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With the progressive introduction of competition into the traditional public utility industries, it becomes necessary for regulators to ensure access of competitors to the bottleneck facilities controlled by the incumbent monopolists on terms consistent with efficient competition. Efficient component pricing correctly solves that problem: under its rules, competition is enabled to achieve first-order, technical efficiency. The rule is also consistent with allowing competition to promote dynamic efficiency, although achieving this goal also requires reforming traditional cost-plus regulation. The Baumol and Sidak rule does not in itself, however, permit competition to fulfill its other functions of eroding monopoly profits and promoting allocative efficiency. It can therefore be permitted only when the charges for the essential inputs are regulated, so as to ensure that any markups above marginal costs in those charges are no greater than is necessary to afford the challenged utility companies a fair opportunity to earn a return on their invested capital.

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Introduction

We are in essential agreement with Baumol and Sidak's argument,[1] although perhaps more sensitive than they to its limitations and necessary preconditions. In a situation in which competitors require an input controlled by one of their rivals, efficient component pricing will in principle ensure the efficient static outcome—namely, that the responsibility for supplying the contested services or fulfilling the contested function be distributed among rivals, actual and potential, in such a way as to minimize total costs. The case for adopting such a policy is not quite so unequivocal when one takes into account allocative and dynamic efficiency considerations—in particular, the contribution that even (statically) inefficient competition may make to the rectification of regulatorily-imposed inefficient price structures and to stimulating improvements in efficiency and service innovation; but in the present circumstances of telecommunications, we agree with the policy they recommend. This Comment will therefore be more in the nature of an exegesis than a critique—an elaboration of some aspects of the argument, a response to criticisms, and in some ways a suggested reformulation of the exposition in such a way as, in our judgment, to make it less susceptible to criticism and misconstruction.

We begin by setting forth an alternative and, we think, a more intuitively comprehensible version of the efficient component-pricing rule, which we have characterized as the principles of competitive parity, and demonstrate its equivalence to Baumol and Sidak's prescription.

Next, since the major criticisms and misunderstandings of their formula relate to the absolute level of the charges for the essential input, to which they give comparatively little attention, we then demonstrate explicitly that the absolute level is indeed irrelevant to the requirements of efficient competition, provided the competitive parity rules are followed. We emphasize, however,

1. William E. Baumol & J. Gregory Sidak, *The Pricing of Inputs Sold to Competitors*, 11 YALE J. ON REG. 171 (1994).

that the absolute level, and therefore the extent to which the monopolist recovers its "opportunity costs," is in other respects economically important and must therefore be regulated.

We then examine the relationship between the rules and the goals of allocative and dynamic efficiency, about which Baumol and Sidak are almost silent. Finally, we confront two frequently encountered but erroneous criticisms—that the rules bias competition by giving a symmetrically favorable treatment to the incumbent suppliers of the essential input and that they leave those suppliers indifferent about remaining in the competitive market or withdrawing from it.

I. Principles of Competitive Parity

We have in various forums expounded what we have referred to as the principles of competitive parity in cases of bottleneck monopoly, the purpose and effect of which are to ensure that the competition between the controller of the bottleneck facility—or supplier of the essential input—and its actual and potential rivals is efficient. That is to say, rules framed in accordance with those principles should produce a distribution of responsibility for performing the contested function among the several rivals on the basis of their respective costs and so minimize the total cost of supplying the contested service.[2]

There are two requirements if this condition is to be met. First, there must be no discrimination, overt or implicit, between the division or affiliate of the company supplying the essential input—for which we will take as our example interconnection with the local telephone exchange company (LEC) network—and the rivals requiring access to it. The discrimination may of course be in the price or the quality or other terms or conditions of supply. In the interest of simplicity, we confine our attention to price, the interconnection charge, and assume that the competition in question is for the provision of local telephone service to business subscribers in concentrated metropolitan areas, including direct access to toll carriers.[3] Second, the margin between the monopolist's wholesale charge, which its rivals must pay, and its retail price, against which those rivals must compete, must reflect the former's economic costs of performing the function for which it and the others are competing.

