

Asymmetric termination charges to support small networks*

3 February 2009

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Abstract

Termination charges toward newer entrants are often set asymmetrically to exceed efficient costs for telephony traffic. Such practices are said to be beneficial to consumers as well as providing competition a “leg-up”. However claims of consumer benefit are dubious at best, while infant industry arguments are no more likely to apply to telecommunications than they apply anywhere else. Appropriate forms of termination regulation are then considered.

JEL codes: L510, L96, L53

Key words: Asymmetric regulation, entry, industry policy, telecommunications, termination charges

* This paper is based on work for Telecom Italia. It is not intended to represent the views of anyone except the authors. © Boreggi, Ergas & Ralph 2008-2009.

1 Asymmetric termination charges: introduction and summary

This paper addresses the effects of asymmetrically setting termination charges above efficient costs for telephony traffic originating on a single large network and terminating on smaller networks (off-net calls). Such practice is not uncommon. In 2007, at least 13 EU nations set asymmetric call termination rates so as to favor entrants (ERG, 2008, page 29). Italy has the highest asymmetries. In 2007, the average entrant rate was 173 percent of the Telecom Italia's rate (ERG, 2008, page 33), which the Italian regulator, Agcom, sets through a network cap to approximate average long run incremental cost.

Allowing smaller networks to have above efficient cost termination charges while requiring the largest network to set termination charges to some estimate of efficient costs is generally rationalized as benefitting consumers and/or as a means of developing competition by encouraging entry (de Bijl and Peitz, 2002; Peitz, 2005a, 2005b; ERG, 2008, page 5). The paper, however, finds that neither rationale is compelling, indeed, quite the opposite, for two reasons:

- the models that demonstrate short run consumer benefits from asymmetric rates are a poor basis for implementing such a policy even accepting their underlying assumptions (section 2); and
- the presumption that financial markets do not allow small networks to find adequate sources of funding and hence require subsidies is untenable in developed countries and, given the internationalization of capital markets, may not be tenable more broadly. Further, if subsidies must be granted regardless of costs, there are better alternatives to asymmetric termination rates. However, any subsidy is much more likely than not to harm consumers and economic efficiency (section 3).

Section 4 considers how call termination charges should be regulated, if at all. It finds there may be some role for regulating interconnection, especially when small and especially entering networks face off against established networks. Economic theory supports reciprocal termination charging as having few regulatory costs, given the large network's termination charges are already regulated, and important efficiency benefits.

If, despite the preceding, asymmetric termination rates are to be imposed, then section 5 argues that they should be subject to safeguards, including a sunset, and all networks should be allowed to set their retail prices to reflect incurred termination charges.

Section 6 concludes.

2 The economics of termination charges

This section outlines the economics of termination charges that are relevant to the setting of asymmetric rates. It makes three main points:

- First, telephony network owners, when acting independently (non-collusively), desire to set inefficiently high termination rates. Indeed, sometimes it is profit maximizing to set termination rates in excess of the level that a monopolist over termination would set. This is particularly so when the network in question is small relative to the rest of the market. Consequently, it is important to weigh carefully any claims made by smaller networks as to the benefits of asymmetric rates (see section 2.1 below).
- Second, putting dubious motives aside, the main theoretical basis for asymmetric termination rates is the possibility that termination charges on smaller networks that are slightly above marginal cost may benefit consumers. For example, Peitz (2005a, 2005b) and de Bijl and Peitz (2002)¹ show this may be so under certain narrow circumstances, at least in the period over which investment, including entry, decisions are fixed, hereafter referred to as the short run (section 2.2).
- Third, that analysis, however, ignores a raft of difficulties that in practice suggest asymmetric rates are unlikely to provide short or long run consumer gain, and would in any case harm short and long run economic efficiency (section 2.3).

Section 2.4 summarizes the reasons why asymmetric termination rates would likely result in serious consumer welfare and economic efficiency losses.

¹ The underlying theoretical approach of these papers is very similar so our discussion focuses on Peit (2005a, 2005b).

2.1 Termination rate incentives

Unregulated competition between interconnecting telecommunications firms can lead to access prices being set either at, or above, the level that a monopolist over termination alone would set (Gans and King, 2000; Wright, 2000; and Wright, 2002).² Such prices are in general inefficient. The incentives of an unregulated network provider to set termination charges above efficient levels are greater to the extent that:

- demand for call termination is inelastic, calls not made due to higher termination charges are not greatly missed by potential call recipients, and do not reduce outbound calls from those potential recipients; and/or
- the market share of the terminating network is small; and
- the access provider of the originating customer cannot pass through to its retail customers the specific termination charges set by the terminating network (that is, off-net prices cannot reflect termination charges); and/or
- retail consumers are not completely aware as to the price of any given retail call (for example, because they do not know the network on which the call will terminate).

To understand the reasons for this, begin by considering the case where (1) retail prices for calls off-net reflect that off-network's termination charges, and (2) retail customers are fully aware of the prices they face. The result is that if a network raises its termination charges, then retail prices for calls from other networks rise and there is a decline in demand for calls to that terminating network. If call recipients do not much regret calls lost due to the higher termination charges (for example, because they are not able to identify what calls they would miss), then the network that raises termination charges loses few direct subscribers. If the decline of inbound traffic also does not materially reduce outbound calling (and the effect could go either way), then the incentives of a network terminating traffic are largely to set the same price for call termination

² See also Armstrong and Wright (2007, especially at page 9). Their model is relatively general, allowing for calling externalities, bypass competition (where calls are passed off as originating from the network that pays the cheapest termination charge), and network competition (where some customers can be reached on more than one network).

that a monopolist over call termination on that network would set.³ This price, in general, is arguably likely to exceed efficient rates, which would reflect marginal private plus social costs (see the start of section 2.2 below).⁴

In reality, (1) larger network providers may face regulation or costs of setting prices that make it difficult to reflect termination charges in their retail prices, and may to some extent set the same (averaged) price on all retail calls regardless of the termination charge incurred on any particular network, and/or (2) retail customers may, to some degree, be unaware of the prices they face when they dial a party off-net,⁵ and so form price expectations on the basis of average retail prices. In either of these circumstances, uncoordinated price setting results in termination charges that exceed the level that a network-specific termination monopolist would set.

For example, if retail prices reflect average termination charges then, as a network raises its termination charge, averaged retail prices only rise proportionate to the market share of the price-raising network.⁶ This attenuates the negative impact on the terminating call volumes (and hence profits) of the price-raising network, as compared with the case when retail prices differentially signal the full terminating price. As a result, it is profit maximizing for each network to set termination prices that exceed the levels network specific termination monopolists would set. The effect is to further reduce consumer welfare and economic efficiency (assuming the monopoly price is indeed inefficient), as compared with the case where retail prices differentially signal the termination charge to each network. In addition, all firms' profits are harmed. With averaged retail rates, a firm that raises termination rates reduces the demand of all other firms,

³ If a network's customers are concerned about call loss, or if reduced call termination reduces outbound calling, then networks would set a price below the termination monopolist's price.

⁴ Strictly, it is possible that, once the recovery of fixed costs are taken into account, the price a network-specific termination monopolist would set could be optimal or too low (respectively if it is equal to or less than the optimal linear Ramsey price).

⁵ Armstrong and Wright (2007, page 9): "In a 2005 market survey of 2,158 users, only 13% of FTM [fixed-to-mobile] callers reported knowing roughly how much it cost for FTM calls to people they most regularly contact."

⁶ The same analysis applies if retail customers have no idea as to the retail rates for a call to any given customer, but respond to the expected price of such calls.

so imposes an externality on other firms that it does not account for. The net effect is a decline in consumer welfare, profits and economic efficiency.⁷

The effect is increased with the number of interconnecting networks. This is immediately obvious where retail prices reflect the average termination charge, since the more networks there are, the more likely it is that some networks will be small relative to the market (and hence will have strong incentives to raise their termination charges, as they bear only a small share of the costs of the resulting distortion to demand, but claim all the direct revenues from the higher charge). However, the same effect arises even when retail prices can differentially vary with call termination charges, because consumer ignorance as to the prices they can expect to pay likely rises with the number of terminating networks.

