

Access Pricing, Bypass and Universal Service in Post

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February 2006

An incumbent postal service provider faces two issues which make the design of efficient access pricing especially difficult: universal service obligations, which require retail prices to be out of line with underlying costs, and the possibility that competing firms will (selectively) bypass the incumbent's delivery network. This note begins to analyse how access charges should best be set in the light of these twin constraints. The note will not provide any recommended numbers for optimal access charges, but rather to suggest a framework which may be useful to understand this difficult and controversial topic.¹

1 Entry and Universal Service

Incumbent postal service providers are required to set retail prices which depart significantly from their underlying costs. The obvious example of this practice is a requirement to offer geographically uniform prices for delivery of specified mail to all addresses, even though the cost of provision (especially of delivery) varies in different regions.² These cross-subsidies lead to difficulties with laissez-faire entry, and there will tend to be 'too much' entry in the artificially profitable segments and 'too little' entry in the loss-making markets. In addition there is the funding

¹A similar analysis is provided by Armstrong (2001), in the context of telecommunications. This analysis is extended in Armstrong (2002, section 2) to allow for product differentiation, downward-sloping consumer demand, and other factors, without changing the qualitative insights obtained in this simple setting.

²This note does not discuss why such cross-subsidies are so prevalent—see Riordan (2002) and Chapter 6 of Laffont and Tirole (2000) for discussion of this topic, again mostly in the context of telecommunications.

problem: if cream-skimming entry eliminates profits from hitherto profitable markets the incumbent may be unable to continue financing its loss-making universal service operations. Because of these three problems, it is often suggested—not least by the incumbents themselves—that competition and universal service requirements do not mix well. Since they have nothing intrinsically to do with the presence of essential inputs and access charges, for simplicity in this section I discuss these issues assuming that entrants do not need access to the incumbent’s delivery network to provide their services. This analysis will then be a useful ingredient in the more realistic analysis in section 2 below.

Consider a specific service offered by an incumbent which offers a regulated price which may be out of line with cost. For simplicity, assume consumers of this service are homogeneous and have inelastic demand for the service (as long as they obtain non-negative surplus). Suppose the incumbent incurs a cost C per unit of supply of this service, and the service generates gross consumer utility U per unit. The price for its service is mandated to be P per unit, and consumer surplus is therefore $U - P$ per unit. There is a potential entrant which can supply its own service that costs c per unit and generates gross utility of u per unit. (The two consumer utilities U and u differ if the firms provide a different quality of service.) Welfare per unit, as measured by the sum of consumer utility and industry profit, is equal to $u - c$ if the entrant supplies the unit and $U - C$ if supply is by the incumbent. Therefore, entry is socially desirable if

$$C \geq c + [U - u] . \quad (1)$$

But when will entry take place? Given the regulated price P , the entrant can attract consumers provided its own price p satisfies $u - p \geq U - P$. Entry will occur whenever the maximum price that can be charged by the entrant, $p = P - [U - u]$, covers its cost, i.e., when

$$P \geq c + [U - u] . \quad (2)$$

Whenever P differs from C , therefore, expressions (1) and (2) demonstrate that private and social incentives for entry diverge.

There are two kinds of market failure, depending on whether the particular service is profitable or loss-making for the incumbent. First, suppose that the service is

profitable, so $P > C$. If the entrant's characteristics are such that

$$P \geq c + [U - u] \geq C ,$$

then entry occurs even though it is socially undesirable. That is to say, entry can profitably take place even when the entrant has higher costs and/or lower service quality than the incumbent. Alternatively, if $P < C$ then whenever

$$P \leq c + [U - u] \leq C$$

it is socially desirable for entry to take place, yet it is not privately profitable.

