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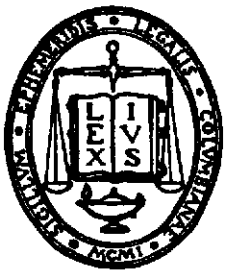

SYMPOSIUM: TELECOMMUNICATIONS LAW: UNSCRAMBLING THE SIGNALS, UNBUNDLING THE LAW

THE TRAGEDY OF THE TELECOMMONS: GOVERNMENT PRICING OF UNBUNDLED NETWORK ELEMENTS UNDER THE TELECOMMUNICATIONS ACT OF 1996

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THE TRAGEDY OF THE TELECOMMONS: GOVERNMENT PRICING OF UNBUNDLED NETWORK ELEMENTS UNDER THE TELECOMMUNICATIONS ACT OF 1996

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Until last year, local telephone markets had been treated as natural monopolies and thus subject to regulation. The Telecommunications Act of 1996 (the "Act") seeks to introduce competition into these markets. One method the Act adopts to stimulate such competition is to mandate that incumbent local exchange carriers (LECs) provide access to their unbundled network elements (UNEs). UNEs are the building blocks of a local telephone network, such as loops and switches. In August of 1996, the Federal Communications Commission (FCC) issued its First Report and Order, *which established a pricing rule for UNEs. The FCC's pricing rule sets the price for a UNE at its total element long-run incremental cost (TELRIC) plus a reasonable share of the incumbent LEC's forward-looking common costs. Mr. Sidak and Professor Spulber propose a pricing methodology to implement that rule based on a combination of what they call the market-determined efficient component-pricing rule (M-ECPR) and competitively neutral end-user charges. They assert that using the M-ECPR to price UNE access is more faithful to the language and intent of the Act than is the approach adopted by the FCC. They also maintain that the FCC misunderstood the efficient component-pricing rule when the agency rejected it as a basis of pricing UNEs*

After outlining their proposal for pricing UNEs, Mr. Sidak and Professor Spulber argue that the FCC's pricing rule is problematic because it prevents the incumbent LEC from recovering its total costs by denying any recovery of the LEC's historical costs and ensuring that it will not fully recover its forward-looking costs. The authors then respond to criticisms of the M-ECPR by various economists and refute assertions that the principal authors of the original efficient component-pricing rule rejected the M-ECPR in favor of TELRIC pricing for UNEs. Mr. Sidak and Professor Spulber con-

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clude by warning that the FCC's pricing rule would discourage investment in local telecommunications networks and may eventually drive LECs into bankruptcy.

INTRODUCTION

The Telecommunications Act of 1996 promised to replace nearly a century of monopoly regulation of the local telephone exchange with a regime that Congress said would "promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunication technologies."[1] Sections 251 and 252 of the Communications Act, added by the Telecommunications Act of 1996, are the core provisions by which Congress sought to open local telephone markets to competition.[2] Those two sections address the pricing of unbundled access to the network of the incumbent local exchange carrier (LEC). Roughly speaking, there are three ways for a firm to enter local telephony. First, it can build its own network and seek "interconnection" with the network of the incumbent LEC so that the entrant's customers can complete calls to, and receive calls from, the incumbent's customers. The relevant policy question is how much the incumbent LEC should charge to terminate a call originating on the entrant's network, and vice versa. The second method of entry is through "resale," which means that the entrant buys from the incumbent LEC at a wholesale price the basic service provided to the customer. The entrant then retails that service under its own brand name and perhaps combines the service with other offerings. In the case of resale, the pertinent question is the size of the wholesale discount that the entrant should receive off the retail price for the basic service that the incumbent LEC sells to its customers. The third method of entry is through the leasing of unbundled network elements (UNEs), which are the building blocks of the local network, such as loops and switches. The entrant can then build its own network on an à la carte basis, leasing some inputs from the incumbent LEC and procuring other inputs from rivals already in the market (such as local transport services provided by competitive access providers) or directly from equipment vendors (such as manufacturers of switches).

If the entrant and the incumbent LEC cannot negotiate mutually acceptable prices, terms, and conditions of interconnection, resale, or the leasing of UNEs, the Telecommunications Act of 1996 directs the state public utilities commission (PUC) to resolve the dispute through

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1. Telecommunications Act of 1996, Pub. L. No. 104-104, 1996 U.S.C.C.A.N. (110 Stat.) 56, 56 (to be codified in scattered sections of 47 U.S.C.).

2. See Telecommunications Act of 1996, 47 U.S.C.A. §§ 251–252 (West Supp. 1997). In addition, Congress abolished any remaining legal barriers to entry: "No State or local statute or regulation, or other State or local legal requirement, may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service." Id. § 253(a).

compulsory arbitration.[3] It appeared as of late 1996 that entrants and incumbent LECs had been unable to reach any voluntary agreements on the pricing of resale or UNEs. As a consequence, literally hundreds of arbitration proceedings began in the fall of 1996. In most cases, each arbitration was a one-on-one proceeding between a single entrant and the incumbent LEC. Presumably, each arbitration will produce an appeal by the loser that will eventually go to the supreme court of the relevant state. It is also possible that collateral attacks on the state arbitration decisions will be launched in federal court. Under either scenario there will likely be conflicts that arise in the interpretation of the Telecommunications Act of 1996. Those conflicts could be between the courts of the several states, between the federal courts of appeals, or between the state courts and the federal courts. The prospect that the Supreme Court will review the substantive pricing provisions of the Telecommunications Act of 1996 is therefore highly likely. The appeal would present questions of statutory interpretation under the Telecommunications Act of 1996, but it also could pose takings questions presented by incumbent LECs and antitrust questions presented by entrants.

Sections 251 and 252 of the Communications Act, added by the Telecommunications Act of 1996, provide a skeleton for the pricing of interconnection, resale, and UNEs. Already litigation has erupted over whether, as a matter of jurisdiction, the proper body for adding the flesh to those provisions is the Federal Communications Commission (FCC) or the state PUCs. In what was regarded by LECs and some PUCs as a power grab, the FCC issued its *First Report and Order* in August 1996, a 683-page directive that established pricing rules that the agency expected the states to follow.[4] The grounds for the multiple appeals filed were, generally speaking, that the FCC had exceeded its jurisdiction and that the substantive pricing standards that it adopted were so low as to effect an uncompensated taking of the property of incumbent LECs in violation of the Fifth Amendment.[5] As of this writing, the U.S. Court of Appeals for the Eighth Circuit has stayed the pricing provisions of the *First Report and Order* pending the court's decision on the merits of the appeal.[6] In the meantime, the Telecommunications Act of 1996 obliges the state PUCs to push forward to establish prices for resale and UNEs.

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3. See id. § 252(b). The state commission must rule on the arbitration within nine months of the time that the incumbent LEC was notified of the entrant's request for arbitration. See id. § 252(b)(4)(C).

4. See In re Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 and Interconnection Between Local Exchange Carriers and Commercial Mobile Radio Service Providers, 11 FCC Rcd. 15,499 (1996) (first report and order) [hereinafter First Report and Order].

5. U.S. Const. amend. V ("[N]or shall private property be taken for public use, without just compensation.").

6. See Iowa Util. Bd. v. FCC, No. 96-3321, 1996 U.S. App. LEXIS 27953 (8th Cir. Oct. 15, 1996) (consolidating nineteen actions; additional docket numbers omitted).

Our focus in this Article is the pricing of government-mandated access to UNEs. That topic raises important questions of regulatory economics. But the complexity of those questions should not obscure one simple fact: An incumbent LEC will become insolvent if it cannot recover its total costs. If the incumbent LEC is to be required by the government to sell its inputs to competitors, then the LEC should be reimbursed for all its costs and be allowed the reasonable rate of return expressly authorized by Congress. The prices for UNEs that entrants have proposed in actual arbitration proceedings, however, would deny the incumbent LEC recovery of, and a reasonable return on, its costs. As a consequence, the incumbent LEC's shareholders would be forced to subsidize competitors as they enter local exchange telephony. The same problems arise under the pricing rules and default proxy rates established by the FCC in its *First Report and Order*. Nonetheless, some states have adopted prices virtually identical to the FCC's proxy prices while purporting to reach that result by some means other than deferring to FCC rules.[7] If imposed on the incumbent LEC, such prices for mandatory network access would raise significant takings questions.[8] In addition, the incumbent LEC's inability to recover its costs would have serious ramifications for consumers. Just as rent control can harm incentives for investment in maintaining the quality of the housing stock, so also prices for UNEs that impair the incumbent LEC's financial integrity would discourage investment in the local telecommunications network. That investment, however, is critical not only to replacing the existing infrastructure as it wears out, but also to maintaining and expanding the infrastructure necessary for new competitors to enter the market for local telephony by any means other than building their own network facilities.

In this Article we provide a pricing rule for the states to apply when administering sections 251 and 252 that is appropriate on both legal and economic grounds. The rule does not depend on how the Eighth Circuit (and perhaps the Supreme Court) ultimately resolves the jurisdictional question presented by the *First Report and Order*. Moreover, our rule anticipates and avoids the takings question, which would otherwise fuel additional litigation once the jurisdictional question has been resolved.[9] We

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7. See, e.g., Application of AT&T Communications of Pa., Inc.; Petition for Arbitration of Interconnection Agreement with GTE North, Inc., No. A-310125F0002, at 16–17 (Pa. Pub. Util. Comm'n Oct. 10, 1996) (recommended decision) (Meehan, Arb.).

8. We explore the takings questions in depth in J. Gregory Sidak & Daniel F. Spulber, Deregulatory Takings and the Regulatory Contract: The Competitive Transformation of Network Industries in the United States (forthcoming 1997) [hereinafter Sidak & Spulber, Deregulatory Takings and the Regulatory Contract] and J. Gregory Sidak & Daniel F. Spulber, Deregulatory Takings and Breach of the Regulatory Contract, 71 N.Y.U. L. Rev. 851 (1996) [hereinafter Sidak & Spulber, Deregulatory Takings and Breach of the Regulatory Contract]. We provide only an abbreviated discussion of the pertinent takings jurisprudence in this Article.

9. Our rule is thus consistent with the principle that a court should construe a statute so as to avoid a "'question of constitutional law in advance of the necessity of deciding it.'"

argue that prices for UNEs should be set according to a standard that we call the market-determined efficient component-pricing rule (M-ECPR). Our rule is a refinement of the efficient component-pricing rule (ECPR) developed by Professors William J. Baumol and Robert D. Willig.[10] As we shall explain, the M-ECPR satisfies the FCC's recommendation that prices for UNEs be based on forward-looking costs. The M-ECPR used alone, however, will not allow the incumbent LEC to recover its full forward-looking costs because states typically have mandated cross-subsidies that are embedded in the incumbent LEC's rate structure. For a state PUC to avoid leaving the incumbent LEC uncompensated for a portion of its costs, the commission must also establish a competitively neutral, nonbypassable end-user charge. When the M-ECPR is combined with a system of competitively neutral end-user charges, the rule satisfies Congress's requirement, discussed below, that prices be based on costs and allow for a reasonable profit.

We emphasize at the outset that the M-ECPR differs from the FCC's erroneous description of the ECPR in its *First Report and Order*, which, to avoid confusion, we label the FCC-ECPR.[11] Unlike the simplistic FCC-ECPR, the M-ECPR takes full account of competitive entry when setting prices for UNEs. In that respect, the M-ECPR benefits consumers and avoids all of the shortcomings that the FCC attributed to the FCC-ECPR in its *First Report and Order*. In contrast, setting prices equal to total element long-run incremental cost (TELRIC), as many entrants have proposed, is inappropriate for pricing UNEs for a number of reasons. Such

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Ashwander v. Tennessee Valley Auth., 297 U.S. 288, 346 (1936) (Brandeis, J., concurring) (quoting Liverpool, N.Y. & Philadelphia S.S. Co. v. Commissioners of Emigration, 113 U.S. 33, 39 (1885)). This principle applies to takings. See, e.g., United States v. Security Indus. Bank, 459 U.S. 70, 81–82 (1982).

