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# **Progress toward Liberalization of the Postal and Delivery Sector**

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# **Progress toward Liberalization of the Postal and Delivery Sector**

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## PREFACE AND ACKNOWLEDGEMENTS

This book arises out of the Thirteenth Conference on Postal and Delivery Economics held in Antwerp, Belgium, June 1-4, 2005. Leading practitioners, postal administrations, and the courier industry, as well as a number of regulators, academic economists, mailers, consultants, technology suppliers, and lawyers came together to examine some of the major policy and regulatory issues facing the industry. Issues addressed included the universal service obligation, regulation, liberalization, competition, access, worksharing, demand, cost, service quality, and postal reform.

The conference and the book follow our earlier conferences. In 1990, the first Conference on Postal and Delivery Economics (CPDE) was held at Coton House, Rugby, England, July 22-25, 1990, in honor of the one hundred and fiftieth anniversary of the Penny Post and the contributions of Sir Rowland Hill. The ensuing book, *Competition and Innovation in Postal Services*, was published by Kluwer Academic Publishers in 1991. In 1992 2<sup>nd</sup> CPDE was held at Village PTT, La Londe les Maures, France, on March 18-21, 1992. This conference resulted in *Regulation and the Nature of Postal and Delivery Services*, published by Kluwer Academic Publisher in 1993. Both conferences were recognized by the European Express Organization with the Hermes Award 1992 at its annual award dinner in Munich on June 22, 1992. The first workshop, The Workshop on Postal and Delivery Economics, was held June 23-26, 1993 in Daun, Germany. In 1994 the 3<sup>rd</sup> CPDE was held in Stockholm, Sweden, May 18-21, 1994, and a workshop, in Hakone, Japan, June 1-4, 1994 combined to produce the volume *Commercialization of Postal and Delivery Services*, published by Kluwer Academic Publisher in 1995. A workshop was held in Naantali, Finland, June 7-10, 1995. The 4<sup>th</sup> CPDE was held in Monterey, California, May 22-25, 1996, and resulted in the book *Managing Change in The Postal and Delivery Industries*, published by Kluwer Academic Publisher in 1996. The next book, *Emerging Competition in Postal and Delivery Services* was a direct result of the 5<sup>th</sup> and 6<sup>th</sup> CPDEs; the former was held in Helsingor, Denmark, June 11-14, 1997; and the latter held in Montreux, Switzerland, June 17-20, 1998. The 7<sup>th</sup> CPDE was held in Sintra, Portugal, June 23-26, 1999, which resulted in the book *Current Directions in Postal Reform*, published by Kluwer Academic Publishers in 2000. The 8<sup>th</sup> CPDE, was held in Vancouver, Canada, June 7-10, 2000, resulting in the book *Future Directions in Postal Reform*, published by Kluwer Academic Publishers in 2001. The 9<sup>th</sup> CPDE was held in Sorrento, Italy, June 6-9, 2001, and the book *Postal and Delivery Services: Pricing, Productivity, Regulation and Strategy*, was published by Kluwer Academic Publishers in 2001. The 10<sup>th</sup> CPDE was held in Potsdam, Germany, June 5-8, 2002, and the resulting

book, *Postal and Delivery Services: Pricing, Delivering on Competition*, was published by Kluwer Academic Publishers in 2002. The 11<sup>th</sup> CPDE was held in Toledo, Spain, June 4-7, 2003, and the resulting book, *Competitive Transformation of the Postal and Delivery Sector*, was published by Kluwer Academic Publishers in 2004. The 12<sup>th</sup> CPDE was held in Cork, Ireland, June 2-5, 2003, and the resulting book, *Regulatory and Economic Challenges in the Postal and Delivery Sector*, was published by Kluwer Academic Publishers in 2005.

The 2005 conference was made possible by the support of the following organizations: Pitney Bowes; Royal Mail; Deutsche Post World Net; United States Postal Service; Canada Post Corporation; FedEx; La Poste; La Poste / De Post; R.R. Donnelley & Sons Company; UPS; Swiss Post; CTT Correios de Portugal S.A.; IBM Business Consulting Services; Postcomm – The Postal Services Commission; Siemens AG; United States Postal Rate Commission; Posten AB ; Finland Post Corporation; Canadian Union of Postal Workers; Anacom; An Post; A.T. Kearney GmbH; Poste Italiane; Postwatch; TPG Post; Haldi Associates; Sidley Austin Brown and Wood LLP; Frontier Economics; Bird & Bird; Envelope Manufactures Association; London Economics; National Association of Letter Carriers; New Zealand Post; Oxera; Venable LLP; and Association for Postal Commerce .

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The host country plays an important role in these conferences. This year's conference, the *Thirteenth Conference on Postal and Delivery Economics*, benefited greatly from the efforts of our host PO, La Poste / De Post. Their representatives Gonzales d'Alcantara and Bernard Damiens were gracious hosts.