At least in theory, it is a straightforward matter to correct this divergence between the private and social incentives for entry, even if the regulator wishes to maintain the non-cost-reflective retail price P . The incumbent is implicitly paying an output tax equal to

$$t = P - C \tag{3}$$

per unit—which is positive or negative depending on the regulated price P —and efficiency is ensured provided the entrant is also required to pay this tax for each unit it supplies.³ Notice this output tax (3) is equal to the incumbent's lost profit—or 'opportunity cost'—when it ceases to supply a unit of the specified service. From an efficiency point of view it makes little difference whether the proceeds from the entrant's output tax are paid directly to the incumbent, to the public purse, or into an industry universal service fund. However, if the incumbent has historically been using the proceeds from profitable sectors to finance loss-making activities then, if the entrant pays the tax to the incumbent or into an industry fund, the incumbent will not face funding problems should entry into profitable markets in fact occur.

While it may seem a little abstract, not to say administratively burdensome, to use these kinds of output taxes to correct for distortions in the incumbent's retail prices, these taxes can sometimes be implemented in a simple and non-discriminatory way via a well-designed universal service fund. This procedure can be illustrated by means of a simple example, which uses purely illustrative figures, as summarized in Table 1. (I return to variants of this example later in the note.)

³With this tax the entrant will find it profitable to attract consumers provided that $u - c - t \geq U - P$, i.e., whenever $u - c \geq U - C$ as claimed.

Here, the incumbent offers a universal mail service. Letters delivered to rural areas incur a higher cost (50p) compared to letters destined for urban areas (20p). Universal service obligations require the incumbent to offer both services at the same stamp price, 30p, and the firm makes a profit from letters to urban areas that covers its loss from delivering letters to rural areas.

Table 1: Using a universal service fund to give correct entry incentives

	urban delivery	rural delivery
number of letters	2bn	1bn
incumbent's cost per letter	20p	50p
incumbent's stamp price	30p	30p
incumbent's overall profit	£200m profit	£200m loss
entrant's contribution to fund per letter	10p	-20p

As discussed, a laissez-faire approach towards entry in this pair of markets will likely lead to (i) inefficient entry into the artificially profitable urban delivery sector, (ii) too little efficient entry into the rural delivery sector, and (iii) funding difficulties for the incumbent in the event of cream-skimming entry into the urban delivery sector. To counter these problems, suppose a universal service fund is set up containing £200m to finance rural service provision. The fund is financed by the profit generated in the urban delivery sector, and any firm—entrants and the incumbent—must pay 10p (the incumbent's profit margin in this sector) into this fund for each letter to urban areas that it delivers. In return, any firm which delivers letters to rural areas receives a subsidy from the fund equal to 20p (the incumbent's per-letter loss in that sector) per letter. Providing the quantities of letters delivered to the two areas remains largely unchanged with entry, such a fund is self-financing, and widespread urban entry does not undermine the ability of the incumbent to serve the loss-making rural market. More important from an economic efficiency point of view is the feature that the contribution scheme ensures that in each market the entrant has to pay the output tax/subsidy (3), which gives it the appropriate entry incentives. Therefore, the most efficient firm succeeds in each sector.

Notice that if the incumbent's retail prices were 'rebalanced' to come into line with its costs (so that a letter to urban areas needed a 20p stamp and a letter to rural areas needed a 50p stamp in this particular example), there would be no need to set up the universal service fund. A policy of free entry would work well in the absence of any tax and subsidy scheme. In the case of basic postal service, it seems unlikely that such rebalancing will be politically acceptable for some time to come. However, policy towards bulk mail is often more flexible in this regard, and there is sometimes scope for prices which better reflect the underlying costs in this market. I return to this point in section 2.2.

Finally, it is useful to discuss the issue of fixed versus variable costs in this context. The previous analysis assumed that costs (20p and 50p in the table) were avoidable. In the case of postal services, a substantial fraction of costs are fixed in nature. Suppose that, in addition to the marginal costs presented in Table 1 there is also a fixed cost, joint to the two sectors, equal to £600m. Since in Table 1 the total variable costs come to £900m, the fixed cost makes up 40% of the total cost. Spreading this fixed cost equally over the two sectors means, for illustration, that the uniform stamp price rises to 50p in order to cover the total costs of £1,500m. In this case, the output tax is increased by 20p in each sector: an entrant should now pay 30p into the fund for each urban letter it delivers, and it pays (and receives) nothing when it delivers a letter to a rural area. These higher access charges serve to ensure both that entrants enter only when they are more efficient, and also that the incumbent's fixed cost is financed if entry occurs.

