

ACCESS AND INTERCONNECTION IN NETWORK INDUSTRIES

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“The most important innovation (in recent regulatory policy)”, notes Sir Christopher Foster, an eminent British expert in the field, “has been the realisation that there is no compelling reason why a monopolist should have the exclusive right to use its distribution network”¹. Removing this exclusive right -- thereby allowing a range of firms to compete in delivering services over that distribution network -- is, however, no easy matter. Rather, it has become one of the central, but also most complex and controversial, tasks of regulatory authorities.

The essence of this task is the creation of rights of access by third parties to some part of the incumbent operator’s facilities. This paper examines the issues which arise in the definition and implementation of these rights. The main arguments can be readily summarised:

- (1) Asymmetries of power and of interest ensure that issues of third party access to “Essential Facilities” will be a source of continuing conflict between the incumbent owners of these facilities and potential downstream competitors; leaving these issues to private negotiation may entail substantial welfare costs.
- (2) There are no simple but economically compelling rules which can be used to guide the resolution of these issues; rather, the appropriate outcomes -- in terms of the scope of access and the conditions on which it is granted -- vary from case to case, and hence must be determined on a basis which allows for the exercise of discretion.
- (3) Given the risks which creating an obligation to supply entails, it is important that this discretion be shielded from rent-seeking and the abuse of political influence; this tells against vesting it in Ministerial decision-making or in industry-specific regulatory bodies.

The paper is structured in three parts. The first part reviews the context in which competitive access issues arise. The second analyses the possibility of developing clear rules for handling these issues. The third part examines the design of institutional mechanisms for resolving access disputes.

I Creating markets for access : the obstacles

Public utilities have generally operated on a highly vertically integrated basis. Services have typically been sold solely to final consumers, with intermediaries playing little or no role in the supply chain. The refusal to sell to intermediaries has excluded or in other ways inhibited competitors from even those parts of these industries which are not inherently natural monopolies: for example, long distance service in telecommunications, or generation in the electricity industry. Creating “wholesale” markets at key steps in the supply chain would allow competition to develop in individual parts of the service, even though other parts might retain their monopoly character. Whether this happens will depend on the willingness of the incumbent firm (the former monopolist) to sell services at

these wholesale layers, and -- absent this willingness -- on the ability of the regulatory authorities to intervene so as to induce the incumbent to do so.

Requirements

Creating a functioning wholesale market generally involves two key elements: the definition and allocation of property rights, which may be translatable into tradeable entitlements; and in the event that they are tradeable, the setting of rules under which trading may occur.

In conventional markets, property rights are defined and traded through implicit and explicit contracts. This process is driven by the self-interest of the parties involved, which derive mutual benefit from re-allocating entitlements to those who place the greatest value upon them. Subject to the normal, economy-wide constraints of the law of contract and of competition law, the voluntary actions of the parties can usually be relied upon to shape an efficient vertical structure of transactions -- that is to create wholesale markets, and the resulting room for intermediaries to operate, where these are likely to contribute to efficiency.

In the public utilities, however, it may be inappropriate to rely on the voluntary action of the parties to identify and exploit opportunities for the efficient “unbundling” of services. In effect, unbundling involves agreements between a former monopolist on the one hand, and actual or potential competitors on the other, for the use by those competitors of the former monopolists’ facilities and/or services. The former monopolist, it can be argued, is likely to have little experience of these agreements and even less incentive to enter into them.

Complexities:

(i) Lack of experience

The lack of experience reflects these industries’ traditional mode of operation:

- (a) Because wholesale markets have not existed, the relevant property rights may be poorly defined². This is especially important because it can give rise to negative externalities -- for example, when the overflow demand from one firm using a shared transmission system creates uncompensated congestion for other users. While properly specifying these rights is a complex task in any industry, it is likely to prove especially difficult in those industries where networks of interdependent users play a central role^{3, 3b}
- (b) The operation of these industries’ retail segments provides little guidance in defining contractual rights of use. Retail supply has usually occurred not through contracts but under tariffs -- that is, posted terms and conditions made available to all users with designated characteristics. These tariffs, which

reflect an obligation to meet all reasonable demands, are usually short-term (that is, they bear primarily on spot prices) and they limit (where they do not entirely negate) the suppliers' liability -- such limitations being to some extent inevitable if the supplier is not allowed to differentiate among customers on the basis of risk. The absence of contractual liability has made it less important for suppliers to precisely define the services being provided; and has limited the degree to which issues of property rights definition have been tested in the courts. There are consequently few precedents to draw on.

(ii) Lack of incentives to unbundle

While lack of experience might slow the emergence of a viable and robustly competitive wholesale market, it would hardly prevent it altogether -- **were this development in the interests of the former monopolist**. In practice, however, the former monopolist usually faces strong incentives to either entirely prevent, or at least substantially distort, the unbundling process. This is because competing entry downstream may (a) erode its monopoly rents -- all the more so when (b) prices poorly reflect costs. Even were some entry to occur, the former monopolist may (c) seek to distort its outcomes through collusion. Each of these is reviewed below.

(a) Effect on monopoly rents

First, downstream entry may reduce the monopoly rents available to the incumbent. This may seem self-evidently true but it is not; indeed, the denial of this proposition has been an important element in the "Chicago" approach to industrial organisation⁴.

Consider, for example, a vertically integrated firm controlling what in U.S. anti-trust law is referred to as an "essential facility". As is shown below, this term is difficult to define precisely. It is intended to describe facilities which (1) are or could be made available to some firms but not to others, (2) with the effect that the firms denied access to these facilities would be placed at so severe competitive disadvantage as to be effectively excluded from a market other than that for the services directly provided by that facility, thereby (3) causing substantial and socially undesirable harm to consumers⁵.

Assume (i) that the facility in question is indeed "essential" to competition in a downstream market; and (ii) that this downstream market is fully competitive (i.e. characterised by the absence of welfare-reducing impediments to entry). Now assume further that to produce the service sold downstream, the services derived from the facility need to be combined with other inputs in essentially fixed proportions -- an assumption which may seem strong but could be justified in the context of many natural monopolies, and notably of reticulation networks⁶. Under these circumstances, the owner of the essential facility, so long as it can price as it wants⁷, does not have an interest in refusing to deal with, and thereby excluding competitors from, the down-stream market. Rather, it can extract whatever monopoly rents are available in that market by raising the price of access to the facility to the profit-maximising point.

Three factors may alter this situation.

First, regulation may prevent the firm from charging for access on a basis which allows it to fully secure the rents which its control of those facilities would otherwise give rise to. If it can “recoup” some part of these foregone rents through its control of the downstream layer, it will have incentives to engage in an up-stream refusal to deal so as to prevent competitive entry downstream.

Second, even in the absence of regulation, structural conditions may differ from those hypothesised in the simple “Chicago School” model:

- (A) The multi-part access charges needed to fully recoup monopoly rents may not be sustainable in an unregulated market⁸ This is especially likely if some “by-pass” is possible -- that is, the up-stream facility is not a pure natural monopoly.
- (B) These problems are accentuated when (i) there is some scope for by-pass, (ii) the owner of the facility is vertically integrated and (iii) the downstream market is not perfectly competitive:
 - Assume by-pass is possible (although costly) upstream and that the downstream market comes close to being a “natural oligopoly” -- a market characterized by sufficient entry and exit barriers to drive it in the long term towards a structure of supply in which suppliers each face a downward sloping demand curve and engage in conscious strategic interaction.
 - Even with fixed proportions and full pricing freedom, it may then be in the interest of the essential facility’s owner to exclude rivals by refusing to deal with them.
 - This is primarily because vertical integration will (i) change the firm’s incentives to engage in price-cutting in the input market and (ii) increase its ability to prevent such price-cutting from occurring downstream as well.
 - The effect of vertical integration in this case will generally be to increase prices to consumers -- a result which may seem obvious to those engaged in business, but has proved extremely difficult to demonstrate analytically⁹

Most of the downstream markets associated with the reticulation networks of public utilities are indeed likely to be imperfectly competitive¹⁰, while there is some, however limited, scope for by-pass of the up-stream layer. As a result, even in the absence of other regulatory distortions, the firms in control of these networks may face incentives to refuse to deal with rivals in circumstances where it would be socially desirable for them to do so.

Third and last, even if it were in the incumbent's interests to allow competing entry (because its owners' losses from increased competition in the downstream market would be outweighed by gains from access revenues and enhanced internal efficiency¹¹), principal -- agent problems may still lead the firm's managers into a refusal to deal. Particularly in enterprises with a history of public ownership, managers may be output or employment maximisers, more interested in retaining market share than in increasing shareholder value. Being risk-averse, the incumbent's managers may weigh the certain loss of a "quiet life" far more heavily than the uncertain gains which they could secure from operating in a competitive environment¹². At the same time, the natural reluctance of managers to assist competitors may be aggravated by the perception that the entrants are seeking to "free ride" on the incumbent's historic investments. As a result, the firm's managers may stall or obstruct access by the entrant, even when such access would have been granted by the facility's owners.