We would like to thank our distinguished dinner speakers, Johnny Thijs, James C. Miller III, and Matthias Krause. In the tradition of these

conferences we very much enjoyed the speech by Johnny Thijs, Chief Executive Officer of La Poste / De Post. His keynote speech at the Conference provided an outlook on the future of postal and delivery networks from the unique perspective of La Poste / De Post. James C. Miller III, Chairman of the Board of Governors – United States Postal Service presented an interesting discussion of postal reform in the United States. Matthias Krause gamely stood in for Stefan Keh, President of Postal Automation Division – Siemens AG, who was unable to be present because of illness. Matthias provided commentary on the role of a leading technology provider in the future of the mail.

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Michael A. Crew  
Paul R. Kleindorfer

# **Universal Service Obligation**

# Chapter 1

## The Welfare Effects of Entry and Strategies for Maintaining the USO in the Postal Sector\*

Michael A. Crew and Paul R. Kleindorfer  
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### 1. INTRODUCTION

The debate on entry policies in the postal sector has centered on how to continue to provide Universal Service without undermining the financial viability of the incumbent Postal Operator (PO). The debate continues as the European Commission conducts a prospective study, as required by the Postal Service Directive, to assess the impact on universal service of complete liberalization in 2009 for each member state. However, several member states have already entered a very clear path leading to full liberalization ahead of this date.<sup>1</sup> This presents a potentially serious problem in that unless the Universal Service Obligation (USO) is eliminated, POs will still have to satisfy the USO without the traditional reserved area. In addition, incumbent POs will face continuing challenges in setting the terms of access offered to entrants. Pricing and contracting will become much more competitive, and access policies will have to take into account

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\* The authors wish to acknowledge the support of Royal Mail Group in the preparation of this paper. The views expressed are solely those of the authors and may not reflect those of Royal Mail Group. We thank Frank Rodriguez for valuable comments on an earlier version of this paper, as well as our discussants Robert Campbell and Sture Wallander at the Conference. We also acknowledge with thanks the assistance of Scott Campion in programming the model underlying the results of section 4 of this paper.

<sup>1</sup> Sweden and Finland no longer have protection of their markets by means of a reserved area. Other countries, notably, Germany, the Netherlands and the United Kingdom, also face the loss of their reserved areas and full liberalization ahead of the rest of the EU.

increasingly important competitive concerns with the revenue required to maintain the USO. Finding a workable solution to these problems is critical since if inappropriate policy choices are made, the changes that are then ushered in could be extremely costly to undo.

In the next section, we review the background to the problem. In particular, we review the nature of the USO and the impact of liberalization on funding the USO. We argue that full liberalization provides small potential welfare gains relative to the risks it entails.<sup>2</sup> Section 3 discusses the options that might be pursued to allow POs to remain viable under full liberalization. These include increased commercial freedom, changes in regulation and relaxing the scope of the USO. Section 4 then provides some illustrative simulations to explore these issues and options. We conclude in section 5 with some implications of our analysis.

## **2. BACKGROUND AND STATEMENT OF THE PROBLEM**

Liberalization of postal markets has been taking place sporadically over the last decade and in Europe, at least, the policy has developed momentum and will not easily be abandoned. This policy is driven by a number of forces including the desire by business to get lower priced service and the desire of competitors to enter postal markets. Competition has long been considered by economists as a force that increases efficiency or welfare by driving prices to costs and by driving costs down. It is this virtuous cycle of cost and price reductions and increased demand that make it attractive. Unfortunately, under full liberalization, this virtuous cycle in the postal sector is likely to be a vicious cycle of higher costs through loss of scale economies, and consequent financial losses.<sup>3</sup>

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<sup>2</sup> At the Cork Conference, when making his discussant comments, John Panzar stimulated our thinking on this point by expressing his opinion that there were unlikely to be any significant benefits from entry in this industry.

<sup>3</sup> While experience in other industries is not conclusive, it may be instructive to note that even with technological change and demand growth on their side financial viability has continued to plague telecommunications under competition. Given the absence of these advantages in the postal sector, it is hard to see how competition would be more effective in the postal sector. Of course, competition could have considerable benefits if structured properly (see below), and the dangers of ultimate bankruptcy of the postal operator are more pronounced in some circumstances than others. Our point here is that the circumstances that seem best suited for reaping the benefits of competition are also those (with steep route profitability profiles, per Crew and Kleindorfer, 2001) that have the largest risk of driving the PO to insolvency under unrestricted entry. We explore this point more fully below.



Currently competition in the letter market varies considerably, from Sweden and New Zealand where there is open competition, to the United States where there is no competition in letter delivery but significant competition upstream. The centerpiece of the debate on postal policies and strategies remains the USO. The USO is the obligation to deliver letters and parcels ubiquitously and, in the case of letters, at a uniform price. In addition, there is an obligation to provide some uniformity in service quality. While outlying areas get lower quality service, the consensus is that delivery standards should not be drastically different across areas. In the eyes of the public and governments around the world, the USO has remained a necessary foundation for postal policy for a number of reasons, including its transparency, its low transactions costs and its ability to provide a simple method of consumer protection through the easily recognizable single-piece uniform price.