10. See William J. Baumol & Robert D. Willig, Brief of Evidence: Economic Principles for Evaluation of the Issues Raised by Clear Communications Ltd. on Interconnection with Telecom Corporation of New Zealand Ltd. [hereinafter Baumol-Willig New Zealand Brief], submitted in Clear Communications Ltd. v. Telecom Corp. of N.Z., slip op. (H.C. Dec. 22, 1992), rev'd, slip op. (C.A. Dec. 17, 1993), rev'd, [1995] 1 N.Z.L.R. 385 (P.C.); William J. Baumol & J. Gregory Sidak, Toward Competition in Local Telephony 93–116 (1994) [hereinafter Baumol & Sidak, Toward Competition in Local Telephony]; William J. Baumol & J. Gregory Sidak, Transmission Pricing and Stranded Costs in the Electric Power Industry 115–38 (1995) [hereinafter Baumol & Sidak, Transmission Pricing and Stranded Costs]; William J. Baumol, Some Subtle Issues in Railroad Regulation, 10 Int'l J. Transport Econ. 341 (1983) [hereinafter Baumol, Some Subtle Issues in Railroad Regulation]; William J. Baumol & J. Gregory Sidak, The Pricing of Inputs Sold to Competitors, 11 Yale J. on Reg. 171 (1994) [hereinafter Baumol & Sidak, Pricing of Inputs Sold to Competitors]; see also William J. Baumol et al., Parity Pricing and Its Critics: Necessary Conditions for Efficiency in the Provision of Bottleneck Services to Competitors, 14 Yale J. on Reg. 145, 146–54 (1997) [hereinafter Baumol et al., Parity Pricing and Its Critics] (coauthored with economists Janusz A. Ordover & Robert D. Willig).

11. See First Report and Order, supra note 4, 11 FCC Rcd. at 15,859–60 ¶¶ 708–711; see also Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, 11 FCC Rcd. 14,171, 14,222 ¶ 147 (1996) (proposed Apr. 19, 1996) (notice of proposed rulemaking) [hereinafter Interconnection NPRM].

pricing subsidizes entrants and removes the incumbent LEC's opportunity to earn revenues that cover its costs, since TELRIC excludes the LEC's shared and common costs.

Part I of this Article shows that the M-ECPR provides a unified framework for pricing UNEs. Part II argues that the *First Report and Order* prevents an incumbent LEC from covering its total costs because the FCC's pricing rules would deny any recovery of the incumbent LEC's historical costs and would ensure that full recovery of its forward-looking costs would be impossible to achieve. The default prices that the FCC established as an "interim" measure would only exacerbate that shortfall in cost recovery. Part III discusses the economic problems that state PUCs would avoid by using M-ECPR pricing; it also responds to the criticisms of M-ECPR pricing raised by expert economists who have testified on behalf of entrants advocating lower prices for resale and UNEs.[12] We show that those critics of M-ECPR pricing do not appreciate that the rule is efficient and compensatory. Part IV responds to a controversy at the cutting edge of the state and federal efforts to implement the pricing provisions of the Telecommunication Act of 1996: the claim that the principal authors of the efficient component-pricing rule, Professors Baumol and Willig, rejected the M-ECPR in favor of TELRIC pricing for UNEs. Part V critically evaluates the proposal of numerous economists to price UNEs at TELRIC. We argue that such pricing would have deleterious effects on economic welfare and that its claimed efficiency is a mirage. In Part VI we conclude by sounding a warning: If they adopt inappropriate pricing standards for UNEs, regulators may precipitate the deterioration of the local telecommunications network that we call the tragedy of the telecommons. In that scenario, the financial nonviability of the private firm that owned and operated the network used for local exchange telephony would necessitate direct public intervention. The Telecommunications Act of 1996 could therefore lead to a government takeover of the local exchange.

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12. See, e.g., David L. Kaserman et al., Local Competition Issues and the Telecommunications Act of 1996, at 14–17 (July 15, 1996) (on file with the Columbia Law Review) [hereinafter Kaserman Report] (prepared for AT&T Corp.); Rebuttal Testimony of Frederick R. Warren-Boulton, AT&T Communications of the Southwest, Inc.'s Petition for Arbitration Pursuant to Section 252(b) of the Telecomm. Act of 1996 to Establish an Interconnection Agreement with GTE Midwest Inc., (Pub. Serv. Comm'n of Mo., filed Oct. 21, 1996) (No. TO-97-63) [hereinafter Warren-Boulton Rebuttal Testimony] (prepared for AT&T Communications of the Southwest, Inc.); Prefiled Direct Testimony of Janusz A. Ordover, Tr. at 33–47, Petition of AT&T Communications of Wis., Inc. for Arbitration per § 252(b) of the Telecomm. Act of 1996 to Establish an Interconnection Agreement with GTE N. Inc., (Pub. Serv. Comm'n of Wis., filed Oct. 21, 1996) (Nos. 265-MA-102, 2180-MA-100) [hereinafter Ordover Testimony] (prepared for AT&T Communications of Wisconsin, Inc.).

I. The Market-Determined Efficient Component-Pricing Rule

The Telecommunications Act of 1996 added section 252(d)(1) to the Communications Act, which states that the price of an unbundled network element "(A) shall be—(i) based on the cost (determined without reference to a rate-of-return or other rate-based proceeding) of providing the . . . network element . . . and (ii) nondiscriminatory, and (B) may include a reasonable profit."[13] In its *First Report and Order*, the FCC related section 252(d)(1) to the agency's notion of total element long-run incremental cost and reasoned that "under a TELRIC methodology, incumbent LECs' prices for . . . unbundled network elements shall recover the forward-looking costs directly attributable to the specified element, as well as a reasonable allocation of forward-looking common costs."[14]

The M-ECPR satisfies the FCC's recommendation that prices for UNEs be based on forward-looking costs. When combined with a system of competitively neutral end-user charges, the M-ECPR also satisfies the requirement of Congress that prices be based on costs and allow for a reasonable profit.

A. *Cost and Profit Concepts*

It is necessary to define key cost and profit concepts before one can understand the debate over the pricing of UNEs and appreciate how the adoption of the M-ECPR would achieve the goals of sections 251 and 252.

1. *Costs.* — The *First Report and Order* refers to various cost concepts. The total service long-run incremental cost (TSLRIC) of a service sold to end users equals the difference in a firm's total costs with and without the provision of that service. In its *First Report and Order* the FCC coined the term total element long-run incremental cost (TELRIC) to describe costs that are incremental (or attributable) to individual network elements.[15] A firm's *joint* costs are those costs incurred when two or more services are produced in fixed proportion.[16] A firm's *common* costs are costs incurred in the provision of some, or all, of the firm's services that are not attributable to any individual service.[17] Hence, common costs can be avoided only by shutting down the entire firm or by not producing a particular group of services under study. Following the FCC's approach, we use the

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13. Telecommunications Act of 1996, 47 U.S.C.A. § 252(d)(1) (West Supp. 1997).

14. First Report and Order, supra note 4, 11 FCC Rcd. at 15,847 ¶ 682.

15. See id. at 15,845–46 ¶ 678. We use TELRIC to refer to the long-run incremental cost of an unbundled network element, and TSLRIC to refer to the long-run incremental cost of a retail service.

16. As the FCC notes, joint costs have the property that "when one product is produced, a second product is generated by the same production process at no additional cost." Id. at 15,845 ¶ 676. Feed for sheep, for example, is a joint cost of mutton and wool.

17. The FCC's definition of common costs includes what are sometimes called *shared* costs. See id. Shared costs are incurred in the provision of two or more services (but not the collection of all the firm's services) but are not incremental to any individual service.

term *common* costs to refer collectively to all costs that are not incremental costs.[18] In addition, a regulated firm may have *residual* costs caused, for example, by assets that remain on its books even though they have no economic value.

To illustrate the concepts of incremental costs and common costs, consider a street vendor who operates a stand that sells both hot dogs and hamburgers. The incremental cost of a hot dog includes the cost to the vendor of the hot dog, the bun, and condiments. Similarly, the incremental cost of a hamburger includes the cost of the ground beef, the bun, and condiments. The common costs include the cost of the grill used to cook both the hot dogs and hamburgers, as well as the cost of the stand. In the provision of local telephone service, common costs include general and administrative costs (for example, accounting and finance, external relations, and human resources) and support costs (for example, general purpose computers). Incremental (or attributable) costs include the costs of central office switching, and cable and wire facilities.

Both incremental costs and common costs necessarily include the return on invested capital. For example, the TSLRIC of a service must include a return on capital sufficient to keep those resources in their current employment. If the return on capital invested to provide a service is below the competitive or fair rate of return, the capital market will operate to move those investments to other projects that yield (at least) a competitive return. A competitive or fair rate of return is the return that could be earned on an investment of comparable risk.

2. *Profit.* — Section 252(d)(1) and the *First Report and Order* also refer to "profit."[19] A firm earns a "reasonable profit" when its economic profits equal zero. Economic profits are zero when total revenues equal total costs, inclusive of a competitive return on capital. The incumbent LEC's return on capital equals the sum of the return on capital for its incremental and common costs. The allowance in section 252(d)(1) for a reasonable profit is accomplished when the incumbent LEC's prices for its regulated services are established so that, on average, the LEC earns zero economic profits on the entire array of regulated services that it supplies. That is, the firm's rates should be established so that, on average, it earns zero economic profits on its regulated services as a whole. Of course, random market factors may cause the LEC's profits to exceed or fall below that value in any particular period.

At the risk of redundancy, four points bear emphasis because they have generated controversy in arbitration proceedings to establish prices for UNEs. First, *firms* earn profits; individual products or services produced by firms do not. It is therefore an incorrect reading of section 252(d)(1) to say that no individual UNE may earn more than a reason-

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18. See id.

19. Telecommunications Act of 1996, 47 U.S.C.A. § 252(d)(1) (West Supp. 1997); First Report and Order, supra note 4, 11 FCC Rcd. at 15,854 ¶ 699.

able profit. Such a reading of the statute would make economic sense only if each network element were supplied by a firm producing only that element as its output and nothing else. The entire exercise of unbundling addressed in sections 251 and 252 presupposes, to the contrary, that the incumbent LEC is a multiproduct firm. Furthermore, the continuation of regulatory policies that impose public service obligations on the incumbent LEC, and the continuation of any subsidies in the retail rate structure, imply that the incumbent LEC will earn a *negative* contribution to its overall profitability from some services (such as basic local service and service to high-cost customers for whom the incumbent LEC is obliged to serve as the carrier of last resort). Given that regulators continue to embed subsidies into the rate structure, it necessarily will be the case that the incumbent LEC will have to earn returns on certain other services that, if viewed in isolation, would appear to yield positive economic profit. For that reason, the proper reading of section 252(d)(1) corresponds to the economic reality of the situation: Regulators must allow the incumbent LEC the opportunity to earn a reasonable profit—a zero economic profit—across the full aggregation of regulated services that the LEC is required to offer.