(b) *Impact of price distortions*

Even assuming away the protection of monopoly rents, incentives to refuse to deal may arise from inherited price distortions. In almost all public utilities, retail prices bear little relation to the costs of providing service. Margins over attributable cost typically differ significantly both as between services and as between customer groups -- a situation often described as cross-subsidisation but which is best viewed as price discrimination¹³.

In considering the nature and effects of these pricing structures, it is useful to distinguish two sources of price discrimination

A first lies in goals of public policy, and notably of income distribution. For example, service is often provided to rural areas at charges which do not fully compensate for the higher costs of supplying these areas -- the classic case being the geographically uniform tariffs typically found in postal systems¹⁴. The higher costs incurred in these areas are then recovered from other areas, where margins are correspondingly high. There is a strong and familiar case against using public utility pricing in this way, especially as compared to relying on direct and targeted subsidies¹⁵. Nonetheless, the pricing distortions, while they persist, create room for inefficient entry, so long as entrants do not bear the same obligation to serve as does the incumbent. If inefficient entry is to be avoided, policy changes are needed to "level the playing field".

Second, price discrimination may arise from the pre-competitive, but commercial choices of the service provider:

- (i) Where the value of a networks depends on the number of its users (a situation often referred to as involving demand side scale economies), the service provider may seek to maximise usage by setting a relatively low access price to marginal consumers.

- (ii) Where users are uncertain of the quality or value of a service they may obtain (say, placing telephone calls), but to be in a position to secure this service must incur fixed (and largely sunk) access costs, it may be worthwhile for the service provider to reduce the risk they face by converting some part of the fixed access fee into a usage charge. As a result, access may be provided at a lower margin over attributable costs than is usage.
- (iii) In industries characterised by economies of scale or scope (arising, for example, from the sharing of common inputs or fixed overheads), prices equal to marginal cost will not yield sufficient revenues for the supplying firm to break-even. Assuming the firm is not subsidised, efficiently recovering total costs will generally require prices which secure greater margins (that is, contributions to the joint and common costs of supply) from some services and customers than from others.

Each of these motives for price discrimination is likely to enhance economic efficiency; but the resulting price structures may not be sustainable in a competitive environment. If entrants can “pick and choose” among services and/or customers, and the down-stream market is relatively competitive, it is likely that margins across services and customer groups will be equalised¹⁶. Where down-stream markets are oligopolistic, this tendency to equalisation may not occur, or occur only weakly¹⁷; but the pricing structures established in these markets may depart in important respects from those which would be chosen under monopoly supply.

As a result, the incumbent firm may well view the emergence of down-stream competition as threatening pricing structures which on purely commercial grounds it either wishes to preserve or sees little scope to vary. By refusing to deal, and preventing the development of a wholesale market, it could perpetuate its current pricing arrangements or at least control the pace at which they were modified.

(c) Scope for collusion

While the desire to continue earning monopoly rents and to preserve existing pricing structures may lead to refusals to deal, it may also lead the former monopolist to other outcomes. In particular, if the incumbent views the emergence of a wholesale market as largely unavoidable, it may seek to collude with entrants. When entry is only viable through shared use of facilities, the opportunities for **de facto** collusion are likely to be especially great:

- (i) The putative competitors in the downstream market will be engaged in the extensive sharing of information and will be exceptionally well placed to observe each other’s conduct.
- (ii) The sharing of key facilities will limit the scope for rivalrous product differentiation and tend to equalise competitors’ cost structures.

- (iii) The incumbent may structure access arrangements so as to provide for **de facto** profit-sharing. For example, access charges may be specified in contingent terms (with what are in effect market share thresholds triggering increased rates) so as to control entrants' sales or growth of sales.
- (iv) Regulatory requirements may facilitate or stabilise tacit coordination. For example, the former monopolist may be required to post its prices and not to provide discounts or rebates. While this may help prevent the abuse of market power, it may also exclude price chiselling -- which is likely to be the main form of competition in markets where products are relatively homogenous¹⁸. Other common restrictions on former monopolists which tend to reduce competition (even while preventing the incumbent from behaving anti-competitively include limitations quantity or cross-service discounts (bundling) from engaging in long term contracts.

The risk, consequently, is not solely that a former monopolist may refuse to deal, but also that should it deal, it may -- which the acquiescence of entrants -- set terms which are not in the public interest.

II Remedies: Rules versus standards

Overall, significant "market failure" may occur in the absence of public intervention. The incumbents may seek to preserve monopoly rents by refusing to deal or by setting access charges at levels which substantially hinder or prevent the development of a wholesale market and of workable downstream competition. At the same time, if retail prices are distorted and the incumbent's revenue losses cannot be fully recovered by its access charges, some entry may occur which merely reflects the price distortions and which hence is socially wasteful¹⁹. Minimising the scope for anti-competitive conduct, while ensuring that conflicts of interest are handled in a manner consistent with economic efficiency, is consequently a major challenge for public policy.

In practice, this task has two major component parts: (i) defining the facilities to which some form of access needs to be provided; and (ii) defining parameters for the terms and conditions on which that access may occur. Given their strongly distributional nature (the incumbent's losses appear as the entrants' gain), each of these decisions is likely to prove highly controversial; can clear but economically compelling rules be found which would help frame negotiations between the parties and expeditiously resolve the disputes which are likely to arise?

Experience and analysis suggests that "bright line" rules are of limited relevance to resolving access issues. Rather, the complexity of the fact situations involved, the need to determine trade-offs between possibly conflicting objectives, and the problems involved in implementation all push towards reliance on the administration of broad standards involving substantial discretion²⁰. Three factors are especially important.

The Uncertain Content and Use of “Essentiality”

(i) Dangers of over-inclusiveness

While there is a clear case for providing entrants with some relief from access refusals by incumbents, there are equally clear dangers involved in any doctrine which imposes an obligation to supply on firms with considerable market power²¹:

- (1) such an obligation may undermine the development of genuine competition. Entrants will have incentives to invoke the compulsory access provisions, rather than bearing the difficulties and risks entailed in organising to meet their own needs. Given the similarity in cost structures and in grade of service which is likely to arise when common facilities are used, consumers could be deprived of real diversity in the market-place.
- (2) Providing compulsory third party access will alter the incumbent’s incentives to expand and modernise its facilities. If competitors are guaranteed access to any under-utilised capacity, the former monopolist may well become reluctant to expand its facilities on a cost-minimising basis, preferring small, sub-optimal capacity increments to ones which are larger and ultimately more economic. A similar chilling impact on incentives will arise if the incumbent is required to share with downstream rivals unique know-how, intellectual property or the other fruits of investments in R&D.
- (3) the third party access arrangements can also reduce the incumbent’s incentive to compete vigorously with its new rivals. If the apparent retention of market power -- as measured say, by market share -- ensures that compulsory access arrangements remain in place, the incumbent may have an interest in providing rivals with artificial room to grow. By the same token, entrants may seek to continue to appear weak, merely for the sake of ensuring that the access requirements remain in place.

(ii) Difficulties in defining “limiting principles”

As a result, even putting aside the more “constitutional” concerns which might be triggered by the curtailment of property rights, it would seem desirable on competition grounds to narrowly define the scope of any “essential facilities” doctrine. However, the inherently judgemental nature of the processes involved in *defining the scope* of the facilities at issue, *diagnosing the extent of the power they confer* in any practical circumstance, and *assessing the consequences* which should flow from this diagnosis, limit the feasibility of unambiguously doing so.

- (1) To describe a facility as “essential” is merely to say that the control of that facility confers a high degree of market power. Indeed, one scholar of the subject argues that the distinction between “essentiality” on the one hand and “market power” on the other involves “labelling, not substance”²². Judgements of market power are

themselves not amenable to mechanical rules (as the diminishing respectability of market share criteria shows); nor has it proved possible to unambiguously define the threshold level of power which distinguishes the control granted by an “essential” facility from that accruing to other possessors of a substantial degree of pricing independence.²³.

- (2) The diagnosis of whether such a threshold, however defined, is met, is then particularly complex in industries subject to some degree of price and output regulation. Professor William Landes and Judge Richard Posner have put the problem well:

“In view of the growing importance of antitrust enforcement in regulated industries, we shall note briefly the significant limitations of (..) formal analysis when applied to a market in which rates are regulated by a government agency. To the extent that regulation is effective, its effect is to sever market power from market share (..). This is obviously so when the effect of regulation is to limit a monopolist’s price to the competitive price level. A subtle effect should also be noted, however, Regulation may increase a firm’s market share in circumstances where only the appearance and not the reality of market power is created thereby. For example, in many regulated industries firms are compelled to charge uniform prices in different product or geographical markets despite the different costs of serving the markets. As a result, price may be above marginal cost in some markets and below marginal costs in others. In the latter group of markets, the regulated firm is apt to have a 100 per cent market share. The reason is not that it has market power but that the market is so unattractive to sellers that the only firm that will serve it is one that is induced to remain in it by the opportunity to recoup its losses in its other markets (..). In these circumstances, a 100 per cent market share is a symptom of a lack, rather than the possession of market power.