If the large network is required to set termination charges to efficient cost, then smaller networks still profit if they can raise their termination charges above those costs. This is perhaps obvious when the large network is not allowed to set retail prices that reflect termination charges (Peitz, 2005a), but it is also so when the large network sets off- and on-net retail prices to reflect the smaller networks' termination charges (Peitz, 2005b).⁸

In summary, independent networks have strong incentives to set termination rates above the efficient cost of termination, and sometimes above the price a network specific termination monopolist would choose. This incentive remains when the incumbent's termination charges are forced to equal efficient cost, is inversely proportional to the network's size, rises with the number of entrants (since this increases the probability that some entrants are small or that consumers are unaware of retail price of a particular call), and is accentuated if the incumbent is not allowed to differentially reflect call termination charges in its retail prices. As a result, smaller networks have good incentives to lobby for above cost asymmetric termination rates.

⁷ With two-part retail prices, if networks can coordinate their termination charges, their incentives are to set these below cost (Laffont, Rey and Tirole, 1998a, 1998b; Wright, 1999; Gans and King, 2001; Dessein, 2003; Armstrong and Wright, 2007). Such coordination is of course illegal in most jurisdictions, and in any case, is increasingly implausible as the number of networks rises. Moreover, the price-raising impact of such collusion is muted as the number of networks rises (Armstrong and Wright, 2007, page 16). To our knowledge, no regulator has ever raised concerns about termination charges being set too low. (In the less realistic case of a uniform linear retail price, firms can effect the cartel price by setting termination charges above costs—see Armstrong, 1998; Laffont, Rey and Tirole, 1998a).

⁸ Formally, Peitz's papers only consider two networks, one larger than the other.

2.2 *Asymmetric termination rates, consumer surplus and economic efficiency*

A standard result of interconnection models is that for networks where the network or subscriber externality plays no role (for example, because networks are mature or private demand is high) both economic efficiency and consumer surplus are maximized when all prices are set equal to marginal cost (Wright, 2000, Propositions 3 and 11; Armstrong, 2006, page 672; Bolt and Tieman (2006); and Armstrong and Wright, 2007, pages 8, 11).^{9, 10} For example, that outcome occurs if termination charges are set to marginal cost and either there is sufficient retail competition to press retail prices to costs, or if only the large network has market power, and its retail prices are regulated to reflect costs (Armstrong and Wright, 2007, page 8).

Peitz (2005a) and Peitz (2005b) are unusual in this respect. In one formulation, the incumbent supplies better service and cost-based prices lead to an inefficiently high entrant market share. In an alternative formulation, misperception causes consumers to underestimate the benefits of the entrant's service, and cost-based prices lead to an inefficiently low entrant market share.

Peitz (2005a) considers firms that must set retail call prices that do not vary according to the network on which the call terminates. In Peitz (2005b), both networks can set differential retail

⁹ If low subscription demand coupled with the subscriber externality leads to inefficiently low subscription decisions on the terminating network, then a second-best optimal termination rate could be higher than marginal cost and asymmetrical. This is plausible if the terminating network either services a relatively poor group of people (for example, a rural network) or supplies a new service (such as when mobile telephony was introduced). Then, in many cases, subscription demand, not reflecting the subscriber externality, would be too low. This note is not concerned with such cases.

¹⁰ Strictly, efficiency requires that prices equal marginal social costs, which may differ from marginal private costs in the presence of externalities (Armstrong, 2006, page 672; Bolt and Tieman, 2006; see also Rochet and Tirole, 2003, page 998), and the calling externality may be relevant here. However, in practice, private willingness to pay for the outbound call often exceeds the call's price, so the calling externality plays no role at the margin, and if it plays a role, it is readily internalized by coordination between the relevant parties, the use of receiving party pays services (for example, 800 numbers), and other remedies such as call-back. In any case, the basic conclusions of this analysis follow through in the presence of calling externalities (Armstrong and Wright, 2007, pages 17-29).

prices to reflect the termination charge a call incurs. Otherwise, the two models are essentially identical.

If retail prices are not held to costs by market forces or regulation, then both models suggest that setting an incumbent's termination charges to cost, but allowing an entrant to charge somewhat above cost, can raise consumer surplus, even if it necessarily lowers economic efficiency.¹¹

Accepting the assumptions of Peitz's models, which the analysis of section 2.3.1 below would reject, sensitivity tests suggest that the overall efficiency loss of asymmetric rates is small to the extent that the smaller network's market share is small¹² and calling demand is inelastic (Peitz, 2005a, page 352). However, in many countries where asymmetric rates are imposed, smaller networks have claimed a substantial share of the total market. In any case, many studies find calling demand to be elastic, and it is not typically found to be particularly inelastic.¹³

It is also the case, as will now be shown, that setting asymmetric termination charges that favor smaller networks may materially harm consumers, as well as harm economic efficiency more deeply than Peitz's models suggest.

In Peitz's models, there is a duopoly and both the larger and the smaller network have market power. The focus is on the predicted outcome (or equilibrium) for retail prices when termination

¹¹ In Peitz's models, economic efficiency can increase as the smaller network's termination charge exceeds efficient costs if a significant number of customers are not currently served. However, this does not apply in developed nations where market penetration levels are very high. Moreover, in a more general model, which allows for heterogeneous calling demands, Dessein, 2003, page 606, warns that even where customers are not being served there is no simple relationship between economic efficiency and the ratio of termination charges to marginal cost.

¹² Though this effect is offset by the fact that smaller networks have a greater incentive to seek termination charges above efficient levels.

¹³ Wheatley (2006) page 1 and Annex 1, found developed countries' own-price demand elasticities for local calls of between -0.1 to -0.5, long distance calls of between -0.2 to -0.5 and international calls of between -0.2 to -1.5. Aldebert et al. (2004) found for the average French consumer own-price elasticities for local calls to be -1.435, long distance calls -1.331, international calls -0.109 and fixed-to-mobile calls -0.491. Ward and Woroch (2004) produce two estimates for each call type examined, being for US own-price demand elasticities for local calls -1.25 and -1.26, intraLATA calls -0.99 and -1.00, and interstate calls -1.05 and -1.10. Wolak (1993) also develops two estimates of US average own-price elasticities, being, for local calls, -0.88 and -0.39, and for long distance, -2.07 and -1.80.

charges are set equal to marginal costs. In that equilibrium, retail prices are non-cooperatively and inefficiently set in excess of marginal cost.

Peitz then considers how the system would shift if the smaller network's termination rate was raised by an arbitrarily small amount above marginal cost. However, and this will be important in subsection 2.3.2 below, Peitz does not predict an outcome (make unambiguous statements about an equilibrium) given asymmetric termination rates. Rather, his results indicate how, for example, consumers' well being would change if, holding other things constant, the smaller network's termination rate was increased infinitesimally.

Peitz's result—that at the margin consumers would benefit from allowing the small, but not the large network, to set above cost termination charges—arises for two basic reasons:

- First, raising the smaller network's termination charge slightly above marginal cost leads the larger network to wish to reduce calls to the more expensive network. In the model, the networks set a subscription charge and a per call minute or usage charge.¹⁴ Profit-maximization leads the networks to price calls at their perceived marginal cost, that is, at their marginal cost plus termination fees, and to claim profits through subscription charges. Consequently, a rise in termination fees means the larger network raises its retail call prices. However, in part because the larger network can only set a single retail call price, so cannot reflect the full costs of termination on the smaller network in its retail calling price, the new calling price does not reduce calls to the smaller network by enough to maximize the larger network's profits. Consequently, the larger network must increase its market share (so fewer calls travel off-net), and to do this it lowers its subscription charge (thereby attracting more subscribers). Thus, the need to seek market share (to increase the share of its traffic that is on-net) makes the larger network behave more competitively.
- Second, with the new higher termination charge, the smaller network also has an incentive to obtain a greater market share so as to capitalize on the revenues from inbound calls. This leads the smaller network to also more vigorously seek customers.