2 Access to the Incumbent's Delivery Network

Here I extend the framework in the direction of greater realism so that the entrant might require access to the incumbent's delivery network. Specifically, there is a vertically-integrated incumbent and a potential entrant which might need access to the incumbent's delivery network in order to be able to compete with the incumbent at the retail level for a specified service (e.g., letters delivered to urban destinations). The incumbent incurs a cost C_1 per unit for providing its end-to-end retail service and a cost C_2 for providing a unit of delivery service to the entrant. The incumbent's retail service generates gross utility U per unit, and it must charge the regulated retail price

P . In addition, the firm levies the per-unit access charge a when it provides delivery service for the entrant. In section 2.1 I discuss the case where the entrant requires precisely one unit of the incumbent's delivery access service for each unit of own service, and then turn in section 2.2 to situations where the entrant can selectively 'bypass' the incumbent's delivery network. The first situation is more relevant for the case of stamped, single-piece mail, whereas the second becomes important in the case of bulk mail.

2.1 No bypass of the incumbent's delivery network

In this section I assume that bypass of the incumbent's delivery network is not feasible for the service in question, so that the entrant requires the incumbent to deliver each item of its mail. As before, the entrant's service generates gross consumer utility u per unit. When the entrant has access to the incumbent's delivery network, it incurs the additional cost c to provide the retail element of its service. That is to say, the total cost when the entrant supplies a unit is $C_2 + c$. Total welfare is higher when the entrant supplies a unit whenever $u - [c + C_2] \geq U - C_1$, i.e. whenever

$$C_1 - C_2 \geq c + [U - u] . \quad (4)$$

Similarly to expression (2) above, entry will actually take when the access charge is equal to a provided that the incumbent's margin $[P - a]$ satisfies

$$P - a \geq c + [U - u] . \quad (5)$$

Therefore, from expressions (4) and (5) the private incentive to enter coincides with overall welfare only when $P - a = C_1 - C_2$, or when

$$a = \underbrace{C_2}_{\text{cost of delivery}} + \underbrace{P - C_1}_{\text{lost retail profit}} . \quad (6)$$

This formula is an instance of the famous 'efficient component pricing rule' (ECPR) policy for pricing network access.⁴ This rule states that the access charge should equal the incumbent's cost of delivering letters, C_2 , plus the optimal output tax in (3) above, which is $P - C_1$. Since the entrant is here assumed to be unable to substitute away

⁴See Willig (1979) and Baumol (1983) for early discussions of this policy, and see section 2.1 of Armstrong (2002) for further analysis and references.

from the incumbent’s delivery network, a regulator might just as well levy the output tax—which is required to correct for the regulated retail pricing distortions—on the entrant’s input, which is exactly what the policy (6) entails.

We can illustrate this ECPR policy in an extension of the above example, summarized in Table 2. Here I assume there are just two components needed to provide an end-to-end letter delivery service: ‘pick up’ and ‘delivery’.⁵ The incumbent is assumed to incur the same pick up cost for all letters but its delivery cost differs in the two kinds of region. The entrant is reliant on the incumbent’s delivery network to provide its own mail service.

Table 2: The ECPR access charge with no bypass

	urban delivery	rural delivery
number of letters	2bn	1bn
incumbent’s total cost per letter, of which	20p	50p
pick up cost is	10p	10p
delivery cost is	10p	40p
incumbent’s stamp price	30p	30p
ECPR access charge for delivery	20p	20p

In this context, the ECPR formula (6) implies the optimal access charge for delivery is 20p per letter, which in this example is the geographically-averaged cost of delivery.⁶ With this delivery charge entry will be profitable only if the entrant has a lower pick up cost than the incumbent (or it provides a better quality service). Notice that the optimal access charge is geographically uniform even though the actual delivery costs vary over the two types of region. The reason for this in this context is that the incumbent’s stamp price is uniform and its pick up cost is also uniform. This policy is superior to a cost-based access charging policy, which would require charging for urban delivery at 10p and charging for rural delivery at 40p. For instance, with an urban delivery charge of 10p the entrant could have a pick up cost as high as 20p per letter (compared to the incumbent’s pick up cost of 10p) and still find entry into

⁵I assume that the associated sorting costs are included in these two costs.

