the loss in contribution. Alternatively, if the incumbent were allowed to cut prices in response to entry, contribution losses might be large even though volume losses were minimal. On the other hand, if the incumbent were allowed to selectively cut

¹⁶ See, for example, Rodriguez, F, Smith, S. and Storer, D., "Estimating the Cost of the Universal Service Obligation in Postal Service," in *Emerging Competition in Postal and Delivery Services*, Crew, M., and Kleindorfer, P., (eds.), Kluwer, 1999. Of course, given the European focus of this literature, the liberalization at issue is the removal or relaxation of a letter monopoly, not of the unique American mailbox monopoly.

prices in those areas where entry occurred, it might be possible for the incumbent to *deter* entry into its profitable markets. In such a circumstance, removal of the statutory monopoly might result in substantial loss of relatively unprofitable volume but little loss in contribution.

These examples reveal the importance of the assumptions made with respect to the continuation of PAEA price cap constraints when attempting to estimate the effects of removing the letter monopoly on Postal Service profitability. The typical “first step” in an Entry Pricing analysis – forecasting volume losses – is only rarely the “last step.” Volume changes will accurately track contribution changes only when Postal Service prices do not change. This may have been a possibility under traditional cost-based PRC regulation. However, it is not a plausible outcome under the price cap regime in place after PAEA.

The decomposition approach introduced in Section 4 provides a useful methodological framework for dealing with the price response issue. Again focusing on the single product case for simplicity, the comparison of interest for valuing the Dual Monopoly is

$$\text{PROFIT}(N_U) - \text{PROFIT}(D_U) = \{[P(N_U) - c]V(N_U) - F\} - \{[P(D_U) - c]V(D_U) - F\}.$$

Since no change of service quality takes place in this comparison, it is assumed above that $c(D_U) = c(N_U) = c$ and $F(D_U) = F(N_U) = F$. This equation can be rewritten as:

$$\text{PROFIT}(N_U) - \text{PROFIT}(D_U) = [P(N_U) - c][V(N_U) - V(D_U)] + V(D_U)[P(N_U) - P(D_U)].$$

The above equation provides a concise illustration of the issues involved in calculating the effects of removing the letter monopoly in the presence of the status quo USO: i.e., the profit effect of moving from D_U to N_U in Figures 1 or 4. The first product on the right hand side multiplies the products contribution per piece after entry times the forecasted change in Postal Service volume resulting from entry. If Postal Service prices are assumed to remain unchanged following entry, this “volume diversion term” captures the entire effect on Postal Service profits and the value of the letter monopoly. The second product multiplies the status quo level of Postal Service volume times the change in Postal Service price resulting from entry. If the Postal Service is allowed to respond aggressively to entry so that Postal Service volumes are relatively unaffected, then this

“price response term” plays the major role in determining the impact on Postal Service profits.

It is important to point out that, even in the simplest case, two of the important terms in the above decomposition equation must be forecast on the basis of some assumptions about the nature of post entry market equilibrium: $P(N_U)$ and $V(N_U)$. Most applications of the entry pricing approach focus on forecasting the change in volume. However, given the pricing flexibility permitted by PAEA, it is important to think carefully about how Postal Service prices are likely to change in response to entry.

5.4 Constructing scenarios for valuing the mailbox monopoly

Valuing the mailbox monopoly presents some novel challenges, primarily because there is no parallel in other jurisdictions. Again, the value of the monopoly position is the reduction in Postal Service profits resulting from its elimination. One would expect Postal Service profits to decline for three main reasons. First, existing competitors (e.g., FedEx and UPS) will be able to deliver to the mailbox. This would improve the quality of their offerings and decrease the Postal Service’s market share for parcels and priority mail. Second, the products of carriers providing delivery using unaddressed mail and newspaper inserts will become more attractive once those can be placed in the mailbox. This may erode Postal Service Standard mail volumes that compete with such alternatives. Third, it has been argued that the presence of non Postal Service pieces in the mailbox may tend to increase the delivery cost of the Postal Service due to Mailbox congestion.

The primary methodological approach for modeling these effects remains the Entry Pricing model. However, in this case the most useful decomposition analysis will focus on quantity and cost rather than quantity and price. We will again focus on the contribution impact resulting from changes involving a single product. Then the comparison of interest for valuing the mailbox monopoly is

$$\text{PROFIT}(L_U) - \text{PROFIT}(D_U) = \{[P - c(L_U)]V(L_U) - F\} - \{[P - c(D_U)]V(D_U) - F\}.$$

The above expression reflects our assumptions that the entry resulting from elimination will not have a significant impact on prices and that congestion cost impacts will affect

volume variable costs rather than fixed costs: i.e., $P(D_U) = P(L_U) = P$ and $F(D_U) = F(L_U) = F$. This equation can be rewritten as:

$$\text{PROFIT}(L_U) - \text{PROFIT}(D_U) = [P - c(D_U)][V(L_U) - V(D_U)] + V(L_U)[c(D_U) - c(L_U)].$$

The above decomposition is readily interpreted and serves to highlight the assumptions that play an important role in valuing the mailbox monopoly. The first product on the right hand side of the above equation is the amount of contribution that would be lost if variable costs remained at their status quo level: i.e., in the absence of significant costs due to mailbox congestion. The second product on the right hand side measures the cost increases suffered by the Postal Service as a direct result of mailbox congestion. The two effects must be combined if one anticipates that elimination of the mailbox monopoly will have a significant cost impact.

5.5 Illustrative example: valuing monopoly using an Entry Pricing model.

The example presented in Table 1 can also be used to illustrate the use of an Entry Pricing model to value a postal monopoly. Columns RevN6 and CostN6 list the revenues the incumbent would receive and the costs it would incur if its monopoly were removed. The revenue value results from the assumption that entrants are able to obtain 40% of the incumbent's volume at given prices in Segment B. The cost figure reflects the assumption that costs decline less than proportionately with volume due to economies of scale.

The value of the monopoly is readily calculated from the profit differences. The ability of entrants to attract 40% of the revenues of the profitable segment results in a loss of 12 for the incumbent. Comparing this outcome to the zero profits earned in the status quo situation establishes that the value of the monopoly was 12. The example also reveals the important role played by assumptions made by the analyst regarding the market share obtained by the entrant. The value of the monopoly is obviously larger the larger the market share is assumed to be that the entrant would capture.

6 Summary and Conclusions

This section presents an explanation of the methodology we use to obtain estimates of the cost of the USO requirements imposed on the Postal Service and the value of the Letter and Mailbox monopolies that it enjoys. Our analysis is based upon the impact of these policies on the profitability of the Postal Service. This focus on Postal Service profits allows us to directly measure the *burden* of the USO and the *market value* of a monopoly position. That is, our approach is designed to calculate the amount of profit that the Postal Service would *gain* if it were relieved of its USO or the amount that it would *lose* if one or both of its monopoly privileges were removed. In each case, this exercise directly measures the dollar *opportunity cost* of the policy at issue.

Because our methodology is based on calculating *changes* in Postal Service profits, it will typically require estimates of those profits in two distinct operating environments: i.e., with and without the policy provision in question. These comparisons will usually involve the current operations of the Postal Service. That is, we evaluate the policy changes at issue relative to the status quo. Since it is pivotal to our approach, we take great care in characterizing the status quo situation of the Postal Service. A major focus of our historical and legal analysis is devoted to carefully understanding exactly what are, and are not, included in the current USO requirements and monopoly positions of the Postal Service. Without a thorough understanding of what is included in these provisions, it is impossible to even speculate about the implications of their removal.

Our focus on the status quo extends also to the current regulatory environment. This includes the system of Price Cap regulation mandated by PAEA and implemented by the PRC. We assume that Price Cap regulation will remain an integral part of all the counterfactual situations that we analyze. This is because we do not consider the elimination of Price Cap regulation to be a policy relevant possibility to consider. Therefore, Price Cap regulation, per se, is not considered part of the USO of the Postal Service.

Much of the analysis of this section utilizes a diagrammatic framework as a heuristic device to illustrate the principles involved. That is, we proceed by “locating” various operating environments of the Postal Service as points on a Cartesian (XY) plane. The

two dimensions considered are the “extent of monopoly protections” and the “severity of the USO.” Associated with any combination of values for these two variables is a level of Postal Service profits that would be earned in the designated environment: e.g., {status quo USO, mailbox monopoly only}. This construction makes it possible to precisely envision the appropriate thought experiment required to evaluate the policy change at issue. Thus, the valuation of a monopoly position begins with a (downward) vertical movement that holds constant USO requirements while relaxing monopoly restriction. The value of the monopoly given up is the difference in Postal Service profits between the (status quo) starting position and the (counterfactual) ending position. Similarly, the cost of providing the status quo level of USO service quality is measured by the change in Postal Service profits that would result from a (leftward) horizontal movement reflecting an elimination of USO constraints while retaining existing monopoly protections. The advantage of this approach is that it makes precise the assumptions underlying the analysis. Also, it makes it clear whether the analyst has succeeded in his mandate to “change one policy at a time,” so as not to confound multiple effects.

Even when care is taken to precisely identify the hypothetical profit comparison being calculated, it remains the case that there are often many operational differences between the “before” and “after” scenarios. In this case, it is sometimes useful to *decompose* the change in Postal Service profits into two or more effects. For example, by definition, the USO cost of reducing delivery frequency from six to three days per week can be divided into two effects: cost savings and foregone revenues. These, in turn, can be further divided into price, volume, and quantity effects. Approaching the exercise in this manner makes explicit the assumptions used in calculating the counterfactual results: e.g., the elasticity of volume with respect to frequency of delivery; the price elasticity of demand; the market share lost to entrants; etc.

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School of Public Policy

Study on Universal Postal Service and the Postal Monopoly

Appendix F

Section 3

Estimates of the Current Costs of the USO in the U.S.

Robert H. Cohen

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1 Summary

1.1 *Scope of the Analyses*

In the U.S. there has been little discussion, let alone agreement, on the elements that are part of the postal “USO.” This is unlike Europe where there have been many policy analyses, quantitative estimates and governmental statements, directives and actual legislation concerning the postal USO. In this analysis, we infer the elements from the specific requirements that are contained in the statutory language (*statutory elements*). In addition, we examine the most reasonable changes that might be made if Congress were explicitly to define a postal USO (*potential statutory elements*). The following is meant to summarize the assumptions that lie behind our approach to defining the USO:

By “universal” we mean that it applies to virtually every person or address. There will always be exceptions in the real world. For example, remote addresses that can only be served by mule train may not get daily delivery or isolated groups living many miles from a town may not have convenient access to a postal facility.

By “service” we mean an aspect of the Postal Service that affects persons or businesses as senders or recipients. This would include reasonable access to counter service, frequency of delivery, speed and reliability of delivery, range of products offered, affordability of products, ability to lodge complaints, rate design, rate discounts, type of retail facility (USPS or contractor), etc. It does not mean aspects of the Postal Service that may indirectly affect senders and recipients such as:

- wages and benefits of postal employees
- whether functions that are invisible to customers such as transportation and sorting are provided by Postal Service employees or contractors
- activities tangential to its mission such as cooperating with the Census Bureau or assisting civil defense efforts
- services provided informally by employees such as checking on infirm recipients, collecting food for the needy or helping a customer filling out a form

By “obligation”, we mean what is required of the Postal Service by statute. Statutes may be modified and additional obligations may be imposed on the Postal Service. Thus, a reasonable analysis of the cost of the USO should, in addition to current statutory

obligations, include those additional obligations that might reasonably be imposed on the Postal Service. We do not mean that these additional obligations be simply theoretical possibilities, but rather, that they stand a realistic chance of being imposed given the issues surrounding the Postal Service and the economic pressures that it faces today.

1.2 Summary of the Results

In this section, the cost of the USO for the year 2007 is estimated according to the method described in section F2, where the cost of each element of the USO is the additional profit or net income that a profit maximizing post would earn if it no longer had an obligation to provide it. This involves first calculating the savings from eliminating the element and then subtracting any revenue loss that would be caused by the discontinuance of the element. The cost of the USO, then, is the sum of the additional net income that would be realized if all the elements of the USO were eliminated.

In this section, each element of the USO is introduced and a summary table of costs is presented.