Second, the only profit that is relevant for purpose of section 252(d)(1) is the profit on the incumbent LEC's *regulated* services. Typically an incumbent LEC is owned by a holding company that has unregulated subsidiaries that make investments in overseas telecommunications ventures or investments in domestic activities that are not regulated. The profit that the incumbent LEC's parent earns from those unregulated activities are not relevant to the definition of reasonable profit under section 252(d)(1) because they do not flow from investments made under the regulatory contract in a particular state to discharge the LEC's assumption of public service obligations there. By analogy, the Supreme Court long ago announced as a matter of takings jurisprudence in *Brooks-Scanlon Co. v. Railroad Commission of La.* that it is impermissible to judge whether rate regulation is confiscatory by including the returns to unregulated operations of the company in question.[20]

Third, whether the incumbent LEC earns a profit must be determined with respect to its regulated subsidiaries *in the particular jurisdiction under consideration.* A state PUC cannot average profit figures across multiple states to determine whether the prices that it sets for UNEs in its own state allow the incumbent LEC the opportunity to earn a reasonable profit. The California PUC, for example, cannot deny an incumbent LEC in California the opportunity to earn a reasonable profit when it sells UNEs to entrants in California on the rationale that the PUC of Ohio has allowed the LEC's sister company in Ohio to earn a return that

20. 251 U.S. 396, 399 (1920) ("The plaintiff may be making money from its sawmill and lumber business but it no more can be compelled to spend that than it can be compelled to spend any other money to maintain a railroad for the benefit of others who do not care to pay for it.").

the California regulators deem to include economic profit. If regulators could do so, they would be tempted to engage in a form of opportunistic behavior. They could "export" to other states the burden of ensuring that the parent company of the various sister LECs earned adequate revenue for its local exchange operations as a whole. Once one state acted in such an opportunistic manner, however, others would follow and it would be impossible for remaining states to cover the parent company's resulting deficit from its local exchange operations.

A fourth and related point concerns the argument advanced by entrants into local telephony that uncompensatory prices for UNEs (and for that matter, for resale) are legally permissible because the Telecommunications Act of 1996 gave the incumbent LECs a quid pro quo in the form of the right, previously withheld, to enter other markets. The most significant of such markets is that for long-distance calls from one local access and transport area (LATA) to another. For a regional Bell operating company, the "in-region interLATA" market consists of the right to carry interLATA calls within the geographic region to which the regional Bell operating company already provides local exchange service—for example, a call from Chicago to Detroit, which both receive local exchange service from Ameritech. The quid pro quo argument concerning LEC entry into interLATA services is not plausible if one assumes, as the interexchange carriers maintain, that the in-region interLATA market is competitive. (That proposition, however, is the subject of bitter controversy as a result of empirical research by Paul MacAvoy suggesting that long-distance markets exhibit tacit collusion among the three major carriers.[21]) If interLATA markets are competitive, then simple arithmetic disposes of the quid pro quo argument. By definition, an incumbent LEC that is forced to accept losses in local exchange services because of unbundling at uncompensatory prices will earn a return that is below the competitive return on capital. The only way for the incumbent LEC to earn a competitive return overall once it may provide in-region interLATA services would be for the LEC to earn supracompetitive returns from those new long-distance services. But if those services are by hypothesis currently earning only a competitive return for the firms providing them, then the incumbent LEC would be averaging a competitive return on capital in the interLATA market and a less-than-competitive return on capital in the local exchange market. The result of that averaging is necessarily an overall return to the LEC that is below the competitive return on capital. In short, the quid pro quo argument is plausible only if those advancing it make what is essentially an admission against interest—namely, that interexchange carriers currently are able to earn supracompetitive returns.[22]

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21. See Paul W. MacAvoy, The Failure of Antitrust and Regulation to Establish Competition in Long-Distance Telephone Services 70–80 (1996).

22. Alternatively, one could argue that the incumbent LEC could earn supracompetitive returns because it would have substantially lower costs of marketing long-

B. *The FCC's Rules for Pricing UNEs*

Having defined the relevant cost and profit concepts, we can now examine how the FCC sought in its *First Report and Order* to set the price for a UNE at the element's TELRIC plus a reasonable share of the incumbent LEC's forward-looking common costs.

1. *Calculating Total Element Long-Run Incremental Costs.* — The first step is to calculate the incumbent LEC's TELRIC for each of its seven unbundled network elements identified in the *First Report and Order*.[23] The FCC defines TELRIC as "the forward-looking cost over the long run of the total quantity of the facilities and functions that are directly attributable to, or reasonably identifiable as incremental to, such element, calculated taking as a given the incumbent LEC's provision of other elements."[24] The *First Report and Order* requires that TELRICs be calculated assuming the use of the most efficient technology deployed in the incumbent LEC's existing wire centers.[25] In addition, estimations of the incumbent LEC's TELRICs are (1) to assume that in the long run, all costs are avoidable; (2) to exclude common costs; and (3) to use the cost causation principle, which states that costs caused by the provision of a given network element should be attributable to that element.[26]

2. *Calculating Forward-Looking Common Costs.* — Second, after calculating all of the incumbent LEC's TELRICs, it is necessary to estimate the LEC's forward-looking common costs, which the *First Report and Order* defines as "economic costs efficiently incurred in providing a group of elements or services (which may include all elements or services provided by the incumbent LEC) that cannot be attributed directly to individual elements or services."[27] A firm's forward-looking common costs are defined as (1) its forward-looking total costs minus (2) its forward-looking attributable costs (equivalent to the sum of the network element TELRICs).

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distance services to customers than the interexchange carriers have. That assumption is not plausible, however, given that the incumbent LECs would be novices at marketing interLATA services and would face at least four established competitors.

23. The seven network elements are local loops; local switching; dedicated transmission links; shared transmission facilities between tandem switches and end offices; tandem switching; signaling and call-related database services; and collocation. See 47 C.F.R. § 51.509 (stayed), in First Report and Order, supra note 4, 11 FCC Rcd. at 16,220 app. B.

24. 47 C.F.R. § 51.505(b) (stayed), in First Report and Order, supra note 4, 11 FCC Rcd. at 16,218 app. B.

25. See First Report and Order, supra note 4, 11 FCC Rcd. at 15,848–49 ¶ 685 ("We . . . conclude that the forward-looking pricing methodology for . . . unbundled network elements should be based on costs that assume that wire centers will be placed at the incumbent LEC's current wire center locations, but that the reconstructed local network will employ the most efficient technology for reasonably foreseeable capacity requirements.").

26. See id. at 15,850–51 ¶¶ 690–692.

27. 47 C.F.R. § 51.505(c) (stayed), in First Report and Order, supra note 4, 11 FCC Rcd. at 16,218 app. B.

How does one estimate the incumbent LEC's forward-looking total costs? The economic principles of regulated firms imply that a good approximation of the incumbent LEC's forward-looking total costs are its current revenues. Regulation allows firms the opportunity to earn a fair return on their invested capital.[28] That principle has two important implications: (1) in long-run market equilibrium, regulated firms do not earn positive economic profits; and (2) in long-run market equilibrium, regulated firms are not forced to earn negative economic profits. Thus, regulation provides a firm with sufficient cash flows to replace depreciated capital and cover its current operating costs, but regulators constrain cash flows to prevent the firm from earning positive economic profits.

The cash flows of a regulated firm must allow it to recover its capital costs on a going-forward basis—that is, not just on an historic basis. In other words, the regulated firm's cash flows must be large enough for the firm to replace its capital over time. Thus, a regulated firm's rates of return and depreciation are adjusted so that its cash flows approximately equal those that would result from the use of replacement costs rather than book costs for its invested capital. Of course, replacement costs may vary from book costs because of inflation, changes in relative input prices (for example, rising wage rates or falling capital costs), and changes in technology. A regulated firm's cash flows should approximate the same cash flows that would result from an explicit, forward-looking calculation of capital costs and operating costs.[29]

3. *Determining the Reasonable Share of Forward-Looking Common Costs to Allocate to Individual UNEs.* — Finally, once one has estimated the incumbent LEC's individual TELRICs and its forward-looking common costs, the remaining step in pricing UNEs under the FCC's approach is to make "a reasonable allocation of forward-looking common costs" across the various UNEs.[30] The *First Report and Order* defines a "reasonable allocation" as follows:

> The sum of a reasonable allocation of forward-looking common costs and the total element long-run incremental cost of an element shall not exceed the stand-alone cost associated with the element. In this context, stand-alone costs are the total forward-looking costs, including corporate costs, that would be incurred

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28. See, e.g., Bruce C. Greenwald, Rate Base Selection and the Structure of Regulation, 15 RAND J. Econ. 85 (1984); Hayne E. Leland, Regulation of Natural Monopolies and the Fair Rate of Return, 5 Bell J. Econ. & Mgmt. Sci. 3 (1974).

29. We therefore do not agree with Janusz Ordover when he asserts: "The M-ECPR methodology for estimating forward-looking common costs enables the [incumbent LEC] to recover its full embedded costs, and not just the forward-looking costs, because it treats revenues, which reflect historic costs, as a proxy for forward-looking, economic costs." Ordover Testimony, supra note 12, at 41.

30. 47 C.F.R. § 51.505(a) (stayed), in First Report and Order, supra note 4, 11 FCC Rcd. at 16,218 app. B.

> to produce a given element if that element were provided by an efficient firm that produced nothing but the given element.[31]

In general, there are two approaches to allocating common costs. One can use an arbitrary accounting formula, which produces fully distributed cost (FDC) pricing. Or one can allocate common costs to individual goods on the basis of actual market forces. The FCC endorses the former, while we endorse the latter.

C. *The Economic Rationale for the M-ECPR*

The M-ECPR prices a UNE in the same way that firms and markets determine the prices of inputs—by summing the element's direct economic costs and opportunity costs to the incumbent LEC. The opportunity costs of providing a UNE equal (1) the revenues that can be generated by the use of that element given the presence of all market alternatives minus (2) the direct economic costs. The opportunity cost of a product or input equals its value in its *best alternative use*, which will change over time. Opportunity costs are therefore by definition forward-looking.

How do companies determine the economic costs of their inputs in practice? Some inputs are purchased on the market. For those inputs the determination of opportunity costs is straightforward because it equals the purchase cost of that input. The market price of the product or service provides the best guide to the economic value of that service because it results from fundamental supply and demand forces. Consumers' willingness to pay and suppliers' costs are reflected in the price that clears the market.[32]

But not all inputs used by a company are easily purchased in the marketplace. For inputs not purchased it is necessary to impute their cost—that is, to attribute to that input the value in its best alternative use. When an input is unique to the company or produced by the company itself, the economically correct price is the best alternative use of that input. Thus, if an owner-manager of a small business puts in time operating the business, the opportunity cost of her time to the business is the best return that she could obtain elsewhere.

The M-ECPR calculates prices for UNEs that reflect market opportunities. The M-ECPR is a public-interest approach to the problem of how a regulated firm should price UNEs that it sells to a competitor. If a com-

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31. 47 C.F.R. § 51.505(c)(2)(A) (stayed), in First Report and Order, supra note 4, 11 FCC Rcd. at 16,218 app. B.

32. In a competitive market, the prices for products and services generally reflect their economic cost. If prices do not generate sufficient revenues to cover costs, firms do not have an incentive to provide those products and services. If prices generate revenues that are above costs, price competition between providers and entry of new providers will drive down prices. In a competitive market, price always includes compensation for such economic costs—for example, for the interest forgone by the firm when it supplies funds from retained earnings rather than borrowing them from a bank.

pany produces an input and sells that input to another company, what would be the economic cost of that input? In that case, the economic cost would equal the direct cost of making that input plus the earnings forgone elsewhere by making the sale.[33] In other words, the economic cost of the input to be sold by the incumbent LEC to another company is the LEC's direct cost of making the input *plus* the opportunity forgone by the LEC from making the sale. This economic reasoning underlies the M-ECPR formula:

> "access" price = incumbent's incremental cost of "access" per unit plus the incumbent's opportunity cost of providing the unbundled input.

This definition is consistent with the explication of the ECPR by Baumol, Willig, Sidak, and others.[34] In the context of unbundled network elements, the incremental cost of "access" is simply the TELRIC referenced in the FCC's *First Report and Order,* appropriately calculated. Recall that TELRIC represents the forward-looking cost (both capital and operating costs) that is attributable to a particular network element, such as a loop. The M-ECPR imposes a constraint on the magnitude of opportunity costs that the creators of the ECPR overlooked. In the absence of market alternatives that offer end users prices below the incumbent LEC's retail rates, the opportunity cost to the LEC of providing the UNE equals forgone revenues (based on the incumbent LEC's tariffed retail rate) less incremental costs.