These requirements reduce to two specific rules, as applied to our example: 1) The LEC's own retail local exchange operations, which are now subject to

2. Although we confine our attention here, for simplicity, to the cost of supplying an assumedly standardized service, our discussion should be understood as defining efficiency in terms of giving customers the best combination of service quality and cost.

3. Competitive access providers (CAPs) now operate, or plan to operate, in 90% of the 50 largest metropolitan areas of the United States. They currently operate in all of the 26 largest metropolitan areas. UNITED STATES BUREAU OF THE CENSUS, STATISTICAL ABSTRACT OF THE UNITED STATES 1992, Table 42 (1993); Compilation of CAP announcements (on file with authors).

competition, must be subject to the same access or interconnection charges as it imposes on its competitors, except to the extent that the (marginal) costs of providing that service to itself and to its competitors differ;[4] and (2) the LEC's retail charges must recover both that access or interconnection charge and the incremental cost of its own retail operations.

It is easy to see intuitively why and how these rules produce the same results as efficient component pricing, indeed, come to the same thing. If the LEC's retail charges must, according to the rules, fully reflect the same interconnection charge as it imposes on its rival plus its own incremental costs of conducting those retail operations; and the retail competitor must recover in its retail charges that same interconnection charge plus its own incremental costs of those same retail operations, if it is to survive, then the one or the other will be able to prevail in competition only if its full incremental costs[5] are equal to or lower than the other's.

II. The Level of the Interconnection Charge

A. *Irrelevance to First-Order Efficiency*

As the foregoing statement of the two requirements for compatibility of an interconnection charge with competitive parity clearly discloses, the *absolute level* of the charge is irrelevant to the ability of the non-integrated rival to compete with the LEC. That ability depends, rather, on the relationship or margin between the interconnection charge—whether high or low, monopolistic or competitive—and the prices at which the LEC offers the competitive service. This is another way of saying that what efficient competition requires is that the non-integrated rival not be subjected to a vertical squeeze, such as was one basis for the condemnation of the Aluminum Company of America (Alcoa)

4. This condition may be important in some circumstances, while unimportant in others. Since it is the task of efficient competition to ensure that the retailing function is carried on in the most efficient possible way—that is, at the lowest incremental cost—possible differences in the incremental cost of the LEC providing interconnection to its rivals, on the one side, and to its own retail operations, on the other, must be taken into account. An example of a situation in which the latter cost is higher than the former would be the competition between the LEC's own Centrex service and the customer installing its own private branch exchange (PBX) or switchboard. Centrex requires a separate access line to every individual subscriber's telephone; for the PBX, in contrast, the LEC provides access via a trunk in which access lines are shared among the subscriber's telephones. In this case, the minimum retail price charged by the LEC must reflect the higher cost of its providing access for its own retail services than of providing it to its competitor, the PBX. Conversely, if the cost to the LEC of providing interconnection to itself is lower than doing so for its competitor, the LEC should not be required to incorporate in its retail charges the higher cost of interconnecting with its rivals; it must not be denied the ability to reflect its lower cost in its own retail prices. (The competitor must of course have the right to demand interconnection in the most efficient manner possible.) For simplicity, we proceed here on the assumption that the respective interconnection costs are the same.

5. *See, supra* note 4 (incremental costs will include the respective costs of providing interconnection in the two cases).

under the antitrust laws. The source of the squeeze was not the absolute height of the price at which Alcoa sold ingot to competing fabricators of sheet but the margin between its respective prices for ingot and sheet. It was the failure of that margin to cover Alcoa's own fabricating costs that made it impossible for equally efficient independent fabricators to compete.[6] Whether the LEC's interconnection charge to its local competitors may properly exceed marginal costs, and if so by how much, is therefore essentially irrelevant to the preconditions for efficient competition.[7]