Statutory elements:

1. Frequency of Delivery
2. Discounts for Nonprofit Categories of Mail
3. Uniform Rate with respect to Distance required for Media Mail/Library Rate Mail
4. Losses on Market Dominant Products
5. Measuring Service Performance of Market Dominant Products
6. Maintaining Small Rural Post Offices (CAG K&L offices)

Potential statutory elements:

7. Alaska Air Subsidy
8. Uniform Rate for First Class
9. Delivery to all Addresses Who Involuntarily Receive No Delivery
10. Six day a week Delivery for all (except for businesses served by five day a week business routes)

Cost of the Statutory Elements of the USO

Elements	2007 Cost (\$ billion)
Six day a week delivery	5.20
Nonprofit Mail Discounts	1.15
Unzoned Media/Library Rates	0.06
Losses on Market Dominant Products	0.45
Measuring Service Performance	0.18
Maintain Small Rural Post Offices	0.59
Total	7.63

Cost of the Potential Statutory Elements of the USO

Elements	2007 Cost (\$ billion)
Alaska Air Subsidy	0.107
Uniform Rate for First Class	0.130
Require Delivery to All Addresses	0.101
Six Day a Week Delivery to all Addresses	0.001
Total	0.339

The statutory USO cost of \$7.63 billion in 2007 was 10 percent of total Postal Service revenue for the year (\$74.97 billion). The potential statutory USO cost of \$0.339 billion in 2007 was one half of one percent of revenue.

Below are the separate analyses of each element of the statutory and potential statutory USO. They are followed by an analysis of the claim that there is a cross-subsidy from urban areas to support delivery to rural areas of the nation.

2 Estimates of the Current Level of the USO in the U.S.

2.1 Analysis 1: Savings from Reducing Frequency of Delivery

2.1.1 Background

Every year since 1984 the Congress has had language in the Postal Appropriations Act that requires the Postal Service to maintain delivery for both city and rural routes at least at the levels that prevailed in 1983.¹ The USO cost of this requirement as stated in the previous section on methodology is its effect on the profits of the USPS if it were a profit maximizing institution. In order to make this calculation we must first establish a minimum frequency of delivery for a post that has a monopoly to deliver all letters to all addresses in the country. This minimum is a matter of judgment and given the current state of delivery economics it must be somewhat arbitrary. The method for calculating this cost element of the USO would be the same regardless of the minimum frequency of delivery.

It is our judgment that a minimum frequency of delivery for a postal universal service provider is every other day or three days per week, given the current role of the post in our communications infrastructure. If a competitor were to enter the market, it might deliver fewer days per week, but we would not consider it a universal service provider.² Delivery by a universal provider on business routes would continue at 5 days per week since businesses are more dependent on frequent mail delivery than are households. Box section delivery would remain unchanged.

As shown in Table 1 below, rural and city delivery costs for FY 2007 were approximately \$29.4 billion³, or about 38% of the total USPS accrued costs of \$77.2 billion for that period. The fixed costs of delivery amount to \$15.1 billion, so the fixed cost percentage is about 51%. Fixed costs include a variety of activities that are necessary each delivery day regardless of the volume being delivered, such as the travel

¹ This is discussed in detail in Appendix B, section 5.2.

² City Mail delivers to about half the addresses in Sweden one and a half days a week or every third business day. Sweden Post delivers 5 days per week as do several other European posts.

³ Sources: Files FY07.CRPT.xls and FY07PbackAll.xls, both in PRC-ACR2007-LR2, Docket ACR2007. These costs include “piggyback” costs (indirect costs which are proportional to delivery costs).

time required to walk or drive the route with no deviations to deliver mail. Virtually all attributable costs vary with mail volume.

Table F3-1. FY 2007 Delivery Costs (\$ billion)

	Attributable Costs	Fixed Costs	Accrued Costs	Attributable %
City Delivery Carriers - In Office	5.70	1.15	6.84	83.2%
City Delivery Carriers - Street	5.43	9.23	14.66	37.0%
Rural Carriers	3.21	4.70	7.91	40.6%
Total Carrier Delivery Costs	14.34	15.07	29.41	48.8%

Note: These costs include indirect costs such as supervision and administration. Total costs rounded.

Rural and city carrier costs are modeled differently in PRC regulatory proceedings because of the difference in the way they are paid. Most rural routes are evaluated routes, meaning that each rural carrier's salary is based on established time standards for each volume variable or fixed activity. A rural carrier's pay is thus based on such items as the delivered volume of each mail type, the numbers of the various types of retail transactions performed, as well as route parameters such as total mileage and number of stops. The pay depends on the results of an annual route evaluation, not on how much time is actually spent on the route on a given day – there is no undertime or overtime. On the other hand, pay for city carriers is based on the actual time spent each day on the route, both in-office and on the street. As with rural carriers, each city carrier's route is evaluated annually with the goal of making the average time required to service the route about eight hours. However, when more time is required to complete the route on high-volume days, the city carrier receives overtime; on low-volume days, the city carrier still receives eight hours pay. For this reason, the average number of daily hours paid for city carriers always exceeds eight – in FY 2007, the average number of city carrier hours per route was 8.57.

Previous researchers have demonstrated that considerable savings in fixed delivery costs could be achieved by reducing the number of delivery days per week, which obviously increases daily volume per delivery point. For example, in one study it was estimated that reducing the frequency of delivery for residential routes from six to three times a week could save as much as half the fixed costs of delivery, which in FY 1999

amounted to almost \$6 billion, or 9% of total costs.⁴ In that study, for simplicity the assumed cost function was one commonly used in postal analyses, in which total costs are assumed to equal fixed costs plus marginal costs times volume. This estimate of fixed cost savings was characterized as an upper bound, since no additional costs or loss of volume due to the reduction of delivery frequency were considered.

In this analysis, we first update the earlier estimates of fixed cost savings as a function of number of delivery days using more recent FY 2007 data. Next, since these delivery frequency cost savings are large in comparison to other USO components, it seemed appropriate to examine the sensitivity of the rural and city carrier savings estimates when more complex but also more realistic assumptions are used. In the second section, we analyze the savings impact of adjusting the size of the new expanded carrier routes to conform to an 8-hour standard carrier day,⁵ assuming a linear cost function. Next, we examine the effect on the savings of using a non-linear city carrier street time cost function introduced by USPS witness Bradley in the R2005-1 rate case and continued in the R2006-1 rate case. We also discuss estimates of savings from reducing delivery frequency by one day that were recently presented by Michael Bradley et al.⁶ In a fourth section, we address the effect on the net savings of potential lost net revenue due to losses in demand caused by reducing delivery frequency. Finally, we summarize our discussion of whether and how the Table 2 carrier savings should be revised, based on the more realistic assumptions about rural and/or city carrier cost behavior described in this analysis.

2.1.2 Case 1: Update of Fixed Costs Savings Using Linear Cost Model

Table 2 below shows the estimated FY 2007 delivery fixed costs savings resulting from changes in delivery frequency from six days per week to five, four, and three days a week, using the assumptions of the previously-mentioned study. Further reductions in delivery frequency did not seem appropriate to maintain a viable Postal Service. With a

⁴ See Cohen, et al (2002). Delivery frequencies of 5, 4, 3, 2, and 1 day per week were considered.

⁵ This is intended to reflect the Postal Service's stated general policy of maintaining a regular (eight-hour) workday for its carriers, which would require route adjustments in response to significant, sustained volume increases of the type discussed here. See PRC Op., Docket No. R2005-1 at 66.

⁶ For the subsequent report, see "Quantitative Analysis of the Universal Service Obligation." Prepared by IBM for the USPS. (October 8, 2008) Available at <http://www.usps.com/postallaw/pdf/IBMReport.pdf>

linear cost function, fixed costs are reduced in direct proportion to the change in delivery days, e.g., half the fixed costs are saved when delivery days are changed from six to three.⁷

Table F3-2. Updated Delivery Fixed Cost Savings (FY 2007)

Delivery Days per Week	Cost Savings (\$ bil)	Percent of Total Costs
5	2.51	3.3%
4	5.02	6.5%
3	7.53	9.8%

Note: same assumptions used as in original paper by Cohen et al. (2002).

2.1.3 Case 2: Effect of Eight-Hour Day Constraint on Savings (Linear Model)

Decreases in delivery frequency would be accompanied by large increases in delivered daily volume per route, so that the time spent by the carrier on a delivery day would significantly exceed the normal eight-hour workday. Under current Postal Service policy, existing routes would probably have to be cut back in terms of delivery points to reach the eight-hour workday target, and new routes would then have to be added to handle the excess volume. In this section, we use the linear cost model as we address possible reductions in fixed cost savings due to this constraint. A series of simple examples will be used to illustrate the different assumptions described here.

Example 1. Assume first that a geographical area has two carrier routes, each with 6-day delivery, 600 delivery points and 3,000 pieces per day, and that each takes 8 hours to complete. Also assume that volume-variable costs are 50% of total costs, so each route would have four hours per day of fixed cost activities and four hours of volume-variable activities. The weekly volume for each route with six-day delivery is $3000 \times 6 = 18,000$ pieces, and weekly total hours per route are $8 \times 6 = 48$ hours, with 24 fixed and 24 volume variable. This scenario represents the current delivery frequency situation, and is summarized in the table below:

⁷ About 9 percent of delivery points are businesses, some of which receive delivery only five days a week. See 2007 USPS Annual Report, p.56. For purposes of this approximate analysis, business deliveries will be treated the same as residential deliveries.

Example 1: 6 delivery days, 8-hour routes, linear model

Number of Routes	2
Delivery Points Per Route	600
Volume	3,000 pieces per route day; 36,000 pieces per week
Fixed Time	4 hours per route day, 48 hours per week
Variable Time	4 hours per route day, 48 hours per week
Variability	50%

Example 2. Assume now the delivery frequency is reduced from six days per week to three days. Then the delivered volume on each route would double to 6,000 pieces on each of the three delivery days. Since we are assuming that the carrier cost function is equal to fixed costs plus marginal cost times volume, with twice as much volume the fixed costs per route would still be four hours, but the variable costs per route would double to eight hours. Thus each carrier's workday would increase by one-third to 12 hours and the volume variability of each route would increase to 66.7%. Total weekly volume for the two routes would be $6000 \times 3 \times 2 = 36,000$ pieces as before. Total weekly variable time would be $8 \times 3 \times 2 = 48$ hours as before, but weekly fixed time per route would now be $4 \times 3 \times 2 = 24$ hours, a reduction of 50 percent, as estimated in the earlier research. The savings in fixed costs are due to the increase in daily volume per delivery point, which improved the efficiency of the delivery process. This example is summarized below.

Example 2: 3 delivery days, 12-hour routes, linear cost function

Number of Routes	2
Delivery Points Per Route	600
Volume	6,000 pieces per route day, 36,000 pieces per week
Fixed Time	4 hours per route day, 24 hours per week
Variable Time	8 hours per route day, 48 hours per week
Variability	66.7%

Example 3. This four-hour route time increase would be sustained rather than temporary, so the Postal Service would most likely have to restructure these routes to restore the

standard eight-hour workday for its carriers. A straightforward and efficient way for the Postal Service to achieve this goal would be to reduce the number of delivery points for each route by one-third to 400⁸. Weekly variable cost for the two routes decreases by one-third to $(2/3) \times 8 \times 3 = 16$ because there would be one-third less volume (4,000 pieces per day instead of 6,000). If all fixed costs were proportional to the number of delivery points on the route, a one-third reduction in delivery points would also reduce weekly fixed costs per route by one third (to $(2/3) \times 4 \times 3 = 8$ hours instead of 12). Under these conditions, weekly volume for the two original routes would be $2 \times 4,000 \times 3 = 24,000$ pieces. Volume variability for each of the original routes would remain at 66.7%, so the increase in delivery efficiency would remain. To handle the remaining 12,000 pieces of weekly volume (one-third of the original 36,000 pieces for the two routes combined), the number of routes would have to be increased from two to three (a 50% increase), with the new route also having 400 delivery points and 4,000 pieces. The new route would have the same volume, fixed cost, and variable cost as the original two routes. The combined weekly fixed costs for the old and new routes would now be $3 \times 8 = 24$ hours. But this means that even after restructuring to accommodate the eight-hour workday, the same 50% of fixed costs would be saved as calculated in the earlier research.

Example 3: 3 delivery days, 8-hour routes, linear cost function, and fixed costs vary directly with delivery points

Number of Routes	3
Delivery Points Per Route	400
Volume	4,000 pieces per route day, 36,000 pieces per week
Fixed Time	2.67 hours per route day, 24 hours per week
Variable Time	5.33 hours per route day, 48 hours per week
Variability	66.7%

Example 4. Now consider the consequences if some of the fixed delivery activities do not vary with the number of delivery points. Although a proper analysis of this issue would require a more formal econometric analysis, we can get a rough idea of its effect on savings by examining the sub-components of city carrier time. For example, it is

⁸ Other methods are possible, including regular use of overtime.

likely that the fixed costs for the “Travel to/from Route,” “Training,” “Break and Personal Needs” and “Clocking in/out” activities for city carriers would remain about the same during a delivery day even if the number of delivery points were reduced substantially. According to data from the ACR2007 PRC Report⁹, the fixed cost of these four sub-activities is about 4.2% of total delivery cost, or about 20 minutes of a full eight-hour day. A one-third reduction in the number of delivery points for each original route will not reduce the 20 minutes by one-third to 13.7 minutes as with the other delivery components. The workday would instead be 8 hours and 7 minutes, so a slightly larger reduction factor in delivery points (0.3429) would be required. The larger reduction factor will also reduce volume per route, and it follows that somewhat more than one new route (1.0438) would be needed on average to handle the remaining volume. This means that instead of saving 24 hours during the week (50% of city delivery fixed costs) as with the earlier examples, only 22.95 hours would be saved (48% of city delivery fixed costs). A summary of this example is shown below.