When market alternatives are present, however, the prices of those alternatives determine the opportunity costs of unbundled network services.[35] This constraint on the magnitude of opportunity costs was not recognized in the earlier literature on the ECPR, perhaps because Baumol and Willig developed the ECPR in the context of trackage rights in railroading and interconnection in local telephony—both instances where competition for the bottleneck input was by definition completely foreclosed.[36] We made this opportunity-cost refinement to the ECPR in a submission that we filed before the FCC in May 1996 in its interconnec-

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33. We therefore do not agree with Frederick Warren-Boulton when he argues that "M-ECPR pricing is not based on cost" and consequently "is incompatible with the Telecommunications Act of 1996." Warren-Boulton Rebuttal Testimony, supra note 12, at 10.

34. See Baumol-Willig New Zealand Brief, supra note 10, at 25–26; Baumol & Sidak, Toward Competition in Local Telephony, supra note 10, at 94–95; Baumol, Some Subtle Issues in Railroad Regulation, supra note 10, at 353–54; Baumol & Sidak, The Pricing of Inputs Sold to Competitors, supra note 10, at 178–79.

35. In this Article, references to "market alternatives" include both actual and potential alternatives.

36. Baumol and Sidak did acknowledge the quite different limitation on opportunity cost that they termed "virtual regulation":

> [T]he mere threat that the government may begin to regulate the price of the vertically integrated monopolist's final product may suffice to excise some or all of its monopoly rents from the opportunity-cost portion of the efficient component price. Stated differently, the incumbent's expected opportunity cost

tion proceeding.[37] But, as we explain below, the FCC failed to comprehend that such a constraint on opportunity cost exists under efficient component pricing. Instead, the FCC criticized the ECPR for *not* constraining opportunity cost; having incorrectly described the attributes of the rule in that manner, the agency then proceeded to reject it. That case of false labeling required us to give the name M-ECPR to our version of efficient component pricing so that it would be clear that opportunity cost, and hence price, are at all times market-determined on a forward-looking basis. To avoid further confusion, we call the FCC's mischaracterization of efficient component pricing the FCC-ECPR.

The M-ECPR shows that the economically correct measure of the incumbent LEC's opportunity costs of selling a UNE is the difference between the market price of the service (inclusive of purchase, installation, and operating costs) and the LEC's incremental costs. With facilities-based competition for some UNEs, the M-ECPR implies that the price of the service should be the sum of the LEC's incremental costs and the opportunity cost, which exactly equals the market price.[38] Properly calculated, M-ECPR pricing takes into account market limits on the contribution of revenues to forward-looking common costs. In this respect the M-ECPR uses market benchmarks to determine the amount of forward-looking common costs that can be "reasonably" allocated to any given UNE.

D. *Opportunity Cost, Stand-Alone Cost, Competition, and Price*

"In economics," wrote Armen Alchian in his classic definition of cost, "the cost of an event is the highest-valued opportunity necessarily for-

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of providing interconnection to a competitor would exclude the monopoly rent over the final product.

William J. Baumol & J. Gregory Sidak, The Pricing of Inputs Sold to Competitors: Rejoinder and Epilogue, 12 Yale J. on Reg. 177, 185 (1995).

37. See Michael J. Doane et al., An Empirical Analysis of Pricing Under Sections 251 and 252 of the Telecommunications Act of 1996, appended to Comments of GTE Service Corporation submitted in Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Docket No. 96-98 (F.C.C., filed May 16, 1996) (coauthored with J. Gregory Sidak & Daniel F. Spulber).

38. The M-ECPR can also be used to determine wholesale prices for the resale services offered by incumbent LECs using the following formula:

Wholesale Price = Retail Price - Avoided Cost of Resale

This method follows precisely section 252(d)(3), which states that "a State commission shall determine wholesale rates on the basis of retail rates charged to subscribers for the telecommunications service requested, excluding the portion thereof attributable to any marketing, billing, collection, and other costs that will be avoided by the local exchange carrier." Telecommunications Act of 1996, 47 U.S.C.A. § 252(d)(3) (West Supp. 1997). Because the method begins with the retail price and subtracts the avoided costs, it is referred to as the "top down" method. See Baumol et al., Parity Pricing and Its Critics, supra note 10, at 149–50.

saken."[39] In economics there is also no dispute as to the definition of opportunity costs. The consensus position has been stated by Professors Kaserman and Mayo as follows:

> The economic concept of costs includes the value of all inputs required for production, including the implicit value of those inputs owned by the producer. . . . Thus, economic costs include both implicit and explicit costs . . . . Implicit costs are defined as the opportunity cost of owned resources, where the term *opportunity cost*, in turn, is defined as the value of a resource in its best alternative use. Explicit costs are the out-of-pocket expenditures on inputs purchased by the firm (which, in the short run, include both fixed and variable inputs).[40]

This standard economic definition of opportunity costs is *not* the definition that the FCC used in its *First Report and Order*. The FCC's definition stated: "Opportunity costs include the revenues that the incumbent LEC would have received for the sale of telecommunications services, in the absence of competition from telecommunications carrier [sic] that purchase elements."[41] The FCC's definition of opportunity costs thus explicitly and incorrectly assumes away the existence of competition, whereas the standard economic definition of the term takes as given all competitive options.

Of course, when one calculates opportunity costs, the revenues that can flow from the use of a UNE depend on whether there are market alternatives to the incumbent LEC's retail services and UNEs. If market alternatives are absent, the incumbent LEC's opportunity costs equal (1) the revenues currently generated in retail rates for services provided by the LEC through the use of that element minus (2) the direct economic costs of the UNE. In this case the incumbent recovers the same flow of contributions embodied in the existing rate structure. On the other hand, if market alternatives are present, the incumbent LEC's opportunity costs equal (1) the revenues that the LEC can obtain in the market through the use of that element minus (2) the direct economic costs of the UNE. In this case the presence of facilities-based entry, and the possibility that entrants may purchase services under existing retail rates that are substitutes for the incumbent carrier's UNEs, reduce the likelihood that the incumbent LEC will recover its total costs. Those forces will nec-

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39. Armen A. Alchian, Cost, *in* 3 International Encyclopedia of the Social Sciences 404, 404 (David L. Sills ed., 1968).

40. David L. Kaserman & John W. Mayo, Government and Business: The Economics of Antitrust and Regulation 32 (1995) (footnote omitted). In light of this universally accepted definition, we cannot accept the criticism of Frederick Warren-Boulton that by our advocacy of the M-ECPR we "seek[ ] to avoid the express injunction in the Telecommunications Act that prices be based on costs by introducing the concept of 'opportunity costs.'" Warren-Boulton Rebuttal Testimony, supra note 12, at 22.

41. 47 C.F.R. § 51.505(d)(3) (stayed), in First Report and Order, supra note 4, 11 FCC Rcd. at 16,219 app. B.

essarily reduce the flow of contributions embodied in the incumbent LEC's existing rate structure.

The *First Report and Order* only discussed efficient component pricing in the circumstance in which no price competition exists. The FCC stated: "The opportunity cost, which is computed as revenues less all incremental costs, represents both profit and contribution to common costs of the incumbent, *given the existing retail prices of the services being sold.*"[42] The agency's proposed rule explicitly assumed the "absence of competition from telecommunications carrier[s] that purchase elements."[43] On the basis of that incorrect definition of opportunity costs, the FCC found:

> We conclude that [the FCC-ECPR] is an improper method for setting prices of interconnection and unbundled network elements because the existing retail prices that would be used to compute incremental opportunity costs under [the FCC-ECPR] are not cost-based. Moreover, the [FCC-ECPR] does not provide any mechanism for moving prices towards competitive levels; it simply takes prices as given.[44]

The FCC's conclusions follow directly from its incorrect definition of opportunity costs. By ignoring the presence of market substitutes, the FCC found that the FCC-ECPR provides no "mechanism for moving prices towards competitive levels." That shortcoming, however, is not shared by the M-ECPR. The FCC itself created this fault in its FCC-ECPR by using a definition of opportunity costs that ignores fundamental market forces.

In contrast, because it reflects all available market alternatives, the M-ECPR forces rates down when opportunity costs fall in the presence of substitute services. Far from taking "prices as given," the M-ECPR recognizes that an incumbent LEC's ability to sell retail services at existing retail prices depends entirely on whether entrants offer lower prices. If such lower prices are forthcoming in the marketplace, the incumbent LEC's opportunity costs fall, which causes the corresponding rates for UNEs to fall as well. In short, the FCC erected a strawman version of the ECPR in its *First Report and Order* and then knocked it down.

Contrary to the FCC's assessment, the M-ECPR method is consistent with the agency's discussion of how forward-looking common costs should be recovered. After discussing various "reasonable" methods for allocating forward-looking common costs, the *First Report and Order* concluded: "In no instance should prices exceed the stand-alone cost for a specific element, and in most cases they should be below stand-alone costs."[45] That outcome is precisely what the M-ECPR method accom-

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42. First Report and Order, supra note 4, 11 FCC Rcd. at 15,859 ¶ 708 (emphasis added).

43. 47 C.F.R. § 51.505(d)(3) (stayed), in First Report and Order, supra note 4, 11 FCC Rcd. at 16,219 app. B.

44. First Report and Order, supra note 4, 11 FCC Rcd. at 15,859 ¶ 708.

45. Id. at 15,854 ¶ 698.

plishes when it examines market alternatives. If, for example, an entrant's stand-alone cost of supplying network elements were less than the incumbent LEC's existing wholesale rate, then that condition would reduce the incumbent LEC's existing opportunity costs of supplying the UNE to the level of the entrant's stand-alone cost.

E. *Examples of the Market Constraint on Opportunity Costs Inherent in the M-ECPR*

Several examples illustrate why the M-ECPR satisfies all the requirements that Congress and the FCC established for pricing UNEs. Consider an incumbent LEC that employs a bottleneck input (such as a loop, which we shall generically call "access") to provide a retail service. The retail service has a regulated price of $10.00 per unit. The incumbent LEC incurs two costs in providing the service: access, which has an incremental cost of $3.00 per unit, and transport, which has an incremental cost of $2.00 per unit. Thus, the regulated price provides contribution to the recovery of the LEC's common costs equal to $5.00 per unit (that is, $10.00 - $3.00 - $2.00). In the absence of market alternatives the M-ECPR price for an unbundled loop is simply $8.00 (that is, $3.00 + $5.00), where $3.00 is the incremental cost and $5.00 is the opportunity cost.

Now suppose that at a cost of $7.00 an entrant can self-supply loops to provide access service. In that case, the incumbent LEC's opportunity costs of selling the services of a loop to a competitor is $7.00 minus $3.00, or $4.00. In this example, the M-ECPR loop price (incremental cost plus opportunity cost) is simply $3.00 + ($7.00 - $3.00) = $7.00. In other words, whenever there are market alternatives, the lowest-priced alternative will determine the M-ECPR price. Alternatively, suppose that the entrant buys a loop for $8.00 but then reduces the retail price to $9.00. That reduction in the retail price reduces the opportunity cost of the loop to $4.00, and the M-ECPR price correspondingly falls to $7.00.

F. *The Efficiency of the M-ECPR*

A desirable feature of the M-ECPR is that it displaces the incumbent if and only if the entrant is more efficient (has a lower cost) than the incumbent. The efficiency property of M-ECPR can be easily demonstrated. Assume in the above example that a unit of access not sold to the competitor could generate a contribution of $5.00 for the incumbent LEC. Thus, the relevant opportunity cost is $5.00, and the M-ECPR price is $8.00. If the incumbent LEC charges $8.00 per unit of access, then two results will obtain: The incumbent LEC will cover its direct cost of providing access, and entry will occur, only if the rival has a lower transport cost. To see how M-ECPR promotes efficient entry, assume first that the entrant has the same transport cost as the incumbent LEC (that is, $2.00 per unit). Combining that cost with the M-ECPR access price of $8.00, the entrant can maintain a retail price of $10.00, which is just the initial regu-

lated rate. Therefore, if the entrant has the *same* transport cost as the incumbent LEC, the M-ECPR price allows it to earn zero economic profit.