Baumol and Sidak are therefore correct in asserting the compatibility between efficient competition and the essential input supplier charging rivals for the "opportunity costs"[8] of making that input available—that is, the net profit from the retail sales that it loses to them—provided, as always, the supplier incorporates that same markup in its own retail charges as well. Regulation of telephone companies has typically held toll rates far above marginal costs, in order to generate a "contribution" to holding down the price of basic residential services.[9] Incorporation of that contribution (the difference between the retail price of the service now subject to competition and the LEC's marginal cost of providing it) in the interconnection charge to competitors, which permits the LEC to continue to recover it equally from the retail business it retains and from the retail business it loses, is in no way incompatible with efficient competition among them. Indeed, frequent assertions to the contrary notwithstanding,[10] a high interconnection charge that incorporates such a contribution is no more obstructive or discouraging of competitive entry than a low charge,[11] provided only that (following the principles of efficient component pricing or competitive parity) the competitive

6. United States v. Aluminum Company of America, 148 F.2d 416, 436-37 (2d Cir. 1945).

7. It is not strictly true that the level of the interconnection charge, and therefore of the final retail price, has no effect on the ease or likelihood of competitive entry, since it will help determine the total size of the market, because of the elasticity of demand for the final service; and, generally, the larger the market, the greater the ease of entry.

8. We choose to surround the term with quotation marks because, in contrast with ordinary usage, it refers here not to real economic costs—foregone opportunities for the use of real resources to produce other goods and services—but losses of money profits.

9. *See, e.g.*, Alfred E. Kahn, *The Road to More Intelligent Telephone Pricing*, 1 YALE J. ON REG. 139 (1984).

10. While the *Clear* decision of the New Zealand Court of Appeal, to which Baumol and Sidak refer, is for the reasons they mention (specifically, the absence in New Zealand of any institutions providing regulatory scrutiny of the level of the interconnection charge) not incompatible with the propositions that both Baumol-Willig and one of us presented in that proceeding, it is also obvious that the Court did not in fact fully grasp this aspect of our argument. Indeed, after correctly summarizing our exposition of the competitive neutrality of the level of the interconnection charges, the Court promptly demonstrated its failure to have understood the concept: "The inclusion in any access levy of a monopoly profit component must affect the price at which Clear can enter the market and so affect the vigour of its competitive conduct. Clear Communications, Ltd. v. Telecom Corp. of New Zealand, C.A. 25-93, slip op. at 33 (C.A. Dec. 17, 1993) (available at the Yale Law Library).

11. Baumol & Sidak, *supra* note 1, at 184.

retail prices charged by the LEC incorporate the same charge, leaving the margin unchanged.

Competitive parity requires and ensures that the outcome of the competition will be determined exclusively by the relative efficiency of the rivals in performing the retail functions they are contesting. Each must incorporate in its retail prices—the LEC under the constraints of the rules we have just outlined, the competitive retailer by the constraints of the market—the respective incremental costs of interconnecting their retail operations. Each bears the same burden of contribution to the recovery of the LEC's costs, so that the markup per unit of output is the same whether that output is sold to end users by the new competitor or by the LEC. And each must, under the same constraints, set its retail charges sufficiently above that level to cover its own incremental costs of performing that function. Suppose then that the competitor and the LEC compete vigorously, reducing their retail prices to the lowest possible level. Under the rules we have set forth, the LEC's lowest possible retail price will be lower than its competitors' when, and only when, the incremental cost of its service is lower than theirs. So the rules ensure the achievement of first-order productive efficiency: that is to say, their result is to distribute production among the competitors in such a way as to minimize total cost.

B. *The Other Side of the Coin*

The absolute level of the interconnection charge and of the opportunity costs or contribution it contains are, however, of genuine economic importance. It is this other side of the coin that we wish Baumol and Sidak had emphasized more than they do. True, as they observe, the fact that a firm subject to intense competition will seek to recover the net profits that it loses as a result of making any of its facilities available to competitors means that such a charge cannot be regarded in itself as monopolistic. But a monopolist too, will seek to recover those "opportunity costs," and by so doing recoup in its charges for the essential input such monopoly profits as it was previously earning from its direct retail sales. And so while efficient component pricing will ensure that the retailing function subject to competition is indeed performed by the most efficient of the rivals, it will not fulfill the other important function of competition—the erosion of monopoly profits.