The resulting competition tends to lower subscription prices, so tends to raise consumer welfare. However, overall efficiency is also reduced: the larger network continues to set per minute prices

¹⁴ Some technical aspects of this assumption are considered in the fourth point of subsection 2.3.1 below.

to reflect its average per minute costs, but given the asymmetric termination charge the larger network must pay the smaller, these costs exceed efficient levels.

The results of Peitz's models crucially depend on the assumption that when termination rates are set equal to marginal costs, the two networks set inefficiently high retail prices. As in all these models, above marginal cost termination charges increase the smaller network's profits (holding other things constant) and so are attractive to the smaller network. In Peitz's models, this then feeds through to increased competition and lower (subscription) prices to consumers, but also to inefficiently low call volumes, and an inefficient allocation of production between the larger and smaller networks.

Another crucial assumption is that no further entry can occur (Peitz, 2005a, pages 343-344).¹⁵ If it could, the prospect of securing high termination charges might induce, possibly inefficient, entry, further harming economic efficiency.

2.3 Asymmetric termination rates are unlikely to be beneficial in practice

The preceding outlined the logic of Peitz's fundamental claim, that a move from cost reflective to asymmetric termination charges can increase the smaller network's profits and consumer welfare, but lowers overall economic efficiency. With that background, this section first evaluates the applicability of the assumptions necessary for Peitz's conclusions (subsection 2.3.1), and then considers an important practical difficulty in setting asymmetric termination rates even if Peitz's assumptions hold (subsection 2.3.2). Finally, the consequences for consumer wellbeing and efficiency are discussed when long run behavior, such as entry and lobbying are taken into account (subsection 2.3.3).

¹⁵ Peitz implicitly assumes entry barriers since the duopolists initially earn monopoly rents without inducing entry. However, based on widespread entry in many telecommunications markets, this may be best thought of as a short run assumption. In any case, higher rents may be sufficient to attract entry that would not emerge when termination rates are reciprocally set to cost.

2.3.1 The failure of crucial assumptions

Peitz's results crucially depend on a range of assumptions that are violated in practice. This section considers four of these: that retail prices are materially above efficient levels; that incumbent's termination rates reflect *marginal* costs; that higher entrant profits facilitate entry that benefits consumers; and that networks' can profitably price usage at marginal cost, obtaining profits from subscription charges.

First, as will be explained in a moment, given cost-based termination, the closer retail prices are to efficient levels, the more likely it is that the claimed consumer gains of asymmetric termination charges do not arise. Yet, the assumptions of Peitz's model—that there is only one entrant and no access regulation or regulation of retail prices—imply that retail subscription prices have relatively high mark-up over costs. In contrast, in many markets, retail prices are likely to be lower than implied by Peitz's model, and for at least two reasons:

- Retail price regulations (such as price caps) restrict the larger network's retail prices, most especially for subscriptions and calling.
- Competition, in many instances facilitated by extensive regulated access to the larger network's infrastructure at cost-based prices, makes retail supply substantively competitive. For example, calling markets in Europe are now considered competitive (EC, 2007b; EC, 2006, pages 25-26).

To the extent that either of these factors apply, the consumer benefits of asymmetric charges fall and may even be negative. This is because the competition increasing effects of the asymmetric rates cannot lower subscription rates below costs. Thus, if regulation or competition or the combination already force subscription prices to be close to costs, then subscription charges can only fall by a small amount. Such a fall only provides small gains that must be weighed against the losses consumers experience due to the larger carrier's higher per minute rates. If retail prices are sufficiently close enough to or equal costs, then the net impact on consumer wellbeing is negative.

Second, Peitz's models also assume termination charges are set to marginal cost. In practice, regulation often allows per minute termination charges that are substantially in excess of the short run marginal cost of a call minute (for example, to ensure fixed costs are recovered). On telecommunications networks, capacity decisions drive costs and the marginal cost of a call

minute is approximately zero¹⁶ (see, for example, Kennet and Ralph, 2008, pages 136-138, and especially 146-147, 153; Harbord and Pagnozzi, 2008, page 3). As a result, a per minute termination charge that reflects the *average* per minute long run incremental cost (LRIC) of termination (so fixed costs are recovered) is not consistent with any of the termination models discussed here. Such charges are common. For example, in Australia, the EU and the US, incumbents are allowed termination charges that are generally intended to reflect average LRIC.

Given termination rates are set to average LRIC, it is considerably less probable that a move to asymmetric termination charges improves consumer welfare. That is, it is true that starting from a situation where both networks' termination charges reflect marginal costs, and retail subscription charges exceed costs, a sufficiently small increase in the smaller network's termination charges improves short run consumer surplus and the smaller network's profits. However, a sufficiently large increase reduces consumer surplus, and can reduce the smaller network's profits. Thus, when the termination rates of larger networks are set to average LRIC, there is a much greater probability that termination rates already exceed the value that optimizes short run consumer surplus; furthermore, this effect will be amplified if small networks are allowed to set asymmetric termination charges, that is, charges above the average LRIC charges set for the larger networks.

Third, Peitz (for example, 2005a, at page 352) also argues that, as asymmetric termination charges are robustly associated with the smaller network's profits, such charges will enable and indeed induce entry (ultimately benefitting consumers and economic efficiency). However, the conclusion that asymmetric termination charges would induce entry cannot be drawn from, and indeed is contrary to, his models. Peitz assumes a duopoly with no entry (making it difficult to make claims about entry) where the two firms are able to set subscription charges above cost and so earn monopoly rents. As already noted, Peitz finds consumer benefits from asymmetric termination charges arise exactly because the two firms can set high subscription rates. But such high charges and profits are only possible if there are entry barriers. This creates two problems for Peitz:

- To the extent entry is possible, that is, the lower those entry barriers, the closer retail subscription charges are to cost, and the smaller the claimed benefits from asymmetric

¹⁶ This may not be true on a mobile network when spectrum scarcity causes congestion externalities.

rates. However, to the extent entry is not possible the less likely it is that it will occur given asymmetric termination charges.

- It may be possible to set the model's parameters so entry only becomes attractive after asymmetric termination rates are introduced, but then no general claim can be made that asymmetric termination charges would induce entry, or that, if it did, such entry would be efficient. Rather, case-by-case analysis based on a model that provides for entry is necessary, and would be subject to all the modeling problems outlined in subsection 2.3.2 below.

Fourth, and on a somewhat more technical level, Peitz assumes a demand structure that leads profit-maximizing firms to set call prices to reflect perceived marginal cost (that is, marginal cost including any termination charges) and any above cost return is obtained through the subscription fee.

On one hand, this captures a key aspect of telecommunications supply in most developed economies, that there is no substantive source of untapped demand for fixed voice service. On the other hand, typically some consumers have sufficiently low demands that pricing in this way may not be profit maximizing (because such prices exclude some customers who could still provide an incremental return over and above marginal costs). Thus, it is possible that profits could be increased by using price schedules that are more complex than Peitz's two-part tariffs, such as menus of two or more part tariffs and other complex pricing schemes, typically with the characteristic that, at least for some customers, usage charges exceed marginal costs.

In the more realistic circumstance, where customers differ and complex prices are used, a move from symmetric to asymmetric calling charges would reduce or eliminate Peitz's predicted improvement in consumer welfare, and strengthen the loss of overall efficiency. First, usage prices, even when termination rates are set to cost, are unlikely to reflect perceived marginal costs. Second, it is true that a move to asymmetric rates would in all probability (1) lead both firms to seek to increase their market share and to do so by lowering subscription charges, and (2) place pressure on the larger network to raise usage charges to reflect the effective marginal costs it now faces. However, this may have a flow through effect on the smaller network's usage prices, notably on the markup over marginal cost. Further, the effect of these changes on consumer welfare gains would be ambiguous for two reasons:

- some individuals with higher demands for calling would be worse off, though they would continue to subscribe (the lower subscription charge would not compensate them for the lost surplus of higher usage charges—see Dessein, 2003); and
- the efficiency losses in moving from symmetric to asymmetric termination charges would be higher than in the case where all usage demand is identical (because even when termination charges are set to marginal cost, some retail call prices are marked up above marginal costs, and efficiency losses typically increase more than proportionately with price distortions).