To satisfy the USO, POs have typically been granted a reserved area, a weight or price limit below which, they are the only legal providers. Absent the obligation of the uniform price and some service uniformity, the ubiquity requirement could be satisfied without a reserved area. The question then is whether the USO can survive without a reserved area. Crew and Kleindorfer (2000, 2001) have argued that the traditional USO is unlikely to be feasible absent a reserved area or some other stable method of funding the USO. The presence of the two forces of technological change and liberalization policies promoting competitive entry puts the traditional USO at risk for two reasons. First, technological competition has provided substitutes for and reduced demand for letter mail. This results in an increase in a PO's unit costs as it loses some of the benefit of scale economics because of the lower output. Meanwhile, the fixed costs of the USO will continue. Second, changes that eliminate the POs' reserved area take away the means of funding the USO.

These twin changes will require changes not only in the way POs operate but may require further changes in the legal framework to assure the continuing ability of POs to fund their USO. Specifically, it seems unlikely that the lettermail USO can be supported without a reserved area, unless service standards are relaxed dramatically. Absent a reserved area, entrants would price below the incumbent in the low cost markets. The incumbent would raise its (uniform) prices making a larger market more attractive to the entrants. The process may result in a graveyard spiral of increasing prices and continuing losses. In view of the limited options for new revenue from, notably, parcels and other mail services (see Crew and Kleindorfer, 2002, 2004), if POs are to remain financially viable, then other sources of funding have to be found to support the USO. We rule out tax/subsidy schemes as infeasible for reasons argued elsewhere (Crew and Kleindorfer 2000). So if liberalization is to continue to the point at which there is no

longer a reserved area, we will clearly need other approaches to funding the USO.

There continues to be a strong desire on the part of the public and consequently government in retaining the USO in essentially its current form. There is also a clear commitment by policy makers in the EU and elsewhere to promote liberalization. However, the joint objectives of achieving full liberalization of postal markets and maintaining the USO in its current form demonstrate a lack of understanding and natural propensity of policy makers to address mutually inconsistent but separately desirable alternatives sequentially rather than confront the inherent tradeoffs that would arise from addressing them simultaneously. The issue of funding the USO that would arise under full liberalization illustrates just this type of behavior. Solutions to the problem are likely to be complex.

### **3. STRATEGIES FOR MAINTAINING THE USO UNDER ENTRY**

When faced with a continuing USO and the loss of its reserved area, POs have a number of options. The feasible options consist generally of a combination of greater commercial freedom with the increased commercial operations and competition implied by this, and a reduction in the scope of the USO. We now consider these options in detail and note some of their interdependencies.

Greater commercial orientation can take a number of forms, resulting in increased cost control, more flexible pricing and the ability to adjust the product line with reduced regulatory oversight. POs can lower their costs by becoming more efficient in both their production processes and in the design of their networks. On the face of it, this is not in the least controversial. POs, the government and consumers would all be very positively inclined toward this objective. The problem is that it is easier said than done. The labor force would not react well to increased efficiency if it meant lower pay or loss of jobs. Regulators, by putting pressure on a PO, may argue that they are performing the same role as the competitive market, namely, driving down costs. The problem is that regulators, unlike a competitive market, which by its very nature cannot be influenced by the individual participants, are influenced by the participants and by government. Therefore, the likelihood of regulators mimicking the competitive market is extremely unlikely, especially since regulators lack the information to enable them to set prices at competitive levels. Thus, the idea that POs can fund their USO by becoming more efficient at the behest of regulators is not promising. Similarly, if strong competition is introduced rather than regulation, costs may be reduced, but without sufficient surplus resulting to cover the USO.

If, along with the competition the PO loses some of the scale economies, the welfare benefits are reduced further.

Increased commercial freedom might also encompass increasing the PO's product lines and allowing them to compete by price much more aggressively. In principle, there is nothing in most countries to prevent a PO from increasing the scope of its product lines under current regulatory policies. However, attempts to do so are typically accompanied by significant delays and regulatory transactions costs, thus discouraging or eliminating the possibility of flexible changes in product line to meet changing customer needs and competitive conditions. Increased commercial freedom means that such regulatory hurdles would be minimized or eliminated.

Merely increasing its product lines may not benefit a PO. This is particularly true where the increase in the product line is induced by regulators, such as in the case of mandatory downstream access. In requiring access, regulators have cited fairness to competitors, opening up the market and providing additional opportunities for profit.<sup>4</sup> Our research has shown that access does, indeed, provide an opportunity for POs to earn additional revenues, but they may not be sufficient to fund the USO under free entry. This is especially true if access is mandated and its price strictly regulated without regard to the impact such access could have on the ability of the PO to support its USO.

Adding product lines freely and the ability to price more aggressively without requiring regulatory approval are major examples of increased commercial freedom. Crew and Kleindorfer (2002, 2004) have shown that both strategies offer ways in which POs can generate additional net revenues and provide a critical combination if financial viability is to be achieved. If POs do not apply these strategies effectively, they are unlikely to be able to survive, but applying them effectively does not guarantee survival where POs retain a significant USO.