To put it another way, the efficient component price charged by railroad *X* to railroad *Y* for interconnection over route AB of $7 per ton, in the Baumol and Sidak example,[12] taken in conjunction with a final price of $10 a ton for transport over the two routes, is indeed fully compatible with efficient

12. *Id.*

competition between the two, as they point out. That demonstration must, however, not be permitted to obscure the fact that price combinations of $6 and $9, $5 and $8, $4 and $7, and $3 and $6 would likewise ensure that result. Baumol and Sidak's conclusion that the efficient price for granting railroad *Y* interconnection is $7 a ton, "the price that would emerge in a competitive market,"[13] is therefore wholly dependent upon their original assumption that $10 a ton is indeed "the competitive price to shippers for transport from A to C."[14] That is to say, they assume that the $4 markup above railroad *X*'s marginal costs is the markup that would be required by a firm operating under conditions of perfect contestability, in a situation in which prices set at bare marginal costs would fail to cover total costs.

There is no basis in their example for quarreling with that assumption. On the other hand, the Baumol and Sidak essay seems at times to move from assumption to presumption: since "even in the most competitive of markets, no landlord will rent for less than the fee determined under the efficient component-pricing rule,"[15] which permits the incorporation of "opportunity cost"—sacrificed profits—they contend, "[s]ince . . . it is expected that competitive prices will be consistent with economic efficiency, the preceding argument establishes a presumption that the component-pricing rule is indeed optimal."[16] This argument is misleading or subject to misconstruction: those "opportunity costs" could just as well be monopoly profits. Baumol and Sidak recognize that possibility, but almost as an afterthought: "The villain is not the efficient component-pricing rule. The real problem is that the landlord has been permitted to charge monopoly prices for the final product in the first place."[17] Unsurprisingly, therefore, opponents of interconnection charges proposed by telephone companies, including Justice Gault, of the New Zealand Court of Appeal,[18] protest that the entitlement claimed by the LECs to recover the "opportunity costs" of business lost to competitors is merely a rationalization for the continued collection of monopoly profits. They are right, it could well be.

The ultimate determination of how large a markup of retail price above marginal cost is economically efficient, and therefore what level of contribution may correspondingly be incorporated in interconnection charges, must be supplied, in circumstances such as these, by regulation, the absence of which in New Zealand was the ultimate reason for the Court of Appeal rejecting our proposals. In the context of U.S.-style regulation, the contribution that a telephone company loses when competitors capture business from it is the

13. *Id.* at 183.
14. *Id.*
15. *Id.*
16. *Id.* at 196.
17. *Id.* at 25.
18. Clear Communications, Ltd., slip op. at 42 (Gault, J.).

markup that was already incorporated, with its regulatory commission's approval, in the regulated prices of the services in question. In regulatory proceedings assessing proposed interconnection charges, the only reasonable assumption is that the commission has set those permissible retail prices at levels (such as the $10 in the railroad example) just sufficient to enable the utility company to earn its necessary return on invested capital.

Another factor influencing the proper level of the interconnection charge is the degree to which the market for interconnection will permit its price to be set above incremental cost. In Baumol and Sidak's stylized examples, interconnection is an essential facility, a monopoly, whose price can be marked up above incremental cost by the full amount of foregone retail contribution because there are no competitive providers. In the world of telecommunications, however, LEC-provided interconnection is not equally essential in all circumstances: some customers have usage volumes sufficiently large that providers of competitive networks find it economic to connect directly with them, bypassing the LEC network, while continuing to use that network to interconnect with other, smaller customers. The effect of such competition is to reduce the efficient interconnection charge because it reduces the "opportunity cost" to the LEC of providing interconnection.[19] Indeed, as the market for interconnection becomes competitive, that "opportunity cost" goes toward zero, because an increase in the amount of interconnection that it provides does not reduce its retail sales equivalently.[20]