Example 4: 3 delivery days, 8-hour routes, linear cost function, and 4.2% of fixed costs do not vary with delivery points

Number of Routes	3.0438
Delivery Points Per Route	394
Volume	3943 pieces per route day, 36,000 pieces per week
Fixed Time	2.7435 hours per route day, 25.05 hours per week
Variable Time	5.2565 hours per route day, 48 hours per week
Variability	65.7%

This example suggests that the effect of fixed costs that do not vary with delivery points is relatively small. Based on this and the ad hoc nature of the estimate, we recommend no changes to the methods of the earlier study assuming the cost function is linear with volume.

⁹ See Docket No. ACR2007, Library Reference PRC-ACR2007-LR2, workbook CS06&7.xls.

2.1.4 Case 3: Effect on Savings of Using New Bradley Nonlinear Model

Now we will consider the results of using the nonlinear cost function proposed for city carrier street time by witness Bradley in Docket No. R2005-1 and updated in Docket No. R2006-1.¹⁰ Prof. Bradley submitted a formal econometric analysis of the variability of city carrier street time with volume, which was later approved by the Commission in both dockets. Unlike earlier city delivery analyses that used a route-day as the unit of observation, his analysis used a 5-digit zip code area-day. In other words, his daily observations of volumes, costs, and other variables were based on all the routes in a set of sampled zip code areas. His econometric equation involved both linear and quadratic terms for five different volume variables: letters, flats, sequenced mail, collection mail, and small parcels. His equation also included linear and quadratic terms for non-volume related variables: delivery points and geographic density (delivery points per square mile in the zip code area).

The two terms in the equation for each volume type were of the following form:

$$\text{Time} = aV + bV^2$$

where Time was the variable city carrier street time for that type of mail, V was the volume for that mail type, and the coefficients a and b were estimated by the econometric model. If the constant b is close to zero, the equation is in effect linear just as the ones discussed in the examples above. If b is positive, the marginal cost for that type of mail grows with increasing volume. Similarly, if b is negative, the marginal cost will decline with increasing volume. Prof. Bradley's results showed that the b coefficients for letters, sequenced mail, and collection mail were negative, but the coefficients for flats and small parcels were positive.¹¹ Although his quadratic model was not designed to model the effect of total volume on delivery costs, it is interesting to note that if one multiplies each volume type by the same scalar factor c, then plots the total cost as a function of c, the nonlinear (squared) terms almost cancel out, and one is left with a near-linear function.

¹⁰ See the testimony of Prof. Michael Bradley in Docket No. R2005-1.

¹¹ See Docket No. R2005-1, USPS-T-14 at page 38 for all the estimated coefficients. Also, see LR-K-81.doc in USPS-LR-81 for the means of the various variables.

On August 14, 2008, Prof. Bradley presented a briefing at the PRC on behalf of the Postal Service that was related to USO costs. In his presentation, he included an overview of his recently-estimated savings from reducing delivery frequency from six to five days a week. At that time, he presented an example of how the Postal Service might save attributable as well as network-related fixed costs by eliminating Saturday delivery. The savings in attributable costs were said to be achieved via the concept of a “volume absorption rate,” meaning that a portion of the extra Monday-Friday volume could be absorbed with no additional costs. In his briefing, he assumed a volume absorption rate of 50 percent for city delivery and 15 percent for rural delivery, and estimated total savings of \$3.5 billion, which included savings of more than \$900 million in attributable cost.¹² This example was also mentioned in the recent IBM/USPS Quantitative Analysis of the Universal Service Obligation, Final Report (October 8, 2008).

On November 7, 2008, Prof. Bradley had a follow-up meeting with the PRC staff to present his preliminary thoughts on the concept of volume absorption and how it might allow attributable delivery cost savings to be estimated. The volume absorption rate seems to be the variability of the marginal cost function (the first derivative of the total cost function). Prof. Bradley noted that his PRC-accepted quadratic model of city delivery street time costs could not be used to calculate the volume absorption rate for delivery costs and therefore the savings in attributable costs. Instead, he used a backup translog model from R2005-1 where he used mail volume as a single output instead of different mail shapes. According to Prof. Bradley, this model can be used to estimate a volume absorption rate of minus 26.6%, and attributable cost savings of approximately \$500 million, for a total cost savings of about \$3 billion from eliminating Saturday delivery.

In summary, there are a number of empirical issues that must be thoroughly reviewed by the Commission and other analysts before a decision can be made as to whether this approach is suitable for developing reliable estimates of attributable cost savings from delivery.

¹² The 50% /15% absorption rate case was merely an example, and had no empirical underpinning.

2.1.5 Case 4: Effect of Volume Losses on Delivery Frequency Savings

FY 2007 contribution per piece was about 13.73 cents, and total contribution was about \$29.14 billion.¹³ It is reasonable to expect that demand and thus USPS net revenue would decline due to decreases in delivery frequency, especially for advertising mail where the time of arrival of the mail piece often must coincide with a planned marketing event. Also, customer dissatisfaction resulting from fewer delivery days would likely cause more rapid diversion of First-Class Mail to electronic alternatives and parcel volumes to competitors' services.

In this analysis, we assume a simple profile of volume losses as a function of delivery frequency, and estimate the effects on the savings as a sensitivity analysis. It was assumed that the effect of changing from six to five days per week would be modest (a 2% loss), but that further decreases in frequency would reduce volume by 3% for each additional day of frequency reduction. These results are shown in the first three rows of Table 3 below.¹⁴ It can be seen by comparing Table 2 and the first three rows of Table 3 that about one-third of the Case 1 savings are lost due to these assumed demand effects.

The last two rows of Table 3 are included to show the sensitivity of the savings loss to different assumed demand effects for the three-day delivery case: a 6 percent volume loss and a 10 percent volume loss.

¹³ See PRC Annual Compliance Report for 2007, p. 24.

¹⁴ Reductions in savings due to the eight-hour constraint (Case 2) were not considered for this case.

Table F3-3. Cost Savings from Reducing Delivery Days with Assumed Volume Losses (FY 2007)¹⁵

Delivery Days Per Week	Volume Loss %	Contribution Loss (\$ bil)	Case 4 Cost Savings (\$ bil)	Percent of Total Costs
5	2.0	0.58	1.93	2.5%
4	5.0	1.46	3.56	4.6%
3	8.0	2.33	5.20	6.7%
3	6.0	1.75	5.78	7.5%
3	10.0	2.91	4.62	6.0%

It should be noted that the column labeled “Case 4 Cost Savings” is the same as the net improvement in USPS profits.

At present, there is great uncertainty about how much volume would decline at the various delivery frequencies. It is therefore interesting to calculate how much volume could be lost at a given delivery frequency before the net profit from the reduction in frequency actually goes to zero. Using this same analysis, the percentage volume losses that lead to net revenue losses equal to delivery frequency savings were calculated for 5, 4, and 3 delivery days and are shown in Table 4 below.

Table F3-4. Volume Loss Necessary to Negate Savings from Delivery Frequency Reduction

Delivery Days	Cost Savings (\$ bil)	Percent of Total Cost	Percent Volume Loss Required for Zero Net Income
5	2.51	3.3%	8.6%
4	5.02	6.5%	17.2%
3	7.53	9.8%	25.8%

Note: Average contribution/piece = 13.7 cents; \$1 bil = 7,284 mil pieces or 3.43 percent of total volume.

It seems likely that a profit maximizing post would choose 3-day delivery, because it is very doubtful that the resulting lost volume would even approach 25 percent of total volume. For this reason, we have adopted 3-day delivery as our base case for calculating USO costs related to delivery frequency.

¹⁵ The Table 3 calculations are documented in the Excel workbook analysis1.xls (Sheet Tables 1-4).

2.1.6 Summary

At this point, our analyses of cost savings from reducing delivery frequency have shown that except for demand effects, we have found no compelling reason to alter the linear-model method of estimating savings used by the earlier researchers. This method involves estimating the fraction of delivery fixed costs saved as the number of eliminated delivery days divided by the current six days. For example, as shown in Table 2 above, going from six-day to three-day delivery would reduce delivery fixed costs by 50 percent, or about \$7.5 billion. The linear model of delivery costs seems adequate for estimating fixed-cost savings and the loss of savings due to restructuring delivery routes to maintain eight-hour workdays seems to be minimal. Prof. Bradley's PRC-accepted quadratic model cannot be used to estimate savings in attributable delivery costs. Finally, demand effects could reduce these estimated delivery frequency savings considerably, as shown in Table 3. We have chosen three-day delivery with an 8 percent volume loss as our base case, so the associated cost savings would be \$5.20 billion.

2.2 Analysis 2: Nonprofit Discounts¹⁶

2.2.1 Background

The table below lists the five categories of mail in the USPS classification schedule that have legislatively-mandated preferred rates, along with their for-profit counterparts.¹⁷

Class	Nonprofit Category	Corresponding For-profit Category
Periodicals	Within County	Regular Rate
Periodicals	Nonprofit	Regular Rate
Periodicals	Classroom	Regular Rate
Standard	Nonprofit	Regular
Standard	Nonprofit ECR	ECR
Packages	Library Rate	Media Mail

In this section, we estimate the magnitude of increased USPS net revenue (profits) under the assumption that nonprofit rates are increased to be the same as their for-profit counterparts.¹⁸ These increased profits are part of the cost of the USO.

This analysis utilizes the PRC forecasting model contained in PRC Library Reference PRC-LR-23 from Docket No. R2006-1.¹⁹ This model, which consists of seven linked

¹⁶ The discounted categories are technically referred to as “preferred” because not all the mailers eligible to use these discounts are nonprofit organizations. The vast majority, however are nonprofit organizations and so we use the term “nonprofit” here.

¹⁷ § 3626. Reduced rates:

(a)(1) Except as otherwise provided in this section, rates of postage for a class of mail or kind of mailer under former section 4358, 4452(b), 4452(c), 4554(b), or 4554(c) of this title shall be established in accordance with section 3622.

(2) For the purpose of this subsection, the term “regular-rate category” means any class of mail or kind of mailer, other than a class or kind referred to in section 2401(c)

(3) Rates of postage for a class of mail or kind of mailer under former section 4358(a) through (c) of this title shall be established so that postage on each mailing of such mail reflects its preferred status as compared to the postage for the most closely corresponding regular-rate category mailing.

¹⁸ The price caps in the PAEA may prevent the Postal Service from increasing the prices of the nonprofit mail to the level charged to other mail in the subclasses. In that case, our calculation represents an upper bound on the actual amount that could be saved if the required discount were eliminated.

Excel workbooks, provides a self-contained tool for evaluating a variety of alternative pricing scenarios. It incorporates the Postal Service's test year volume forecasting procedures and input data as described in library references USPS-LR-L-63 and USPS-LR-L-66. It also includes the detailed after-rates pricing information for all major mail categories needed to estimate after-rates revenues, attributable costs, and contribution to institutional costs.

2.2.2 Results

Table 5a below presents volume, revenue, attributable cost, contribution to institutional costs, and revenue per piece information for the nonprofit and for-profit categories as shown in PRC Docket No. R2006-1 (Opinion and Recommended Decision.)²⁰ Table 5a shows that the contribution levels for the nonprofit categories of Periodicals and Package Services are very small compared to the Standard mail nonprofit categories, so most of the improvement in contribution would be expected from the latter. Table 5b presents the same financial information as in Table 5a under the assumption that each nonprofit rate cell is set equal to its for-profit counterpart.

¹⁹ PRC-LR-23 reflects the changes described in the Commission's Opinion and Recommended Decision on Reconsideration (4/27/08). PRC-LR-2, which contains additional documentation, reflects the rates recommended by the Commission in its initial Opinion and Recommended Decision (2/26/07).

²⁰ Within county is not included because its affect on the results of this analysis is *de minimis*

Table F3-5a. Contribution from For-Profit and Nonprofit Rate Categories (Docket No. R2006-1 Test Year 2008 Rates)^a

Mail Category	Volume (000)	Revenue (\$ 000)	Attributable Costs ^a (\$ 000)	Cont. to Institutional Costs ^b (\$ 000)	Revenue Per Piece (Cents)
Periodicals:					
Regular Rate	6,287,446	2,016,728			32.1
Nonprofit	1,697,440	358,001			21.1
Classroom	60,230	17,571			29.2
Outside County	8,045,116	2,392,300	2,388,687	3,613	29.7
Standard Mail:					
Regular	63,478,847	15,672,195			24.7
Nonprofit	12,416,064	1,802,679			14.5
Regular and Nonprofit	75,894,910	17,474,874	10,233,260	7,241,614	23.0
ECR	29,677,241	5,624,459			19.0
Nonprofit – ECR	2,529,325	293,963			11.6
ECR and NECR	32,206,566	5,918,422	2,869,200	3,049,222	18.4
Package Services:					
Media Mail	153,674	390,476			254.1
Library Rate	12,352	30,829			249.6
Media and Library	166,026	421,305	406,428	14,877	253.8
Totals	116,312,619	26,206,901	15,897,574	10,309,326	23.7

^a Source: PRC-LR-23, Docket No. R2006-1

^b Separate cost estimates are not available for nonprofit and for-profit categories within a combined category.