⁶The fact that the ECPR delivery charge is equal to the geographical average of actual delivery costs is due to the assumption that the incumbent’s services just break even over the two markets. On the other hand, if the market runs at a loss overall, then the ECPR access charge would be below the average delivery cost.

that sector to be profitable. And with a rural delivery access charge of 40p an entrant (no matter how efficient) could compete against the incumbent's subsidised stamp price of 30p for that service.

It makes little difference to this analysis if the incumbent's delivery costs are largely fixed rather than incurred on a per-letter basis. (It is plausible that, since virtually all addresses are passed by a deliverer each working day, the cost of delivering an extra letter is small.) The ECPR policy is a 'retail-minus' charging system, and the access charge is equal to the incumbent's retail price (here, 30p) minus its avoided cost (here, the pick up cost is 10p), and the magnitude of the marginal letter delivery cost plays no role. Of course, though, the calculation is sensitive to assumptions about whether the pick up cost element is largely variable or largely fixed in nature.

In sum, when entrants have no realistic scope for delivering letters themselves, and when the incumbent's retail prices are regulated, the ECPR formula for pricing access by entrants to the incumbent's delivery network is an appropriate guide for policy. This framework probably applies best to stamped, single-piece mail. However, especially for bulk mail, there are situations where entrants can realistically deliver their own mail, in which case this framework does not apply well. Since the ECPR policy entails access charges which do not accurately reflect the underlying costs, the policy is not appropriate when an entrant can bypass the incumbent's delivery network when its own delivery cost is lower than the ECPR access charge.

2.2 Allowing for bypass of the incumbent's delivery network

Suppose next that the entrant has scope to deliver its own mail. As mentioned, this is most likely to apply with bulk mail services. When the entrant does so suppose that it incurs a total cost \hat{C}_1 per unit for its own end-to-end retail service, and this service generates gross consumer utility \hat{u} per unit. (Utility \hat{u} may differ from u if using the incumbent's delivery service degrades or enhances the entrant's service compared to its stand-alone service.) The entrant has three choices: it can decide to provide the end-to-end service itself (and not use the incumbent's delivery network at all); it can decide to enter but to use the incumbent's delivery network, or it can not enter at

all. Welfare per unit with these three possible entry strategies is

$$\begin{cases} \hat{u} - \hat{C}_1 & \text{with stand-alone entry} \\ u - [c + C_2] & \text{with entry via the incumbent's delivery network} \\ U - C_1 & \text{with no entry .} \end{cases} \quad (7)$$

Which regulatory policy ensures that the maximum value of welfare in (7) is achieved? Since the relationship between the entrant's inputs and outputs is no longer a fixed one, the regulator will need, if administratively feasible, to use *both* an access charge and an output tax to attain the best outcome.⁷ Specifically, suppose that regulatory policy requires the entrant to pay a tax t per unit of its output and a charge a to the incumbent when the latter delivers a unit of the former's service. Following the same reasoning as in section 1, given the regulated price P the maximum price the entrant can charge for its end-to-end service is $P - [U - \hat{u}]$, while the maximum price it can charge for its service which uses the incumbent's delivery network is $P - [U - u]$. With the two charges t and a , the entrant's profit per unit of output when it decides to supply the end-to-end service itself is

$$P - [U - \hat{u}] - [t + \hat{C}_1] . \quad (8)$$

The entrant's profit per unit of output if it instead decides to use the incumbent's delivery network is

$$P - [U - u] - [t + a + c] . \quad (9)$$

Therefore, given that entry takes place, by comparing expressions (8) and (9) we see that the entrant will choose to make use of the incumbent's delivery network whenever

$$a \leq [u - \hat{u}] + [\hat{C}_1 - c] .$$

On the other hand, given that entry occurs expression (7) implies that welfare is higher when the entrant uses the incumbent's delivery network whenever

$$C_2 \leq [u - \hat{u}] + [\hat{C}_1 - c] .$$

Therefore, given that entry takes place, private and social incentives for the entrant to use the incumbent's network are brought into line by choosing the access charge