Notice in this case that the causality between price and market share is reversed. Instead of a large market share leading to a high price, a low price leads to a large market share; and it would be improper to infer market power simply from observing the large market share.”²⁴

- (3) No lesser difficulties are likely to be encountered in assessing the reasonableness or otherwise of any refusal to deal by the owner of that facility and the related feasibility and desirability of allowing third party use to occur²⁵. The incumbent may, for example, point to the transactions costs which would need to be incurred so as to protect its quality of service from the effects of third party use; it may equally point to foregone economies of scope. The legitimacy of these business justifications needs to be examined, and set against any genuinely exclusionary effect.

As a result, substantial judgement, of the “rule of reason” variety, must be involved in determining whether the facility to which access is being sought is, in fact, essential, and, if so, whether an access right should be provided. Principles which need to be considered in

taking these decisions can be identified²⁶, but they are far from constituting “bright line” rules.

The setting of “efficient” access prices

The difficulties involved in defining efficient rules are at least as great in the area of access pricing. At issue here are the bounds to be imposed on the charges which an incumbent may set to third parties for the use of any “essential facilities” the incumbent controls.

It should not be taken for granted that private negotiations between an incumbent and potential users of its facilities will invariably fail. It may be that the strong tendency of negotiators to seek “to split the difference” and the scope to develop “win — win” solutions will lead to mutually acceptable outcomes (though there is a natural suspicion in these cases that the agreement reached does not provide for the greatest competition between the parties). Nonetheless, the likelihood must be that the great asymmetry in bargaining position and the disparity in the parties’ interests will preclude agreement through private negotiation and -- left unchecked -- lead to outcomes which are not in the interests of consumers. There may consequently be a role for access pricing rules, whose function would be to provide socially efficient “threat points” in the negotiation process.

In examining such rules²⁷, it is useful to consider a hypothetical situation in which there are no variable costs in the upstream (“monopolised”) market but solely joint and common costs which need to be recovered (these may be the costs of a “Community Service Obligation” or they may simply reflect economies of scale and scope to service provision); and ask whether the proposed rules, in addition to their performance in terms of the standard (and admittedly inadequate) metric of maximising the sum of consumer and producer surplus²⁸:

- allow competition to develop where it is efficient and to an extent which ensures that consumers reap the benefits which competition can provide;
- maintain the viability of the up-stream (“monopoly”) market and of any obligations which may bear on providers in that market; and
- do this in a manner which is practical, recognises that taxation and on-budget subsidies are problematic, and is mindful of the limited ability of policy-makers to comprehend and police markets.

Two broad sets of approaches have been developed in this respect. In the first, bounds on access charges are defined by reference to resource costs (broadly, costs of production). In the second -- most famously the Efficient Component (Baumol — Willig) Pricing Rule - - the incumbent is allowed some scope to influence these charges by its own pricing behaviour in the retail market.

(i) *Cost-based approaches*

Four approaches are representative of pricing rules based on resource costs:

- (1) Lump sum fees: A particularly simple way of ensuring that the joint and common costs of the network are recouped while at the same time allowing some degree of competition would be to levy a lump sum “entry tax” intended to cover the joint and common costs incurred upstream. This would have the strong advantage of not affecting the marginal choices of any entrant in the downstream market; it would also be consistent with some axiomatic cost-sharing rules which have desirable welfare properties²⁹.

Unfortunately, the simplicity of the approach is largely illusory. In practice, markets are shared, but rarely equally, and multiple entry can occur. Since new entrants can rarely claim more than a small fraction of the existing market, at least initially, such a fee would seem to exclude entry by all but those with the wealthiest backers. Even were this not undesirable, the possibility of multiple entry means that the “correct” charge will vary with the expected number of entrants, requiring estimation of the equilibrium number of firms - a task which exceeds the current limits not only of practice but even of economic theory.

- (2) Per Unit Charges: An alternative to lump sum charges is to set a fixed per unit access fee (units being defined in terms of the relevant measure of the flow of output), with the fee being calculated so as to exactly allow recovery of the upstream joint and common costs.

Unlike lump sum charges, per unit fees readily deal with unequally split market shares and multiple entrants. However, this approach may entail considerable welfare losses. In effect, the use of per unit fees to recover non-variable costs will almost inevitably distort downstream pricing and output decisions. Moreover, if the downstream market is imperfectly competitive, the per unit fee will lead to double marginalisation, so that a fee lower than that which actually recovers costs would be required to maximise social surplus. Finally, even were these welfare losses considered acceptable, implementing this approach requires knowledge of downstream market elasticities -- since the fee chosen must exactly cover the joint and common costs *after* firms set their prices and demand is realised. This difficulty is even greater in practice, since access will be provided to multiple interrelated downstream markets, requiring interdependent estimation of the relevant demand schedules.

- (3) Incremental costs: Here the access fee is set to recover any additional costs the upstream monopolist must incur as a result of serving the downstream entrants. So long as these costs are determined as an approximation to short-run marginal cost (so that they fluctuate with capacity utilisation), fees set on this basis will maximise consumer welfare if the downstream market is contestable^{30 31}. Additionally, since the incremental cost base will tend to be below those provided by other rules, this

rule will usually encourage entry, thus yielding any efficiencies which increases in the number of market participants may give rise to³².

However, the use of incremental costs has a number of important drawbacks:

- Since incremental costs are not readily related to the upstream deficit, setting access charges on this basis will not usually guarantee that the incumbent covers its costs.
 - Moreover, if the incumbent is forced to recover any upstream deficits through its pricing in downstream markets, the use of an incremental cost access fee can seriously distort outcomes when competition in the downstream market is imperfect.
 - Finally, this approach is informationally demanding, and may be vulnerable to strategic manipulation. Incremental costs, which should be forward looking, are notoriously difficult to estimate and can only rarely be derived from standard accounting systems. Further, where “access” involves multiple services such costs must be estimated for every possible access service, as well as all combinations thereof, and in some cases may be only poorly defined.
- (4) Fully Distributed Cost (FDC) allocations: Fully Distributed Cost, or FDC, is a cost allocation approach which provides for an exhaustive allocation of joint and common costs. This approach involves dividing the costs of serving customers into attributable and joint costs and then distributing the joint costs, for example “on the basis of some common physical measure of utilization, such as minutes, circuit-miles, message-minute-miles, gross ton-miles, MK., or kwh”³³. Other common FDC rules distribute costs on the basis of relative service revenues (so that services which account for a high share of revenues are allocated a high share of joint costs) and relative attributable costs. Given an FDC allocation, the access fee is allocated to output components (lines, minutes, kilometres of haulage) so as to recover the sum of the costs the allocation rule imputes to the downstream market.

Economists (and increasingly, accountants) view FDC approaches with great suspicion³⁴:

- FDC allocations are inherently arbitrary since the costs which the FDC approach distributes to a particular service bear no relation to the actual consequences of either providing or not providing that service.
- Access prices set on the basis of FDC allocations can therefore be highly misleading as a guide to action, since they may cause a firm not to enter the downstream market even though the prices it could set in that market would more than recover the costs its actions actually caused.
- FDC prices may not be demand consistent, so they may not even recover costs.

- Precisely because of their arbitrary nature, access charges based on FDC costs may be unsustainable in an environment where some by-pass of the monopoly facility can occur.
- Finally, the ability to recover FDC costs from competitors may reduce the pressures within the incumbent firm to monitor and control joint and common costs, leading to long-term losses in technical efficiency.

Despite seemingly unanimous condemnation, FDC remains the most commonly used approach to cost determination. This is partly because of its acceptability by regulatory, audit and tax authorities, which ensures that the data on which it is based is almost always directly available from standard accounting systems and is readily subject to independent audit. It is also because top managers perceive FDC as helping ensure that their business will recover the totality of its costs³⁵, even though this belief is rarely accurate in a competitive environment. Finally, FDC may well appeal to perceptions of “fairness” since it allocates the “burden” of the joint costs according to keys (such as output or usage) which have the appearance of objectivity.