Pricing flexibility is a key strategy for POs under liberalization. In the face of entry, failure to compete on price effectively guarantees a graveyard spiral as POs lose more and more of the profitable business. Pricing flexibility requires POs to change their approach to pricing. What previously worked well might be a recipe for greater losses under free entry. This is true in the case of upstream discounts, for example, presort or barcode discounts, which have been highly successful for some POs, notably USPS. However, the efficiency consequences of upstream discounts depend in important ways on whether or not the PO has a monopoly on local

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<sup>4</sup> The British regulator, Postcomm, has argued that providing access would be a means to making Royal Mail profitable.

delivery (as is the case with USPS). In particular, applying existing approaches mechanically may cause serious problems under liberalization.

Commercial freedom could extend to direct and perhaps strong competition on the part of POs. Instead of blandly sitting back while cream-skimming entrants capture market share, POs need the freedom to compete head on. It would not just be a matter of offering attractive access prices but lowering prices including end-to-end prices to retain business in the face of entry. This kind of commercial freedom and pricing flexibility would require regulatory policies that did not require regulatory approval for price changes. The majority of a PO's products would be deemed competitive and not subject to regulatory approval if the PO decided that it needed to change its prices to remain competitive.

Reducing the burden of the USO *prima facie* appears to be a highly effective way of enabling a PO to survive when facing entry. The general idea is that if the uniformity constraint of the USO is relaxed, then the PO is likely to remain viable under a broader set of demand, cost and entry scenarios than it could under more stringent uniformity constraints. However, it is difficult to see how the uniform price can be eliminated for single-piece mail, which since the inauguration of the Penny Post in 1840 has been the hallmark of modern postal service. The economic benefits of the uniform price are primarily felt in the transactions cost savings of single-piece mailers. The effect of a uniform price is also to put a ceiling on the prices that can be charged to small customers, including those in the highest cost zones. Even for large customers, format pricing is driving pricing more in the direction of uniformity.

Relaxing service quality standards has been discussed as a way of partially mitigating the cost of very high-end routes, thereby significantly decreasing the USO burden and the reserved area required to support this burden. For example, Haldi and Merewitz (1997) and Cohen, Ferguson, Waller and Xenakis (2000) discuss the benefits of decreasing the USO burden under entry by making significant changes in the service standards, with high cost areas receiving significantly lower service standards (e.g., three-days a week delivery instead of five or six). The logic of the approach relies on decreasing the cost of high-cost routes and the required subsidy for these, under uniform pricing, from low-cost routes. The primary reduction in cost is likely to arise from reducing the fixed costs of daily delivery. Relaxing service quality standards in this or other ways, however, may undermine the value of the USO itself, as it is typically understood to embody ubiquity and some uniformity in service quality. Reductions in quality would likely be concentrated on remote high cost areas resulting in significant differences in quality between high and low cost areas. Whether the extent of the differences in quality would be acceptable is an unexplored

area. Not only customers in the high cost areas might find the service standards unacceptable but also large customers might find low service quality in the high cost areas to be unacceptable. Thus, quality reductions provide no guarantee that the bottom line will be greater. They reduce demand as well as variable costs. However, if they fail to reduce fixed costs, the benefits are limited unless the variable cost reduction greatly exceeds the loss in revenue from demand erosion. Furthermore, reducing service standards may cause not only a reduction in demand but also a reduction in cost of serving these areas by entrants. The latter may make some regions attractive that were previously not attractive to entrants.

To illustrate some of the potential outcomes, and the complexity of navigating these, we explore now some scenarios using an extension of the simulation model originally developed in Crew and Kleindorfer (2005). The model is focused on the factors that would alleviate or exacerbate the effects of entry on overall welfare and on the financial sustainability of the PO facing a USO, where the structure of USO-related costs can be changed through the pricing and service quality strategies discussed above.

#### **4. ILLUSTRATIVE POLICY OPTIONS IN A SIMULATION-MODEL-BASED FRAMEWORK**

In this section, we will examine some of the consequences of liberalization with illustrative results derived from a simulation model. The model is described in a Technical Appendix<sup>5</sup> and is an extension of our earlier model, Crew and Kleindorfer (2005). The purpose of the simulations is to throw light on the effects of liberalization on a PO with a continuing USO. These can include serious threats to the PO's financial viability, which could be sufficiently severe to give rise to a graveyard spiral as noted above. The analysis makes it possible to examine the directions that entry policy might take, including a comparison of the approaches to entry being considered by various countries. TPG, for example, is opposed to mandating access, while Postcomm, the UK regulator, and Royal Mail are putting in place comprehensive mandatory access offerings. In the US, extensive upstream access (worksharing) arrangements have been employed for many years. In addition, USPS provides downstream access although it is not universal, unlike worksharing. As a further element of pricing flexibility, not considered here, downstream access might be treated (and priced)

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<sup>5</sup> Available on the CRRRI website at <http://crrri.rutgers.edu/pub/appendix2005.pdf>.

differently for direct customers of the PO than for (customers served by) entrants.<sup>6</sup>

## 4.1 Model Structure

There are several approaches to representing the nature of competitive interaction between the incumbent PO and entrants. The model here assumes that entrants form a competitive fringe,<sup>7</sup> which is a reasonable representation when there are many actual or potential licensed entrants. There are two mail products, residential mail and business mail where class of mail is identified by the originator. Residential mail is assumed completely non-contestable in that the entrant does not enter that market. Business customers, on the other hand, are served by both the PO and entrants.