Suppose now that the entrant has a *lower* transport cost than the incumbent LEC—say, $1.00 per unit, as compared with $2.00 for the incumbent LEC. In that case the entrant can purchase access at the M-ECPR price and set a retail price of only $9.00 per unit. Thus, the more efficient firm can profitably enter and take customers away from the incumbent LEC. Finally, if the entrant's transport cost were *greater* than that of the incumbent LEC (say $3.00 per unit), then it could not profitably enter, which would be the efficient outcome from society's standpoint.

G. *Application of the M-ECPR to Calculate Unbundled Loop Prices*

Consider now a numerical example of the use of the M-ECPR to calculate the price of an unbundled loop used by an incumbent LEC to supply basic service to a business customer. Because the actual data concerning an incumbent LEC's TELRICs and forward-looking common costs may be proprietary, we present suggestive figures that are consistent with data we have observed in actual arbitrations, but which do not correspond to any specific LEC in any specific state.

As explained above, the M-ECPR price of a UNE depends on the presence or absence of market alternatives. If all market alternatives are assumed away, then one obtains FCC-ECPR prices. But if one considers market alternatives, then one obtains M-ECPR prices. In the next two subsections, we calculate the rates for unbundled loops provided to business customers. First we assume away all market alternatives to the incumbent LEC's services, and then we explicitly consider those alternatives to calculate the M-ECPR rates.

1. *Calculation of FCC-ECPR Prices for Unbundled Loops on the Assumption That No Market Alternatives Exist.* — Consider the services provided to an average business customer, assuming the absence of market alternatives. Such a customer consumes various services of the incumbent LEC, each having a TSLRIC and each producing a contribution to the LEC's overall revenue adequacy. In addition to consuming the basic retail service (that is, local exchange service), the customer typically consumes local toll service, vertical services, and switched access services. Typically the incumbent LEC's local toll, vertical, and switched access services are priced to generate high contribution margins. In addition, the business customer pays the carrier common line charge (which is a federally mandated stream of revenue to the LEC to rebalance local and long-distance rates), which by definition consists entirely of contribution to the LEC.[46] Assume that the total monthly revenues from the services consumed by an average business customer are $60 per line, and that the sum of the TSLRICs for providing those services is $25 per line. Thus, the average

46. See Michael K. Kellogg et al., Federal Telecommunications Law § 9.6.7 (1992).

business customer generates a total contribution of $35 per line per month. As explained earlier, that $35 of contribution is not profit in either the economic or accounting sense of the word. Rather the $35 reflects compensation for the incumbent LEC's common costs (including the costs of performing its public service obligation and paying the subsidies embedded in the rate structure[47]) and a competitive return to investors. As a practical matter, if the incumbent LEC loses the business customer as a subscriber of basic monthly access service, the LEC will lose the opportunity to sell all of the complementary services that such a customer typically consumes.

Assume that the incumbent LEC has correctly estimated the TELRIC of an unbundled loop to be $20 (which would include the incremental marketing cost of providing unbundled loops). The FCC-ECPR, which assumes that no market alternatives exist, would price the unbundled loop by adding the TELRIC of the loop ($20) to the incumbent LEC's opportunity cost of providing the unbundled loop to an alternative local exchange carrier (ALEC) ($35 of forgone contribution), for a total price of $55 per line.[48]

2. *Calculation of M-ECPR Prices for Unbundled Loops on the Assumption That Market Alternatives Exist.* — Now suppose that the entrant's stand-alone cost of supplying its own loop facilities is less than the unbundled loop price for average business customers that was calculated on the assumption that no market alternatives existed for the incumbent LEC's access service. Should regulators give the incumbent LEC the flexibility to lower the price of its unbundled loop facilities? Yes, because otherwise the unbundled loop price would violate the pricing constraint that both the market imposes and the *First Report and Order* recommends—namely, that the price of any UNE not exceed its stand-alone cost. Given the presence of market alternatives, the incumbent LEC's M-ECPR price equals its TELRIC for loop service plus the opportunity cost *as constrained by market forces*. A simple example will illustrate the operation of this pricing constraint.

Assume that a facilities-based competitor can self-supply loop facilities to business customers for $38 per line per month. The incumbent

47. Baumol and Sidak have noted that "when a regulated firm has special-service obligations imposed upon it . . . [t]hese obligations are appropriately treated as sources of common fixed costs for the firm; the costs must be covered legitimately by the firm's prices." Baumol & Sidak, Toward Competition in Local Telephony, supra note 10, at 108–09.

48. We assume that the ALEC bypasses the incumbent LEC's port/switching facilities so that it obtains no contribution from the provision of those unbundled network elements. If, to the contrary, unbundled prices for port/switching services included some contribution (in other words, if market alternatives were less binding), then that contribution would be subtracted from total forward-looking common costs before determining the unbundled price of the loop. That subtraction would ensure the contribution provided by unbundled loops and port/switches did not exceed the contribution embodied in the prices of the incumbent LEC's retail services.

LEC's forgone revenues would equal $38 minus its TELRIC for loop service (including marketing costs), which in our example equals $20. Thus, the resulting M-ECPR loop price equals $20 + $18 (that is, $38 - $20), or simply the entrant's stand-alone cost of $38.

An ALEC has other available substitutes for the leasing of unbundled loop facilities besides constructing its own loops. An ALEC can acquire basic business service at wholesale rates, which includes the services of both a loop and port/switching services; alternatively, the ALEC can purchase two-wire private-line service from the incumbent LEC at that service's tariffed rate. If either alternative has a lower price than the unbundled loop price calculated on the assumption that no such market alternatives existed, then the ALEC will choose to purchase the lower-priced alternative. If private-line service is a good substitute for the incumbent LEC's unbundled loops, then the presence of the private-line rate constrains the incumbent LEC's ability to charge a price for an unbundled loop that maintains the level of contribution that the incumbent LEC previously earned from serving the typical business customer. For example, if the incumbent LEC's two-wire private-line rate is $27, then $27 also becomes the highest price that the incumbent LEC can receive for an unbundled loop. Consequently, the stand-alone cost of the best alternative technology for an unbundled loop, $27, becomes the M-ECPR price.[49]

In sum, given the presence of a two-wire private line service at $27, the FCC-ECPR unbundled loop price is $55, whereas the M-ECPR unbundled loop price is $27. This example illustrates the potentially large differences between FCC-ECPR prices and M-ECPR prices. Those price differences result from the fact that the FCC-ECPR explicitly assumes away all competitive market alternatives, while the M-ECPR explicitly takes those alternatives into account. Clearly, the FCC was incorrect in its *First Report and Order* when it rejected efficient component pricing for UNEs

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49. Professor Paul W. MacAvoy, in testimony before the Illinois Commerce Commission, presented the important insight that unadjusted ECPR pricing, which he calls competitive parity pricing (CPP), will fail to deter inefficient bypass:

> [I]n some instances wholesale rates for specific services should be below the CPP level. One special case is when the reseller has the option to self provide facilities-based wholesale service on a stand-alone basis. If the CPP wholesale price for service exceeds the stand-alone costs of that potential facilities-based carrier, then the CPP rate for that service could generate inefficient bypass.

Prepared Direct Testimony of Paul W. MacAvoy, attached to Comments of Ameritech Illinois, Inc., AT&T Communications of Illinois, Inc., Petition for a Total Local Exchange Service Wholesale Tariff from Illinois Bell Telephone Co. d/b/a Ameritech Illinois & Central Telephone Co. Pursuant to Section 13-505.5 of the Illinois Public Utilities Act, No. 95-0458, at 10 (Ill. Com. Comm'n Sept. 1995). MacAvoy notes that "modifications from CPP rates should be undertaken only when necessitated by the possibility of uneconomic bypass by a potential reseller entrant." Id. However, his correct suggestion that the incumbent has an incentive to reduce prices to compete with potential entrants does not recognize the additional point made here—that the correctly-calculated ECPR adjusts price downward because entry changes the incumbent's opportunity cost.

because the agency assumed that such pricing would use "existing retail prices," which were not cost-based, "to compute incremental opportunity costs" and because the rule supposedly "simply takes prices as given" and "does not provide any mechanism for moving prices towards competitive levels."[50]

The foregoing analysis does not change because differences may exist from an engineering standpoint concerning the provisioning and testing of a two-wire private line versus the (four-wire) unbundled loop. Cellophane, cling wrap, aluminum foil, glass jars, and Tupperware all differ from an engineering perspective in terms of how they are designed, manufactured, tested, packaged, and marketed. Yet, as anyone who has taken an antitrust course well knows, those differences are not relevant to the question of whether, at a particular price, consumers view those five products as substitutes for one another.[51] Typically in antitrust cases the extent of demand substitutability (commonly called the relevant product market) is evaluated in terms of the goods to which consumers would turn if the price of the product sold by the firm under examination increased by five percent.[52] As we have just shown using stylized figures based on actual arbitration proceedings, the percentage price difference between the FCC-ECPR price and the M-ECPR price for an unbundled loop is likely to be far greater than five percent in most states, and therefore the extent of substitution in demand from the unbundled loop to the two-wire private line is likely to be high.

Entrants seeking an even lower unbundled loop price than the M-ECPR price have argued that the two-wire private-line rate is an artificial alternative to the unbundled loop because it is a substitute that the incumbent LEC itself provides to its competitors. Therefore, the argument goes, the incumbent LEC can control the price of the substitute for its bottleneck input, the unbundled loop. This argument is specious on several grounds. First, before unbundling began, regulators had already approved the two-wire private-line tariff as a just and reasonable rate for that service. In economic terms, the two-wire private-line tariff has been set so that it does not exceed stand-alone cost. (In cases where the regulator has set the two-wire private-line tariff below the TSLRIC for that service, it is appropriate for the price to be raised to TSLRIC to ensure that the service is not receiving a subsidy from any other service.) Second, the incumbent LEC remains subject to price regulation and may not raise the tariff of the two-wire private-line at will. Indeed, in many states the incumbent LEC is subject to rate freezes or price caps that foreclose the possibility of rate increases entirely. Furthermore, even in those states where no formal rate freeze or price cap is in effect, one must ask

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50. First Report and Order, supra note 4, 11 FCC Rcd. at 15,859 ¶ 709.

51. See, e.g., William M. Landes & Richard A. Posner, Market Power in Antitrust Cases, 94 Harv. L. Rev. 937, 945, 947-48 (1981).

52. See U.S. Dep't of Justice, Merger Guidelines—1984 § 2.11, reprinted in 4 Trade Reg. Rep. (CCH) ¶ 13,103.

how long ago regulators permitted a general rate increase and how soon they are likely to do so again in the future. Third, assuming counterfactually that the incumbent LEC did have some ability to raise the two-wire private-line price, how high could the LEC go? Clearly, the incumbent LEC would be constrained to charge no more than the stand-alone cost of the best alternative access technology that the LEC itself did not supply. In our example, that price would be the $38 stand-alone cost to the ALEC of constructing its own loop, although there may subsequently be other access substitutes available at lower cost from third parties, such as competitive access providers. Finally, even if the incumbent LEC could raise the price of its unbundled loop to the ALEC's $38 stand-alone cost of constructing a loop, it bears emphasis that *that* price would still be $17 lower than the $55 price that the incumbent LEC would have to charge for its unbundled loop to preserve the contribution that the forgone business customer would have made to the LEC's ability to earn just enough revenue to break even.