III. Allocative and Dynamic Considerations

Our recognition that the level of contribution incorporated in retail prices—and therefore, properly, in the wholesale, interconnection charge—must be determined, or must be assumed to have been determined, by regulators should not be interpreted as reflecting an opinion that regulatory commissions typically perform this task in a manner consistent with either static or dynamic efficiency. As for the former criterion, we have already alluded to the ubiquitous regulatory practice of requiring undercharging for basic residential

19. When interconnection is an LEC monopoly, the LEC supplies either it or retail service for every business customer. In this case, when it provides interconnection for a competitor, the LEC foregoes the contribution it would have earned from providing the retail service. In contrast, when there is more than one provider of interconnection, an LEC can supply additional interconnection service without concomitantly losing retail customers. Hence the "opportunity cost" of supplying interconnection, the "foregone contribution from retail service," is smaller when there is competition in the former market.

20. For example, if the retail price were 50¢ per minute and the marginal costs of toll and interconnection 4¢ and 3¢ respectively, then the efficient component price for interconnection would be 49¢ per minute (the 3¢ marginal cost of providing interconnection plus the 46¢ of foregone contribution). If, however, the competitor can connect directly with large business customers in the central business district at a cost of 6¢ per minute, the largest contribution the LEC can realize from these customers is 3¢, not the 46¢ embedded in the 49¢ per minute price.

service and overcharging for toll and local access services to businesses, particularly in concentrated metropolitan areas. These policies produce severe allocative inefficiency, primarily because of their repression of demand for the overcharged services.[21] Not surprisingly, the latter markets are the ones that have been especially attractive to competitors. Efficient component pricing becomes necessary, then, to avoid technical or productive inefficiency, but by preventing competition from driving prices to marginal cost, it preserves the allocative inefficiency inherent in the preexisting price structure.

The essentially cost-plus character of traditional regulation and the consequently inadequate incentives it offers for continual improvements in efficiency are likewise widely recognized. An important reason for opening telecommunications markets to efficient competition, across the board, is the expectation that it will produce improvements in dynamic efficiency as well.

The expected superiority of competition in stimulating technological progress and service innovation has led critics of efficient component pricing or competitive parity rules to argue that regulators should accord competitors terms of interconnection more favorable than those principles would require, typically by excluding part or all of the lost contribution from the interconnection charge. Frequently, these recommendations betray a failure to comprehend the rules—an erroneous belief that the lower the charge, the lower the barrier to entry—and/or a failure to make explicit their intention that, while the competitors would be partially or totally exempt from the contribution, the LEC would continue to be required to incorporate the full previous markup in its own retail prices of the competitive services. Under that arrangement, the incumbent company would in effect be forced to provide its would-be rivals with a price umbrella far above its own marginal costs, enabling them to survive and prosper even if their marginal costs of performing the contested function were higher than its own.

Translated to an intellectually defensible version, these proposals reduce to assertions that the competition encouraged by such departures from the conditions of (statically) efficient competition will eventually more than compensate for the static, first-order (production) inefficiencies that would flow from the proposed violation of the competitive parity rules. This rationale comes down to the historic infant industry argument: achieving the goal of an effectively competitive market may require temporarily handicapping incumbents or offering preferences to their inexperienced, fledgling rivals, in order to give the latter a fair opportunity to acquire sufficient experience, overcome the advantages of incumbency, and demonstrate their competitive worthiness and ability ultimately to survive without preference or protection.

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21. *See supra* note 6; *see also* Alfred E. Kahn & William B. Shew, *Current Issues in Telecommunications Regulation: Pricing*, 4 YALE J. ON REG. 191 (1987).

While such arguments are not unequivocally incorrect as a matter of principle, most economists would question their wisdom in most circumstances, in consideration of