(ii) Revenue - Based Approaches

- (ii) In contrast to cost-based approaches are rules which base access charges on the incumbent’s prices. These too are vulnerable to strategic manipulation: just as a rate-of-return regulated firm can alter its asset base to maximise its profits, so a firm subject to a condition which relates the charges it imposes on incumbents to its prices in the downstream market will take that condition into account in its price-setting. Nonetheless, it can be claimed that these rules can be designed to provide the incumbent with stronger incentives to accommodate entry when it is efficient. Two variants of these rules are considered here:
- (1) The Efficient Component Pricing (ECPR) Rule: Although often referred to as the Baumol — Willig Rule³⁶, the rule’s origins lie in the vertical price squeeze standard set down by Judge Learned Hand in the Alcoa case³⁷. In that case, Judge Hand proposed what has become known as the “transfer price test”, designed to determine whether a vertically integrated firm with market power had set prices in the upstream market in such a way as to unreasonably exclude downstream competitors. Under this test, simply put, unreasonable exclusion would be found if the integrated firm could not have sold its downstream products profitably, had it had to pay a “transfer price” equal to the market price it had set for the input over which it had market power. It follows that the lawful price at which such a firm may set the upstream (“access”) price cannot exceed its own downstream price minus the incremental cost it incurs in the downstream processing stage. This test, which has played an important role in U.S. and European Union³⁸ case law, constitutes the essence of the ECPR.

The ECPR ensures that the incumbent firm will never be forced to operate at a loss. When retail prices are regulated (for example, so as to provide for a Community Service Obligation), the rule protects (rather than undermines) the price structure which the regulators have set. It can nonetheless allow for entry when the entrant is more efficient than the incumbent, and indeed is consistent in this respect with the standard antitrust test for unreasonable exclusion. And even though the ECPR is criticised for leading to access prices which are too high, there are a range of circumstances in which prices set according to this rule will be below those which maximise social surplus³⁹. Finally, the ECPR appears to be minimally invasive of the incumbent's property rights.

These are very considerable advantages; but the ECPR also suffers from a number of significant weaknesses:

- When downstream competition is intense, and the entrant's costs are lower than those of the incumbent, the incumbent's downstream prices are poorly defined (its market share should tend towards zero), voiding the ECPR of an empirical anchor.
- Conversely, if there are economies of scope between the upstream and downstream markets, the ECPR, rather than providing welfare improvements, can serve to maintain monopoly prices. It may be that this outcome can be averted by price regulation -- for example, by ensuring that prices are no lower than incremental costs and no higher than stand-alone costs. However, were price regulation in fact able to achieve such unambiguous welfare-enhancing outcomes, downstream competition would be superfluous; the fact that policy is seeking to allow competition suggests that price regulation cannot really do the job.
- Finally, when the downstream market is not contestable, the ECPR may actually reduce welfare. For example, if product differentiation is endogenous (the service being supplied is not perfectly homogenous and producers can outlay costs which will subsequently be sunk so as to affect demand), the ECPR (which treats differently reductions in retail market prices on the one hand and increases in retail market quality on the other) creates incentives for the incumbent to invest in excess product differentiation.

In addition to these analytical weaknesses, the ECPR is more difficult to implement than it may seem to be. Thus, if the incumbent's retail (downstream) prices are non-linear, the ECPR generally requires the calculation of a linear approximation to downstream consumers' outlay schedules. Equally, implementation of the ECPR involves knowledge of the incremental costs incurred by the incumbent in the provision of the downstream service; these costs are not likely to be available in satisfactory form from the incumbent's system of accounts. Given these information imperfections, the incumbent will face strong incentives to "allocate" costs to the monopoly level, thereby positioning itself to recoup them from rivals.

- (2) An upstream revenue cap: In this rule, proposed by Ralph⁴⁰, with a more general variant (in the form of a global price cap) being advanced by Laffont and Tirole⁴¹, the incumbent is free to set the access charge subject to the constraints that the charge it sets is (i) less than its downstream price; and (ii) consistent with a simple revenue cap: such that the revenues derived from sales in the upstream market (to consumers, downstream competitors, and -- on an imputed basis -- to the incumbent itself) do not exceed upstream costs (including the costs of any social obligations bearing on the upstream operator). Only total upstream costs and *ex post* revenues need to be known to implement this mechanism, so that -- compared to alternatives -
- it is informationally efficient.

In the upstream market, the revenue cap is very similar to a price cap. It always allows for non-zero profits, and hence ensures the funding of any cost “burdens”. In the downstream market, the least-cost competitor can achieve profits up to the difference between its costs and those of its closest competitor. Firms therefore face the same incentives to innovate and reduce costs as in any competitive market.

These results ensure that welfare is improved over the unregulated case -- indeed, by more than in any other mechanism surveyed here (excepting lump sum charges which outperform the revenue cap when they allow entry *and* there is downstream market power). Nonetheless, welfare is not brought to first-best levels: profits are not reduced to zero and price relativities (the ratio of upstream to downstream prices) are not necessarily optimal.

(iii) Overall outcomes

In short, none of the mechanisms -- or “pricing rules” -- reviewed here can be excluded outright: rather, they each have strengths and weaknesses which need to be taken into account. Much as with the scope of the “essential facilities” doctrine, balancing these strengths and weaknesses -- summarised in *Table 1* -- involves complex and inevitably controversial policy trade-offs. The choice of rule will depend on circumstances: on the extent of regulatory distortions in retail prices (generally, the greater these distortions are, the stronger the case for the ECPR); on the extent of downstream entry barriers (the closer the downstream market is to being potentially contestable, the stronger the case for a fee set on the basis of incremental costs); on the lumpiness of upstream investment (which makes for short-run marginal cost rather than long-run incremental cost); and on the extent and quality of the information available (the poorer the information, the stronger the case for mechanisms which encourage substantial self-revelation of information, such as the local price cap).

The administration of the access process

The difficulties involved in attempting to constrain access processes through mechanical rules are even more apparent at the implementation stage. Three points can be made in this regard:

- (1) Given the incentives for anti-competitive conduct, the lack of experience with a wholesale market, and the problems of coordination characteristic of network industries, access entitlements will prove difficult to define and to price, at least initially. This can be expected to give rise to frequent disputes between the parties. In a “normal” market, the effective management of these disputes would probably involve vertical integration -- that is, the internalisation of activities within an enterprise, allowing disputes to be more expeditiously handled through administrative processes⁴². It is, however, a goal of policy in these industries to promote the emergence of trading relations between distinct entities located at differing points in the vertical chains. There is consequently a transactions cost issue which needs to be faced.
- (2) Relatedly, experience with access and interconnection issues in a broad range of industries confirms that it is simply not possible to cover in an initial agreement the full set of contingencies which will ultimately arise. This is in no small part because network interconnection involves a large number of non-price issues (such as the location of interfaces, the provisioning of links and the management of end-to-end service quality), each of which creates scope for opportunistic conduct at the implementation stage by the parties to the agreement. Moreover, the sharp asymmetry of interests between the parties, and the fact that neither is actually in a situation where it stands to gain much by building good-will, means that contracts are not self-enforcing and that incentives for strict compliance may be weak.
- (3) Resolving these disputes almost invariably involves functions of arbitration, in which expert judgement is used to assess the reasonableness (rather than the rule-conformity) of conflicting claims. It may be possible for the parties themselves to determine a mechanism (such as commercial arbitration) which meets these needs. Nonetheless, in the absence of such mechanisms or in the event of their break-down, there will be strong pressures for policy to provide a *low-cost mechanism for dispute-resolution*. The costs which acceding to these pressures entails -- including in terms of reducing the incentives for the parties to address and resolve disputes in good faith -- then need to be balanced against the benefits of speedier and possibly cheaper conflict resolution.

III Institutional Design

Addressing these complexities seems to call for a highly discretionary model of public policy, capable of making trade-offs in the light of particular fact situations, using incrementalism to adapt to new information and to evolving circumstances, and providing for the arbitration of disputes according to standards of reasonableness. So high a level of discretion must nonetheless give some cause for concern; after all, the issues being determined can have a major impact on property rights and income distribution, as well as on efficiency both in the markets directly concerned and in the economy more broadly. To the extent to which the exercise of discretion cannot be hemmed in by conduct-related rules, it would seem desirable to do so through “jurisdictional rules”⁴³ which, by locating

responsibility for rule-setting in institutions with given characteristics, provide (to use Kelsen's famous description of constrained discretion) the process of mediating access disputes with "a frame if not a picture."⁴⁴

In analysing these issues of choice of jurisdiction, the natural starting point is the fact that those making and implementing policy operate with highly imperfect information, have objectives which may not be identical with those of the public most broadly defined, and hence cannot be expected to guide an industry, activity or market to full efficiency. As a result, policy-driven outcomes (including those of the putatively low-cost mechanism for dispute resolution) are likely to be inferior to those of a workably competitive market, in some cases drastically so. In deciding the extent and form of intervention in the granting of third party access, the risks of "government failure" must therefore be weighed relative to those of their "market" counterpart. Two recommendations flow from this starting point:

- (A) Intervention to grant third party access should be confined to areas where markets are least likely to work satisfactory -- that is, to areas which are far from being workably competitive.
- (B) In structuring intervention in those areas, the choice of policy instrument should be mindful of the costs and benefits of institutional alternatives -- that is, the vulnerability of each policy instrument to the various pathologies of public policy which underpin "government failure"⁴⁵. Presumably, intervention to promote interconnection should only occur if policies and instruments can be designed whose net costs fall short of those of simply leaving outcomes to commercial negotiation.