As a result, Peitz's basic claim, that an incremental rise the smaller network's termination rates can increase consumer welfare need not hold.

2.3.2 The practical problem with setting asymmetric termination charges

The preceding considered how applying more realistic assumptions to Peitz's models weakens, perhaps greatly, the case for asymmetric termination charges. In this subsection, the assumptions of Peitz's models are taken as given, and the extent to which these models can provide prescriptive direction to a regulator is considered. The section makes the point that the mere possibility that regulation may improve consumer wellbeing, most especially when the extent of the benefit cannot be readily quantified and is known to harm economic efficiency, is not sufficient grounds for implementing regulation.

To be more explicit, recall that Peitz starts from the equilibrium when termination charges are set equal to short run marginal cost. He then analyses the impact of raising the termination charge of the smaller network by an arbitrarily small amount. He finds that consumer surplus and the entrant's profits both tend to increase, but economic efficiency tends to fall.

However, what is of ultimate interest is not these tendencies, but rather the nature of the equilibriums that arise when the entrant's termination charge is progressively raised above marginal cost. In particular, to effect good policy it is necessary to understand how consumer surplus and economic efficiency change as the termination charge rises. For example, it is possible that even a small, but not infinitesimally small, increase in the entrant's termination charge could lead to a fall in consumer welfare (as well as economic efficiency). Thus the

regulator, if it wants to rely on Peitz's model as a justification for allowing the entrant a higher termination charge, must be careful not to set that charge too high.

Unfortunately, Peitz's models do not and cannot determine whether a particular asymmetric rate will benefit or harm consumers. As Peitz (2005a, page 354) puts it somewhat laconically:

there may be implementation problems: one needs a quantitative assessment [of] what is the right access mark-up for [the smaller network].

Indeed, Peitz (2005a, page 354) is so unsure as to how the right termination rate asymmetry might be determined he recommends:

Given these problems [of assessing the right mark-up on the smaller network's termination charges] one can interpret my principle of access regulation as follows: The regulator should worry most about obtaining reliable cost data of the [larger] network. If the [smaller network] has to provide access at its stated costs an upward bias of cost data of the [smaller] network actually correspond to asymmetric access prices.

Such an arbitrary approach seems a poor basis for implementing regulation.¹⁷ Moreover, section 2.3.1 above suggests it is unlikely that one could calibrate Peitz's models so as to provide less arbitrary guidance (because his assumptions are so different to reality). Further, even if calibration were possible, because termination rates are in practice set substantially in excess of marginal cost, there is no presumption that even a small asymmetry from those rates would benefit consumers.

2.3.3 Long run costs to consumers and economic efficiency

There are also important questions about the efficiency of subsidized entry that Peitz does not consider. In particular, while Peitz's models recognize the allocative efficiency losses that too

¹⁷ Peitz (2005a, page 352) notes "Locally, the loss in total surplus is small if the entrant's market share is small or if demand is insensitive to price changes at per-minute price equal to true marginal costs. By simulations, one can show that for some reasonable parameter constellations and large deviations of the entrant's access price from marginal costs the loss in total surplus turns out to be small". On this see section 2.2 above.

high termination prices cause, they do not account for what are likely to be much greater productive and dynamic efficiency losses generated by providing artificial profits to entrants.

Productive efficiency losses can be expected to be large because they occur across the entire production process, rather than merely distorting choice at the margin. Thus, for example, when an inefficient firm produces output, waste can occur on every unit produced, as well as because too little output is produced (an allocative efficiency cost). The net effect would likely bring great harm to consumers, and would certainly reduce economic efficiency.

Dynamic efficiency losses are likely to be even larger as innovation is probably the single most important source of benefit competition generates, the loss of innovation compounds over time.

Focusing first on productive efficiency losses, setting termination rates above efficient costs:

- distorts competition, allowing inefficient entrants to successfully compete with efficient firms, including by providing incentives to inefficiently bypass efficient supply (as Peitz, 2005a, page 354, admits);¹⁸
- leads to inefficient cream-skimming (again, as recognized, but not modeled, by Peitz at page 354), notably competition among entrants for customers who tend to receive more calls than they make (since such customers are highly profitable when termination charges exceed costs); and
- creates inefficient entrants who are dependent on the regulator. Such entrants are likely to become long-term advocates of the regulation, despite the intention that the competition fostered by the regulation would replace the regulation (this is discussed in more detail in section 3.3.3 below).

Further, even accepting Peitz's suggestion that asymmetric termination charges may be a valuable short-term policy tool for inducing efficient entry (which, as just noted, is unlikely), Peitz's model is arguably irrelevant in countries where there are many, and especially well-established and large, entrants (see section 3.1 below). However, even if the regulator desires

¹⁸ Arguably, the Italian Fastweb provides an example. In 2007, Fastweb sought asymmetric termination charges in part because it claimed its costs exceeded those the Italian regulator found to be efficient. Despite this, it is our view that Fastweb is one of the more efficient networks in Italy, and overstated its unit costs by using an artificially small base.

more or larger entrants, to the extent that entrants lack market power, asymmetric rates need not subsidize entry, except to in the sense that it leads to, often perversely, lower call prices. This is because firms without market power must pass any gains from asymmetric rates onto their subscribers, so make no gains themselves. In comparison, in Peitz's model, asymmetric termination charges provide the smaller network with a source of funds that can be spent on network development because Peitz *assumes* the smaller network has market power.

As a result, Peitz's model cannot properly be claimed to support the use of high and asymmetric termination charges as a way of promoting facilities-based entry, for it does no such thing, and indeed, is incapable of doing so. On the contrary, to achieve its results, it assumes duopolists with market power and no entry, but those results would not in general hold were further entry possible.

A policy of being open to setting high and asymmetric termination charges also encourages rent seeking, which will further erode or eliminate any funds that asymmetric charges might otherwise have made available to entrants. Rather, smaller networks will spend at least some of these funds in advance by competing to obtain subsidies in the regulatory arena. At the same time, larger networks will spend money seeking to prevent the transfer of such rents (this is discussed in more detail in section 3.3.2 below).

It is also important to recognize that, in seeking asymmetric termination charges to raise their profits, smaller networks effectively raise the costs of larger networks, thereby harming competition. This has both allocative and, more importantly, dynamic efficiency costs. In the model, the larger network's retail calling prices rise with the effective marginal costs that it faces, which include the smaller network's termination charge. Thus the effect of high termination charges is to raise the larger network's costs, effectively weakening it as a competitor (though not necessarily forcing it to exit).¹⁹

¹⁹ The European Commission (EC, 2007a, page 9) notes this possibility in a slightly different context:

A specific and different type of barrier to the development of effective competition can also occur in the electronic communications sector where interconnection is required to enable a calling party to make a call to a specific subscriber number. In cases where a charge is levied for terminating the call, (which is passed on as a retail charge to the calling party), the terminating network operator can affect competition adversely by raising a rival's costs or by passing on inefficiencies to competitors.

2.4 Summarizing why asymmetric termination rates would likely result in serious consumer welfare and economic efficiency losses

In reality, it is unlikely that the claimed benefits of asymmetric termination rates can be achieved. The possibility that asymmetric charges can raise consumer welfare in the models of Peitz (2005a, 2005b) is critically dependent on (1) the capacity of existing firms to set retail prices that are above efficient levels (2) when all termination charges are set to short run marginal cost.

The first assumption is likely to have limited application in practice. Many larger networks operate in an environment where there are both regulatory and competitive constraints on their capacity to set retail prices above cost. Moreover, regulated access to the larger network's infrastructure often makes those competitive constraints sharp.

In many cases, the second assumption is also violated. Instead, termination rates are set well above short run marginal costs. For both reasons, it is possible that any asymmetric termination rate may hurt rather than benefit consumers, and in any case will harm economic efficiency.