H. *The Presence of Market Alternatives Prevents an Incumbent LEC from Recovering Its Forward-Looking Common Costs*

When customers can self-supply loops or purchase substitute services from the incumbent LEC at a rate less than the unbundled loop price calculated on the assumption that no market alternatives exist, the M-ECPR prices for loops and other (more substitutable) UNEs will not enable the incumbent LEC to recover its forward-looking common costs. M-ECPR prices do enable an incumbent LEC to cover the direct economic cost of providing the unbundled services—that is, the direct incremental cost of providing the service (TELRIC) plus opportunity cost. But M-ECPR prices are not "make whole" prices for the incumbent LEC because they do not enable it to earn revenues equal to its total forward-looking costs. A fortiori the presence of market alternatives prevents an incumbent LEC from recovering its historical costs.

The numerical example above indicates that the incumbent LEC would incur a deficit of $28 (that is, $55 - $27) for each typical business customer that the LEC lost when selling an unbundled loop at the $27 price mandated by the presence of market alternatives.[53] Competitors, of course, generally do not enter markets by first targeting "typical" customers. Rather, entrants characteristically target the highest-margin business customers first. Consequently, in the initial months following competitive entry, the incumbent LEC's average deficit arising from the loss of a business customer due to the sale of unbundled loops would substantially exceed $28 per line. We therefore believe that Janusz Ordover is in error when he asserts that a "pricing rule[ ] which combines TELRIC-based pricing with competitively neutral mark-ups subject to stand-alone cost

53. If the incumbent LEC's two-wire private line rate were below its TELRIC, the deficit would be larger.

ceiling[s] maintains the [incumbent LEC's] opportunity to achieve revenues adequate for the recovery of *all* efficient, forward-looking direct and common costs."[54]

In short, the *First Report and Order* specifies that prices for UNEs "shall recover the forward-looking costs directly attributable to the specified element, as well as a reasonable allocation of forward-looking common costs."[55] But market alternatives will likely prevent an incumbent LEC from fully recovering its forward-looking common costs. We must therefore turn to the question of how the FCC's recommendation can be met so that an incumbent LEC can recover its forward-looking common costs and thus maintain its financial viability.

I. *The Role of Competitively Neutral End-User Charges in Recovering an Incumbent LEC's Forward-Looking Common Costs*

How should prices for UNEs be established to ensure that the incumbent LEC's rates recover its forward-looking common costs? As a general statement, the M-ECPR does not alter in any material way the traditional problems faced by a regulated carrier operating with a rate structure that contains cross-subsidies mandated by regulation. For a firm's rate structure to be preserved and to allow recovery of its total costs, accompanying end-user charges are required. As the example above clearly demonstrates, although the M-ECPR enables the incumbent LEC to recover its incremental costs and opportunity costs of the sale of UNEs, it does not allow complete cost recovery, as would regulated rates in the absence of entry. Thus, the incumbent LEC also may be prevented from recovering its historical costs. Generally, facilities-based entry and M-ECPR pricing of UNEs result in stranded costs, which are defined as (1) the present value of the incumbent firm's net revenues under regulation minus (2) the present value of the incumbent firm's net revenues under competition.[56] Stranded costs arise because competition that becomes possible as a result of regulatory change immediately reduces the M-ECPR price that the incumbent firm can earn.

The fall in the M-ECPR price provides useful guidance on how to set end-user charges to recover the incumbent LEC's stranded costs. The end-user charge should equal the difference between net revenues obtained using the FCC-ECPR (that is, the price based on the regulated rate structure) and the net revenues obtained from the lower, market-constrained M-ECPR price that takes into account the substitutes for the incumbent LEC's UNEs that are available to the ALEC.

What costs does the end-user charge recover? The end-user charge recovers portions of six types of cost burdens that the incumbent LEC

54. Ordover Testimony, supra note 12, at 22.

55. First Report and Order, supra note 4, 11 FCC Rcd. at 15,847 ¶ 682.

56. See Sidak & Spulber, Deregulatory Takings and Breach of the Regulatory Contract, supra note 8, at 922–23.

cannot recover through competitive, unbundled prices but nonetheless has incurred to discharge its public service obligation: (1) shared costs of network operation, incurred among two or more (but not all) of the incumbent LEC's services, but not wholly attributable to any single service; (2) common costs of network operation, incurred among all of the incumbent LEC's services; (3) losses incurred in providing services to customers at regulated prices that are below the incremental cost of providing such services; (4) costs incurred as a result of incumbent burdens that the incumbent LEC continues to bear after the advent of competition, but which entrants are not required to bear, such as universal service obligations; (5) costs incurred by the incumbent LEC to accomplish government-mandated unbundling of network elements or resale of network services; and (6) losses incurred when the incumbent LEC's avoided costs are incorrectly overstated and are used to establish the discount that competitors receive when purchasing wholesale services from the incumbent LEC. If such a system of end-user charges were not put in place, the incumbent LEC would earn *negative* economic profit and therefore would be denied the opportunity to earn the "reasonable profit" envisioned by section 252(d)(3) of the Telecommunications Act of 1996.

J. *Recombination of Unbundled Network Elements, Regulatory Arbitrage, and Statutory Consistency*

Entrants into local telephony have argued that they should have the ability to recombine the incumbent LEC's UNEs to create a service that would be identical to the service that the LEC offers to entrants at a (discounted) wholesale price.[57] Entrants point to section 251(c)(3), which imposes on the incumbent LEC the following duty concerning resale:

> The duty to provide, to any requesting telecommunications carrier for the provision of a telecommunications service, nondiscriminatory access to network elements on an unbundled basis at any technically feasible point on rates, terms, and conditions that are just, reasonable, and nondiscriminatory in accordance with the terms and conditions of the agreement and the requirements of this section and section 252 of this title. An incumbent local exchange carrier shall provide such unbundled network elements in a manner that allows requesting carriers to combine such elements in order to provide such telecommunications service.[58]

Entrants emphasize the second sentence. The incumbent LEC argues in response that Congress intended the entrant to choose the resale alternative if the entrant intended to offer a retail service to customers that con-

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57. See, e.g., In re Petition for Approval of Transfer of Local Exchange Telecommunications Certificate No. 33 from Central Telephone Company of Florida to United Telephone Company of Florida, No. 961362-TL, 1996 Fla. PUC LEXIS 2216, at *57 (Fla. Pub. Serv. Comm'n Dec. 31, 1996).

58. Telecommunications Act of 1996, 47 U.S.C.A. § 251(c)(3) (West Supp. 1997).

sisted entirely of the UNEs of the incumbent LEC. Recombination, the LEC argues, would defeat that purpose; therefore, consistent with the first sentence of section 251(c)(3), which permits the LEC to impose just and reasonable conditions on the sale of UNEs, it is lawful for the LEC to refuse to sell UNEs that will be recombined to simulate resale.

The earlier economic analysis of opportunity cost and recovery of forward-looking common costs elucidates this question of statutory construction. It is telling that recombination is even an issue. The fact that the entrant seeks to establish its right to recombine UNEs indicates that the entrant expects that the prices for the UNEs necessary to provide basic service—the loop and port—will recover a lesser amount of common costs than will the wholesale price of basic service. In other words, the entrant's demand to recombine UNEs signals the entrant's belief (1) that the incumbent LEC's forward-looking common costs are *not* de minimis, and (2) that summing up the prices of UNEs will allow the entrant to pay a smaller amount toward the recovery of the incumbent LEC's shared costs and common costs than would the entrant's purchase of wholesale service for resale. Viewed in these terms, recombination of UNEs is a form of arbitrage induced by distortions in the regulated pricing of UNEs and wholesale services.

There is no reason to suppose that Congress wanted to create the opportunity for entrants to engage in such arbitrage. Indeed, the contrary presumption should hold. Sections 252(c)(1) and 252(c)(3) should be read so that regulatory arbitrage is not possible. The price of those two entry options should yield the same contribution to the recovery of the incumbent LEC's common costs. If they do, then the entrant will face price signals that properly induce the firm to select one entry path over the other solely on the basis of the entrant's own efficiency in the provision of non-bottleneck inputs relative to the incumbent LEC's efficiency. If the prices for wholesale services and for UNEs were correctly calculated according to the M-ECPR to reflect in each case the direct cost and the opportunity cost to the incumbent LEC of making the sale to the entrant, and if an end-user charge were imposed to recover the shortfall toward the recovery of common costs that the incumbent LEC cannot avoid in its pricing of UNEs, then the incumbent LEC and the entrant would both be indifferent between entry by one method rather than the other. In short, the M-ECPR and end-user charge are necessary policies to permit the pricing provision for resale in section 252(c)(3) to reconcile with the pricing provision for UNEs in section 252(c)(1). If the two sections were reconciled in that manner, the incumbent LEC would be indifferent as to whether the entrant purchased a wholesale service or all of the elements necessary to assemble that service. Any other pricing rule is likely to encourage regulatory arbitrage, which is a result that Congress could not have intended.

K. *Summary*

We have presented the M-ECPR and shown that it satisfies the FCC's recommendation that prices for UNEs be based on forward-looking costs. When combined with a system of competitively neutral end-user charges, the M-ECPR also satisfies the requirement in section 252(d)(3) that prices be based on costs and allow for a reasonable profit. The M-ECPR is *not* the same as the FCC's misunderstanding of efficient component pricing, which we term the FCC-ECPR. The M-ECPR produces substantially lower prices than the FCC-ECPR because market forces limit the M-ECPR on a continuous, forward-looking basis to the stand-alone cost of the best substitute technology by which an ALEC can achieve access to the incumbent LEC's network.[59]

II. THE FCC'S *FIRST REPORT AND ORDER* WOULD DENY THE INCUMBENT LEC RECOVERY OF ITS TOTAL COSTS

The FCC's *First Report and Order* would establish a blueprint for bankrupting incumbent LECs. The order would have that effect because it (1) denies recovery of historic costs incurred by the incumbent LEC to discharge its obligation to serve; (2) forbids the incumbent LEC to recover shared costs and common costs on network elements (particularly loops) that have a low enough price elasticity of demand to bear higher levels of cost recovery without exceeding an entrant's stand-alone cost for that particular element; and (3) forbids the incumbent LEC to pursue cost recovery by charging up to stand-alone cost for UNEs other than loops. Consequently, the FCC has foreclosed the possibility that the incumbent LEC will be able even to achieve the recovery of forward-looking costs that the agency's order purports to endorse. In this Part we consider each of the three preceding factors by which the FCC would deny the incumbent LEC full recovery of all the economic costs that it incurred to discharge its obligation to serve the public.

A. *Prohibition on the Recovery of Historic Costs*

The *First Report and Order* precludes the recovery of the incumbent LEC's historic costs through the prices charged for mandatory access to unbundled network elements. The FCC stated that "the sum of the direct costs and the forward-looking common costs of all elements will likely differ from the incumbent LEC's historical, fully distributed costs."[60] Economists testifying on behalf of entrants similarly have rejected using the price of mandatory network access to recover any portion of historic,

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59. It is puzzling that Janusz Ordover, who endorses efficient component pricing but has nonetheless opposed our M-ECPR in testimony on behalf of AT&T, advocates a pricing rule for UNEs that "combines TELRIC-based pricing with competitively neutral mark-ups subject to stand-alone cost ceiling[s]." Ordover Testimony, supra note 12, at 22. That description fits the M-ECPR that Ordover purports to reject.

60. First Report and Order, supra note 4, 11 FCC Rcd. at 15,854 ¶ 698.

embedded costs.[61] In the face of this opposition to cost recovery by the incumbent LECs, it bears emphasis that the M-ECPR does *not* guaranty full recovery of historic costs because the market-allowed M-ECPR price of a network element is at all times capped by the entrant's stand-alone cost of supplying that element by the least-cost technology then available. Consequently, as we explained in Part I, even a system of M-ECPR prices for network access will have to be accompanied by an end-user charge to make the incumbent LEC whole for its stranded costs and thus avoid a taking.[62]

B. *Prohibition on the Recovery of Shared Costs and Common Costs in the Pricing of the Few Network Elements That Can Contribute to Recovery of Unattributable Costs*

The FCC offered two cost-allocation methods by which an incumbent LEC would be allowed to seek to recover forward-looking common costs. The effect of both proposals, however, would be to deny the incumbent LEC any practical ability to recover its nonattributable costs.