The second of these points is arguably the most difficult. Primarily at issue are the incentives and constraints bearing on each of the means by which policy can be made and implemented -- means which (in Australia, at least) include Parliament, Ministerial Departments, industry-specific regulatory agencies, regulatory agencies whose mandate is defined in terms of an issue area (rather than an industry), and the system of Courts and Tribunals. In practice, several of these are typically involved in any issue area, and would be in the implementation of policies for access and interconnection; but to what extent are the costs of the "government failures" they entail likely to be less than the costs of the "market failures" for which remedies are being sought?

This issue can be explored by considering first, a conceptual framework for analysing the question of choice of institutions and then some of this framework's insights to the Australian experience with regulating interconnection in telecommunications.

(a) *Analysing institutional choice*

The classical theory of public administration addresses questions of institutional design primarily in terms of *institutional capability*. Institutions are seen as differing mainly in terms of (1) their capacity to initiate action; (2) their access to resources (including of

expertise); and (3) the nature of their accountability (which is essentially an aspect of access to resources). Broadly, Ministerial processes tend to be the least constrained in each of these respects, with the system of Courts and Tribunals falling at the other extreme. Institutional choice then depends on matching each function of government with capabilities it requires.

More recent work, informed by the debates surrounding the “interest group theory of politics”, emphasises a rather different set of institutional features⁴⁶. In particular, stress is placed on what might be described as the *permeability* of the various institutional alternatives -- the degree to which, and the manner in which, they are open to external influence or (less pejoratively) participation. Here too, Ministerial processes tend to be the least constrained, with they system of Courts and Tribunal again falling at the other extreme. This is readily illustrated, albeit at the cost of considerable simplification.

Consider, for example, the process by which parties express a position on an issue. Interested parties face relatively low costs in putting their views to Ministerial Departments and to regulatory agencies; moreover, they can do so without disclosing those views to public scrutiny. Far greater constraints are involved in participating in the more formal adjudicative processes of the system of Courts and Tribunals, and only in narrowly defined circumstances can one do so without accepting public disclosure.

Consider equally the outcomes of the respective processes. The decisions taken by Ministerial Departments may affect many parties -- for example, a whole industry, or an entire class of participant within that industry. As a result, it is not unusual for complex coalitions of interested parties to participate in the making of policy. Moreover, Ministerial decisions are only loosely bound by what has been done to date: past outcomes do not bind current processes. Participation by interested parties is therefore a fairly on-going process, especially as there is always the prospect and/or risk that decisions previously taken will be reversed. In contrast, the outcomes of court adjudication, although they may have substantial impacts on third parties, typically centre on the parties directly before the Court, and only limited room is left for coalitions of interested parties. At the same time, adjudication is generally a time-limited process, so that it is only in exceptional cases (generally associated with broad social issues) that any coalitions which may have been formed persist.

Finally, consider the processes’ ultimate transparency. Despite the conventions of parliamentary accountability, it seems fair to say that Ministers face relatively little burden in having to give reasons for their decisions, other than to the extent needed to retain Parliamentary support. This inevitably reduces the information available to the broader public and its agents (such as the press). At the other extreme, the Courts are subject to relatively stringent requirements to give reasons and to do so in a manner capable of meeting the needs of the system of appeals.⁴⁷

Three broad implications are generally drawn from these differences.

(1) *Ministerial decision-making is especially vulnerable to rent-seeking:*

- Putting aside the exploitation of disenfranchised minorities (the problem of the “tyranny of the majority”), this type of decision-making is most likely to fail when the gains associated with a policy are concentrated while the costs it imposes are diffuse. The potential gainers can then organise to exert the maximum influence on the taking and implementing of decisions -- through threats and inducements, by distorting the information they provide, and (in coalition with the Minister) by making it difficult for those who are losing out to realise the costs which are being imposed on them.
- However, Ministerial decision-making is also relatively unstable. This has some obvious advantages in allowing scope for iterating towards better public policy -- for example, by incorporating new information and/or accommodating changing community values. From the point of view of interested parties, however, the threat of future changes must reduce the value of any gains currently secured.

(2) The system of Courts and Tribunals is substantially less vulnerable to these forms of manipulation, although it does not escape them altogether. Some scholars, most prominently Judge Posner, have claimed that this system, at least in countries of the Common Law, tends to produce economically efficient outcomes -- because (i) it is the parties with the most to gain which have the strongest incentive to seek redress; while (ii) the procedural and substantive safeguards under which the system works limit the scope for rent-seeking, especially in countries in which costs can be recovered⁴⁸. In the strongest version of this claim, court-made law is seen as more conducive to efficiency than the setting of rules or standards by statute⁴⁹. However, even those writing within this literature admit that a number of factors constrain the effectiveness of courts and tribunals:

- Courts typically deal with a fairly narrowly defined range of issues. The doctrine of justiciability restricts the judiciary in its ability to issue advisory opinions, and prevents it from examining issues which are moot or where the parties have no standing to maintain the action. At the same time, there is a general requirement that the controversy in a case be immediately present and involve a real, and not merely speculative, injury to a party⁵⁰.
- Even within this class of issues, only a few are resolved through litigation. The high costs and complexities involved in taking or participating in legal action mean that cases are most likely to arise when highly concentrated interests are involved, and when it is those interests which capture the greatest part of the value of outcomes. When the outcomes are of substantial value to third parties, directly or through precedent, the difficulties involved in securing

from these parties a contribution to costs may lead to under-investment in litigation.

- Moreover, the courts face severe constraints in terms of how they resolve even those issues which they do address. Courts have limited access to resources: they do not, and even in countries of Civil Law cannot, resemble Weberian bureaucracies⁵¹. As a result, the expertise on which they can draw is necessarily of a different, more generalist, kind than that found in Ministerial Departments and regulatory agencies. Nor are courts well equipped to administer remedies which entail continuing oversight and the taking of a range of ancillary decisions (as is typically the case in the provision of access to “essential facilities”⁵².)
 - More controversial is the standard Benthamite critique of the cognoscibility of the common law. According to this view, court decisions, because they are cast in terms of the issues immediately facing the court, may not be sufficient to establish clear guidelines for future conduct. However, this view would seem to under-estimate the value of precedent and the ability of courts to create what are, in fact, if not in name, rules⁵³.
- (3) Regulatory agencies are in an intermediate position between Ministers and Courts⁵⁴. More explicitly set out functions and more formalised procedures for determining standing, assessing the admissibility of evidence and justifying the decisions taken, reduce vulnerability to rent-seeking, as do rules limiting *ex parte* consultation. The agencies are also generally able to call on in-house expertise, enhancing the scope for pro-active rule-making and enforcement. At the same time, the agencies typically retain the powers of initiative needed to address issues on an *ex ante* basis and to resort to policy incrementalism as a response to uncertainty.

But there are also substantial pathologies, whose effects may be heightened by the complex technical nature of many regulatory decisions and the resulting community ignorance of what regulators do -- ignorance reflecting the relatively low stakes (and hence limited incentive to invest in information) which most individuals have in the outcomes of the regulatory process. Four aspects of these pathologies are especially striking in industry-specific regulatory agencies:

- An industry-specific agency typically escapes scrutiny not only by the general public but also by firms in other industries, since (1) the industry being regulated will generally account for a very small part of other industries’ total costs; and (2) the agency’s limited scope shields firms in other industries from the precedent value of its decisions. The stakes mobilised by the agency are consequently almost inherently more fragmented, reducing *de facto* accountability.

- As a result, Ministers can use such an agency as a means of enhancing the value of decisions they have taken. In particular, the agency can provide a means of creating *specialty enfranchised constituents* with privileged access to the decision-making process. Because the agency is less vulnerable to policy shifts (being constrained, for example, by substantive and procedural legislation), these constituents -- the “winners” in the prior “rent-seeking” game -- can thereby be given a greater degree of commitment about the durability of the bargains they have struck. The arcane nature of many regulatory decisions, and the complex and opaque rhetoric in which they are cast, may allow the regulatory agency to get away with implementing policies which are even more directly redistribute and responsive to special interests than those announced by the Minister to Parliament -- suggesting that from a rent-seeking point of view, industry-specific regulation may well be a fairly natural complement to, rather than substitute for, Ministerial involvement.
- At the same time, the agency, to fulfil its functions, is likely to need a substantial degree of autonomy. This enhances the scope for goal displacement (the conflict between the agency’s ostensible goals and the actual goals of its members), as well as introducing a degree of uncertainty into the agency’s decisions. To perpetuate their organisational culture and protect their access to resources, agency administrators will have incentives to make the gains they provide to agency stakeholders dependent on the agency’s survival. They may therefore actively seek out new “winners”, thereby expanding their clientele, while reminding prior clients of the need to invest in retaining agency loyalty. The result may be even more complex redistributions than those originally intended.