Similarly, Peitz places great weight on the fact that the smaller network's profits are raised if its termination rate is allowed to exceed costs when the larger network's are not. For Peitz, such profits will attract and fund entry that may improve consumer welfare. However, such profits are only obtained to the extent that smaller networks have sufficient market power to claim economic rents. In many instances, especially when networks can enter using the assets of the larger network, this is not possible.

Further, even accepting Peitz's models at face value, regulators face a fundamental difficulty. Calibrated modeling based on Peitz's models is essentially impossible and thus it is impossible to determine the quantum of the above cost subsidy to smaller networks that will benefit, rather than harm, consumers.

Putting that aside, and assuming that asymmetric termination rates can be set to provide a short run benefit to consumers, setting asymmetric termination rates is still likely to have significant adverse consumer welfare and efficiency consequences.

Short run economic efficiency is reduced as the large network is underused and small network overused. These short run losses, however, are probably dwarfed by long run dynamic losses, and in the long run consumers are also likely to be harmed. Subsidies directly distort the investment decisions of all networks, encouraging inefficient entry and expansion by smaller

networks and discouraging investment by the larger network. Worse, the particular form of the subsidy, the asymmetric termination rates, reduces the capacity of the subsidizing firms to compete. At the long run equilibrium, market structure, pricing and ongoing investment are all inefficiently distorted.

Conventional short run efficiency losses may also be dwarfed by waste from rent seeking. This will be particularly encouraged since modeling cannot provide clear guidance as to what degree of asymmetry would provide short run consumer benefits, hence there are fertile grounds for contentious disputes (again see section 3.3.2 below).

Moreover, waste from inefficient market structure, pricing, investment and rent seeking will be ongoing. As will be discussed in section 3.3.3 below, subsidies are difficult to reverse as dependent networks have strong incentives to lobby and operate so as to ensure the subsidy's continued existence. Given the centrality of telecommunications to the success of a modern economy, such ongoing losses would have a great impact on national income and ultimately consumer wellbeing.

3 Asymmetric termination charges to fund entry

One of the reasons asymmetric termination charges are said to be valuable is that they may help fund expansion by a smaller network or new entry. This section considers the broad arguments for funding competitive entry and expansion in telecommunications. It makes three main points:

- The view that state intervention is needed to provide funding for new networks presumes that modern capital, including private equity, markets are unable to fund profitable opportunities, most particularly in telecommunications. However, the facts suggest otherwise. Where telecommunications markets have been opened, substantial entry and investment has typically occurred. As a result, new networks do not appear to face particular difficulties in raising capital (section 3.1).
- Further, even if efficient entrants face material capital constraints (and this seems unlikely), asymmetric termination rates are an inappropriate policy response to this difficulty (section 3.2).

- More generally, special support of infant firms (whether through asymmetrical termination charges or other means) is unlikely lead to efficient outcomes, but more frequently distorts competition, creates waste through regulatory rent seeking, and creates a costly dependency on regulation that is difficult to unwind (Section 3.3).

3.1 Modern capital markets in telecommunications appear to function effectively

If a single characteristic were to be chosen to describe development in most telecommunications markets over the past two and a half decades it would probably be extensive competitive entry. As a result, there is no reason to think that an entrant with a solid business plan would be unable to gain the funding required to make that plan work.

This is not to trivialize the difficulties of entering an industry like telecommunications, which requires, among other things, great technical and marketing skills, and the ability to plan for the long term, in a particularly dynamic market. Yet modern capital markets are global, deep, and sophisticated, with substantial experience in funding new or developing telecommunications firms. Moreover, the continued growth of private equity has further increased the pool of funds available to telecommunications firms, with several specialist firms concentrating on the sector. At the same time, entrants have become increasingly sophisticated, learning from each other and supporting each other across national borders (as witnessed by the European Competitive Carrier Association—see <http://www.ectaportal.com/en/>).

The consequences of this are readily apparent. Competitive entry in telecommunications is common in most developed countries, and even in many developing countries (though more often focused on mobile than fixed line entry). In all those places, capital markets have brought together a wide range of investors and start-up carriers, thereby bringing the capital necessary to fund entry and market expansion, and further developing telecommunications expertise among investors and their intermediaries. It is improbable that entrants (especially in the highly sophisticated markets of Europe), having already relied with much success on global capital markets, need subsidies in the form of above-cost termination charges to allow further, but still efficient, expansion.

Italy is a case in point. In 1998, the Italian market was opened to competition, and despite symmetric termination charging, much market entry occurred. In 2007, Italy introduced the

highest asymmetric termination rates in the EU even though Telecom Italy (TI) faced fixed line competition from companies like Fastweb, Wind, Tiscali, Tele2, BT Italia, and Colt. These are international firms with strong capital and technological underpinnings, and it is implausible to suggest that any of these firms face material barriers to raising capital or expertise.

For example, in 2000, Fastweb's IPO was, at that point, the largest for a non-state owned company in Italy.²⁰ In 2003, Fastweb became a blue chip company on the Milano exchange. In 2005, Fastweb (2006) raised €800 million, and in 2007, was subject to a majority takeover by Swisscom, the Switzerland incumbent carrier, for €4.2 billion (Fastweb, 2007). Taking into account all these circumstances it is inappropriate that TI's shareholders should be forced to subsidize such a carrier, as they will be until 2010 (EC, 2008)²¹, and completely implausible that such subsidies are likely to benefit the Italian consumer or economy.

Similar can be said of the other companies listed here. Wind is TI's strongest competitor in the fixed voice market. It has access to international capital and expertise, being owned, through Weather, by the family of the Egyptian businessman, Naguib Sawiris, which also has a controlling stake in Orascom, one of the largest mobile telephony operators in Africa, the Middle East and Asia. Tiscali has operations in the UK. Tele2 is owned by Vodafone (2007). BT Italia is owned by British Telecom. Colt (2006) is a business-focused pan-European operator serving large and medium size businesses that prides itself on reaching more European business centers than any other operator.

In the same vein, it seems unlikely that established or new entrants in such countries as Austria, Belgium, France, Germany and the Netherlands face inefficient capital market constraints. Indeed, (usually mobile) entrants may not face, relative to incumbents, inefficient capital market constraints even in many developing countries. Rather, such firms typically are large experienced multinationals, often with incumbency in other locations. For example, Weather has already been mentioned. Similarly, MTN operates in over twenty countries, mostly in Africa,²²

²⁰ BusinessWeek, Swisscom Gobbles Up Fastweb, 12 March 2007.

²¹ See also http://www.telecomsitaly.com/2008/05/asymmetric_termination_rate_fo.html, sighted 6 September 2008.

²² <http://www.mtn.co.za/AboutMTN/Pages/MTNGroup.aspx>, sighted 6 September 2008.

while Digicel operates throughout the Caribbean, as well as in Central America and on several Pacific islands.²³

3.2 *Asymmetric termination charges: an inappropriate response*

This subsection makes three points:

- It is a basic rule that regulation should not proceed unless there is an identified market failure and a material likelihood that the costs of the regulation will be substantively outweighed by its benefits (subsection 3.2.1).
- But even if regulation is called for, the best regulatory policy should be implemented (subsection 3.2.2).
- Finally, direct costs of any proposed regulation should be funded in a manner that is both equitable and likely to minimize efficiency losses (subsection 3.2.3).

Asymmetric termination charges fail on each of these three counts.

3.2.1 **Cost-benefit test**

Symmetric termination charges are proposed for two reasons: because they *may*, at least short run, benefit consumers and because they facilitate presumably efficient competition by funding entry and/or smaller networks. Starting with the consumer benefit rationale, section 2.3 demonstrated that, even though it is certain that society as a whole will be worse off, there is only the possibility (and no more than that) that asymmetric termination charges will benefit consumers (and they could harm them). To this must be added the direct and unintended costs of regulation, which can be expected to be high. Thus, the consumer benefit rationale *a priori* fails. It matches a weak and reversible claim of benefit against the surety of efficiency losses (as predicted by the models plus the unmodeled, but inevitable, costs of regulation).