It can be seen that this increase in nonprofit rates results in an increase in contribution of about \$1.20 billion in TY 2008, or about \$1.15 billion in FY 2007 dollars²¹. In FY 2007 dollars, about \$940 million of this increase is due to higher nonprofit revenues, but another \$210 million arises because of lower attributable costs, which in turn are caused by reduced nonprofit volume resulting from the price increases. About 98 percent of the increased contribution is from the Standard mail nonprofit categories, with the remaining two percent from the nonprofit categories in Periodicals and Package Services.

²¹ Data from the PRC web site shows that the 12-month change in the CPI-U as of August 2008 is 4.3%.

Table F3-5b. Contribution from Nonprofit and For-Profit Rate Categories (Docket R2006-1 Rates With Equal Nonprofit and For-Profit Rates)^a

Mail Category	Volume (000)	Revenue (\$ 000)	Attributable Costs ^a (\$ 000)	Cont. to Institutional Costs ^b (\$ 000)	Revenue Per Piece (Cents)
Periodicals:					
Regular Rate	6,287,446	2,016,728			32.1
Nonprofit	1,681,051	371,710			22.1
Classroom	59,637	18,258			30.6
Outside County	8,028,134	2,406,697	2,383,645	23,052	29.7
Standard Mail:					
Regular	63,478,847	15,672,195			24.7
Nonprofit	10,939,011	2,614,744			23.9
Regular and Nonprofit	74,417,858	18,286,939	10,034,102	8,252,837	24.6
ECR	29,677,241	5,624,459			19.0
Nonprofit – ECR	2,384,979	448,663			18.8
ECR and NECR	32,062,219	6,073,123	2,856,340	3,216,782	18.9
Package Services:					
Media Mail	153,674	390,476			254.1
Library Rate	11,619	30,616			263.5
Media and Library	165,293	421,091	404,632	16,459	254.8
Totals	114,673,504	27,187,849	15,678,719	11,509,131	23.1

^a Source: Excel workbook nonprof1.xls from workpapers

^b Separate unit costs are not available for nonprofit and for-profit categories within a combined category.

2.3 Analysis 3: Uniform Rate for Media Mail and Library Rate Subclasses

The Media Mail and Library Rate subclasses have a statutory restriction²² that requires their rates to be uniform with respect to distance. Consisting largely of books, their total FY 2007 revenue is \$407 million and total contribution to institutional cost is a negative \$38 million.²³

The issue here is to estimate the additional contribution that could be earned if the two subclasses were zoned. They have a cousin subclass, Bound Printed Matter (BPM), which also consists largely of books but is zoned. The average weight of BPM is 2.2 pounds and the combined average weight of Media Mail and Library Rate is 2.1 pounds.²⁴ Our approach to estimating the additional contribution from zoning uses the unit contribution of Bound Printed Matter as a proxy to estimate the increase in contribution from Media Mail and Library Rate. This approach is supported by the high cross-elasticity of Media/Library Rate with Bound Printed Matter of 1.005. This is the highest cross price elasticity between two USPS products in the set of demand equations estimated by USPS witness Thress in the R2006-1 rate proceeding.²⁵ For FY 2007, the combined unit contribution of Media/Library was -21.7 cents and the unit contribution from BPM was 13.9 cents, so BPM's contribution was 35.6 cents higher than Media/Library.²⁶ Multiplying the combined volume of Media/Library Rate (176.6 million) by 35.6 cents results in an estimated additional \$63 million contribution if Media/Library were zoned.

²² 39 U.S.C. sec. 3683.

²³ See FY 2007 PRC Annual Compliance Report, p. 24.

²⁴ See FY 2007 USPS RPW Report.

²⁵ USPS-T-7, Docket No. R2006-1.

²⁶ FY 2007 PRC Annual Compliance Report, p. 24.

2.4 Analysis 4: Losses on Market Dominant Products

2.4.1 Domestic Mail

A profit maximizing Postal Service would raise prices on loss-making market dominant products to at least break even or reduce the quality, and hence the cost, of such products to achieve the same end. Alternatively, the Postal Service would discontinue the loss-making products. For purposes of this analysis, we shall assume that the universal service obligation prevents the Postal Service from taking any of these remedial steps, although current law might be interpreted to permit all three.²⁷

The Postal Service had four loss-making domestic market dominant products in 2007 (Within County and Outside County Periodicals, single piece Parcel Post and Media Mail/ Library Rate). Had the first rate increase under PAEA gone into effect prior to the beginning of FY 2007, it would have been possible for the Postal Service to eliminate the losses on the two parcel subclasses by using the flexibility allowed under the price cap rules. Under the PAEA price caps, the 2007 losses on the two subclasses that make up the periodical class could not have been eliminated. Thus, the loss of \$448 million by periodicals is caused by the current statutory obligations and consequently, the negative contribution made by them is part of the cost of universal service. See Table 6 below.

Table F3-6. FY 2007 Domestic Product Losses Associated with the USO

Product	Volume (million)	Revenue (\$ million)	Attributable Cost (\$ million)	Loss/piece (cents)	Loss (\$ million)
Within County Periodicals	736	73	86	1.6	12
Outside County Periodicals	8,059	2,115	2,550	5.4	436
Total	8,796	2,188	2,636	5.1	448

Source: PRC 2007 Annual Compliance Report, p.68

²⁷ The requirements of the universal service obligation under current law are unclear on each of these points; see Appendix B.

2.4.2 International Mail

Inbound International First Class lost approximately \$73 million in 2007.²⁸ Inbound Registered Mail also lost an undisclosed amount.²⁹ The delivery of International Mail is a treaty obligation of the U.S. Government. A profit maximizing Postal Service would accept responsibility for this obligation because International Mail as a whole (inbound and outbound) is profitable. Revenues exceeded costs by \$256 million.³⁰

The USPS relies on the Universal Postal Union's (UPU) system of rates and on bilateral agreements to pay other posts and to receive payments from other posts when they deliver each other's mail. These rates are called terminal dues. There is a question of whether a profit maximizing Postal Service would attempt to negotiate new terminal dues agreements to eliminate the losses on inward mail. Under terminal dues arrangements the payments that the USPS receives for inward mail are closely related to the rates it pays for outward mail. An increase in the former would result in an increase in the latter.³¹ There is insufficient public information to conclude if the Postal Service is likely to improve the overall net profitability of International Mail by renegotiating its terminal dues arrangements in an attempt to reduce or eliminate losses on inward First Class mail. A profit maximizing USPS would do this only if it improved its overall profitability. Since International Mail as a whole, is profitable, we conclude that there is no USO cost associated with the losses on inward international mail.

²⁸ Source: PRC Annual Compliance Report for 2007, p.118.

²⁹ The PRC stated that the figure was not reported by the Postal Service to the PRC.

³⁰ Op cit., p. 115

³¹ The new rates would presumably be based on each country's domestic tariff. Because the Postal Service has a relatively low domestic tariff (owing to its large economies of scale), and most other countries have a much higher domestic tariff, it might be a net loser under a domestic tariff based system. In addition, the U.S. volume of the inward mail is smaller than outward mail and there are currency issues that would result in negative consequences for the USPS. The consequences could well be an erosion of the overall profitability of International Mail for the Postal Service.

2.5 Analysis 5: Cost of Measuring Service Performance

The PAEA requires that the Postal Service measure the service performance of market dominant products on an annual basis. Without this statutory obligation, a profit maximizing USPS might not measure service performance. Thus service measurement is a cost of the USO.³²

The Postal Service has provided what it calls “rough estimates” for service measurement:

External costs

\$17 million for the External First Class (EXFC) measurement system.

\$20 million (minimum) for the EXFC expansion to include Periodicals, Standard Package Service and Special Services.

Internal costs

\$145 million (primarily for scanning carrier route bundles, saturation mail, post office boxes³³, containers, etc).

Total costs

\$182 million (minimum)

³² Before the PAEA the only category measured on an end-to-end basis was single piece First-Class mail.

³³ A P.O. box scan is a scan of a bar code next to a box section after all mail is up loaded to that section.

2.6 Analysis 6: Savings from Closing Small Rural Post Offices (CAG K&L)

2.6.1 Background

Under section 403(a)(3), the Postal Service is required "to establish and maintain postal facilities of such character and in such locations, that postal patrons throughout the Nation will, consistent with reasonable economies of postal operations, have ready access to essential postal services." In developing rural free delivery services in the early twentieth century, Congress substituted rural carrier services for the services of small post offices in many rural areas. Since fiscal 1985, however, Congress has added a rider to the annual appropriations act that prohibits the Postal Service from using funds appropriated in that act to close or consolidate small rural and other small post offices. As a legal matter, it appears that the Postal Service is not barred from using other funds to close small or rural post offices even though the original intent of Congress was surely to prevent such closures. This conclusion is reinforced by the fact that since 1985, the Postal Service has actually closed or consolidated hundreds of small post offices.³⁴ At the same time, the Postal Service claims that the rider discourages closures of additional small post offices. Out of an abundance of caution, we have, for purposes of the present calculation, treated the cost of maintaining all remaining post offices as a mandatory cost of the Postal Service. The result, therefore, represents an upper bound estimate for the cost of the USO with respect to the operation of small and rural post offices since it very likely overstates the actual legal obligation of the Postal Service.

Virtually all of the approximately 9,200 CAG K&L post offices have counter transaction costs and post office box operations costs (per box) that are much higher than costs at larger offices. They typically have just one employee providing retail services to customers and filling post office boxes. Closing these offices and transferring their functions to more efficient operations could save considerable costs.³⁵

³⁴ In 1985 there were 29,557 post offices. At the end of 2007 there were 27,276 post offices.

³⁵ For example, a 1982 General Accounting Office study suggested that closing 7,000 of these offices could save almost \$400 million at that time.

In this analysis, we assume that rural carriers will provide all retail transactions that were formerly performed at these small offices. We also assume that post office box services at these stations will be replaced by rural carrier delivery to new Neighborhood Delivery Collection Box Units (NDCBU, cluster boxes). Delivering to an NDCBU is the lowest cost alternative and thus should result in the highest savings or cost of this element of the USO. The difference between the current costs of CAG K&L operations and the costs of these alternative methods, less the lost revenue from existing paid CAG K&L boxes, will serve as an estimate of the USO costs savings from closing small rural post offices.

2.6.2 Information on CAG K&L Offices

For FY 2007, there were 9,218 CAG K&L post offices,³⁶ with costs of \$663.9 million,³⁷ so the annual cost per office was \$72,021.³⁸ Recent information from the USPS-sponsored IBM study of smaller post offices showed that average retail revenue per CAG K&L office was \$30,374, so the total FY 2007 retail revenue for these offices was about \$280 million.³⁹ Also, the USPS Finance department estimated that there were about 0.552 retail transactions per retail revenue dollar at small offices in FY 2007,⁴⁰ so the estimated number of FY 2007 retail transactions at CAG K&L offices would be 154.5 million.

The number of paid post office boxes at CAG K&L offices plus the number of “free” post office boxes is assumed to be the number of additional delivery points that must be served by rural carriers as a result of closing the CAG K&L offices. Free boxes are provided by the Postal Service for all delivery points to customers who involuntarily

³⁶ See the Postal Service Active Employee Statistical Summary for year-end pay period 20, FY 2007.

³⁷ See PRC-ACR2007-LR2 from Docket No. ACR2007. This figure includes direct costs such as customer transactions and sorting incoming mail to boxes, as well as indirect costs such as depreciation and energy costs.

³⁸ As a comparison, the FY 2007 cost of contract stations, which are comparable in size and functions to CAG K&L offices, was \$79.135 million (see PRC-ACR2007-LR2, Excel workbook FY07CRpt.xls, in Docket No. ACR2007. The number of contract stations in FY 2007 was 3,131 (see FY 2007 Annual Report, p. 56). Thus the annual cost per contract station was \$25,274.

³⁹ Information provided on September 30, 2008 from Linda Kingsley, SAPMG, USPS. The ongoing IBM study was the source.