(b) *Implications in the context of access and interconnection*

What do these institutional characteristics imply for the design of access regimes? These implications can be illustrated by considering the regulation of interconnection in Australian telecommunications. Especially striking is the interaction of extensive Ministerial involvement with industry-specific regulation. Three points are worth making.

- (A) The decision to open the market to competition, though undoubtedly a step to full liberalisation, was tied up with a significant Ministerial “bargain” with interested parties. In particular, the need to successfully complete the sale of the AUSSAT satellite and of the license to operate as a second general carrier, had a major influence on government policy. Above and beyond a genuine interest in promoting competition, the government was anxious to ensure the credibility of its commitments to the consortium which purchased the second license. Three instruments proved especially important in this respect:
 - (1) Direct commitments negotiated “off the public record” (and in some cases, apparently inconsistently with the public record) by the Minister⁵⁵;

- (2) The use of Ministerial Direction to establish principles for interconnection charging, thereby curtailing the risk that other parties (most notably Telstra, the communications unions and consumer groups) might amend the bargain at the implementation stage; and
 - (3) Reliance on AUSTEL, rather than on agencies exposed to broader scrutiny, as the primary instrument for policy implementation, with the *Telecommunications Act 1991* clearly vesting special rights of consultation in the general carriers.
- (B) The continued public ownership of Telstra, the incumbent carrier, substantially increased the Government's ability to engineer a redistributive bargain. In effect, the Minister was able to curtail Telstra's appeal against incursions on property rights -- most notably by making it clear that the Government expected Telstra to accept the process underway. Given the rights of appeal which had to be provided for in the Act, is questionable whether a privately-owned firm would have acquiesced to anywhere near the same extent.
- (C) Since that time, the successful implementation of the first stage of full competition (duopoly) and changes in broader public goals (most notably the importance attached to developing a national competition policy) have undermined the legitimacy and stability of the original bargain (which in any case involved a sunset clause). Paralleling these changes in circumstances, AUSTEL has used its autonomy to seek to alter its client base, notably by creating a constituency of "service providers" (essentially resellers) dependent on it for privileged access to Telstra's network⁵⁶. While politically astute, this strategy seems likely to create substantial economic costs as AUSTEL seeks to impose on the market outcomes quite different from those which would prevail in a less regulated environment.

IV Conclusions

Interconnection will remain a formidable policy problem so long as incumbents control "essential facilities" in markets subject to severe retail price distortions. Economic theory does not provide simple means of resolving the disputes these circumstances give rise to; moreover, even putting the pricing issues aside, there may be a need for more permanent structures to help govern the non-price aspects of third party access. These governance problems do not seem resolvable without substantial scope for discretionary judgment. The question then is whether institutions can be designed which can address these tasks without themselves giving rise to formidable costs.

The institutions through which policies are made and implemented can be analysed in terms of their institutional capability on the one hand and of their vulnerability to rent-seeking on the other. Ministerial decision-making tends to be the most vulnerable to manipulation by concentrated interests. Industry-specific regulators have a greater degree of autonomy, but frequently serve to add credibility to the special bargains made by

Ministers. Moreover, Australian experience suggests that industry-specific bodies are liable to substantial goal-displacement, seeking to perpetuate intervention even where it is not needed. Though courts tend to be less vulnerable to rent-seeking than the other institutions of public governance, there are severe limits on their capabilities.

This suggests reliance on institutions which are subject to effective surveillance by broad interest coalitions, as is typically the case with national competition policy authorities. At the same time, it is important to ensure that these bodies themselves remain subject to judicial review. While this may somewhat slow the process of dispute resolution, it is likely to yield substantial benefits over the longer run in terms of the predicability and consistency of the rules which can guide private behaviour in this area.

¹ C.D. Foster *Regulation, Privatisation and the Natural Monopolies* (1993) at page 167.

² See for example R.T. Smith, A.S. De Vany and R.J. Michaels “Defining a right of access to interstate natural gas pipelines” *Contemporary Policy Issues* 8 (1990) p142; and William W. Hogan *Coordination for Competition in an Electricity Market* (1995).

³ In the railroads, for example, “capacity” is a relatively poorly defined concept, since the volume of traffic which can be handled upon a given network depends not only on the number and origin/destination of trains but also on the speed at which they are operated. Hence, a fully exchangeable “transport entitlement”, governing access to tracks by competing users, would have to be a complex set of rights. Moreover the value of this entitlement might be significantly affected by the behaviour of third parties. For example, a breakdown on a track will delay all the scheduled traffic on that path and on the paths used to provide redundancy, imposing external costs on network users (that is, costs which are internal to the network but external to the party causing them). If moral hazard is to be avoided, these costs would need to be internalised (that is, imposed upon the party causing them, thus reducing the incentive to create delays by (for example) using poor quality rolling stock). Properly specified contracts for access to track by competing users must consequently provide for penalties in the event that the user imposes delays on third parties. Correctly setting these penalties requires knowledge of the value of delays. This can be calculated in principle -- for example, if the right to use tracks at a particular time, on a particular path and at a particular speed is auctioned to competing users, the bids made will reflect the value of delayed or lost load. However, this requires mechanisms which go well beyond the experience of current operators, and is therefore likely to prove controversial.

^{3b} In these industries, diminished vertical coordination, as well as creating third party effects in the quality of service, may also undermine least cost capacity expansion, unless complex cost-sharing mechanisms can be put in place. Simulations suggest that the excess costs arising from this reduction in coordination may be substantial -- see, for example, Ross Baldick and Edward Kahn “Network Costs and the Regulation of Wholesale Competition in Electric Power” *Journal of Regulatory Economics* 5 (1993) p367.

⁴ Note, however, that the primary emphasis in the Chicago tradition has not been placed on denying that a firm which controls an essential facility may secure monopoly rents by refusing to deal. Rather, it has been on arguing that when the firm chooses to do so, the impact on social welfare (the sum of consumer and producer surplus) is generally positive. A good presentation of the Chicago argument is in D.J. Gerber “Rethinking the monopolist’s duty to deal: a legal and economic critique of the doctrine of ‘essential facilities’” *Virginia Law Review* 74 (1988) p1069.

⁵ Although the term “essential facility” only appears in a reported judicial decision in 1977, receiving its first authoritative statement in *haec verba* in *Hecht v. Pro-Football, Inc.*, 570 F. 2d 982, 992 (D.C. Cir. 1977) *cert. denied*, 436 U.S. 956 (1978), the doctrine can be traced back to the Supreme Court’s 1912 ruling in *United States v. Terminal Railroad Association* [224 U.S. 383 (1912)]. The main features of the doctrine were concisely summarised by the U.S. Seventh Circuit in 1983 as requiring that a plaintiff seeking access to a facility establish the following

elements to show liability: “(1) control of the essential facility by a monopolist; (2) a competitor’s inability practically or reasonably to duplicate the facility; (3) the denial of the use of the essential facility to a competitor; and (4) the feasibility of providing the facility”. See *MCI Comm. Corp. v. American Tel. & Tel. Co.*, 708 F.2d 1081, 1132-33 (7th Cir.) cert. denied, 464 U.S. 891 (1983).

6 For example, transmitting a unit of electricity from point A to point B requires the use of the high voltage transmission grid in essentially fixed proportions. Equally fixed amounts of transmission are required to transport a given volume of natural gas from one point to another. Finally, while some substitution opportunities do exist, providing a telephone connection on demand in a network with many users is difficult to do without using a local loop at each end.

7 Including terms of costlessly designing and implementing a menu of two-part tariffs, so that it could derive the full benefits of price discrimination.

8 See D. M. Mandy “Non uniform Bertrand Competition” *Econometrica* 60 (1992) p1293.

9 See O. Hart and J. Tirole “Vertical integration and market foreclosure” *Brookings Papers on Economic Activity* 205 (1990); J.A. Ordover, S.C. Salop and G. Saloner “Equilibrium market foreclosure” *American Economic Review* 80 (1990) p127; and J.A. Ordover, S.C. Salop and G. Saloner “Equilibrium market foreclosure: Reply” *American Economic Review* 82 (1992) p698.