²³ http://www.digicelgroup.com/group/about_digicel.php, http://www.digicelgroup.com/group/digicel_pacific.php, sighted 6 September 2008.

Section 2.3 also showed that modeling, at least within Peitz's framework, is unlikely to be able quantify consumers' gains from asymmetric termination charges, assuming there are some. As a result, no strong expectation can be established that the benefits of asymmetric termination charges are likely to justify its costs. That is, it is unlikely more careful analysis could reverse that *a priori* failure.

The second basic rationalization of asymmetric termination charges is to transfer funds to entrants to "jump start" competition. However, as shown in section 3.1, there is no *a priori* reason to believe there is a market failure in the supply of funds. On the contrary, capital markets appear to be working well if international experience of telecommunications entry is any guide.

Thus asymmetric termination charges fail a cost benefit test.

3.2.2 There are better options to imposing asymmetric termination charges

Even accepting that asymmetric termination charges meet a cost benefit test, they are still inappropriate if they have not been demonstrated to be the best available policy. No regulatory policy should be undertaken if alternative programs would be much less distorting. Ideally, policies aimed directly at the market failure are called for (Bhagwati and Ramaswami, 1963). In this case, the cause of the capital market failure should be identified and directly addressed, and if that is impossible, then direct telecommunications financing subsidies designed to offset the identified market failure should be examined.

If, for whatever reasons, directly addressing the problem is ruled out, then there are other alternatives that are likely to be superior to asymmetric termination charges. For example, loosening retail regulation on the large network might make entry more profitable and hence achieve the regulatory objective at lower cost. Assuming current retail price controls are efficient (and entry difficulties could indicate they are too low), such a loosening would lead to short run distortions in retail prices, but would not distort competition (which would eventually correct retail prices). As a consequence, such a policy would impose a lower efficiency cost than asymmetric termination charges, though it would likely increase prices and hence result in a short run losses to consumers. In comparison, asymmetric termination charges distort two instruments (prices and competitiveness).

3.2.3 Funding regulation

Finally, if special support of entrants is called for, for both reasons of equity and economic efficiency, then the larger network's shareholders should not be the funders of the industry policy. However, this is what asymmetric rates do. If the asymmetric charges redistribute revenues toward smaller networks while also benefiting consumers (as claimed), then the incumbent's shareholders pay for the whole subsidy plus the loss in overall economic efficiency of the policy.^{24, 25}

To place the entire burden of the subsidy on the incumbent's shareholders seems inequitable, and indeed may be a taking. The inequity is all the more aggravated as the taxed firm is being forced to redistribute income to a rival.

Putting equity aside, taxing a single firm to provide entrants with funding is likely to be highly distorting compared with a more broadly based tax.

3.3 *Protection of infant firms is misguided*

The preceding argued, in part, against the specific policy of asymmetric termination charges as a means of helping new entrants. More generally, economists view policies that are designed to protect fledging firms and new entrants (sometimes couched in terms of sheltering an infant industry) with deep mistrust. Baldwin, 1969, provides the classical statement in terms of industry policy, and this concern also applies to protecting telecommunications entrants:

²⁴ In Peitz's models, sufficiently small asymmetric termination charges increase consumer welfare and the entrant's profits, but reduce overall welfare. This implies, the incumbent's profits are reduced by the sum of (1) the gain in consumer welfare, (2) the gain in the entrant's profits, and (3) the loss of total welfare due to the move to asymmetric termination charges. This redistribution could impose losses on the incumbent, depending on the initial extent of the incumbent's profits.

²⁵ Alternatively, if consumers bear some of the costs of the subsidy, then they are no longer made better off by asymmetric rates, and the policy is without merit. In that circumstance, economic efficiency and consumer wellbeing and the incumbent's profits fall, but the entrant's surplus rises.

Economists (this one included) have been seemingly universal in their condemnation of asymmetric regulation. (Weisman, 1994, page 500)

Deliberate attempts to tilt the marketplace, even temporarily, in favor of entrants have been controversial, to say the least. (Tye, 2002, pages 37-38)

Economists have concerns about protecting entrants for several reasons:

- Protection rarely leads to efficient competition, but instead creates distortions that harm consumers and economic efficiency. This is most especially so in telecommunications:
 - because the telecommunications industry is exceptionally dynamic, distortions reverberate well into the future; and
 - because telecommunications services are fundamental to the broader economy, distortions impact on every aspect of national production and consumption.
- A regulatory process that legitimizes asymmetric regulation promotes wasteful rent seeking (the long running termination disputes in Italy provide a good example).
- Protection creates a dependency on regulation that is self-perpetuating, making it difficult to ever remove the distorting preference and entrenching the efficiency losses just outlined.

In what follows, these three compounding sources of efficiency losses are explained in more detail. Subsection 3.3.1 considers the standard losses in allocative, productive and dynamic efficiency due to distortions of relative prices. Subsection 3.3.2 covers rent seeking losses that would not be incurred except for the legitimization of asymmetric regulation; while subsection 3.3.3 shows that the proposed regulatory approach is likely to become entrenched, perpetuating both these sources of efficiency loss over time.

3.3.1 Conventional losses of allocative, productive and dynamic efficiency

Asymmetric termination charges distort competition, weakening both the incentives of the incumbent and entrants. The incumbent's capacity to press price toward actual costs becomes increasingly limited as the termination charges it faces are raised above costs. More generally,

the incumbent's incentives to compete aggressively are weakened because it expects effective competition on its part may engender further policies aimed at penalizing it and favoring entrants. Entrants also have disincentives to aggressively compete since the regulatory bias they enjoy may be removed if they are successful. Together, these effects reduce and postpone competition for as long as the protective policies are expected to be in effect and can permanently reduce competition instead of encouraging it. At the very least, they can be expected to offset whatever competition-enhancing effects the asymmetric regulation has or is intended to have.

Asymmetric termination charges also distort relative prices, leading to inefficient investment, production and consumption decisions. Worse, because of the highly dynamic nature of the telecommunications industry, such harms have significant long-term consequences. Since telecommunications is a fundamental input to virtually every productive process in a modern economy, these efficiency losses will be substantial.

In contrast, competitively neutral policies do not distort competition or prices. The resulting competition and innovation generates immediate and ongoing benefits and these would be likely to exceed (in present value terms) the sum of present efficiency losses and any claimed future (and hence discounted) benefits of asymmetric regulation.

As a result, the economic literature provides few examples of positive outcomes attributed to infant industry policy, while those that exist are often controversial.²⁶

3.3.2 Losses due to rent seeking

Extranormal profits are a form of economic rent – that is, a payment in excess of that required to induce supply. Rent seeking occurs when economic actors spend resources to claim such rents. Such expenditure reduces existing wealth, but creates no new wealth, so is a pure waste (the seminal paper is Tullock, 1967). The waste associated with rent seeking is a separate source of economic waste to the efficiency losses just outlined. Further, rent seeking can waste at least as many resources as the available rents (since firms will compete with each other to claim the

²⁶ See, for example, Irwin (1996), and also de Long (2007) on the US tinplate industry, http://www.j-bradford-delong.net/Comments/Irwin_Tinplate.html, sighted 28 September 2007.

rents, and in that competition each will be willing to expend resources equal to the available rents weighted by the probability that they will win those rents).²⁷

Regulation can greatly influence the extent of rent seeking. On one hand, a regulator that consistently focuses on promoting economic efficiency and refuses to engage in direct redistribution of income between firms, for example, by taking a competitively neutral stance, signals that rent seeking will not be rewarded. This discourages wasteful competition among firms for regulatory favors. On the other hand, if the regulator creates rents for some firms, or seeks to alter the market's distribution of revenues, then firms will be encouraged to waste resources to try to convince the regulator to make rule changes to their benefit. Moreover, the harmful effects of such rent seeking go far beyond a specific program, because firms know that if the regulator has shown itself willing to create or transfer rents in one circumstance, then it may well be willing to do so, with sufficient persuasion, in another.