The fundamental dynamic of entry is captured by allowing entrants to price completely flexibly while the PO is required to maintain a uniform price (for single-piece letters) for the PO. The PO provides not only end-to-end service for its customers but also can provide access services, whereby mail collected and presorted by entrants can be turned over to the PO for delivery, with the delivery or access charge depending on the ultimate destination of the mail (i.e., access charges may differ according to delivery zone). We are interested in modeling the portion of the total mail demand captured by entrants, especially in the low-cost, high-margin delivery zones, and the consequences of this under various policy options for the ability of the PO to support its USO.

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<sup>6</sup> Note that the European Union Postal Directive specifies that direct customers of the PO may not be treated differently than competitors in respect to access or other services (other than through cost-based differences that might arise from volume discounts, etc.), although it should be noted that downstream access itself is not mandated in the EU Postal Directive. According to Article 12 of the Directive, "whenever universal service providers apply special tariffs, for example for services for businesses, bulk mailers or consolidators of mail from different customers, they shall apply the principles of transparency and non-discrimination with regard both to the tariffs and the associated conditions. The tariffs shall take into account the avoided costs, as compared to the standard service covering the complete range of features offered for the clearance, transport, sorting and delivery of individual postal items and, together with the associated conditions, shall apply equally both as between different third parties and as between third parties and universal service providers supplying equivalent services. Any such tariffs shall also be available to private customers who post under similar conditions." For a survey of recent developments in the EU, see WIK (2004).

<sup>7</sup> A competitive fringe is a simpler alternative to a Cournot or Bertrand approach as all members of the fringe take price as given. See De Donder et al. (2002) for a discussion of alternative models of competition.

For business mail, the demands for the PO's mail and the entrants demand are not only functions of each other's prices but also incorporate "loyalty", a term we borrow from the marketing literature. The idea of "brand loyalty" or "switching costs" captures the effect of a consumer's cost of switching to another supplier, and incorporates both elements of familiarity and knowledge of purchasing arrangements as well as relationship-specific investments by customers in working with a particular supplier. In the literature on the graveyard spiral, the effects of loyalty were incorporated by d'Alcantara and Amerlynck (2004), and their notion of loyalty is essentially what is used here. Namely, loyalty (to the incumbent) is represented as the level of price discount that must be offered by entrants to compete on an even footing with the incumbent. Such loyalty effects will depend on the customer segment, and on the delivery zone of mail arising from this segment. The technical representation of loyalty in the demand equations has the same effect as the perceived quality of the incumbent's service relative to entrants (a matter discussed further below).

Loyalty is an important concept for a PO as it is sometimes argued that the USO, because of the ubiquity obligation, confers visibility and enhances the PO's brand name. This may mean that the PO may be able to charge a somewhat higher price than an entrant without suffering significant demand erosion, and the loyalty variable is intended to capture such effects. Over time, such advantages are likely to diminish, especially in the case of business customers, and loyalty parameters could be adjusted accordingly.

The cost structure of entrants and the incumbent are likely to be different. The incumbent is expected to have higher costs because of the USO and these are incorporated through higher fixed costs. In addition, the incumbent may have labor agreements that result in higher costs. Putting this together, it seems likely that the incumbent will have a cost advantage in the high cost routes because of ubiquity and the entrant on the low cost routes because of his ability to employ lower priced labor. To allow for zonal cost differences, our model has 10 zones, with the highest cost zone being 10 and the lowest 1. Similarly, the parameter values for loyalty are set to imply no loyalty (to either the incumbent or entrants) in the low cost zones, growing to a loyalty discount of over 20% for the incumbent in high-cost areas.

Base case cost parameters are given in Table 1<sup>8</sup>. In particular, we assume per unit upstream costs (collection, consolidation and presortation costs) are identical for both entrants and incumbents in the base case (denoted  $C_{IU}$  and  $C_{EU}$  in Table 2 below). We assume (as in Crew and Kleindorfer (2002)) that there is a cost associated with entrants' turning over mail to the incumbent (e.g., receiving and billing costs) of  $C_a$  per unit. Delivery costs (assumed

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<sup>8</sup> Details can be found in the Technical Appendix to this paper, available <http://crri.rutgers.edu/pub/appendix2005.pdf>.

constant per unit) for the incumbent ( $C_{ID}(k)$ ) and entrants ( $C_{ED}(k)$ ) rise as the zone increases from 1 to 10, where the entrants have advantages in the low-cost zones and the incumbent has advantages in the high-cost zones.