⁴⁰ Information provided on August 5, 2008 by Jay Lewis, Cost Attribution, Finance, USPS.

receive no delivery from rural carriers.⁴¹ In FY 2007, there were about 390 thousand free boxes and 712 thousand paid boxes in CAG K&L offices, so the total number of boxes was about 1.102 million.⁴² This would be the total number of additional delivery points that would have to be served by rural carriers.

There are five sizes and eight rate groups (including free boxes) of post office boxes, each with its own annual price. USPS FY 2007 PO Box billing determinant data⁴³ were used to compute the lost annual revenue from all sizes and groups of CAG K&L post office boxes as \$26.4 million.

2.6.3 Information on Rural Carrier Costs

The FY 2007 cost of each rural carrier transaction was estimated to be \$0.092.⁴⁴ A separate analysis of the Rural Mail Count data was used to arrange the routes by density in terms of boxes (delivery points) per mile. The cost to deliver to a box that was part of an NCDBU for each quintile of these density-ordered routes was then determined, and the average cost for the bottom three density quintiles turned out to be \$0.113 per box.⁴⁵ This figure was used to estimate the costs of the extra delivery points.

2.6.4 Calculation of FY 2007 Savings from Closing CAG K&L Offices

Multiplying the 1,102 million post office boxes in current CAG K&L offices times \$0.113 per NCDBU box delivery times 300 delivery days per year yields about \$37.4 million dollars per year as the cost of providing CAG K&L post office box service by rural carriers. The cost of providing the current CAG K&L annual retail transactions by rural carriers would be 154.5 million times the unit transaction cost of \$0.092, or about \$13.9 million. As noted above, the lost paid CAG K&L post office box revenue would be \$26.4 million. The sum of these three items is \$77.7 million. The annual savings from replacing CAG K&L post office operations by rural carrier operations would be the

⁴¹ In FY 2007, there were 1.365 million free boxes. See FY 2007 PO Box billing determinant data from USPS-FY07-LR-4, Docket No. ACR2007.

⁴² See Excel workbook CAGK AND CAGL POBOXES FY 2007, dated 10/15/08.

⁴³ See FY 2007 PO Box billing determinant data

⁴⁴ Source: FY 2006 Rural Mail Count and FY 2007 salary data. See workpapers for documentation.

⁴⁵ Source: FY 2006 Rural Mail Count and FY 2007 salary data. See workpapers for documentation.

current CAG K&L office cost of \$663.9 million less \$77.7 million, so the net FY 2007 annual savings would be about \$586 million and that is the USO cost of this element.

2.7 Analysis 7: Alaska Air Subsidy

The cost of domestic Alaska air transportation was about \$115 million in FY 2007.⁴⁶ Air transport is used in Alaska to transport all USPS products to remote locations that cannot be reached by road or water. As can be seen from the second column of Table 7 below, most of this cost (\$112 million) is caused by parcel post, which is used for transporting essential supplies to remote regions of Alaska.⁴⁷

The PRC has taken the view that most of this cost (\$107 million in FY 2007 or 93 percent of the total) should be considered institutional rather than attributable. Its adjustment is shown in the third column of the table. This adjustment in effect shifts the cost of the high-cost Alaska air transportation to the high-volume classes of mail which pay the bulk of the institutional costs. The PRC has considered its \$107 million adjustment a cost of providing universal service. A profit maximizing USPS would eliminate air service for products that are only entitled to surface transportation. Potentially, an explicit USO for the USPS would require the provision of ubiquitous service for all market-dominant products, and so the Alaska air adjustment would be part of the cost of the USO.

⁴⁶ See PRC Library Reference PRC-ACR2007-LR2 in Docket ACR2007, Excel workbook FY07Crpt.xls.

⁴⁷ This is called the Alaska bypass program because most of the parcels bypass a post office and are loaded on to aircraft directly from warehouses located at airports.

Table F3-7. Domestic Alaska Air Before and After Adjustment

	Before Adjustment (\$ million)	After Adjustment (\$ million)
Total First Class	.258	.180
Priority Mail	1.034	.730
Express Mail	0	0
Total Periodicals	.210	.150
Total Standard Mail	1.277	.900
Parcel Post	112.019	7.864
Bound Printed Matter	.141	.100
Media Mail	.155	.110
Total Package Services	112,315	7.885
U.S. Postal Service	.242	.170
Free Mail	0	0
International Mail	0	0
Total Attributable	115.336	8.097
Other Costs	0	107.239
Total Costs	115.336	115.336

2.8 Analysis 8: Uniform Rate for First-Class Mail

2.8.1 Background

There is statutory language stating there must be at least one class of mail for letters that is sealed against inspection and whose rate is uniform throughout the US.⁴⁸ First-Class mail fulfills this requirement. Further, the Commission has issued a ruling that that this statutory provision does not require distance-invariant rates.⁴⁹ It ruled that the statute required that First-Class rates be uniform in the sense that they be invariant with respect to where the sender is located in the US. The First-Class rate structure for a mailer in New York must be the same as for a mailer in San Juan or Seattle.

In this analysis we make the assumption that the USO requires distance invariant rates for workshared First-Class mail. To measure the cost of this possible USO provision we estimate the increased profits that the Postal Service could earn if dropship discounts were allowed for workshared First-Class mail. A profit maximizing post with the letter monopoly would likely allow dropshipping of workshared First-Class mail and in a competitive environment it would likely want to have different prices by region, three or five-digit zip code, or even by individual delivery route.

We assume that First-Class dropship discounts will be based on avoided costs as required by the PAEA. Cost avoided discounts benefit the mailer when he can do the work for less cost than the Postal Service avoids. When the discount is set at avoidable costs, the Postal Service benefits because the price elasticity effect generates increased volume and contribution in that same subclass. In the case of First-Class, there is also a major contribution benefit from worksharing discounts due to a relatively high

⁴⁸404 (c) The Postal Service shall maintain one or more classes of mail for the transmission of letters sealed against inspection. The rate for each such class shall be uniform throughout the United States, its territories, and possessions. One such class shall provide for the most expeditious handling and transportation afforded mail matter by the Postal Service. No letter of such a class of domestic origin shall be opened except under authority of a search warrant authorized by law, or by an officer or employee of the Postal Service for the sole purpose of determining an address at which the letter can be delivered, or pursuant to the authorization of the addressee.

(a) Notwithstanding any other provision of this title, the rates of postage established for mail matter enumerated in former section 4554 of this title shall be uniform for such mail of the same weight, and shall not vary with the distance transported.

⁴⁹ Opinion and Recommended Decision, Docket No. R77-1, at 417-18 (1978).e

conversion rate of similarly workshared for-profit Standard Regular mail to First-Class mail, because both mail categories can be effectively used for sending advertising mail. The contribution benefits of this conversion are due to the fact that workshared First-Class mail has a much higher unit contribution than for-profit Standard Regular mail.

We do not know the discount that the Postal Service would offer, since we do not know what the cost savings to the Postal Service would be. Thus we can not estimate with precision the increased contribution that could be generated from a First-Class dropship discount. However, we estimate the effect on total contribution of 1.0, 1.5, and 2.0-cent First-Class SCF dropship discounts, which are comparable to similar worksharing discounts for Standard mail. We also assume that the 40 percent⁵⁰ of turnaround mail (i.e., mail that originates and destines in the same SCF) would not be eligible for this discount.

As with the analysis of increased contribution from eliminating nonprofit rate preferences (Analysis 2), this analysis utilizes the PRC financial forecasting model contained in PRC library reference PRC-LR-23 from Docket No. R2006-1. However, for this analysis of First-Class dropship discount discounts, special runs of the model were made to reflect the updated forecasting data available from PRC Docket No. ACR2007. For further information on this model, see the write-up of Analysis 2 and the documentation in R2006-1 library references PRC-LR-23 and PRC-LR-2.

2.8.2 Results

The second, third, and fourth columns of Table 8a below show the volume, contribution, and contribution per piece for First-Class and Standard mail from the PRC FY 2007 Annual Compliance Report. The last three columns of Table 8a show the FY 2007 results in terms of changes in volume and contribution from introducing an additional 1.0-cent dropship discount to non-turnaround workshared First-Class mail. Table 8b shows similar information for 1.5-cent and 2.0-cent dropship discounts. The increases in contribution resulting from the 1.0, 1.5, and 2.0-cent discount levels are, respectively, \$89.4 million, \$130.1 million, and \$164.6 million. We will use the 1.5-cent discount as

⁵⁰ See Docket NO. R2006-1, Response of the USPS to Question 5, POIR No. 5.

our base case in this analysis, so the profit increase for non-uniform First-Class rates is estimated at \$130.1 million.

It can be seen from Tables 8a and 8b that the majority of the additional contribution from these dropship discounts comes from the transfer of significant volumes from Standard Regular letters and cards to First-Class workshared mail. Some additional contribution also arises from the transfer of First-Class Single Piece letters and cards to First-Class workshared mail, and from a modest net increase of workshared First-Class volume due to lower average prices. For example, with a 1.5-cent dropship discount, about 678 million pieces of Standard Regular Mail and 426 million pieces of First-Class Single Piece letters and cards transfer to workshared First-Class. Also, workshared First-Class volume increases by about 275 million pieces due to lower average prices.

Table F3-8a. FY 2007 Contribution from First-Class Drop-ship Discounts, 60% of Mail Available

Mail Category	Volume (000)	ACR2007 Contribution (\$000)	Cont/Pc (Cents)	% Volume Change	1.0 cent disc Volume Change (000)	Contribution Change (\$000)
First-Class Mail:						
Single-Piece Letters	40,121,742	7,356,510	18.34	-0.67%	(267,654)	(49,076)
Workshared Letters	49,978,441	10,598,607	21.21	1.22%	608,954	129,137
Total Letters	90,100,184	17,955,117	19.93		341,300	68,014
Single-Piece Cards	2,141,669	48,878	2.28	-1.10%	(23,540)	(537)
Workshared Cards	3,656,291	441,106	12.06	8.44%	308,593	37,230
Total Cards	5,797,959	489,984	8.45		285,053	24,090
Total First Class	95,898,143	18,445,101	19.23		626,353	120,473
Standard Mail:						
Regular	56,555,118			-0.80%	(449,724)	
Nonprofit	12,113,798			0.00%	0	
Regular and Nonprofit	68,668,917	4,742,306	6.91		(449,724)	(31,058)
ECR	32,177,311			0.00%	0	
Nonprofit - ECR	2,669,884			0.00%	0	
ECR and NECR	34,847,195	2,884,860	8.28		0	0
Total Standard Mail	103,516,112	7,627,166	7.37		(449,724)	(31,058)
Total Mail	199,414,255	26,072,267	13.07		176,629	89,415

Sources: PRC 2007 Annual Compliance Report and library references PRC-LR-2 and PRC-LR-23 in Docket No. R2006-1.

Table F3-8b. FY 2007 Contribution from First-Class Drop-ship Discounts, 60% of Mail Available

Mail Category	% Volume Change	1.5 cent disc Volume Change (000)	Contribution Change (\$000)	% Volume Change	2.0 cent disc Volume Change (000)	Contribution Change (\$000)
First-Class Mail:						
Single-Piece Letters	-0.98%	(392,781)	(72,018)	-1.25%	(499,764)	(91,634)
Workshared Letters	1.82%	910,637	193,113	2.36%	1,179,269	250,080
Total Letters		517,856	121,095		679,505	158,446
Single-Piece Cards	-1.56%	(33,487)	(764)	-2.04%	(43,796)	(1,000)
Workshared Cards	12.84%	469,304	56,618	14.18%	518,464	62,549
Total Cards		435,817	55,854		474,668	61,550
Total First Class		953,673	176,949		1,154,173	219,995
Standard Mail:						
Regular	-1.20%	(678,351)		-1.42%	(802,370)	
Nonprofit	0.00%	0		0.00%	0	
Regular and Nonprofit		(678,351)	(46,847)		(802,370)	(55,412)
ECR	0.00%	0		0.00%	0	
Nonprofit - ECR	0.00%	0		0.00%	0	
ECR and NECR		0	0		0	0
Total Standard Mail		(678,351)	(46,847)			(55,412)
Total Mail		275,322	130,102		1,154,173	164,583

Sources: PRC 2007 Annual Compliance Report and library references PRC-LR-2 and PRC-LR-23 in Docket No. R2006-1.

2.9 Analysis 9: Delivery to All Addressees Who Involuntarily Do Not Receive Delivery

There are currently 1.365 million “free” post office boxes for rural addressees in areas served by CAG H-L post offices that do not have the option of receiving their mail via home delivery.⁵¹ An explicit USO for the Postal Service might reasonably require that all addressees be provided delivery from rural carriers unless they opt to receive post office box delivery. Not all eligible addressees would choose to do so, but our analysis will assume the worst case, i.e., all free post office boxes convert to rural delivery.