(1) the inescapable costs of such preferences, issuing from their distortion of competition and consequent interference with the most efficient distribution of the supply function among competitors on the basis of their *current* marginal costs;
(2) the social costs of encouraging would-be competitors to devote a large portion of their energies to rent seeking—obtaining and perpetuating preferential subsidies and protections, rather than concentrating on providing superior service to consumers at attractive prices;
(3) the preferability of leaving determinations of the long-term prospects of new and uncertain ventures to the market generally and to financial markets in particular. If a new venture of this kind is indeed meritorious—that is to say, carries sufficient promise of becoming profitable after an initial learning period—then the general presumption is that investors will be willing to supply the necessary capital, including the coverage of losses during the learning period;
(4) the difficulty of determining whether the would-be competitor is indeed a struggling, inexperienced but promising newcomer that both requires and deserves some special preference in order to give it an opportunity to demonstrate its competitive merits; and
(5) the lesson of history that so long as companies are insulated from competition, they are, to that extent and for that reason, less likely ever to grow up and attain the ability to compete without such special protections. The history of telecommunications regulation in the United States over the last several decades is replete with examples of competitors (as well, historically, as the incumbent AT&T!) making unabashed use of the regulatory process over long periods to handicap rivals and to preserve artificial, regulatorily-conferred advantages and consequent distortions of competition.

It takes very little imagination or information about the industry today and about the actual identity of the emerging new competitors of the LECs (such as of US West with Time Warner, of MCI with various cable systems and metropolitan competitive access providers, and of the ill-fated multi-billion dollar alliance of Bell Atlantic and TCI, the largest owner of cable systems in the country) to envision the consequences of a policy of introducing such systems of competitive handicaps of incumbents and preferences for entrants. History clearly justifies the prediction: if commissions adopt such recommended

policies as identifying new entrants as struggling infants, they will continue to find themselves for years subject to similar entreaties by billion-dollar "infants," suitably diapered and with mendicant bowls in hand, continuing to play the game of regulatory rent-seeking, in order to avoid having their merits subjected to an unbiased market test.

The best answers to the familiar limitations of traditional regulation as a provider of incentives for improving efficiency and service innovation are progressive deregulation, the opening of all markets to efficient competition under rules of competitive parity, and reform of the methods of regulating monopoly to mitigate, if not totally eliminate, its cost-plus character. The most attractive of these reforms, which is being adopted widely abroad, involves abandoning rate base/rate of return and replacing it with pure price regulation, typically with prescribed indexations for inflation and adjustments for certain kinds of unforeseeable exogenous developments and achievable gains in productivity.[22]

IV. Fallacious Criticisms of the Efficient Component-Pricing Rule

A. *The Charge of Asymmetry*

Although the Baumol and Sidak prescription and our rules for competitive parity are logically unassailable, we are also aware that they are in at least one important respect counter-intuitive. It is therefore necessary periodically to explain to professional economists as well as lay persons that they are neither inefficient nor unfair. The case in opposition—plausible but incorrect—takes a variety of forms:

- It cannot be conducive to efficient competition if rivals of an incumbent telephone company are forced, because of its monopoly control over an essential input (even with the permission of regulators), to pay it a price for that input higher than incremental cost or than the price that would be set if the supplier were constrained by effective competition.

- It cannot be consistent with efficient competition if challengers of an incumbent monopolist are forced to pay a price for its services that ensures its retention of the profits from whatever business it loses to them.

22. *See, e.g.*, INCENTIVE REGULATION, REVIEWING RPI-X & PROMOTING COMPETITION (Tony Gilland ed., 1992); PRICE CAPS AND INCENTIVE REGULATION IN TELECOMMUNICATIONS (Michael A. Einhorn ed., 1991).

- Rendering the incumbent whole in this way means that it will be indifferent about competing at all, since it will retain the same profits on business it loses to competitors as on business that it retains.

- In an industry ubiquitously characterized by economies of scope, prices set at the marginal or full incremental costs of individual services are highly likely to yield revenues insufficient in the aggregate to recover common costs and therefore to yield an economically required return on total investment. A regime, regulatorily administered and approved or not, that ensures an incumbent company continued recovery of the requisite markups above marginal costs from the competitive services—recovered from its rivals—leaves equally or even more efficient competitors incapable of recovering the equally necessary contribution to *their* common costs. That is to say, even if the competitors' incremental costs of performing the competitive function are no higher than those of the incumbent company, the competitive price that they must meet will be sufficient only to recover those marginal costs plus a contribution to the common costs *of their rivals*—which they will be forced to turn over to those rivals in the charge they pay for interconnection. In these circumstances, manifestly, there will be no room in that price for any recovery of *their* common costs, even though the contribution they require may be no greater than the one required by the incumbent monopolist.