⁷See Armstrong, Doyle, and Vickers (1996) and section 2.4.2 of Armstrong (2002) for a discussion of the case where the access charge is the *only* instrument available. In that case, since the access charge has to perform two tasks a compromise must be made, and a degree of productive inefficiency results.

to equal the incumbent's cost of delivering a unit of service, so that $a = C_2$. Making the access charge equal the incumbent's cost of providing delivery service gives the entrant the appropriate price signal about whether or not to bypass the incumbent's delivery network.

Turning next to the appropriate choice for the output tax t , following the previous discussion in section 1 the ideal output tax is given by $t = P - C_1$ per unit, as in expression (3) above. With these choices for a and t we see that the entrant's profits per unit with each of its three options for entry are:

$$\begin{cases} [\hat{u} - U] + [C_1 - \hat{C}_1] & \text{with stand-alone entry} \\ [u - U] + [C_1 - c - C_2] & \text{with entry via the incumbent's delivery network} \\ 0 & \text{with no entry .} \end{cases}$$

Comparing these profits with social welfare in (7) we see that the entrant's incentives are now exactly in line with welfare: the entrant will enter the specified market when it is socially optimal for it to do so, and if it does enter it will choose to use the incumbent's delivery network whenever it is efficient to do so.⁸ An alternative way to present this policy is that when entry occurs: (i) if the entrant uses the incumbent's network it pays the ECPR access charge (6), and (ii) if the entrant does not make use of the incumbent's network, it must pay the output tax (3).

Other regulatory policies will cause various kinds of inefficiencies. For instance, if the entrant can simply use the incumbent's delivery network at cost but there is no output tax, then it will face the correct signals about whether or not to bypass the delivery network, but it will not have the appropriate incentives to enter. Alternatively, if the ECPR charge (6) were imposed without a separate output tax, then the entrant might decide to deliver its own mail even when it would be more efficient for the incumbent to do so.

Laffont and Tirole (2000, pages 118–119) discuss the benefits of imposing output taxes on entrants and note that their use would imply that cost-based access charges are optimal (as confirmed in this note). They suggest that the use of these kinds of taxes is 'politically unlikely', but go on to suggest that these taxes could be repackaged as a tax on the whole industry so as to make them seem less discriminatory. The

⁸This insight—that when bypass is possible the regulator with enough instruments at its disposal should price the input at marginal cost—is well-known in other contexts. See pages 179–181 in Tirole (1988) for an account of how an (unregulated) upstream monopolist prices its input at marginal cost when it has additional instruments for controlling downstream competition.

output tax element of this regulatory policy can again be implemented by means of an industry universal service fund, as described in Table 3.

Table 3: Giving appropriate entry and bypass incentives

	urban delivery	rural delivery
number of letters	2bn	1bn
incumbent's total cost per letter, of which	20p	50p
pick up cost is	10p	10p
delivery cost is	10p	40p
incumbent's stamp price	30p	30p
entrant's contribution to fund per letter	10p	-20p
incumbent's access charge for delivery	10p	40p

Here, there is a universal service fund that operates just as in Table 1: a firm sending mail to an urban address must contribute 10p to this fund, and a firm sending mail to a rural address can receive 20p from the fund. In addition to these contributions, the entrant can gain access to the incumbent's delivery network at actual cost (not the geographically averaged cost as in Table 2).⁹ Notice that if the entrant chooses to enter by making use of the incumbent's delivery network, its total payment is the ECPR charge of 20p per letter for both kinds of destinations, just as in Table 2. However, the advantage of splitting the ECPR charge into two elements—a cost-based access charge together with an output tax—is that when self-delivery by entrants is a possibility it is undesirable to make the incumbent's delivery access charges deviate from the incumbent's delivery costs, since that policy invites inefficient bypass of the incumbent's delivery network.