The costs of providing rural delivery to these addressees will include the cost of providing their retail transactions as well as six-day-a-week delivery to assumed new stand-alone roadside boxes. For the cost of providing retail transactions, the average number of rural carrier retail transactions per box per day is 0.29 and the cost of each one is \$0.092.⁵² Thus the cost for new rural carrier retail transactions for all 1.365 million free box holders would be 1.365 million x .29 x \$0.092 x 300 days, or \$10.7 million per year.

The daily rural carrier delivery cost per rural stand-alone box is estimated from an analysis of recent Rural Mail Count data to be \$0.221.⁵³ The additional FY 2007 cost of providing rural delivery to the “free box” addressees would thus be 1.365 million boxes times \$0.221 per box times 300 delivery days per year, or \$90.5 million. The total estimated annual USO cost of providing free delivery to all addressees who cannot currently obtain it is \$10.7 million plus \$90.5 million, or \$101.2 million.

⁵¹ See FY 2007 PO Box billing determinant data from USPS-FY07-LR-4, docket No. ACR2007.

⁵² Source: FY 2006 Rural Mail Count and FY 2007 salary data. See workpapers for documentation.

⁵³ This figure is the average of the stand alone box delivery costs for the 60% of rural routes with the lowest density, i.e., boxes per mile. FY 2006 Rural Mail Count and FY 2007 salary data. See workpapers for documentation.

2.10 Analysis 10: Six-Day Delivery for All Residences

Currently, a small number of the approximately 135 million residential delivery points⁵⁴ receive delivery less than six days a week. An explicit USO could reasonably require that all residences receive delivery six days a week.

The Postal Service reports that there are only 25,009 residential delivery points that receive delivery less than six-day-a-week delivery, and each gets delivery three days a week, mostly from Highway Contract Routes⁵⁵. The annual number of extra deliveries for six-day delivery to these addresses would be 25,009 addresses times 3 days per week times 52 weeks a year, or 3.901 million deliveries. Assuming that these addresses are in rural areas, we use the FY 2007 estimate of daily rural carrier delivery to a stand-alone box on low-density routes⁵⁶, \$0.221⁵⁷, to estimate these costs. The annual cost of these additional deliveries would be 3.901 million deliveries times \$0.221 per delivery or about \$862,000.

Thus, the additional cost to the Postal Service from a new USO requirement that all residences receive 6 day a week delivery would be less than a million dollars annually.

⁵⁴ See USPS Annual Report for FY 2007, p. 56.

⁵⁵ Source: Linda Kingsley SAPMG, USPS on October 8, 2008.

⁵⁶ Specifically, the average of the stand alone box delivery costs for the 60% of routes with the lowest density, i.e., boxes per mile.

⁵⁷ Source: FY 2006 Rural Mail Count and FY 2007 salary data. See workpapers for documentation.

2.11 Urban-Rural Cross Subsidy

It is widely believed that rural delivery is a USO cost because profits from urban areas cross-subsidize delivery to rural areas in the U.S. This may be true for European countries where delivery is to the door of every dwelling and letter carriers must traverse every country lane and driveway. It is not a valid generalization for the U.S., however, because our rural delivery system is much less costly while providing a lower quality of service. The USPS delivers to roadside boxes that are placed along the principal routes of travel. People who live on roads that are not on the carrier's route of travel must place their mailboxes along the carrier's route. Moreover, the carrier frequently drives down the route of travel in only one direction. When this happens, customers must place their mailboxes on the side of the road that the carrier travels. A comparison was made by the staffs of the PRC and La Poste on the cost of rural delivery in the U.S. and France. Examining the most rural parts of each country, it was found that USPS carriers can serve twice as many addresses as La Poste carriers in the same amount of time even though carriers in both countries use vehicles to serve their respective routes and the distance between dwellings is much greater in the U.S.⁵⁸

In urban areas carriers primarily deliver to curbside mailboxes or to the door. Routes that deliver to the door (called park and loop routes) cost 53 percent more per address than routes that deliver to curbside mailboxes.⁵⁹ There are approximately twice as many park and loop routes as curblines. Many of these are in areas with lower than average income (and mail volume) and are unprofitable. In contrast, curbside routes are usually in suburbs and less densely populated areas of cities where incomes (and mail volumes) are higher than average and the routes are profitable.

⁵⁸ See section 3.2 of "Delivery Cost Heterogeneity and Vulnerability to Entry", Bernard, Cohen, et al., *Postal and Delivery Services, Delivering on Competition*; Ed., Michael Crew and Paul Kleindorfer, Kluwer Academic Publishers, 2002.

⁵⁹ Email from USPS Finance Department to the authors, dated 11/8/08

Table 9 below from an earlier PRC staff paper divides delivery routes into 20 groups, each containing 5 percent of the routes (semi-deciles) sorted according to profitability.^{60,61}

Table F3-9. Annual Route Profits and Losses by Semi-Decile^a (1999, \$ million)

Profits		Losses	
1	\$1,690	12	(4)
2	888	13	(56)
3	701	14	(112)
4	575	15	(172)
5	471	16	(236)
6	382	17	(307)
7	303	18	(391)
8	232	19	(505)
9	168	20	(764)
10	108		
11	50		
Total Profits	5,572	Total Losses	(2,551)
Net Profits	3,021		

^a Profitable and unprofitable semi-deciles do not sum to total profits and total losses because semi-decile 12 contains both profitable and unprofitable routes.

The profitability of a route is determined by the mode of delivery and the volume of mail delivered on the route, and volume is, in turn, primarily determined by the income of the addresses on the route.⁶² Since low income households are found in both urban and rural areas, loss making routes are found in both urban and rural areas.

The PRC staff conducted another study that found that, on the whole, rural routes are profitable⁶³ The Postal Service has two distinct delivery crafts, city delivery carriers and rural carriers. The latter serve both urban and rural areas. In the study, all Rural Carrier

⁶⁰ "An Empirical Analysis of the Graveyard Spiral"; Cohen, Robinson, Sheehy, Waller, and Xenakis; Competitive Transformation of the Postal and Delivery Sector; Ed. Crew and Kleindorfer; Kluwer Academic Publishers, 2003.

⁶¹ The profit or loss on a route is defined as the revenue from the mail on the route minus the upstream cost of the mail on the route minus the cost of the route.

⁶² Household Diary Study, 2006, United States Postal Service, p. 12.

⁶³ "The Cost of Universal Service in the U.S. and its Impact on Competition", Cohen, Robinson, Waller and Xenakis; Proceedings of Wissenschaftliches Institut für Kommunikationsdienste GmbH (WIK), 7th Koenigswinter Seminar on Contestability and Barriers to Entry in Postal Markets, November 17th-19, 2002

routes were ordered by the number of boxes per mile on each route.⁶⁴ Then 60 percent of routes that serve the fewest boxes per mile were selected. These routes clearly served rural areas.⁶⁵ It turned out, that only 13.3 percent of households are served by that group of rural routes.⁶⁶ This is far less than the 21 percent of the households classified by the Census Bureau as being in rural areas.⁶⁷ Because rural carrier routes become more profitable as boxes per mile increase, and since the study clearly selected the most rural of rural routes, it understated the profits earned from delivering to all rural areas and correspondingly overstated the profits earned from delivering to urban areas. Forty-seven percent of the routes serving the study sample of rural areas of the U.S. were unprofitable and forty-four percent of the routes serving remaining (presumably) urban areas were unprofitable.

In summary, there is no urban-rural cross-subsidy in the U.S. A more accurate generalization would be that there are unprofitable rural and urban routes that are cross-subsidized by profitable rural and urban routes. The most important factors in determining profitability are the mode of delivery and the volume on the route. As noted, the most expensive mode of delivery is park and loop routes which are the predominant mode in urban areas. The least expensive mode is curbside delivery in urban areas. The cost of rural delivery to roadside boxes falls in between.

A better analysis of the role of income and route profitability could be done if the carrier route data that the PRC receives from the Postal Service was not stripped of zip code identification.

⁶⁴ We take the number of boxes per mile as a proxy for population density.

⁶⁵ The remaining 40 percent of rural routes were combined with city delivery routes to calculate profits from urban areas.

⁶⁶ We assume that each box serves one household.

⁶⁷ U.S. Census Bureau Census 2000 Summary File 1 Final National. Source: ftp://www2.census.gov/census_2000/datasets/Summary_File_1/Final_National/ (Table P15 Households; data dictionary reference name: P015001; summary level: 010; geographic component codes: 00, 43). October 19, 2002.

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School of Public Policy

Study on Universal Postal Service and the Postal Monopoly

Appendix F

Section 4

**Quantitative Analysis of the Value of the Postal and
Mailbox Monopolies**

Robert H. Cohen

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1 Quantitative Analysis of the Value of the Postal and Mailbox Monopolies

1.1 Value of the Combined Postal Letter and Mailbox Monopolies

The value of a monopoly is the loss of net income to a post if its monopoly were eliminated while holding its USO constant according to the methodology laid out in Section 2 of Appendix F.¹ This section deals with the combined letter and mailbox monopoly of the Postal Service in order to see the impact of a competitive postal market on Postal Service profits. The next section deals with the case where the mailbox monopoly alone is eliminated but not the letter monopoly because the United States is unique in being the only country in the world with a mailbox monopoly. Therefore it is of interest to see how much profit the Postal Service would lose if it were eliminated while keeping the letter monopoly.

This analysis employs an updated model that was originally developed by the PRC staff and used in a staff paper to test the hypothesis that liberalization of the U.S. postal market would cause the USPS to enter a graveyard spiral.² The model is one of a family belonging to the “entry pricing” methodology in the postal economic literature. It is used here to estimate the volume that would be captured by an entrant from the incumbent (USPS) and the impact of the lost volume on the Postal Service’s net revenue (or profits) under the assumption that the letter and mailbox monopoly are both eliminated. All elements of the USO are retained. The model is used with 2007 data in this analysis.

The letter monopoly in the U.S. is a delivery monopoly. Mailers or third parties are allowed to barcode, sort and transport mail as long as the Postal Service delivers it. The USPS has adopted an extensive array of discounts called worksharing discounts that are, to the extent practical, set equal to the Postal Service’s avoided cost. At each point in the value chain mailers and third parties make a choice to do the work themselves or let the

¹ This subject is discussed further in Section 1.1.3

² Cohen, R., Robinson, M., Sheehy, R., Waller, J. and Xenakis, S. “An Empirical Analysis of the Graveyard Spiral”; Competitive Transformation of the Postal and Delivery Sector; Eds. Michael A. Crew and Paul R. Kleindorfer; Kluwer Academic Publishers, 2003.

Postal Service do it. The decision is based on a comparison of their cost to do the work with the discount. If the mailer's cost is smaller than the discount, the mailer or third party will decide to do the work itself and collect the discount. Otherwise, it will let the Postal Service do the work. In short, the lowest cost producer does the work. The result is a competitive upstream postal market that greatly simplifies our analysis of the profits that the Postal Service will lose if the combined monopolies are eliminated. We need only consider the delivery portion of the postal value chain since we already have a competitive upstream market.

The model examines a delivery firm (or entrant) that attempts to cream-skim volume from the U.S. Postal Service. Very simply, the model examines data on USPS delivery routes to see if an entrant could profitably deliver the contestable mail (i.e. the mail for which an entrant could compete) on the routes. In the model the entrant only delivers mail but it does have to sort the mail into delivery sequence and do the other in-office activities required of letter carriers to prepare their mail for delivery. It relies on workshared volumes that are presorted and entered locally by mailers or third parties. It is assumed that entry will occur wherever it is profitable. When it does occur, the entrant is said to have skimmed the route by capturing volume and as a result the net income of the Postal Service declines. We refer to a single entrant, but there is no *a priori* reason why there could not be multiple entrants. It is the total impact of entry on the Services' net revenue that matters. The model assumes that the entrant has access to the mail box.

1.1.1 Contestable Volumes

The value of the monopolies is most sensitive to the estimate of the volumes for which the entrant could compete. In this section the estimate of contestable volumes is based on an analysis of how mailers and third party consolidators presort and dropship mail. This information is used to quantify the volumes for which a delivery entrant could compete. An empirical and reproducible estimate is the goal.

Not all the 212 billion pieces delivered by the Postal Service in 2007 could be captured by a delivery entrant. For example, single piece first class mail could not be captured because by definition, a delivery entrant does not have an upstream infrastructure to

collect, consolidate, sort and transport mail. Mail is contestable if it is presorted and dropshipped locally so that it needs no upstream work prior to preparation for delivery.