Baumol and Sidak explicitly confront these considerations and supply the correct response in their penultimate section, "*Entry by Efficient Rivals.*" This is a case, however, in which the argument of the other side has such plausibility, we believe it essential to spell out the elementary economics of the response more fully than Baumol and Sidak have:

1. The treatment under our rules of the incumbent telephone company and its would-be rivals is indeed asymmetrical. The justification is that the former are and have been thoroughly regulated public utility enterprises, operating under an arrangement that is supposed to assure them a fair opportunity to recover a return on and of their prudently undertaken investments, in exchange for regulatory limitations on their earnings and the assumption of obligations to provide service ubiquitously.

2. The LECs have been required by their regulators to provide much of their service at rates either below incremental costs or embodying inefficiently low markups above those costs. Their regulators have permitted them, in compensation, to recover the requisite contribution to their common costs disproportionately in rates for some services—in particular, toll and both basic

and optional services to urban business customers—substantially above both incremental and embedded costs. The latter, inflated rates have artificially induced competitive entry. The preferable method of removing that artificial inducement would be for regulators to permit a rebalancing of rates for the several services to bring them closer to economically efficient levels.[23] Meanwhile, the principles we have enunciated merely perpetuate the preexisting regulatorily-prescribed set of markups, sufficient—but in principle no more than sufficient—to permit the utility companies to earn the return to which they are entitled.

3. The non-marginal, common or fixed costs of incumbent telephone companies and competitors alike are irrelevant to the efficient distribution of the contested business among them. The only relevant determinant is their comparative marginal costs, and that is the basis on which the rules of competitive parity and efficient component pricing would ensure that efficient outcome.

The maximization of efficiency (concededly, statically) means minimizing the additional, marginal or incremental costs of supply. When a would-be entrant proposes to offer its services in competition with an existing supplier, it is the task of efficient competition to ensure that the aspiring competitor prevails to the extent—and only to the extent—that the total incremental costs to society involved in its supplying the service are equal to or lower than those of the incumbent. That is precisely what our rules accomplish. To the protest of aspiring competitors that, while their incremental costs of providing the competitive service might be no higher than those of the incumbent telephone companies, they cannot take over the portion of the supply function to which those low marginal costs entitle them unless they can also recover some contribution to the coverage of their common costs, then, there are two equivalent answers: (1) In the situation they posit, their incremental costs of supplying the competitive service are really higher than those of the incumbent telephone company, because, concededly, they are unable to undertake the supply of those services unless they are able to recover also some contribution to their common costs; or (2) if, in order to enter the market, the would-be competitor must itself incur certain common, fixed costs of supplying a number of services, some portion of which it must recover in the price of the competitive service, production by two firms, each of them incurring significant fixed costs, is socially inefficient. If the incumbent telephone companies could profitably retain the competitive business at prices covering only their marginal costs but the challengers require some larger markup, in order to recover for themselves some of their fixed, common costs, then it is inefficient for society

23. *See, e.g.*, BROWN & SIBLEY, THE THEORY OF PUBLIC UTILITY PRICING (1986); ALFRED E. KAHN, THE ECONOMICS OF REGULATION, ch. 5 (1988).

to make it possible for the latter to do so;[24] it would involve the wasteful duplication and incurrence of new, additional common costs of facilities and activities already provided by the incumbent. As Baumol and Sidak point out, the total costs incurred by society would be inflated by the additional fixed costs incurred by the entrants, even though they might require no larger contribution than the LECs to the recovery of those costs.

In the interest of logical completeness, we respond to the counter-consideration, to which we have already alluded, that this reasoning is entirely static, that society's incurring of the costs of inefficient duplication—the higher real costs of making it possible for the market to be served by two or more competitors rather than one—may be a small price to pay for the dynamic benefits of the competition it makes possible. Our response is an expression preference, in the interest of both static efficiency and superior dynamic performance, for three policies: (1) leaving it to the market to determine whether the service in question is a natural monopoly (in which event the duplication of fixed costs would be inefficient), (2) opening that market to efficient competitive entry, rather than biasing the process in such a way as to encourage inefficient entry as well, while also (3) reforming regulation in such a way as to give the monopolist incentives to improve its efficiency and to innovate more closely approximating incentives of firms in unregulated markets.