10 In telecommunications, for example, margins in the U.S. market for long distance service to residential consumers appear to have remained high since the divestiture of AT&T, at least partly because of price leadership exercised by the dominant firm. This has been largely facilitated by regulation, which has forced AT&T to disclose its charges and imposed lags on price changes, making price coordination easier. One view of the evidence can be found in: In the United States District Court for the District of Columbia *Motion of Bell Atlantic Corporation, BellSouth Corporation, NYNEX Corporation and Southwestern Bell Corporation to Vacate the Decree in United States of America v. Western Electric Co Inc., and American Telephone and Telegraph company*, Civil Action No. 82-0192 (HHG); but see also, dissenting, *Affidavit of B. Douglas Bernheim and Robert D. Willig* United States District Court for the District of Columbia *United States of America v. Western Electric Co. Inc., and American Telephone and Telegraph Company*, Civil Action No. 82-0192 (HHG) *ATT’s Opposition to the Four RBOC’s Motion to Vacate the Decree* 1 Appendix A.

11 Entry may provide benefits to the owners of the incumbent firm by allowing some measure of “yardstick competition.” This refers to the impact of product market conditions on agency costs, that is, on the costs involved in ensuring that owners and managers have adequate incentives to act efficiently. The underlying notion is that in a more competitive market (and assuming that the firms in the market can be prevented from colluding), owners can more readily compare performance across firms. This allows them to discriminate between say, low profits due to industry-wide demand shocks and low profits due to managerial slack or to rent-sharing between managers and workers. As a result, owners can better structure the incentives managers face, securing a closer alignment between managerial actions and public objectives.

12 This is merely a manifestation of the endowment effects analysed by David Kahneman, Jack Knetsch and Richard Thaler “The Endowment Effect, Loss Aversion and Status Quo Bias” *The Journal of Economic Perspectives* 5 (1991) p193.

13 In economic analysis, cross-subsidies only occur when charges are below attributable cost for some consumers (and/or services) and/or above stand-alone cost to others. In other words, price discrimination does not necessarily involve cross-subsidisation. See, for a thorough discussion, D.F. Spulber *Regulation and Markets* (1989) at 113 and following.

14 On which see notably Ronald Coase “The Economics of Uniform Pricing Systems” *The Manchester School* 15 (1947) at pages 139-156.

15 An especially interesting recent re-statement of this case is in M. Fuss and L. Waverman “Efficiency principles for telecommunications pricing” *Paper presented to the National Conference on the Future of Telecommunications in Canada*, Toronto, April 1 and 2, 1993. Fuss and Waverman’s argument that basic access in telephony is not a Feldstein good is consistent

with the findings on subsidy incidence reported in H. Ergas, E. Ralph and S. Sivakumar *Reforming Australian Telecommunications* (1991).

16 Note that many of the problems associated with price-deaveraging (and notably the unsustainability of efficient -- that is, welfare-increasing -- cross subsidies between services) could be avoided were each customer required to obtain *all* of the services provided by the utility from a single supplier. In this case, the competing suppliers could continue to set prices for individual services in a way which came close to maximising the sum of consumer and producer surplus (which requires revenue transfers between *services*) while ensuring that there were no revenue transfers between *consumers*. The resulting set of prices would fall in the “second best core” -- that is, the set of prices which would allow a supplier of the service in question to recover the totality of its costs without creating incentives for any group of consumers to “break away from the grand coalition to produce the vector of goods on its own”. The concept of the second-best core, which is central to the analysis of efficient pricing in markets characterised (i) by cost subadditivity (economies of scale and scope) and (ii) competitive entry, was initially developed in R. Guesnerie and C. Oddou “Second Best Taxation as a Game” *Journal of Economic Theory* 25 (1981) at pages 67 to 91. A full treatment can be found in Daniel Spulber *Regulation and Markets* (1989), at pages 180 to 198.

17 Recent analysis suggests that there can be more price discrimination in a differentiated products oligopoly than in the corresponding monopoly: see S. Borenstein “Price discrimination in a free entry market” *Rand Journal of Economics* 16 (1985) p380 and T. J. Holmes “The effects of third-degree price discrimination in oligopoly” *American Economic Review* 79 (1989) p244. The passenger airline market can be cited as a case where de-regulation and competitive entry have resulted in **increased** price dispersion; see S. Borenstein and N. Rose “Competition and price dispersion in the U.S. airline industry” *NBER Working Paper*: 3785 (1991).

18 Some evidence to this effect is provided in J. T. Hong and C. Plott “Rate filing policies for inland water transportation” *Bell Journal of Economics* 13 (1982) p1; D. M. Grether and C. Plott “The effects of market practices in oligopolistic markets” *Economic Inquiry* 22 (1984) p479; and (with more mixed results) in F.J. Ruppel, S. Fuller and M. McKnight “Grain shipper/railroad contract disclosure” *Journal of Agricultural Economics Research* 42 (1990) p8. A comprehensive survey of the evidence on the competition-chilling effect of posted prices in concentrated markets can be found in Douglas Davis and Charles Holt *Experimental Economics* (1993).

19 Note that even this “uneconomic entry” may be economically desirable if (i) the costs associated with the price distortions exceed those arising from the transfer of output from the (lower cost) incumbent to the (higher cost) entrant; and/or (ii) if it accelerates the process of price adjustment by the incumbent. Even in the unlikely circumstance in which a regulator could accurately measure the relative costs and competitiveness of the entrant and any given incumbent (so that “agency cost” considerations are not relevant), it would consequently be wrong to seek to prevent all “uneconomic entry”. Rather, the “first best” option in these circumstances is to act on the price distortions so as to minimise the likelihood that uneconomic entry will occur. However, where the price distortions are actually a desired outcome of policy, then there is a case for ensuring that the burden of providing uneconomic services does not unduly disadvantage the incumbent (taking account, in this equation, of any special advantages the incumbent secure from statute or merely from inherited dominance.)

20 *Rules* can be defined as decision norms entailing an advance determination of what conduct is permissible, leaving only factual issues for the adjudicator. In contrast, a *standard* while specifying some goals and criteria, may leave both the detailed specification of the scope of permissible conduct and the determination of factual issues to the adjudicator. Thus, “driving in excess of 90 kilometres per hour is prohibited” is a rule; “driving unsafely is prohibited” is a standard. Rules allow those likely to be influenced by a norm to ascertain the permissibility of conduct prior to engaging in that conduct, but they generally also involve higher initial costs of production (at least, if one is trying to “get them right”) than standards. See Frederick Schauer *Playing By the Rules : A Philosophical Examination of Rule-Based Decision-Making in Law and*

in *Life* (1991) and Louis Kaplow “Rules versus Standards: An Economic Analysis” *Duke Law Journal* 42 (1992) p557.

21 William Blumenthal “Three Vexing Issues Under the Essential Facilities Doctrine” *Antitrust Law Journal* 58 (1990) p868; and generally, Phillip Areeda and Herbert Hovenkamp *Antitrust Law* § 736.2 (Supp. 1993).

22 J. Gregory Sidak, Private Communication.

23 According to the Hecht court, for example, the facility involved does not need to be “indispensable; it is sufficient if duplication would be economically infeasible and if denial of its use inflicts a severe handicap on potential market entrants”; *Hecht v. Pro-Football, Inc.*, 570 F. 2d 982, 992 (D.C. Cir. 1977) *cert. denied*, 436 U.S. 956 (1978). Since then, the standard has become more stringent: for example, “(a)s the word “essential” indicates, a plaintiff must show more than inconvenience, or even some economic loss; he must show that an alternative to the facility is not feasible”; *Twin Laboratories Inc. V. Weider Health & Fitness* 900 F. 2d. 556, 569-70 (2nd Cir. 1990); and similarly *Alaska Airlines Inc. v. United Airlines Inc.*, 948 F. 2d. 536, 544 (9th Cir. 1991) *cert. denied*, 112 S. Ct. 1603 (1992) [asserting that an essential facility must confer a power not merely to harm competitors but to eliminate competition in the downstream market]. It can be argued, however, that even this trend has not been sufficient to set clear bounds on the threshold of essentiality; see Phillip Areeda “Essential Facilities: An Epithet in Search of Limiting Principles” *Antitrust Law Journal* 58 (1989) p841.

24 William M. Landes and Richard A. Posner “Market Power in Antitrust Cases” *Harvard Law Review* 94 (1981) p937, 975-76.

25 See, for example, Patrick J. Ahern “Refusals to Deal After Aspen” *Antitrust Law Journal* 63 (1994) p153.

26 See, for example, Phillip Areeda and Herbert Hovenkamp *Antitrust Law* § 736.2a(Supp. 1993); and Donald I. Baker “Compulsory Access to Network Joint Ventures Under the Sherman Act: Rules or Roulette?” *Utah Law Review* 56 (1993) p999.

27 More comprehensive reviews can be found in WIK - EAC *Network Interconnection in the Domain of ONP: Study for DG XIII of the European Commission - Final Report* (1994); and Henry Ergas and Eric Ralph “The Interconnection Problem With a Focus on Telecommunications” *Communications & Strategies* 16 (1994) p9, on which this discussion draws.