## 4.2 The Effect of Reducing the Burden of the USO

There are a number of ways of reducing the burden of the USO. One approach is to reduce reliability. That is, service to high cost areas might become less reliable. Instead of being delivered in say 2 days with a probability of 95 percent, mail would be delivered in 2 days at probability of, say, 60 percent. This might correspond to providing lower priority in mail processing operations to mail destined for high cost areas, treating it, in effect, similar to Second Class Mail in two-tier systems. We do not examine this. Instead, we examine an approach frequently proposed, namely reducing the frequency of delivery to high cost areas. Instead of six deliveries per week, such areas would get, say, three deliveries per week. To model the effects of this in our simulation model, we assume that delivery costs are reduced in the five highest cost areas relative to the Base Case, thus reducing the cost of the USO, leaving the delivery costs in the five lowest cost areas the same. This reduction in the quality of service is likely to have an adverse impact on demand. To reflect this, we assume that the impact of service quality reduction is to increase the perceived price of the service (by a pre-specified amount), thus reducing demand relative to the *status quo* in these areas as a result of the reduction in the quality of the service. Naturally, cost savings for a PO have an unambiguously beneficial effect on financial viability. Moreover, to the extent that the zones have costs in excess of the uniform price, demand reductions would also have a beneficial financial effect in that less money would be lost because of the lower volume.

The specific cases we modeled allow the PO to relax the USO service quality in higher cost zones (those with indices greater than a specified zone  $k^*$ ). We report here only one case in which service quality for the USO was relaxed in zones 6 through 10, for both the incumbent PO (I) and entrants (E), with assumed consequences as follows: 1) fixed costs of the incumbent PO are reduced by 20% (overall); 2) variable costs for both I and E are reduced by 20%; 3) the required mark-up for entrants in zones 6-10 is discounted from 40% to 32% (a reduction of 20%), reflecting the lower fixed costs under the relaxed service quality standard; 4) demand reductions occur corresponding to an effective price increase of 20% (these lead at the base case breakeven analysis for I to average volumetric demand reductions in these zones of about 5%). These four assumptions illustrate more generally



the set of cost and demand impacts that would have to be estimated to assess the consequences of service quality reduction.

**Table 1: Base Case Values for Cost Parameters**  
**“20% Red” Refers to a Service Quality Reduction in Zones 6-10**

Upstream Cost for I ( $C_{IU}$ )	10
Upstream Cost for E ( $C_{EU}$ )	10
Adaptation Cost ( $C_a$ )	2
USO Fixed Cost (F)	100,000

Zone k	$C_{ID}(k)$ Base Case	$C_{ED}(k)$ Base Case	$C_{ID}(k)$ 20% Red (k = 6-10)	$C_{ED}(k)$ 20% Red (k = 6-10)
k=1	12	10	12	10
k=2	14	12	14	12
k=3	16	16	16	16
k=4	18	20	18	20
k=5	21	25	21	25
k=6	24	30	19.2	24
k=7	30	40	24	32
k=8	45	55	36	44
k=9	60	70	48	56
k=10	75	90	60	72

### 4.3 Pricing of End-to-End and Access Services and the Role of Commercial Freedom

Pricing decisions for end-to-end services and for access services provided by the PO to entrants are made within the framework of these demand and cost structures. Three pricing approaches are used for access and worksharing discounts. Avoided Cost (ACE), Approximate Delivery-Zone Access Prices (DAP) with Limited Information and Approximate Delivery-Zone Access Prices with Full Information (DAPFI). The first two are recognized in the literature and ACE is employed by many POs as their basic framework for pricing access and worksharing discounts. ACE is a close approximation to DAP as indicated by Crew and Kleindorfer (2002).

ACE is defined in the usual manner and is sometimes referred to as the (top down) efficient component pricing rule (ECPR). It is the single-piece price less the value of the cost savings of the incumbent as a result of the entrant performing upstream work (typically collection, bar-coding and presortation). One problem with ACE is that it assumes implicitly that the top down price is close to economic cost. Given that, the single piece uniform price is too high in the low cost areas and too low in the high cost areas, ACE is going to perpetuate these inefficiencies. Take the case of a

high cost area costing 50 cents a letter, but the uniform price is 30 cents and the presort discount 10 cents. To charge an access price of 30 minus 10, namely, 20 cents would exacerbate the funding problem. The correct (DAP) price would be 40 cents but the entrant would not pay this, as the single piece price is 30 cents. Thus, an access price of 40 cents for a high cost zone would lead the entrant to use the PO to carry all of the letters of its customers to that zone at the single-piece rate of 30 cents. Accordingly, DAP takes the cost of delivery in the area concerned and deducts any presort discount as long as the resulting access price is 30 cents or less. Otherwise, the access price is the single piece price of 30 cents. It is based, in effect, on the value of the work still required when the letter enters the mail stream, but truncated by the single-piece rate, which is always available to entrants under the USO.

DAPFI is an extension of DAP in the sense that it assumes perfect knowledge by I of the costs of the competitive fringe. Thus, it takes entrants' costs into account and adjusts access prices accordingly. DAPFI enables the PO to compete more effectively and therefore provide more funding for the USO. As perfect information about entrants' costs is not available, DAPFI cannot be employed in practice, but it should be noted that DAPFI represents an upper limit on the benefits from commercial freedom related to access pricing. In addition, it indicates that there may be some potential benefit to an incumbent in making an estimate of entrants' costs and a PO with the requisite commercial freedom would likely use this information for pricing and depart from simple DAP.