Presort requirement--letters

The basic sorting of mail to the carriers delivery sequence is necessary to any delivery operation. A delivery entrant would be able to capture *letters* that are presorted to the 5 digit, or ECR level, and dropped at the SCF³ or DDU⁴. The USPS uses machines that sort this mail to the carriers delivery sequence in one pass and does not have to sort them twice (once to the carrier route and once to the delivery sequence). It is assumed for the purpose of this analysis that entrants have similar machines but we include no cost for the entrant.⁵

Presort requirement--flats

In 2007 there were no machines in general use that could sequence *flats*. Consequently entrants could only capture ECR presorted flats because five digit flats still need upstream processing to allow them to be sorted to the carrier's delivery sequence. Unlike letters, flats must first be sorted to the carrier route level and then they can be sequenced for delivery on the route. If they are given to the USPS when they are presorted to the 5 digit level only, the cost to the mailer of presorting them to the carrier route level and giving them to the entrant would be higher than the cost (to the mailer) of giving them to the Postal Service as 5 digit mail. In summary, all mail that is given to the Postal Service at some upstream point⁶ to sort and/or to transport to the SCF/DDU is not contestable and is not available to the entrant.

Dropship estimates

Standard mail has cost based discounts for presorting and transportation. First class has no dropship discounts and periodicals have dropship discounts based on the advertising

³ SCF (sectional center facilities) are mail processing and local transportation hubs.

⁴ A DU is a delivery unit where carriers pickup and prepare their mail for delivery. DDU refers to a destination delivery unit where highly presorted mail is dropped by mailers (or third parties).

⁵ This contributes to the model generating an upper bound estimate.

⁶ An upstream sorting point for letters is prior to the 5 digit presort level and for flats its prior to the carrier route presort level.

portion of periodicals only and not on the editorial portion. The table below shows the dropship volumes for standard mail. It can be seen that a large preponderance of the volume is dropshipped to the SCF level or DDU (local delivery unit.)

Table F4-1: Distribution of Standard Regular and ECR Mail by Drop Entry Point (2007)

	Volume (billions)	Distribution of Volume (%)
Non-Dropshipped	1.6	4.6
BMC Entry	2.9	8.3
SCF Entry	21.4	61.3
DDU Entry	9.0	25.9
Total	34.9	100

Source: PRC-ACR2007-LR5

Contestable Standard Regular and ECR consists of 5 digit, carrier route presorted letters that are drop shipped to the SCF or DDU level and carrier route flats that are drop shipped to the SCF or DDU level.

This analysis assumes that if the monopolies were lifted, cost based transportation discounts would be offered for First Class and Periodicals so that the Postal Service could better compete.⁷ Much First Class 5 digit and carrier route bar-coded mail is not local and we don't know how much of this mail could be drop shipped and the question is made even more difficult because of the time value of First Class mail. This analysis assumes that half of the 5 digit and carrier route First Class (letters and cards) would be drop shipped if cost based discounts were offered. In addition, it assumes that the same percentage of carrier route presorted Periodicals would be drop shipped as carrier route presorted flats in Standard Mail. Finally, parcel post (Parcel Select) volume that is drop shipped to the DDU is considered contestable.

The contestable volumes used in this study for the combined monopolies are shown in the table below: This is 26 percent of the total mail for 2007.

⁷ The current statutes allow the Service to offer these discounts now. In a competitive environment the Postal Service would almost certainly have to offer these discounts or risk losing substantial bulk volumes simply because they were not priced in an economically rational manner.

Table F4-2: Base Case Contestable Subclasses and Contestable Volumes (Letter & Mailbox)

Subclass	Contestable Volume (billions)
First Class Presort Letters	10.0
First Class Presort Cards	0.8
Periodicals	2.9
Standard Regular	13.3
Standard ECR	28.3
Parcel Post	0.2
Total	55.3

1.1.2 Model Input Variables

The model has three additional input variables: the number of days per week the entrant delivers, the entrant's cost advantage, and the discount that the entrant offers relative to the prices that the USPS offers. They are discussed below.

Number of days per week

Mail delivery has both a fixed and a variable component. The fixed component involves the carrier walking or driving between stops and other activities whose time does not vary with the volume of mail that the carrier delivers. The variable component, of course, varies with the volume that is being delivered. The entrant on a particular route may choose to deliver from 1 to 6 days per week. Its delivery frequency will, for the most part, determine the amount of fixed delivery cost it incurs. For example, delivering 3 days per week incurs about half the fixed cost of delivering 6 days per week.

Entrant's cost advantage

The entrant may have a cost advantage over the Postal Service because its operations are more efficient or its labor costs are lower than the Service's. These two effects are combined in this variable and it ranges from zero to 30 percent in the model runs that are presented below.

Entrant's price discount

An entrant would have to offer a discount from the USPS price in order to attract customers. We know from the experience of other countries that have liberalized postal markets that discounts are almost always offered by entrants. The discount in the model affects the revenue that an entrant can receive from a route. This in turn affects whether a particular route would be profitable for the entrant. It will be profitable for the entrant to skim fewer routes as its discount increases. The price discount ranges from zero to 20 percent in the model runs presented below.

The model does not take into account the price elasticity of the mailer. It simply allows the entrant to take all the contestable mail when it is profitable for the entrant to do so. Some mailers will not use a new competitor to the established postal provider right away even if offered a discount. Brand loyalty, inertia, the need to prove quality and other factors affect the pace at which mailers will shift mail to an entrant even when offered a price discount.⁸ Varying the percentage of base volumes can also be used to see the impact of mailers' reluctance to switch postal delivery firms. If for example only 35 percent of mailers were willing to switch from the Postal Service, a model run with 35 percent of the base contestable volume would show the affect on postal profits. Thus, we also include 35 and 70 percent of base contestable volumes in model runs shown below. This is in addition to varying the contestable volumes over the range 50, 100, 150 percent of base contestable volumes (to see the impact of other estimates of base volumes).

⁸ See the PRC staff paper Cohen, R., Robinson, M., Sheehy, R., Waller, J. and Xenakis, S. "Will Entrants into a Liberalized Postal Market Attract Investors"; Regulatory and Economic Challenges in the Postal and Delivery Sector, Eds. Michael A. Crew and Paul R. Kleindorfer; Kluwer Academic Publishers, 2005.

In an email to the authors from a spokesman at City Mail (Sweden Post's main competitor in its liberalized postal market) has observed that capturing "volume in this market is a very slow process ... one can expect a lot of conservatism among the customers. This is especially true about administrative mail (bank account statements, invoices, etc.). It takes time to prove your quality."

1.1.3 Description of the Model

The model makes use of data on all evaluated rural routes (97 percent of rural routes) and on a ten percent sample of city routes.⁹ The data includes the volume of mail (by shape for rural routes and by subclass for city routes) that is being delivered on the day the data is recorded.¹⁰ The model examines each route in its data set. After taking into consideration the entrant's cost advantage and its price discount, the model calculates whether the revenue from the contestable volume on the route covers the entrant's costs. If not, the model examines the next route. If yes, then the entrant can profitably deliver the contestable volumes on the route, and the route is said to be skimmed by the entrant and the model goes on to the next route.

More specifically, the entrant's variable delivery cost for each class of mail is assumed to be the same as the Services' adjusted for its cost advantage. The variable delivery cost is computed for the contestable volumes on the route. Next the entrant's fixed cost for the route is computed. Here the model starts with the Postal Services fixed costs and takes into account the number of days per week that the entrant is delivering¹¹ and the entrant's cost advantage. The entrant's total delivery cost for the route is the sum of its fixed and variable cost. Because the entrant is simply delivering mail, it has no non-delivery costs. The revenue for each contestable subclass of the entrant is the product of the unit delivery price¹² of the USPS for each contestable subclass times a discount factor (which is an input variable) and the contestable subclass volumes on the route. The revenue for all the contestable subclasses is summed to compute the entrant's total revenue on the route.

⁹ City delivery volume data is obtained from USPS-FY07-28 - City Carrier Cost System (CCCS), rural delivery volume data is obtained from USPS-FY07-29 - Rural Carrier Cost System (RCCS), and rural carrier costs by mail shape were obtained from the FY2006 Rural Mail Count (RMC), which was graciously provided by the Postal Service.

¹⁰ Shape volumes from the Rural Mail Count are converted to subclass volumes using conversion factors derived from the Rural Carrier Cost System.

¹¹ All things being equal, the fixed cost of the entrant is proportional to the number of days a week that it delivers.

¹² The delivery price for each subclass is the average price minus the average upstream attributable cost. Because the Postal Services worksharing discounts are equal to avoidable upstream costs, this produces a good estimate of delivery prices.

If a route is skimmed, new Postal Service volumes are computed reflecting the lost volume. When all routes have been examined, Postal Service volumes under competition are known and new revenues are calculated.¹³ Similarly, the model calculates new revenue and new upstream and delivery costs for the new volume of mail that the Postal Service will deliver after the contestable mail on the routes has been skimmed. The reduction in profit due to entry is the value of the letter monopoly.¹⁴

1.1.4 Model Results

In our opinion, realistic ranges for the input variables and the base case are the mid range of the values.

The base case for the combined letter/mailbox monopoly is as follows:

10 percent--Discount

3 -- Number of days per week that the entrant delivers

10 percent—Entrant's cost advantage (labor cost and efficiency)

100 percent of contestable volume available

Base case value of the monopoly: \$3.48 billion

Percentage of routes skimmed: 48 percent

The value of the monopoly should be looked at in the context of the Postal Service's \$75 billion revenue for that year. The base case monopoly value is less than 5 percent of revenue. It should be noted that several factors contribute to this being an upper bound estimate. The model assigns no costs to the entrant for capital equipment. Moreover, it will be seen in a discussion below that some skimmed routes do not form the critical mass necessary for operation and no adjustment has been made for mailers' reluctance to switch to an entrant even if offered a discount.

Sensitivity analysis for model input variables

¹³ The weighting in the model takes into account the fact that city routes are represented by a 10 percent sample.

¹⁴ More specifically, pre- and post-entry profits are calculated for the sample, which are subsequently multiplied by a weight that determines the annual profit lost from entry.

To test the sensitivity of the result, the value of the combined letter and mailbox monopoly is shown below for the full range of each variable while holding the other variables to their base case values.

Table F4-3: Values of the Combined Letter and Mailbox Monopoly

Discount	0 percent	5 percent	10 percent	15 percent	20 percent
Value	\$3.9 bil	\$3.7 bil	\$3.5 bil	\$3.3 bil	\$3.1 bil
Skimmed routes	56 percent	52 percent	48 percent	44 percent	40 percent

Days/week	1	2	3	4	5	6
Value	\$5.1 bil	\$4.4 bil	\$3.5 bil	\$2.7 bil	\$2.1 bil	\$1.6 bil
Skimmed routes	92 percent	69 percent	48 percent	34 percent	24 percent	17 percent

Cost Advantage	0 Percent	10 Percent	20 Percent	30 percent
Value	\$3.1 bil	\$3.5 bil	\$3.9 bil	\$4.3 bil
Skimmed routes	41 percent	48 percent	57 percent	65 percent

Contestable Volume	50 Percent (low)	100 Percent (base)	150 Percent (high)
Value	\$0.8 bil	\$3.5 bil	\$5.9 bil
Skimmed routes	17 percent	48 percent	66 percent

It can be seen that the value is most sensitive to the contestable volume with a range from low to high of \$5 billion. Next is the number of days per week that the entrant delivers. Here the range is \$3.5 billion. The results are not nearly as sensitive to the discount or to the cost advantage variables. Each has about a billion dollars separating the low and high values. It is intuitive that the result is most sensitive to the contestable volume input variable. The amount of contestable volume can be thought of as the size of a pie and the other variables can be thought of as determining how large a portion of the pie will be captured by the entrant. Because the contestable volume ranges from 50

percent to 150 percent of the base amount, it is the largest factor in determining the size of the entrant's share. If contestable volume were only allowed to range from 95 percent to 105 percent, then the number of delivery days per week would have the largest influence in determining the entrant's share. It can also be seen that the results are decidedly non-linear with the amount of contestable volume.

The number of days that the entrant delivers is the way that an entrant can control its fixed cost to gain an advantage over the incumbent. In Sweden, City Mail (Sweden Post's main competitor) began by delivering two days a week.¹⁵ City mail later changed to delivering every third weekday (or an average of 1.5 days a week) and improved its profitability significantly.

The highest and lowest values of the letter monopoly assuming the most favorable and least favorable values of the input variables are:

Highest--\$7.1 billion (98 percent of routes skimmed)

(delivery once a week, no discount, 30 percent cost advantage and high contestable volume-150 percent of base)

Lowest--\$0.2 billion (2 percent of routes skimmed)

(delivery 6 days a week, 20 percent discount, no cost advantage, and low contestable volume-50 percent of base)

The percentage of routes skimmed is proportional to the value of the monopoly.

Sensitivity analysis for mailers' reluctance to use an entrant

To quantify the impact of mailers' reluctance to use an entrant we have examined the case where only 35 and 70 percent of the contestable mail would be turned over to the entrant. We do this by adjusting the amount of contestable volume to 35 and 70 percent of the base amount in the table below. It can be seen that if mailers were reluctant to turn over mail to the entrant even with a discount, that this would significantly reduce the value of the monopolies from the base case.

¹⁵ Sweden Post delivers 5 days per week.