In particular, consider the possible problems which arise if the ECPR price (6) were used as a basis for policy (without the additional use of output taxes). In the example, this would mean that the incumbent be required to deliver all letters from entrants at the price of 20p per letter. For letters destined for rural locations, this subsidised charge means that an entrant can successfully compete against the incumbent if its 'pick up' cost is no greater than 10p, and this outcome is efficient.¹⁰ For

⁹These cost-related delivery charges are sometimes termed zonal access charges.

¹⁰One potential downside, however, is that an entrant could have a rural delivery cost of 30p say (as compared to the incumbent's cost of 40p), and still not be able to enter profitably. That is to say, there is scope for inefficient lack of entry with such a policy.

letters destined for urban locations, however, the inflated access price will tempt some entrants to deliver their own letters. This could well be inefficient. For instance, an entrant might have a urban delivery cost as high as 20p, as compared to incumbent's delivery cost of 10p, and still prefer to deliver the letters itself. In addition to the evident inefficiency of this outcome, there remains the funding issue that the incumbent may be unable to continue funding its loss-making operations if its profits are eroded in this manner by cream-skimming entry. If the incumbent's access charges are regulated according to the ECPR policy (with no output taxes placed on entrants), then the regulator must find some other mechanism to limit the danger of inefficiency posed by selective bypass of the incumbent's delivery network.

The intricate regulation illustrated in Table 3 can be greatly simplified if the incumbent's retail prices for the specified service were rebalanced to reflect the underlying costs. (For business services such as bulk mail, for instance, there is less political imperative for universal service.) If retail prices are rebalanced in this way, then policy towards access pricing is more straightforward for these services. For instance, in the context of Table 3, if the incumbent offered retail prices 20p and 50p respectively for urban and rural mail services, the optimal policy is simply for entrants to have access to the incumbent's delivery network at actual cost (respectively, 10p and 40p) and the need for a universal service fund is avoided. Of course, when retail prices have been fully rebalanced in this way, cost-based access charges coincide exactly with the ECPR policy in expression (6) since there is then no 'lost profit' when the incumbent loses business to an entrant.^{11,12}

However, this convenient conclusion cannot so easily be made if there are significant fixed costs, in addition to the variable costs presented in Table 3. Suppose, as discussed at the end of section 1, the incumbent incurs a fixed cost of £600m to serve these two sectors. To fund this fixed cost, suppose there is a uniform mark-up of the retail price over marginal cost. Therefore, the re-balanced retail prices are 40p and 70p per item for urban and rural services. (These prices ensure the incumbent's

¹¹However, with the (rather extreme) numbers in this example, the rural access charge of 40p is actually above the uniform retail stamp price of 30p (assumed to continue for single-item services), and so an entrant in the bulk mail service would be better off simply putting its rural mail in the incumbent's street mail boxes than using the cost-based access product.

¹²Sections 6 and 7 of Armstrong and Sappington (2005) emphasize the benefits of rebalancing retail tariffs prior to liberalisation, in part because this eases the regulatory task of choosing access charges.

total cost of £1,500m is covered.) In this case a policy of charging entrants for access at (marginal) cost is problematic. If an entrant can use the incumbent's delivery network at cost (10p and 40p respectively), then it could be much less efficient than the incumbent in the pick-up segment, and still find it profitable to enter given the incumbent's high retail prices. In addition to the inefficiency of this outcome, the incumbent will find it impossible to finance its fixed cost if widespread cream-skimming entry occurs. Therefore, ideally an output tax (of 20p per item in both sectors) continues to be required, even though retail prices are rebalanced, in order to ensure that only efficient entry occurs and that the incumbent's fixed costs are financed. If these output taxes are not administratively feasible, then some other means need to be found to prevent inefficient cream-skimming entry. One possible compromise might be to add a mark-up on the access charges as a contribution to covering the incumbent's fixed cost.¹³

3 Margin Squeezes

So far this note has taken as given the need to control the incumbent's access charges. In this section I discuss why an incumbent may be tempted to set the access charge at too high a level, if it is left unregulated. I also discuss the danger of a regulator setting too big a margin.