The model implies considerable commercial freedom for the PO in all three cases. The PO is assumed to set prices for end-to-end service and for access to break even, and is not subjected to a price cap as faced by many POs.<sup>9</sup> The access pricing regimes allow varying degrees of commercial freedom in the pricing of access. ACE allows the least based as it is on the avoided cost rule. DAP allows the PO more freedom and DAPFI as it is able to charge any rate it deems appropriate within the constraints of the upper limit resulting from the single-piece price.

In addition to the pricing flexibility embodied in the access prices, we also assume further pricing flexibility in some scenarios that allows the PO to cut prices in the low-cost areas for business customers. In the results reported here, we assumed the following price discounts in zones 1-3: Discount in zone 1 = 30%, Discount in zone 2 = 20%, Discount in zone 3 = 10%. With an eye on Table 1, this means that when pricing flexibility was allowed, the effective single-piece price for end-to-end service and for ACE

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<sup>9</sup> The impact of a price cap is clearly going to make a PO's financial viability after liberalization more tenuous if it is set low initially and the regulator is slow to allow increases.

access pricing (similar results for DAP and DAPFI access pricing hold, based on the PO's price for end-to-end service to that zone) for business customers in these zones is as follows:

**Table 2: End-to-end (E2E) and ACE Access Price for Incumbent PO for Base Case and for Scenarios in which Pricing Flexibility in Low-Cost Zones is Permitted**

Scenario	Zone 1	Zone 2	Zone 3	Zones 4 - 10
Base Case E2E Price	$P_1$	$P_1$	$P_1$	$P_1$
ACE Access Price for Base Case	$P_1 - C_{IU} + C_a$	$P_1 - C_{IU} + C_a$	$P_1 - C_{IU} + C_a$	$P_1 - C_{IU} + C_a$
E2E Price under Pricing Flexibility	$0.7 * P_1$	$0.8 * P_1$	$0.9 * P_1$	$P_1$
ACE Access Price under Pricing Flexibility	$0.7 * P_1 - C_{IU} + C_a$	$0.8 * P_1 - C_{IU} + C_a$	$0.9 * P_1 - C_{IU} + C_a$	$P_1 - C_{IU} + C_a$

As access prices are derived from the uniform single-piece rate, possibly discounted in low cost zones, according to one of the three access pricing policies employed, we need only determine whether there is a uniform price that will allow the PO to break even, given the assumed access pricing regime and any pricing flexibility allowed. A search process accomplishes this. Absent a feasible uniform price, a graveyard spiral results.

#### 4.4 Illustrative Results

We report here a few of the illustrative results from our simulations. We capture these in five cases, as shown in Tables 3-7 below.

Our Base Case assumes that entrants can bypass I and engage in end-to-end delivery. It also assumes no pricing flexibility for I in low-cost areas and no service quality reductions in high-cost areas. The Base Case shown in Table 3 shows the expected result that the more commercial freedom is given for access pricing (moving from ACE to DAP to DAPFI), the lower the single-piece price and the higher the welfare (relative welfare effects are not large here; survival and avoiding the GYS is the main issue). We see that the fraction of revenue at breakeven prices accounted for by fixed costs is about 40% for ACE and DAP pricing, roughly in line with the value of this ratio in many POs. We also note that the single-piece price and the volume-weighted entrant's price across zones decreases slightly in moving from ACE to DAP to DAPFI. This reflects the increased efficiency of DAP and DAPFI over ACE in reducing subsidies for access to high-cost zones.

We report also the volume-weighted incumbent price, but this is identical to the single-piece price since no pricing flexibility is allowed in the base case.

For the Base Case, the percentage of total revenues for I and E that are accounted for by worksharing is rather small. Customers use either I's end-to-end services or E's end-to-end services, when bypass is allowed. The only mail that is workshared (consolidated by E and given to I to deliver) is for the high-cost zones serviced by E for its customers.

**Table 3: Base Case  
Bypass Allowed; No Pricing Flexibility  
Standard USO with No Service Quality Reductions  
Entrants' Markup = 40%; Access Pricing Methods as Shown**

Access Pricing Method	ACE	DAP	DAPFI
Single-Piece Price	63.96	63.65	60.75
Incumbent's Fixed Costs (F)	100,000	100,000	100,000
Weighted Incumbent Price WPI	63.96	63.65	60.75
Weighted Entrants' Price WPE	40.32	40.31	40.18
F/(Incumbent's Revenue)	0.4021	0.4006	0.3388
Incumbent's Market Share	51.61%	51.81%	61.89%
Percentage Workshared	1.91%	1.91%	1.93%
Total Welfare	1,254,157	1,254,530	1,266,607
Fixed Cost (F) at which Graveyard Spiral is Induced	133,000	133,500	142,500

Now let us consider the Base Case where Bypass is not allowed. In this case entrants must tender all mail they collect to I for final delivery. Given the reduced scope of their activity, we reduce the Entrants' markup to recover fixed costs in this case to 10%. We see the results in Table 4. Comparing these results to those of Table 3, we see that the single-piece price and all other prices for I and E are considerably lower and welfare is higher than when bypass is allowed. Notably, the fixed cost at which the GYS is induced is much higher when bypass is not permitted.