28 This metric relies on strong assumptions about compensation and income distribution. A fuller treatment would take account of the concerns reviewed in Michael Trebilcock *The Limits of Freedom of Contract* (1993) and H. Peyton Young *Equity in Theory and Practice* (1994).

29 See, for example, the “Minimum Cost Steiner Network” algorithms reviewed in William W. Sharkey “Network Models in Economics” in *The Handbook of Operations Research and Management Science* (1995); and the serial cost allocation techniques set out in Herve Moulin “Serial Cost Sharing” *Econometrica* 60 (1992) p1009.

30 The importance of using short-term marginal costs, rather than long run incremental costs, emerges clearly from the simulations reported in Rolla Edward Park *Incremental Costs and Efficient Prices With Lumpy Capacity: The Two Product Case* (1994) RAND, Santa Monica, California. The relevant theory is set out in David Starrett *Foundations of Public Economics* (1988) 283-291. Useful examples of practical application are in F.C. Schweppe and others *Spot Pricing of Electricity* (1988).

31 The resulting charges will obviously fluctuate more than the smoothed approximations provided by long run incremental costs. However, market participants should be able to offset these fluctuations through hedge contracts; see William W. Hogan “Contract Networks for Electric Power Transmission” *Journal of Regulatory Economics* 4 (1992) p211.

32 By reducing price-cost margins, greater competition will yield improvements in allocative efficiency; but it may also increase technical efficiency, that is, the productivity with which resources are used. Recent, largely theoretical, work identifies three mechanisms through which productive efficiency may be affected by changing product market conditions.

First are the “yardstick competition: effects discussed above at note 11.

Second, though yardstick efficiency depends on the basic environmental (i.e. non-managerial) factors determining profits within an industry being highly correlated across firms (since this is what allows managerial performance to be compared), product market competition may also yield efficiencies when the firms within an industry differ in important respects. In particular, if firms are viewed as taking bets on particular ways of doing things, having a greater number of firms in a market will, all other things being equal, accelerate the rate at which the most efficient approaches are discovered by managers, owners and regulators. to the extent to which there are spill-over effects (that is, the firms in an industry can learn from each other, for example through the yardstick effects of benchmarking), learning will increase efficiency not only in the innovating firm but also across the firm population as a whole. This mechanism, which is similar to the notion that one should “let a thousand flowers bloom”, can be referred to as increasing “sampling efficiency”.

Third and last, increased product market competition will alter the process by which inefficient firms are “weeded out” and efficient firms rewarded. The presumption here is that firms are indeed asymmetric, and that superior performance cannot be costlessly imitated. Stronger product market competition is then presumed to result in the more rapid and complete sorting of firms into distinct performance classes, with the less productive firms being forced to exit the market. The most natural route through which this Darwinian process occurs is the reduction in price-cost margins brought by increased competition, since this will make it more difficult for inefficient firms to survive. At the same time, regulators, now better able to compare performance, are not likely to continue protecting inefficient firms, while potential investors and employees, mindful of the costs of poor performance, will be less willing to supply capital and labour to the firms least likely to survive. As a result, inefficient firms will face tighter price and cost constraints, making their continued existence less likely.

Given these sources of greater efficiency, competition may increase welfare, even in industries where there are substantial economies of scale (bearing in mind that in these industries, free entry would -- in the absence of the mechanisms described above -- usually lead to wasteful duplication of investment) See John Vickers *Concepts of Competition* (1994).

33 Alfred Kahn *The Economics of Regulation : Principles and Institutions*, (1970)I 150.
34 Economists’ critiques of FDC include Kahn, *ibid*; Ronald Braeutigam “An Analysis of Fully Distributed Cost Pricing in Regulated Industries” *Bell Journal of Economics* 11 (1980) p182; James C. Bonbright et. al. *Principles of Public Utility Rates* (2nd ed.) (1988); and Bridger Mitchell and Ingo Vogelsang *Telecommunications Pricing: Theory and Practice* (1991). Criticisms by accountants include Kent B. Monroe *Pricing: Making Profitable Decisions* (1979); and Robin Cooper and Robert Kaplan “Measure Costs Right: Make the Right Decisions” *Harvard Business Review* (1988).

35 See, for example, the survey results presented in Sayel Ramadan “The Rationale for Cost Allocation: A Study of UK Divisionalised Companies” *Accounting and Business Research* 20 (1989) p31.

36 The term reflects the formal setting out of the rule in Robert D. Willig “The Theory of Network Access Pricing” in H. Trebing (ed.) *Issues in Public Utility Regulation* (1979) p109 and William J. Baumol and Gregory Sidak *Towards Competition in Local Telephony* (1974).

37 *US. v. Aluminium Company of America et. al.* 1945 Trade Regulation Reports (57,342), 57,689-691, F. 2d. 416 436-38.

38 For example, in *Napier Brown — British Sugar* [OJ (1988) L 284/41, (1990) 4 CMLR 196], the ECJ found that “a dominant firm has an obligation to fix its prices at such a level that a

reasonably efficient competitor on the derivatives (downstream) market is able to survive.” UK and EC precedents are discussed in Richard Whish *Competition Law* (3rd. edition) (1993) p532.

39 This is most likely to be the case when customers in the downstream market can be segmented into groups with differing demand elasticities, as was the case in *Alcoa*. See Martin K. Perry “Forward Integration By Alcoa” *Journal of Industrial Economics* 29 (1980) p37.

40 Eric Ralph “*Regulating a Input Monopolist : A Low Information Interconnect Mechanism*” draft.

41 Jean-Jacques Laffont and Jean Tirole “*Creating Competition Through Interconnection: Theory and Practice*” *Journal of Regulatory Economics* 10 (1996) p227.

42 Internalisation would alter the incentives facing the parties in the direction of more cooperative behaviour. Disputes would consequently occur far less frequently. Moreover, those disputes which did occur within a vertically integrated firms (for example, over transfer prices or quality of service) could be handled through authoritative decision-making processes.

43 The term is derived from and discussed in Schauer op. cit.

44 See Lawrence M. Freidman “Law and its language” *George Washington Law Review* 33 (1964) p263.

45 See Brian W. Hogwood and B. Guy Peters *The Pathology of Public Policy* (1985).

46 The underlying models are set out in George J. Stigler “The Theory of Economic Regulation” *Bell Journal of Economics and Management Science* 2 (1971) p3; Richard Posner “Theories of Economic Regulation” *Bell Journal of Economics and Management Science* 5 (1974) p335; and Sam Peltzman “Towards a More General Theory of Regulation” *Journal of Law and Economics* 19 (1976) p211. These have given rise to a prolonged debate.

47 The issues involved in requirements to give reasons are nicely explored in Frederick Schauer “Giving Reasons” *Stanford Law Review* 47 (1995) p101.

48 See Richard Posner *Economic Analysis of Law* (1972) and George L. Priest “The Common Law Process and the Selection of Efficient Rules” *Journal of Legal Studies* 6 (1977) p65.

49 See Paul H. Rubin *Business Firms and the Common Law: The Evolution of Efficient Rules* (1983) 17-38.

50 This requirement is referred to in the United States as the “ripeness” doctrine. See, for example, *Maryland Gas Co. v. Pacific Coal and Oil Co.*, 312 US 270, 273 (1941) (asserting that courts do not have jurisdiction over controversies which are not immediate and real.)

51 The contrasts are well brought out in Lon L. Fuller “The Forms and Limits of Adjudication” *Harvard Law Review* 92 (1978) p353; and Gerald N. Rosenberg *The Hollow Hope: Can Courts bring about Social Change?* (1991).

52 The capacity of courts to handle Essential Facility issues are discussed in Mary Azcuenage “Essential Facilities and Regulation: Court and Agency Jurisdiction” *Antitrust Law Journal* 58 (1989) p879 and in Areedan and Hovenkamp op. cit at 736.2h. This is merely the old problem that Miss Johanna Wagner can be restrained by the Court from singing for Mr Gye; but she cannot be compelled to sing well for Mr Lumley: *Lumley v. Wagner* 1 DeG. M. & G. 604, 42 Eng. Rep. 687 (ch. 1852).

53 See Melvin A. Eisenberg *The Nature of the Common Law* (1988); Frederic Schauer “Is the Common Law Law?” *California Law Review* 77 (1989) p455; and Peter Stein *Legal Institutions: The Development of Dispute Settlement* (1989).

54 The relevant literature is usefully review in Peter H. Schuck *Foundations of Administrative Law* (1994); and Ronald Cass and Colin Diver *Administrative Law* (1995).

55 These included an agreement varying the public “network roll-out” conditions imposed on Optus and an agreement with the predecessor entity to Vodafone varying the date at which further licenses for mobile services might be issued.

56 AUSTEL *Service Provider Inquiry: Final Report* (1995).