Consider a vertically-integrated incumbent which supplies an essential input to a potential entrant.¹⁴ To discuss whether, and if so how, to regulate the incumbent's access charges, for simplicity suppose that there is no possibility of bypassing the incumbent's delivery network, i.e., we return to the framework described in section 2.1 above. Keeping the same notation as above, suppose the incumbent has cost C_1 per unit for supplying its service to final consumers and cost C_2 per unit for supplying the input to a potential entrant. The entrant needs one unit of the input for each unit of output it supplies, and it incurs marginal cost c for converting a unit of the input into a unit of the final product. Finally, suppose that the incumbent is free to choose its access charge a (though its retail price is still regulated at the level P).

¹³See footnote 6. The socially optimal way to cover the incumbent's fixed cost is for the regulator to choose both the retail price(s) and the access charge(s) simultaneously to maximize total welfare, i.e., to use Ramsey pricing. See Laffont and Tirole (1994) for more details.

¹⁴For more detailed discussion of this topic, see Bouckaert and Verboven (2004).

3.1 Characteristics of the entrant known

First we consider the case where the entrant's characteristics are known to the incumbent. In the current context, the relevant characteristics are the entrant's quality of service u and its cost c . The incumbent has two choices for how to supply the market, and it could (i) supply the final service to consumers directly, or (ii) sell access to the entrant who then supplies the final service.

Suppose the incumbent decides to sell the service to consumers itself (option (i)), and does not allow the entrant access to its delivery network (or sets a prohibitively high access charge for this). In this case the incumbent makes profit $P - C_1$ per unit. Suppose instead it follows option (ii) and sells access to the entrant. Given the incumbent's price P , the maximum price which the entrant can charge is $p = P - [U - u]$, and so the entrant finds entry profitable with the access charge a provided that $P - [U - u] \geq a + c$. Therefore, the maximum access charge which will be accepted is $a = P - c - [U - u]$, and so the incumbent's profit per unit with option (ii) is $P - c - [U - u] - C_2$. Therefore, the incumbent will choose to follow option (i) or (ii) depending on whether or not condition (4) is satisfied.

In other words, the unregulated incumbent will choose to allow entry if and only if entry is socially efficient. This is the essence of the 'Chicago view', which states that a vertically integrated incumbent has no incentive to foreclose a more efficient entrant (even though it certainly has the ability to do so).¹⁵

3.2 Characteristics of the entrant not known

Suppose next that the incumbent does not know everything about the potential entrant. For simplicity of notation, suppose the entrant is known to supply a service with the same quality, so $u = U$. This implies that consumers will simply buy from the firm with the lower price. (This assumption has no effect on the argument.) Suppose that the incumbent does not know the cost c of the entrant at the time it sets its access charge a . Suppose the incumbent believes that this cost c is a random variable with distribution function $F(c)$.

If the incumbent sets the access charge a , the entrant can profitably enter if its own cost is lower than the maximum price it can charge, i.e., when $a + c \leq P$, in which

¹⁵See Rey and Tirole (2005) for further discussion.

case the incumbent will make its profit solely from selling the input to the entrant. Otherwise, the incumbent makes its profit from selling directly to final consumers. Therefore, the incumbent's expected profit per unit with the access charge a is

$$\pi = F(P - a)(a - C_2) + [1 - F(P - a)](P - C_1) .$$

Therefore, the (risk-neutral) incumbent will choose a to maximize

$$F(P - a)(C_1 - C_2 - [P - a]) .$$

Clearly, the incumbent will choose an access charge which satisfies $[P - a] < C_1 - C_2$, or

$$a > C_2 + [P - C_1] . \tag{10}$$

In other words, if the incumbent is free to set its own access charge, it will choose the charge to exceed the ECPR charge in expression (6) above. Since the ECPR charge is the socially optimal access charge in this context, it follows that an incumbent which does not know the exact characteristics of the potential entrants will tend to set an excessive charge if free to do so. With an access charge as in expression (10), an entrant which is more efficient than the incumbent might not be able profitably to enter this market. In such cases, the incumbent engages in a *margin squeeze* (or price squeeze).