Agreeing to allow asymmetric termination charges provides an entrant with the opportunity to obtain revenues from the incumbent, and does so with no obvious limitation. For example, as noted, Peitz's work provides no means for identifying what level of asymmetric charges are likely to be optimal. As a result, entrants are encouraged to spend resources to convince the regulator that they should be the beneficiary of as much largess as can be obtained. Equally, an incumbent, in response to entrants' claims, will have little choice but to spend resources to avoid incurring higher than efficient costs and subsidizing its rivals. However, such competition for regulatory influence is (at best) a zero sum game. It is a fight about how available resources should be distributed, and creates no new value for the community.

In addition, once the broader prospect of influencing a regulator willing to engage in redistribution is taken into account, there is potential for waste on a very substantial scale. Firms have good incentives to go to the regulator, not merely for asymmetric rates, but with any plausible story that would lead to redistribution of market revenues in their favor.

In summary, any money spent on fighting over the extent of asymmetric charges is wasteful, but such waste is exactly what allowing asymmetric charges encourages.

²⁷ Rent seeking wastes at least all the available rents if competition for those rents is fully effective. Rent seeking can waste substantially more than the available rents if, as is common, resources spent to gain the rents are sunk, and there are sequential rounds of competition (for example, repeated opportunities for regulatory hearings to win a fixed prize).

3.3.3 Losses due to the inefficient perpetuation of regulation

A final difficulty with asymmetric regulation is that it can ossify inefficient market structures. This occurs in two ways. First, regulation intended to support entrants may take forms that support specific business models. For example, asymmetric termination encourages an approach that relies on terminating voice telephone calls. This, however, may prevent more efficient means of providing services from emerging (as the relative returns on them are lowered). Such distortions are likely to be particularly harmful in a market as dynamic as telecommunications.

Second, asymmetric regulation gives rise to a moral hazard: entrants will tend to develop an unnatural dependence on the regulatory process for survival.²⁸ By putting incumbents at a competitive disadvantage, emerging firms face reduced competitive pressure that effectively protects inefficient and weak players (the explicit aim of asymmetric termination charges). However, many such firms may never graduate to being efficient competitors, capable of standing up without regulatory support. Rather, they may only survive by reason of the asymmetric regulation. Indeed, there is evidence that infant industry policies in the context of international trade tend to result in sheltered firms that come to depend on regulatory assistance rather than outgrow it (Irwin, 1996; Bhagwati, 2005, page 27). Thus, efficiency gains that regulatory policy was supposed to deliver are in fact not obtained. Instead the inefficient regulatory regime becomes increasingly difficult to dismantle as an often increasingly large group of firms, their employees and suppliers, have strong reasons to lobby its maintenance.

This is true in telecommunications (Farrell, 1997), just as it is so more generally. US long distance termination rates provide an example that is close to asymmetric rates. The US rates were originally set to cross-subsidize access, with particularly large subsidies being directed toward rural carriers, whose business models continue to rely on this revenue source. It took the US Federal Communications Commission (FCC) many years to bring non-rural rates into line

²⁸ This is common argument from the regulatory literature. For an example in the context of telecommunications, see (Weisman, 2006, pp. 15-17). That being said, such incentives weaken as the number of entrants rise, because entrants wish to free ride on the lobbying of other entrants, and because some entrants may believe they that they could displace inefficient entrants if entrant protection was unwound.

with costs, and since that point, the FCC has spent more than a decade, thus far unsuccessfully, trying to press rural long distance termination rates down to costs.

3.4 Asymmetric termination charges to fund entrants: A case not made

In summary, regulation should be imposed only when a strong and positive case has been made in its favor. However, the case against asymmetric termination rates is much stronger than this presumption. It is not merely that no substantive case has been made for any deliberate policy to distort competition in favor of entrants (much less of a particular entrant), but rather that there is a strong case that such policies will harm consumers, competition, efficient investment and the economy at large.

4 Alternative regulatory means of encouraging competitive entry and expansion

The preceding two sections respectively argued that:

- setting termination rates asymmetrically above efficient costs would likely harm rather than benefit consumers, even in the short run, and would harm economic efficiency in both the short and long run; and
- more generally subsidizing entrants was also likely to be harmful.

Despite this, a case can be made that established networks with substantial market power²⁹ may be unwilling to interconnect with smaller or entering networks. This section makes two points:

²⁹ We distinguish a firm with substantial market power, which is can expect to earn extranormal rents over the long term, from a firm with technical market power. Technically, a firm has market power if it is not a price taker, that is, if it is able to trade off a higher price against lower volumes, rather than lose a substantial proportion of its customer base. Such market power is common in most markets, for example, because firms differentiate their products. Markets may be effectively competitive even when all firms have (technical) market power. In that case, no firm expect to earn long run extranormal rents.

- First, economic literature and successful regulatory policy support the view that networks should be required, as a default position, to negotiate reciprocal (symmetric) termination rates. Such a light handed approach is likely to lead to relatively efficient interconnection agreements that are competitively neutral, while minimizing the need for networks to seek regulatory intervention.
- Second, asymmetric termination charges should only apply if a particular network has higher termination costs than other networks for reasons that are outside its control (for example, it may be efficient and operate in a high cost area) and serve objectives of public policy (for example, it may be required to operate in a high cost area that would not be efficiently served). The default, however, should be symmetry in rates, with an option being available for a network to demonstrate that the economic, that is, efficient, cost of termination on its network is higher than implied by a reciprocal charge. Allowing charges to reflect efficient costs, when these vary from network to network, will benefit users and competition, promoting efficient investment and overall economic efficiency.

4.1 Reciprocal termination rates

Incumbent networks with substantial market power may be able to profitably refuse to interconnect their networks with smaller or entering networks. For this reason, interconnection between telephone networks is almost universally required. Section 2.1 above explained that interconnecting networks, especially smaller ones, have strong incentives to set termination charges at, or above, the levels a network-specific termination monopolist would set. However, the economic literature shows that this incentive is substantially attenuated when firms must agree on reciprocal charges. In particular, where interconnecting networks can be expected to have balanced traffic,³⁰ and have similar efficient costs, a reciprocity requirement would likely be

³⁰ Traffic is balanced when the traffic that originates on one network and terminates on another is equal to traffic that flows in the opposite direction. Balanced traffic can readily arise, and is indeed typically observed, even when networks have very different sizes (for example, inter-network mobile-to-mobile traffic is often balanced). This is possible because while the calls that originate from the larger network are proportionate to its size, only a small fraction of those calls terminate on the smaller network, and similarly while a relatively small number of calls originate on the small network, a substantial number of these terminate on the large network. All that is

sufficient to ensure reasonably efficient (if not necessarily fully optimal) interconnection rates (Houpis and Valletti, 2005, 256-57).³¹ Indeed, even Peitz (2005a, 352) recommends this in the long term:

Access price regulation is not needed in the long term if, in its absence, operators negotiate a reciprocal access price...

Moreover, putting aside the costs of regulation, when one network is forced to set termination charges to reflect costs, then a reciprocal charging rule has strong tendencies toward producing efficient outcomes.

4.2 *Asymmetrical costs*

Of course, reciprocal termination charges may not be ideal if the efficient costs of terminating calls varied from network to network. For example, it is likely that termination on a mobile network is somewhat more costly than termination on a fixed network. It may also be the case that termination on a rural network may be more costly than on an urban network. Given this, an effective regulatory rule is to allow non-reciprocal agreements where a network demonstrates it has higher, but still efficient, costs of termination. Thus, any agreement between two networks would by default require reciprocal termination charges. However, if a network could convincingly demonstrate that it efficiently incurs higher costs to terminate calls than those identified by the regulator, then it could be allowed to charge those costs.

Such an approach, which has been implemented to great effect by the FCC, has the additional advantage of having a rather light regulatory hand. In the US, fixed line termination charges are set to approximate average long run incremental costs,³² and networks interconnecting with

required is that the calling demand be approximately isotropic. Thus, for example, if the average propensity of any customer on any network to call any other customer is the same for all networks, then traffic flows between any two networks are balanced.