B. *Incumbent Company Withdrawal from Competition*

Opponents of the pricing rules we espouse respond also that if incumbent telephone companies are permitted to retain, in their wholesale interconnection charges, whatever net profits they previously obtained by selling at retail, they might simply withdraw from the retail markets, thereby frustrating the purpose of opening those markets to competition.

There are several reasons for dismissing the possibility. First, there will, in practice, be a systematic tendency for the contribution element in the interconnection charge to fall short of fully compensating the telephone companies for the loss of profits from the retail business they lose to competitors. The reason is that the contribution element will necessarily be calculated as an average from the sales of the services that the competitors propose to offer—in our illustration, to business customers as a group. Yet the contribution the LECs actually receive from those services typically varies widely among these customers, depending on the size of the customer, the

24. True, under the rules, the incumbents recover also a contribution above marginal costs in either the retail price of the business they retain or in the interconnection charge on the business they lose. The fact remains that they could profitably retain the business even if the price covered only marginal costs; and as we have seen, collection of the contribution confers no advantage upon them in competing for the retail part of the business, since both they and their rivals must reflect that contribution equally in their competitive prices.

volume of its usage and the costs of serving it. The experience with competition in telecommunications demonstrates that new entrants will concentrate their efforts on the more profitable customers, below-average in the cost of connecting them and above-average in the amount of contribution they generate. The telephone companies will therefore fight to hold on to those unusually profitable accounts; the interconnection charge will not fully compensate for their loss.

Second, the monopoly power of the telephone companies as wholesale suppliers of access to their networks—on which, according to the withdrawal from retailing scenario, they would continue to rely for the continued flow of profit—is clearly limited and transient. Their networks are already subject to bypass through interconnections between large customers and interexchange carriers, either directly or via competitive access providers, and they face the growing threat of direct competitive challenge also from radio-based telephone carriers[25] and cable operators,[26] whether or not in alliance with out-of-region telephone companies. In these circumstances, it would be suicidal for the local telephone companies to retreat from retail competition and attempt to rely solely on their continued ability to exploit such monopoly power as they currently enjoy in providing access to ultimate customers.

Moreover, third, if the LECs were to retreat, they would give up competitive advantages that they now undeniably enjoy, arising out of their long-standing relationship with their present customers and the goodwill they have accumulated over the years as "the" telephone company. Finally, and probably most important, there is the close-to-universal recognition in the industry that the future profits of the telephone companies will depend increasingly on the vigor with which they exploit the potential of telecommunications technology by constantly developing and expanding the range and variety of their offerings. With the rapidly growing threat of competition to their historic monopoly, the likelihood that telephone companies will withdraw from the retail business, opting out of the competitive race to provide ultimate customers with an expanding range of services—informational, communications, video and all the rest—must be equivalent to the likelihood of their withdrawing from business entirely, which is indeed what withdrawal from retailing would ultimately entail.

25. Witness, for example, AT&T's pending acquisition of a financial interest in McCaw, the largest operator of cellular systems in the U.S.

26. Witness, for example, MCI's recent announcement of an ambitious program to construct its own local networks by, among other ways, acquiring financial interests in cable companies. WALL ST. J., Dec. 30, 1993, at A3.

Conclusion

As the public utilities are opened to competition, regulation must take on the new function of ensuring access of competitors to the bottleneck facilities controlled by the incumbent companies on terms that ensure the competition will be efficient, while continuing to honor its historic obligation to afford the still-regulated utilities a fair opportunity to recover their prudently incurred costs. Baumol and Sidak's efficient component-pricing and our rules of competitive parity offer the efficient solution to the pricing of those essential inputs, provided the level of the charges is subject to effective regulation or, eventually, constrained by effective competition.