The reason why a vertically integrated firm wishes sometimes to exclude a more efficient rival in this case (in contrast to the Chicago view in section 3.1) is that the entrant has private information about its cost, and the incumbent wishes to appropriate part of the entrant's efficiency advantage. This argument provides a coherent justification for why it might be desirable to introduce regulation that constrains the incumbent's margin not to be too small.

Notice that it is generally not sufficient merely to control the incumbent's margin $(P - a)$, although such a policy will usually be sufficient to keep entrants content. If regulation does wish to control only this margin, then the analysis in this note shows that the optimal way to do this is to require that the ECPR charge in (6) is implemented. In other words, the incumbent should be allowed to choose its pair of prices (P, a) as long as its margin is given by

$$P - a = C_1 - C_2 .$$

When the incumbent is constrained in this way, entry will occur whenever the entrant is more efficient than the incumbent, and so productive efficiency is implemented. However, the problem with this policy on its own is that it does not constrain the retail price P at all. For instance, in this particular framework, the incumbent will simply choose the retail price that fully extracts consumer surplus ($P = U$). In sum, a policy that focusses purely on avoiding a margin squeeze, i.e., on protecting entrants' interests, will not adequately protect consumer interests. To meet the needs of final consumers, P (or a) also needs to be directly controlled.¹⁶

3.3 The danger of too big a regulated margin

Regulators are often, for understandable reasons, keen to see competition thrive the industries they oversee. Market entry (along with impressive regulated price reductions imposed on the incumbent) is one of the most visible indicators that a regulator is doing a 'good job'. The easiest way to achieve sizeable market share reductions for the incumbent is to implement a big margin for entrants, bigger than the ECPR margin for instance. This can be done either by mandating high retail prices or low access charges. The former clearly is unpopular with consumers (and politicians), whereas the latter policy is a more discreet form of entry assistance. As emphasized throughout this note, though, there are clear dangers of inefficient entry when access charges are set too low, since high-cost entrants might then prosper. Moreover, when access charges are set too low, the incumbent will have an increased incentive to discriminate against its rival using *non-price* means. For instance, the incumbent can usually find ways to delay the provision of its access products to rivals, or to provide an artificially degraded access service. Typically, such behaviour is hard to monitor and prevent fully by a regulator. When access charges are set according to the ECPR in expression (6), however, the incumbent has no incentive to disadvantage its rivals by these non-price means since it obtains the same profit whether or not entry occurs.¹⁷

¹⁶See Armstrong and Vickers (1998) for further discussion of this point.

¹⁷See Sand (2004), for instance, for further discussion.

4 Conclusions

This note is intended to provide a simple framework for discussing access pricing in postal service. The first point to be made is that there is a coherent argument for regulating the terms of access to an incumbent postal operator's delivery network. (This argument was presented in section 3.2 above.) An incumbent may be tempted to set too high an access charge if left unregulated in those (plausible) situations where it is not well-informed about the characteristics of the entrants.

In section 2.1 I argued that the appropriate regulated margin was the ECPR margin, at least for those services where entrants have no scope to bypass the incumbent's delivery network. One important advantage of an ECPR policy is that it removes the incumbent's motive to use non-price means to disadvantage its rivals. In this circumstance, the regulator has less need to undertake detailed and intrusive investigation into the incumbent's non-price behaviour, and need only monitor its charges.

In section 2.2 I discussed how problems emerge with this policy when entrants have the ability to deliver mail themselves. The ECPR policy might mean that for some services access charges are substantially above the associated costs, and in these cases an entrant might decide to deliver its own mail even if its costs of doing so are substantially above the incumbent's. Such an outcome is both inefficient and erodes the incumbent's ability to fund its other services. Therefore, regulators should be sympathetic to the principle of cost-reflective access charges, especially if the associated retail prices are also cost-reflective. If the incumbent's retail prices cannot be fully rebalanced to reflect marginal costs (e.g., because of universal service constraints or because retail prices must also serve to cover fixed costs of operation), the regulator will need to use some form of an output tax/subsidy scheme for entrants. Carefully designed output taxes serve to give appropriate signals for efficient entry, and they also serve to contribute to the financing of the incumbent's fixed costs and/or universal service subsidies.

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