The first method was a fixed markup: "One reasonable allocation method would be to allocate common costs using a fixed allocator, such as a percentage markup over the directly attributable forward-looking costs."[63] This approach is seductive because of its apparent simplicity. In one of the first state arbitration proceedings under the Telecommunications Act of 1996, for example, an administrative law judge of the California PUC ordered that GTE offer UNEs to AT&T at TELRIC plus sixteen percent.[64] The practical effect of a fixed percentage markup, however, is to subsidize entrants at the expense of the incumbent LEC. If the fixed percentage produced a price exceeding the entrant's stand-alone cost for the element, the entrant would self-supply that particular network element rather than buy it from the incumbent LEC. (In addition, as we shall explain presently, the FCC would forbid such a price, assuming unrealistically that the incumbent LEC were so ignorant of basic economics as to attempt to charge a price so high.) If the entrant self-supplied the element, the incumbent LEC would earn no contribution whatsoever to recovery of its unattributable forward-looking costs. That prospect is real. There are multiple providers of signaling services. There are also competitive commercial providers of switching services—

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61. See, e.g., Kaserman Report, supra note 12, at 12–14.

62. For a complete discussion of the takings analysis, see Sidak & Spulber, Deregulatory Takings and the Regulatory Contract, supra note 8; Sidak & Spulber, Deregulatory Takings and Breach of the Regulatory Contract, supra note 8.

63. First Report and Order, supra note 4, 11 FCC Rcd. at 15,853 ¶ 696.

64. See Petition of AT&T Communications of California, Inc. for Arbitration Pursuant to Section 252 of the Federal Telecommunications Act of 1996 to Establish an Interconnection Agreement with GTE California, Inc., Arbitrator's Report, Application 96–08–041, at 13 (Cal. Pub. Utils. Comm'n Oct. 31, 1996). The decision uses TSLRIC terminology rather than TELRIC.

including competitive access providers (CAPs) and interexchange carriers, which can adapt their long-distance switching facilities to perform local exchange switching. For example, AT&T reportedly intends to use its own switches, or those leased from CAPs, and, as of October 1996, had signed contracts with six CAPs for such services in over eighty cities.[65]

On the other hand, if the fixed percentage produced a price less than what the incumbent LEC otherwise would charge for the element (bearing in mind that the incumbent LEC in no event could price the element above its stand-alone cost), then the entrant would buy the element from the incumbent LEC rather than self-supply it. In that case, the incumbent LEC would have been forced to forgo a significant share of the overall contribution earned for its recovery of forward-looking common costs. The shortfall in contribution would equal the difference between (1) the element's stand-alone cost and (2) the sum of the element's TELRIC and its fixed-percentage markup over TELRIC. That shortfall to the incumbent LEC is a coerced transfer to, and subsidy for, the entrant.

The FCC's second method for allocating common costs among UNEs was an example of what economists have dubbed "reverse Ramsey pricing" because of its tendency to minimize rather than maximize consumer welfare.[66] The FCC stated:

> We conclude that a second reasonable allocation method would allocate only a relatively small share of common costs to certain critical network elements, such as the local loop and collocation, that are most difficult for entrants to replicate promptly (*i.e.*, bottleneck facilities). Allocation of common costs on this basis ensures that the prices of network elements that are least likely to be subject to competition are not artificially inflated by a large allocation of common costs.[67]

Citing Ramsey pricing specifically, the FCC ruled that "an allocation methodology that relies exclusively on allocating common costs in inverse proportion to the sensitivity of demand for various network elements and services may not be used."[68] Despite the well recognized welfare-maximizing characteristics of Ramsey pricing principles, the FCC believed that an analogous method of allocating forward-looking shared or common costs across network elements would violate the 1996 legislation:

> We conclude that such an allocation could unreasonably limit the extent of entry into local exchange markets by allocating more costs to, and thus raising the prices of, the most critical bottleneck inputs, the demand for which tends to be relatively

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65. See Catherine Arnst, AT&T: Will the Bad News Ever End?, Bus. Wk., Oct. 7, 1996, at 122, 128.

66. See David E.M. Sappington & Dennis L. Weisman, Designing Incentive Regulation for the Telecommunications Industry 16 (1996).

67. First Report and Order, supra note 4, 11 FCC Rcd. at 15,853 ¶ 696.

68. Id. (citing Frank P. Ramsey, A Contribution to the Theory of Taxation, 37 Econ. J. 47 (1927)).

> inelastic. Such an allocation of these costs would undermine the pro-competitive objectives of the 1996 Act.[69]

By imposing this "reverse-Ramsey" constraint on the incumbent LEC's pricing of network elements, the FCC condemned the LEC to insolvency. It is a sham for the FCC to have told incumbent LECs that they can recover their forward-looking common costs only by raising the prices of their most price-sensitive network elements above TELRIC. Such a constraint ensures that the incumbent LEC will be denied the ability to recover any appreciable amount of its unattributable forward-looking costs. That constraint is tantamount to the FCC ordering every incumbent LEC to write a check to each prospective rival to help pay for its cost of entry into the local market.

C. *Prohibition on Pricing Any Element at Stand-alone Cost*

Lest any doubt remained concerning the futility of its rules for pricing network elements, the FCC removed that doubt with its imposition of one final, fatal constraint: "In no instance should prices exceed the stand-alone cost for a specific element, *and in most cases they should be below stand-alone costs.*"[70] The first half of that sentence is superfluous. The laws of economics already prohibit a firm from charging a price exceeding stand-alone cost. The second half of the sentence, however, introduces a serious, new regulatory constraint that assures that the incumbent LEC would never be able to recover the full amount of its forward-looking common costs.

After forbidding the incumbent LEC to use its pricing of unbundled loops to recover forward-looking shared costs and common costs, the FCC would take away as well the LEC's ability to raise the price of its remaining unbundled elements to *their* stand-alone costs. Given the entrant's ability to combine at will its own self-provision of elements with its purchase of unbundled LEC elements, the FCC would ensure that the incumbent LEC would be prevented from earning the requisite contributions from its sale of UNEs to recover the total forward-looking costs of its network.

Paradoxically, the FCC's pricing rules for UNEs would discourage the very facilities-based competition in local telephony that the 1996 legislation envisioned. It would, after all, be foolish for any entrant to build its own network from scratch if the incumbent LEC was bound by regulation to sell UNEs below their stand-alone costs, and if, in particular, the LEC was obliged to sell unbundled loops to entrants at a price that was allowed to exceed TELRIC by only a scintilla.

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69. Id.

70. Id. at 15,854 ¶ 698 (emphasis added).

III. Answering the Critics of Efficient Component Pricing

Since the early 1990s the efficient component-pricing rule (ECPR) has generated controversy in discussions of regulatory theory and policy. Much of that controversy has resulted from criticisms lodged against the ECPR to the effect that the rule is not general in its applicability or not efficient in some respect. The criticism reached its peak in the *First Report and Order*, when the FCC mischaracterized the ECPR and then forbade the states to use the rule that the agency mislabeled as the ECPR. We respond here to the various criticisms and show that they are misplaced. But to avoid further mislabeling, we call our rule the M-ECPR.

A. *The FCC's Denunciation of Efficient Component Pricing in Its 1996 Interconnection Rulemaking*

The FCC's proceeding, commenced in April 1996 pursuant to the new Telecommunications Act of 1996, on the pricing by incumbent LECs of interconnection, resale, and UNEs subjected the ECPR to unprecedented scrutiny.[71] In its notice of proposed rulemaking, the FCC reached two adverse tentative conclusions concerning the ECPR. First, the FCC asserted that "use of the ECPR or equivalent methodologies to set prices for interconnection and unbundled network elements would be inconsistent with the section 252(d)(1) requirement that [prices] be based on 'cost.'"[72] Second, the FCC proposed "that states be precluded from using this methodology to set prices for interconnection and access to unbundled elements."[73] In addition, the FCC solicited comment on whether a state's use of the ECPR "would constitute a barrier to entry as under section 253 of the 1996 Act."[74] Those two adverse conclusions, along with the agency's question signaling its predisposition to reach a third adverse conclusion, were predicated on the FCC's misunderstanding of the economic effects of the ECPR and its evident ignorance of the state of academic research on the ECPR.

Contrary to the impression that an uninformed reader might have received from the FCC's exiguous discussion of the ECPR, the rule has generated a growing body of academic support. We respond below to the critics of the ECPR, as well as to several other familiar canards concerning the rule. Before doing so, however, we review the growing number of academic economists and governmental bodies that endorse the rule.

B. *Academic Proponents of Efficient Component Pricing*

Other than referencing several writings by Baumol and Sidak, the FCC did not state or imply in its interconnection proceeding that any

71. See Interconnection NPRM, supra note 11, 11 FCC Rcd. at 14,222 ¶ 147.
72. Id. at 14,222 ¶ 148.
73. Id.
74. Id.

other scholar in law or economics had endorsed the ECPR.[75] To the contrary, a substantial body of academic literature has endorsed the ECPR and refined the rule. In addition to the writings and testimony of Professor Baumol, that literature includes books, articles, and working papers by such academic economists as Michael A. Crew,[76] Jerry Hausman,[77] Alfred E. Kahn,[78] Paul R. Kleindorfer,[79] Paul W. MacAvoy,[80] Janusz A. Ordover,[81] John C. Panzar,[82] and Robert D. Willig.[83]

Efficient component pricing has captured the attention of European economists as well. The respected French economists, Jean-Jacques Laffont and Jean Tirole, also endorse the ECPR subject to several caveats

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75. See id. at 14,222 ¶ 147 & n.207 (citing Baumol & Sidak, Toward Competition in Local Telephony, supra note 10; Baumol, Some Subtle Issues in Railroad Regulation, supra note 10); Baumol & Sidak, Pricing of Inputs Sold to Competitors, supra note 10.

76. See Michael A. Crew & Paul R. Kleindorfer, The Economics of Postal Service 33 (1992) [hereinafter Crew & Kleindorfer, Economics of Postal Service] ("[T]he basic logic of efficient component pricing appears to be a robust starting point for policies to encourage competition and dynamic efficiency while preserving the natural monopoly efficiencies of the local delivery network."); Michael A. Crew & Paul R. Kleindorfer, Pricing in Postal Service Under Competitive Entry, *in* Commercialization of Postal and Delivery Services: National and International Perspectives 117, 122–27 (Michael A. Crew & Paul R. Kleindorfer eds., 1995) [hereinafter Crew & Kleindorfer, Pricing in Postal Service].

77. See Jerry A. Hausman & Timothy J. Tardiff, Efficient Local Exchange Competition, 40 Antitrust Bull. 529 (1995). Hausman and Tardiff propose a pricing rule that is consistent with our M-ECPR, although they distinguish their rule in practice from the benchmark case of the ECPR presented by Baumol and Sidak. See id. at 539, 544–45, 552–53.

78. See Alfred E. Kahn & William Taylor, The Pricing of Inputs Sold to Competitors: A Comment, 11 Yale J. on Reg. 225 (1994).

79. See Crew & Kleindorfer, Economics of Postal Service, supra note 76, at 33; Crew & Kleindorfer, Pricing in Postal Service, supra note 76, at 122–27. Curiously, Crew and Kleindorfer are coauthors of a report prepared for AT&T for submission in state arbitration proceedings that urges regulators to reject the use of efficient component pricing for UNEs. See Kaserman Report, supra note 12, at 14–17.

80. See MacAvoy, supra note 21, at 209.

81. See generally Baumol et al., Parity Pricing and Its Critics, supra note 10; Janusz Ordover & Robert Willig, Notes on the Efficient Component Pricing Rule, paper presented at The Transition Towards Competition in Network Industries, First Annual Conference, PURC-IDEI-CIRANO, Montreal, Oct. 13–14, 1995 (on file with the Columbia Law Review).