The weighted entrants price (WPE) in this case is higher than the case where Bypass is allowed, as WPE is derived from the access price for E plus E's upstream collection and consolidation costs  $C_{EU}$ . Since  $C_{EU} = C_{IU}$  in the Base Case, this means (e.g., for ACE access pricing) that

$$\begin{aligned} \text{WPE} &= (1 + M_E) * [P_A(k) + C_{EU}] \\ &= (1 + M_E) * [P_1 - C_{IU} + C_a + C_{EU}] = (1 + M_E) * [P_1 + C_a] \end{aligned}$$

where  $M_E$  = entrants markup over cost (to recover their fixed costs), assumed in this case to be 10%. Even if the entrants' markup were 0%, we see from this that (under the assumption that  $C_{EU} = C_{IU}$ ) the WPE would exceed  $P_1$  by

$C_a$  in the case of ACE access pricing and by more than this in the case of DAP or DAPFI access pricing.

**Table 4**  
**Bypass Not Allowed; No Pricing Flexibility**  
**Standard USO with No Service Quality Reductions**  
**Entrants' Markup = 10%; Access Pricing Methods as Shown**

Access Pricing Method	ACE	DAP	DAPFI
Single-Piece Price	43.6	43.2	43.2
Incumbent's Fixed Costs (F)	100000	100000	100000
Weighted Incumbent Price WPI	43.6	43.2	43.2
Weighted Entrants' Price WPE	50.1	50.6	50.6
F/(Incumbent's Revenue)	0.248	0.248	0.248
Incumbent's Market Share	88.84%	89.08%	89.08%
Percentage Workshared	38.44%	38.46%	38.46%
Total Welfare	1,324,628	1,324,988	1,324,988
Fixed Cost (F) at which Graveyard Spiral is Induced	>300,000	>300,000	>300,000

**Table 5**  
**Bypass Allowed; Pricing Flexibility**  
**Standard USO with No Service Quality Reductions**  
**Entrants' Markup = 10%; Access Pricing Methods as Shown**

Access Pricing Method	ACE	DAP	DAPFI
Single-Piece Price	64.1	63.8	61.1
Incumbent's Fixed Costs (F)	100,000	100,000	100,000
Weighted Incumbent Price WPI	60.4	60.2	57.6
Weighted Entrants' Price WPE	41.1	41.1	41.0
F/(Incumbent's Revenue)	0.389	0.388	0.330
Incumbent's Market Share	53.80%	53.99%	64.18%
Percentage Workshared	1.93%	1.93%	1.95%
Total Welfare	1,265,710	1,266,007	1,277,489
Fixed Cost (F) at which Graveyard Spiral is Induced	136,169	136,169	145,772

Table 5 shows the consequences of allowing pricing flexibility (see Table 2). As expected, pricing flexibility allows the USO to be supported at a higher level of fixed costs and welfare is higher at the base case level of fixed costs ( $F = 100,000$ ). The uniform price actually increases under pricing

flexibility, while the weighted price decreases slightly. This reflects the fact that pricing flexibility discounts the price to business customers in the low-cost areas, where the discount is taken off the uniform price. As a result, for a given level of fixed costs, the overall level of the uniform price must be increased (slightly) to maintain breakeven operations.

Table 6 shows the additional impact of allowing pricing flexibility (see Table 2) in addition to prohibiting bypass by entrants. The results are similar to Table 4, except now there is a difference for weighted Incumbent price (WPI) from the results of Table 4, with WPI being lower as a result of the allowed pricing flexibility (even though the single-piece price is increased somewhat relative to Table 4). Welfare is increased relative to Table 4 since price in the high-demand, low-cost areas is closer to marginal cost.

**Table 6**  
**Bypass Not Allowed; Pricing Flexibility Allowed (See Table 2)**  
**Standard USO with No Service Quality Reductions**  
**Entrants' Markup = 10%; Access Pricing Methods as Shown**

Access Pricing Method	ACE	DAP	DAPFI
Single-Piece Price	46.83	46.46	46.46
Incumbent's Fixed Costs (F)	100,000	100,000	100,000
Weighted Incumbent Price WPI	43.24	42.94	42.94
Weighted Entrants' Price WPE	48.70	49.02	49.02
F/(Incumbent's Revenue)	0.250	0.249	0.249
Incumbent's Market Share	88.69%	88.91%	88.91%
Percentage Workshared	38.17%	38.19%	38.19%
Total Welfare	1,329,600	1,329,875	1,329,875
Fixed Cost (F) at which Graveyard Spiral is Induced	>300,000	>300,000	>300,000

Tables 7-8 show the consequences of service quality reductions and pricing flexibility when bypass is allowed. Comparing these results with the base case in Table 3, we see some increase in welfare and increases as well in the survival level of USO fixed costs that can be supported under these regimes. While the welfare increases are not as substantial as under the case of prohibiting bypass, they are nonetheless significant, and indicate the potential of commercial freedom and redesign of the scope of the USO to contribute to the sustainability and efficiency of the PO under entry.