Available Volume	35 Percent	70 Percent
Value	\$0.3 bil	\$1.8B
Skimmed routes	6 percent	31 percent

1.1.5 Critical Mass

This analysis uses the route data made available to the PRC by the Postal Service which has stripped it of zip code information making it impossible to determine the geographic proximity of the skimmed routes. This is important because entry would only take place if there were a critical mass of routes (or really addresses) that were profitable to serve. It can be expected that there are some relatively isolated skimmed routes that do not meet the critical mass test. We know that the profitability of routes depends on volume and that volume is primarily related to the income of the addresses served. Further we know that relatively high income people tend to live in different neighborhoods than relatively lower income groups.¹⁶ Consequently, a large majority of the skimmed routes would be in geographic clusters and would form a critical mass. To the extent that a number of skimmed routes are relatively isolated and are not in areas that form a critical mass, the model predicts entry where it is unlikely to occur and therefore overstates the value of the monopoly. The results can be considered to be an upper bound on the value of the monopoly.

Finally, we know that mail processing costs in the USPS mail processing plants vary widely.¹⁷ A more accurate estimate of the value of the monopolies could be made if the mail processing cost data could be related to the route data. Here again, the Postal Service did not release geographic identifiers with its mail processing center cost data.

¹⁶ See the Appendix to Cohen, R., Ferguson, W., Waller, J. and Xenakis, S. "An Analysis of the Potential for Cream Skimming in the U.S. Residential Delivery Market"; Emerging Competition In Postal and Delivery Systems; Eds. M. Crew and P. Kleindorfer; Kluwer Academic Publishers, 1999.

¹⁷ Cigno, M., Monaco, D. and Robinson, M. "Do Differences in Facility Specific Mail Processing Unit Costs Have Implications for the Cost of the Universal Service Obligation?" *Unpublished Manuscript*. Washington, D.C.: Postal Regulatory Commission.

1.2 Alternative Financing for the USO

The mid range “cost of the statutory USO” calculated in Appendix F3 is \$ 7.6 billion. This is close to the upper range of the value of the letter/mailbox monopoly. This coincidence might be taken by some observers as a justification for maintaining the twin monopolies, but this conclusion would be erroneous. In each case, it is important to keep in mind precisely what was calculated.

The “cost of the USO” can be thought of as an estimate of what would happen if Congress sold the Postal Service without adjusting the monopoly laws to a firm intent on profiting as much as possible from ownership while being required to stay within the statutory price caps. Seeking to maximize its profit, it would eliminate all elements of the statutory USO. We have estimated that the new owner would earn \$ 7.6 billion more than the Postal Service now earns.

Similarly, the “value of the monopolies” represents an estimate of the losses that the Postal Service would suffer if Congress repealed the monopoly laws but left the Postal Service hobbled by its current universal service obligations as it entered a new competitive world. This means that the Postal Service would have to maintain 6 day a week delivery even if its main competitor delivered only once or twice a week; to maintain all small post offices even though its competitors had none; to continue to provide reduced rates to nonprofit mailers while its competitors did not; to continue economically irrational prices for Media mail by not reflecting the distance pieces traveled while competitors charged distance based prices; and continue to charge below cost prices for periodicals.¹⁸ Under this scenario, new competitors would cherry pick profitable routes, and the Postal Service, we estimate, would lose \$ 3.5 billion per year in profits using our mid range estimate and \$7.1 billion using the highest in our range of estimates.

In both cases, the calculations are highly sensitive to starting assumptions. The estimate for the cost of the USO would change if statutory or regulatory obligations

¹⁸ Media Mail is the only product that can not be zoned because of a statutory prohibition.

change. The estimate of the value of the monopoly would change if the Postal Service's cost per piece changes causing the Postal Service to become more or less competitive with potential entrants. Moreover, the value of the monopolies will shrink much faster than the cost of the USO as mail volumes decline.¹⁹

In real life, Congress would not allow private ownership of the Postal Service without requiring that it provide minimum levels of service and perhaps fulfill certain social obligations. These calculations offer an orderly way of establishing boundaries for an essentially indeterminate problem. In particular they do not address the question of how the profits of the Postal Service would be affected if it had much more flexibility to modify its current USO in response to competition.

Congressional appropriations for "public service" costs incurred by the Postal Service ended in 1982.²⁰ Congress stopped paying the Postal Service for "revenue forgone" that resulted from statutorily mandated discounts for nonprofit and other mail in 1993. Since then mailers have been forced to pay higher rates in order to cover whatever costs the Postal Service has incurred in providing services which it would not normally offer but must maintain because of the USO.

If the monopoly laws were repealed, the Postal Service would still likely have market dominance in a number of markets and could still force mailers in those markets to cover the cost of the USO through higher rates (provided the price caps do not make this impossible). However, if the loss of the monopoly stimulated the Postal Service to greater efficiency, then these mailers might pay less. Alternatively, the cost of the USO could be financed directly by Congressional appropriations (as it used to be) or by a fee collected from competitors in a liberalized postal market as has been described in Appendix H.

¹⁹ The largest cost component of the statutory USO is frequency of delivery and its USO cost is fixed. The next largest component is maintaining small rural post offices and its cost is 82 percent fixed. In a secular declining volume scenario, its costs would probably be 100 percent fixed because it is likely that salaries of postmasters would not be allowed to decline.

²⁰ It should be noted, however, that there is in current law a perpetual public service authorization of \$ 460 million per year, but no funds have actually been appropriated to the Postal Service since 1985 because the Postal Service has not requested any. See Appendix B for a more complete discussion.

Finally, it should be noted that the estimate for the “value of the monopoly” would be greatly reduced if the Postal Service were to price bulk products flexibly.²¹ This can easily be done now that bulk postage is calculated with computers. Prices for mail destined to highly profitable zip codes (routes) could be lowered and the lost revenue could be made up by increasing prices on mail destined for unprofitable zip codes (routes) so that total revenue remains roughly constant. This would to a great extent prevent cream skimming and the revenue loss caused by eliminating the monopoly. Consequently, our monopoly valuation is an extreme upper bound.

Sweden is a case in point. City Mail, its primary competitor, entered the market in 1991 when the country was *de facto* liberalized. The Swedish postal monopoly was then eliminated in 1993. City Mail delivers every third business day to over half the addresses in the country. It delivers highly presorted mail of all types. There is no distinction between First Class and Standard mail. The Competition Authority has permitted Sweden Post to have different prices for different delivery zones for bulk mail based on the cost of serving the zones. City Mail went bankrupt twice and now is profitable and enjoys about a ten percent market share. In the meanwhile Sweden Post has reduced employment by about a third and consumer surplus for mailers has increased. See Joint staff paper by the PRC and National Post and Telecom Agency, Sweden²²

²¹ There does not seem to be a statutory bar to charging different prices for mail sent to different destinations. Uniform pricing for non-First Class products is a voluntary policy of the Postal Service and not a statutory requirement. There is a statutory requirement to price First class uniformly, but it does not mean that mail sent to different destinations cannot be charged different prices. It appears to mean that the same schedule of prices must be available to all mailers regardless of where the mail originates. For a fuller discussion see Appendices B and H.

²² Cohen, R., Jonsson, P., et al. “The Impact of Competitive Entry in Sweden”; Presented at the WIK Wissenschaftliches Institut für Infrastruktur und Kommunikationsdienste GmbH 10th Königswinter Seminar on Postal Markets between Monopoly and Competition, February 12-14, 2007; www.prc.gov.

1.3 Value of the Mailbox Monopoly Alone

A significant amount of mail falls outside the letter monopoly and can legally be delivered by USPS competitors. Because the Postal Service enjoys a separate monopoly on the mailbox, competition for this volume is minimal. Only the Postal Service is allowed by statute to place anything in a mailbox²³. The categories of mail that are outside the letter monopoly include periodicals, unaddressed saturation mail, catalogues over 24 pages, parcels and letters over 12.5 ounces.

The same entry point model is used to estimate the value of the mailbox monopoly with contestable volumes changed to reflect the legal prohibitions. As would be expected the number of skimmed routes are fewer, the amount of mail lost by the Postal Service is much smaller and the impact on USPS profits is much less than in the analysis of the combined letter/mailbox monopoly. The contestable volumes for the mailbox monopoly are shown in the following table. Here it totals 23 billion pieces, compared to the 55.3 billion pieces that are contestable in the combined letter /mailbox monopoly analysis.

Table F4-4: Contestable Subclasses and Contestable Volumes (Mailbox Alone)

Subclass	Contestable Volume (billions)
Periodicals	2.9
Standard ECR	19.9
Parcel Post	0.2
Total	23.0

The base case has changed for the mailbox monopoly because the reduced contestable volumes make it likely that new entrants will follow the practice of the existing alternative delivery operations that deliver unaddressed advertising materials. They generally deliver once a week or even less frequently. Consequently, the base case is changed here to delivery one day per week and the rest of the base case is the same as in the combined letter/mailbox monopoly analysis.

²³ 18 USC 1725.

10 percent--Discount

1-- Number of days per week that the entrant delivers

10 percent--Entrant's cost advantage (labor cost and efficiency)

100 percent of contestable volume available

Base case value of the monopoly alone: \$1.33 billion

Percentage of routes skimmed: 51 percent

Again this result is less than 2 percent of revenue for 2007 and it is much lower than for the combined monopolies.

Sensitivity analysis for model input variables

As before, the value of the mailbox monopoly is shown below for the full range of each variable while holding the other variables to their base case values.

Table F4-5: Value of the Mailbox Monopoly Alone

Discount	0 percent	5 percent	10 percent	15 percent	20 percent
Value	\$1.42 bil	\$1.38 bil	\$1.33 bil	\$1.27 bil	\$1.20 bil
Skimmed routes	58 percent	55 percent	51 percent	48 percent	43 percent

Days/week	1	2	3	4	5	6		
Value	\$1.33 bil	\$0.76 bil	\$0.40 bil	\$0.26 bil	\$0.19 bil	\$0.16 bil		
Skimmed routes	51 percent	21 percent	9 percent	4 percent	3 percent	2 percent		
Cost Advantage	0 Percent		10 Percent		20 Percent		30 percent	
Value	\$1.22 bil		\$1.33 bil		\$1.43 bil		\$1.50 bil	
Skimmed routes	44 percent		51 percent		59 percent		65 percent	

Contestable Volume	50 percent (low)	100 Percent (base)	150 Percent (high)
Value	\$0.40 bil	1.33 bil	2.25 bil
Skimmed routes	21 percent	51 percent	67 percent

The value of the mailbox monopoly alone is far lower than the combined letter and mailbox monopoly because far less volume is subject just to the mailbox monopoly. As in the case of the joint monopolies, the value is most sensitive to the contestable volume and delivery frequency.

The following two cases which show first a very low value of the mailbox monopoly and second, a very high value are taken from the table above.

10 percent -- Discount

1 -- Number of days per week that the entrant delivers

10 percent – Entrant's cost advantage (labor cost and efficiency)

50 percent of contestable volume available

Value of the monopoly: \$0.40 billion

10 percent -- Discount

1 -- Number of days per week that the entrant delivers

10 percent – Entrant's cost advantage (labor cost and efficiency)

150 percent of contestable volume available

Value of the monopoly: \$2.25 billion

The highest and lowest values of the mailbox monopoly assuming the most favorable and least favorable values of the input variables are:

Highest -- \$2.4 billion (79 percent of routes skimmed)

Lowest -- \$0.06 billion (1 percent of routes skimmed)

Sensitivity analysis for mailers' reluctance to use an entrant

To quantify the impact of mailers' reluctance to use an entrant when just the mailbox monopoly is eliminated we have again examined the case where only 35 and 70 percent of the contestable mail would be turned over to the entrant. We do this by adjusting the amount of contestable volume to 35 and 70 percent of the base amount in the table below. It can be seen that if mailers were reluctant to turn over mail to the entrant even with a

discount, that this would significantly reduce the value of the monopolies from the base case.

Available Volume	35 Percent	70 Percent
Value	\$0.19 bil	\$0.76 bil
Skimmed routes	10 percent	36 percent

A mailbox issue

There is an alternative delivery industry in many cities in the U.S. These firms do not use the mailbox and they usually place material that is outside the letter monopoly in a plastic bag and hang it on the door knob. Given the economies of scale in delivery, there is usually only one firm serving in any given area and they typically deliver one day per week or less frequently. It would be expected that if these firms and new entrants had access to the mailbox, they would still deliver once a week or less frequently because of the limited volume available to them. There might be some cost associated with USPS delivery personnel finding the mail that patrons have deposited in their own mail box for pick up. However, many routes would have no competition and those that did would have this issue only once a week or less frequently.²⁴ This might increase the Postal Service's delivery cost somewhat, but at present there is no reliable way of estimating any increase cost.

²⁴ A separate smaller box might be attached by households to their mail box to hold letters for pickup by USPS carriers.

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