³¹ In a duopoly, requiring reciprocal termination charges can lead to prices set below marginal costs, which is also inefficient (Laffont, Rey and Tirole, 1998b; Wright, 1999; Gans and King, 2001).

³² There are some exceptions to this, notably for termination on rural networks, which have lead to many egregious examples of highly distorting regulatory gaming (see Searcey, 2007, for a recent case).

fixed line networks must, as a matter of default, set reciprocal charges. While networks can seek asymmetric charges by demonstrating they face higher costs, it is interesting that even the mobile networks have chosen not to do so.

If asymmetric cost-based rates are to be allowed, then costly regulatory disputes can be avoided if the regulator provides guidance as to the range of efficient costs. It is our view that in virtually all cases efficient costs between different fixed line networks are unlikely to differ by a material amount. Further, if a regulator were to allow smaller networks more leniency in estimating costs (following Peitz, 2005a, page 354), and this would not be competitive neutral and so we would counsel against such an approach, then it is even more critical that allowed variations be subject to regulatory boundaries.

Finally, efficient pricing requires that networks be allowed to reflect the costs they face, on a network-by-network basis, in their retail prices. Thus, on- and off-net calls should be allowed to be priced so as to reflect the underlying termination charges (implicit, in the case of on-net calls) of each call. Such *cost-based* price variation is not a form of price discrimination, but rather is a standard characteristic of any effectively competitive market, and cannot have anticompetitive effects. Instead, such prices would merely be cost-reflective.

5 Minimizing efficiency losses if asymmetric rates must be set

If, despite the preceding, asymmetric termination charges in excess of efficient costs are to be set, then a very cautious approach is called for. In particular:

- The regulator must enunciate clear limiting principles designed to minimize the scope of regulatory dispute, especially given the risk that asymmetric charges will harm consumers, competition, efficient investment and the economy overall. For example, any mark-up above cost could be based on regulatory estimates of a regulated incumbent's costs (which gives the regulatory policy baseline consistency), or matched to international benchmarks.
- Any mark-up over efficient costs must be proportional to the demonstrated need for that mark-up. This requires consideration of the degree to which capital markets fail to provide entrants with efficient levels of funding. For example, there would be no need for above cost rates if entrants have adequate access to capital markets. However, in the

unlikely event that there are capital market inefficiencies which would leave entrants with less capital than would be optimal (and yet for some reason do not impede investment by the incumbent³³), then the mark-up above costs should not exceed the level necessary to generate efficient funding (and, nor should the mark-up exceed levels that will generate excessive efficiency costs, even if at those levels efficient funding is not achieved).

- Setting termination charges in excess of efficient costs will only harm users, competition, and efficient investment if maintained over the long term. Consequently, the regulator must also provide firm sunset clauses for allowing such asymmetric charges. Moreover, any triggers for ending asymmetric charges must be beyond the influence of the regulated parties, so they do not distort networks' incentives.

These measures will help reduce the efficiency costs of asymmetric charges.

In what remains of this section, this last point is developed in more detail.

5.1 The time period for allowing above cost pricing and triggers

Even proponents of above cost termination rates or other favorable treatment of entrants usually recognize that such measures should be temporary (see, for example, Peitz, 2005a, page 354). Thus, entrants should only be allowed to set above cost prices for a clearly defined and short period of time that is not open to manipulation by any of the relevant parties. That raises two questions: how long should above cost asymmetric rates be allowed, and what, if any triggers, should be set which lead to the end of such rates.

While a definitive answer cannot be given to the first question, for an industry as dynamic as telecommunications, the relevant period should be quite short—that is, closer to one to three years, rather than five to ten, from the point the market is opened to competition. Moreover, a

³³ For instance, it is not impossible that capital markets would require a substantial risk premium to invest in some developing country markets. However, that risk premium would apply to the incumbent as well, and indeed, if the incumbent is less geographically diversified than the entrant, may be greater for the incumbent. As a result, such a risk premium would not justify asymmetric termination charges.

glide path could be established so as ensure an easy transition to competitively neutral treatment.

It is also our opinion that any asymmetric treatment of entrants that is not based on efficient costs should terminate after a preset time limit, rather than be subject to triggers. Otherwise perverse incentives are created if the ability to set above cost charges is linked to matters that interested parties can influence. For example, an entrant has the ability to determine its absolute size and market share, and can even influence the market share of incumbents. Thus an entrant's incentives to compete change as a market share or size trigger is approached: so long as the entrant stays sufficiently small, it continues to earn profits on termination charges, but if its share just exceeds the trigger, then it loses a substantial margin on every call it receives. The impact of crossing such thresholds would distort entrants' behaviors.

This also applies to price reductions in a glide path, that is, termination rate falls should occur when preannounced exogenous events occur, such as the passage of a pre set period of time, rather than being subject to triggers networks can influence.

If more complex exogenous triggers are to be set, for example, based on parameters such as market share, then they have to be expressed in ways that interested parties cannot influence. For example, if a preset market size is to be the trigger, then a forecast can be made as what is a reasonable period that would allow the entrant to achieve that market size, and that timeframe would used as the trigger (and not the market share itself). In that circumstance, an entrant has no incentives to under-perform, since that will not change the date at which it loses the ability to charge above costs. Indeed, the entrant will have strong incentives to grow a quickly as possible to maximize the rents it can claim through above cost prices, before the cut-off date is reached.

Additionally, it is important that the exogenous triggers are meaningful. For example, it would be inappropriate to use an incumbent's market share for a trigger as this, in general, has no bearing on the extent to which a particular entrant faces inefficient barriers in accessing capital markets. Moreover, even if an entrant's market share was thought to be related to its (efficient) capacity to raise funds (and it will be explained in a moment that this is unlikely), an incumbent's market share is a poor proxy for an entrant's market share. For example, an incumbent's market share may stay constant or even rise, while an entrant's market share rises, because the entrant's gains were at the expense of other entrants, rather than the incumbent. Similarly, it is also not obvious that an entrant's market share can indicate its ability to access capital markets. For example, a more important variable may simply be the entrant's absolute size (though this too is

problematic), and an entrant may be growing, while its market share is shrinking, because the market is also growing. That being said, an entrant's market share is also unlikely to be related in any simple way to capital market inefficiencies. Instead, relevant triggers would most likely directly consider the entrant's capacity to efficiently raise funds in capital markets, and would only consider variables such as the entrant's absolute size, or market share to the extent that these could clearly be related to that capacity.

In choosing among these options, it is important to take account of measurement costs. Particularly in modern telecommunications markets, entrants operate in many markets (including telephony, broadband and a range of other telecommunications services). As a result, the definition and measurement of "market share" is inherently ambiguous. Equally, there is no widely used method for measuring the extent of capital rationing (that is, the extent of the gap between the capital resources available to a firm and those that would be available to it in a perfectly efficient capital market). As a result, it may be preferable to simply use a duration criterion, that is, a fixed period of time.

In addition, if asymmetric termination charges are to be allowed, then all other networks should be allowed to set cost-reflective retail prices. Such prices are not discriminatory and do not allow incumbents to harm competition, but rather are consistent with competitive markets, and would both benefit consumers and economic efficiency.

6 Conclusion

There is little to be said for asymmetric termination charges. The theory that suggests they may benefit consumers also shows they harm economic efficiency, and cannot quantify the consumer gain. Moreover, the models used cannot be said to characterize reality. The result is that, even before thinking of the inevitable costs of regulation, asymmetric termination charges are more likely to do harm than good. As a result, they fail the basic test that any regulatory policy should pass to justify implementation. Not surprisingly, this view is reinforced when the likely regulatory costs of asymmetric termination charges are considered. Further, even if regulation is called for, or forced by political considerations, a range of alternative policies are likely to be less distorting.

If, however, asymmetric termination charges must be implemented, the regulator should place careful bounds on these, both in terms of allowed price ranges and duration.

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