82. See John C. Panzar, The Economics of Mail Delivery, *in* Governing the Postal Service 1, 6–10 (J. Gregory Sidak ed., 1994); John C. Panzar, Competition, Efficiency, and the Vertical Structure of Postal Services, *in* Regulation and the Nature of Postal and Delivery Services 91, 96–98 (Michael A. Crew & Paul R. Kleindorfer eds., 1992).

83. See Response of William J. Baumol and Robert D. Willig to the Verified Statement of Alfred E. Kahn at 2–3 (Dec. 13, 1996), Central Power & Light Co. v. Southern Pac. Trans. Co., Nos. 41242, 41295, 41626, 1996 STB LEXIS 358 (Surface Trans. Bd. Dec. 27, 1996); Verified Statement of William J. Baumol and Robert D. Willig at app. B (Oct. 11, 1996), Central Power & Light Co. v. Southern Pac. Transp. Co., Nos. 41242, 41295, 41626, 1996 STB LEXIS 358 (Surface Transp. Bd. Dec. 27, 1996); Baumol et al., Parity Pricing and Its Critics, supra note 10; Ordover & Willig, supra note 81.

that they themselves characterize as academic "quibbles,"[84] notwithstanding the FCC's implication in the interconnection proceeding and in its earlier proceeding on commercial mobile radio service (CMRS) interconnection that Professors Laffont and Tirole opposed the ECPR.[85] Laffont and Tirole examine Ramsey-Boiteux pricing as a means of carrying out a second-best allocation of network fixed costs between the incumbent's final output price, the access charge, and the competitor's final output price. The Ramsey-Boiteux prices depend on elasticities of demand. Laffont and Tirole select optimal access charges that depart from the marginal cost of access due to the cost of public funds needed to cover fixed cost.

In the United Kingdom, Mark Armstrong, Chris Doyle, and John Vickers have similarly examined the theoretical conditions under which the ECPR is obtained within a Ramsey-pricing framework.[86] They impose the standard break-even constraint and show that the second-best optimal access price involves a mark-up over the marginal cost of access only if the break-even constraint binds. They conclude that, if the incumbent's technology has increasing returns to scale, the access charge is set in excess of marginal cost, assuming uniform pricing and ruling out lump-sum transfers.

C. *Government Proponents of the ECPR*

The ECPR has already advanced from theory to practice in the United States and abroad. The FCC, however, ignored that regulators—including the FCC itself—had already embraced the efficient component-pricing rule, though sometimes giving a different name to the pric-

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84. See Jean-Jacques Laffont & Jean Tirole, Creating Competition Through Interconnection: Theory and Practice, 10 J. Reg. Econ. 227, 230 (1996) [hereinafter Laffont & Tirole, Creating Competition Through Interconnection]. See also Jean-Jacques Laffont & Jean Tirole, Access Pricing and Competition, 38 Eur. Econ. Rev. 1673 (1994) [hereinafter Laffont & Tirole, Access Pricing and Competition]. Oliver Williamson expresses reservations about the ECPR on grounds of its practicality and on grounds of the assumptions that Laffont and Tirole assert are necessary for the rule to be optimal. See Oliver E. Williamson, Deregulatory Takings and Breach of the Regulatory Contract: Some Precautions, 71 N.Y.U. L. Rev. 1007, 1018 (1996) [hereinafter Some Precautions] (citing Laffont & Tirole, Access Pricing and Competition, supra, at 1693–94).

85. See Interconnection NPRM, supra note 11, 11 FCC Rcd. at 14,222 ¶ 147 & n.209 (citing Laffont & Tirole, Access Pricing and Competition, supra note 84). Similarly, in its NPRM on CMRS interconnection, the Commission erroneously cited Laffont and Tirole as support for the Commission's following assessment of the ECPR: "Critics . . . have shown that these properties [of economic efficiency produced by the ECPR] only hold in special circumstances. On the other hand, some express concern that the ECPR may inhibit beneficial entry." Radio Service Providers, Equal Access and Interconnection Obligations Pertaining to Commercial Mobile Radio Service Providers, 11 FCC Rcd. 5020, 5046 ¶ 53 (1996) (notice of proposed rulemaking) [hereinafter CMRS NPRM] (citing Laffont & Tirole, Access Pricing and Competition, supra note 84; Laffont & Tirole, Creating Competition Through Interconnection, supra note 84, at 3.

86. See Mark Armstrong et al., The Access Pricing Problem: A Synthesis, 44 J. Indus. Econ. 131 (1996).

ing method employed. The Interstate Commerce Commission had applied the rule in several railroad rate cases involving trackage rights.[87] In 1989 the California PUC embraced the rule under a different name—"imputation"—in its reform of regulation of local exchange carriers.[88] In 1994, the California PUC reaffirmed its endorsement of the ECPR.[89] In 1992, New Zealand's High Court adopted, and in 1993 its Court of Appeal rejected, the rule (but not its logic) in antitrust litigation between Clear Communications, Ltd., and the former government telephone monopoly, Telecom Corporation of New Zealand, Ltd.[90] In October 1994, however, the Judicial Committee of the Privy Council of the House of Lords reversed in relevant part the decision of the Court of Appeal and, citing academic articles on the ECPR by Professors Baumol and Kahn, held that the rule is compatible with New Zealand antitrust principles governing the pricing of a bottleneck input sold by a vertically integrated firm to its competitors.[91] And in March 1996, the National Regulatory Research Institute—the research arm of the National Association of Regulatory Utility Commissioners (NARUC)—endorsed the use of the ECPR for the pricing of unbundled access to transmission facilities in the electric power industry.[92]

Remarkably, despite its current criticisms of its depiction of the ECPR, the FCC in effect adopted the rule in March 1996 for the pricing of mandatory leased access of cable television channels: "We generally agree with Time Warner that the value of leased access channels 'is the opportunity cost imposed on the operator from the lost chance to pro-

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87. See St. Louis S.W. Ry.—Trackage Rights over Mo. Pac. R.R.—Kansas City to St. Louis, 1 I.C.C.2d 776 (1984), 4 I.C.C.2d 668 (1987), 5 I.C.C.2d 525 (1989), 8 I.C.C.2d 80 (1991).

88. See Alternative Regulatory Frameworks for Local Exchange Carriers, Inv. No. 87-11-033, 33 C.P.U.C.2d 43, 107 P.U.R.4th 1 (1989).

89. See Alternative Regulatory Frameworks for Local Exchange Carriers, Inv. No. 87-11-033, Decision 94-09-065 at 204–24 (Cal. Pub. Utils. Comm'n Sept. 15, 1994). For a discussion of the California imputation ruling, see Hausman & Tardiff, supra note 77, at 543–47, 545 n.25, 554–55.

90. See Clear Communications Ltd. v. Telecom Corp. of N.Z. Ltd., slip op. (H.C. Dec. 22, 1992), rev'd, slip op. (C.A. Dec. 17, 1993). The rule was rejected because the Court of Appeal held that under New Zealand law no agency has the power to prevent inclusion of monopoly profit in the opportunity cost component of the input price, a conclusion subsequently rejected by the Judicial Committee of the Privy Council. For discussions of the case, see Baumol & Sidak, Pricing of Inputs Sold to Competitors, supra note 10, at 189–95; James Farmer, Transition from Protected Monopoly to Competition: The New Zealand Experiment, 1 Competition & Consumer L.J. 1 (1993); Kahn & Taylor, supra note 78, at 229 n.10.

91. See Telecom Corp. of N.Z. Ltd. v. Clear Communications Ltd., [1995] 1 N.Z.L.R. 385, 404–05 (Oct. 19, 1994, Judgment of the Lords of the Judicial Committee of the Privy Council) (citing Baumol & Sidak, Pricing of Inputs Sold to Competitors, supra note 10, at 195–96; Kahn & Taylor, supra note 78, at 231–32).

92. See Robert J. Graniere, Almost Second-Best Pricing for Regulated Markets Affected by Competition (National Regulatory Research Inst. Paper No. NRRI 96-10, Mar. 1996).

gram these channels.'"[93] The FCC defined opportunity cost in that situation as follows:

> The portion of the maximum rate for leased access channels included in a tier of programming which we propose be paid by the leased access programmer . . . would be based on the reasonable costs (including reasonable profits) that leased access imposes on the operator. These costs are specific to the channels designated for leased access. Some of these costs are associated with removing or "bumping" non-leased access programming to accommodate leased access programming; others are the direct costs associated with the specific leased access programmer or its programming. To simplify this discussion, we will refer to all of these costs as opportunity costs.[94]

The FCC further concluded that "any profit which is generated from subscriber revenue could be viewed as an opportunity cost imposed on the operator who forgoes these profits when this channel is used to carry leased access programming."[95] The FCC did not explain why it proposed in its interconnection docket to prohibit the states' use of the same pricing rule for mandatory access that the agency embraced only three weeks earlier and that numerous other regulatory bodies have endorsed as conducive to economic welfare.

In May 1996 the FCC again embraced the ECPR, this time explicitly, in a rulemaking concerning open video systems (OVS).[96] The Telecommunications Act of 1996 added section 653 to the Communications Act, which "establishes a new framework for entry into the video programming delivery marketplace—the 'open video system.'"[97] The OVS regulatory regime is intended to create

> an option, particularly to a local exchange carrier, for the distribution of video programming other than as a "cable system" governed by all of the provisions of Title VI [of the Communications Act]. If a telephone company agrees to permit carriage of unaffiliated video programming providers on just, reasonable and non-discriminatory rates and terms, it can

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93. In re Implementation of Sections of the Cable Television Consumer Protection and Competition Act of 1992: Rate Regulation Leased Commercial Access, MM Docket No. 92-266, CS Docket No. 96-60, 1996 FCC LEXIS 1544, at *57 ¶ 61 (F.C.C. Mar. 29, 1996) (order on reconsideration of the first report and order and further notice of proposed rulemaking) [hereinafter Leased Access Order on Reconsideration] (quoting Time Warner comments).

94. Id. at *62 ¶ 69. "[T]he operator would be allowed to recover only those types of opportunity costs which can reasonably be attributed to carriage of the leased access programming and which are reasonably quantifiable." Id.

95. Id. at *70 ¶ 78.

96. See In re Implementation of Section 302 of the Telecommunications Act of 1996, Open Video Systems, CS Docket No. 96-46, 1996 FCC LEXIS 2285 (F.C.C. June 3, 1996) (second report and order) [hereinafter OVS Second Report and Order].

97. Id. at *1 ¶ 1.

> be certified as an operator of an "open video system" and subjected to streamlined regulation under Title VI.[98]

The OVS proceeding thus considered how a LEC seeking to enter the video marketplace pursuant to Title VI regulation would have to price its carriage of unaffiliated video programming.

The FCC concluded that "the most effective way to evaluate whether a rate is just and reasonable is to compare it to an imputed carriage rate associated with the open video system operator or its affiliate."[99] The agency called this method the "imputed rate approach" and characterized it as "an application of the Efficient Component Pricing Rule to open video systems."[100] The FCC considered the ECPR the appropriate rule for pricing "just, reasonable, and nondiscriminatory" access to an *entrant's* facilities:

> This approach is particularly applicable to circumstances where a new market entrant, the open video system operator, will face competition from an established incumbent, the cable operator. A competitive environment facilitates this approach as market forces limit the ability of the open video system operator to increase its imputed carriage rate. The open video system operator must obtain programming and seek subscribers in a competitive environment, thereby providing a sound basis of comparison to determine whether the unaffiliated rate is just and reasonable. The prices that determine the revenues and costs that make up the imputed carriage rate are effectively set in a competitive market.[101]

But the FCC immediately distinguished this application of the ECPR to a LEC entering a market from the case of the incumbent LEC's sale of mandatory network access to competing providers of telephony services:

> Use of this approach is appropriate in circumstances where the pricing is applicable to a new market entrant (the open video system operator) that will face competition from an existing incumbent provider (the incumbent cable operator), as opposed to circumstances where the pricing is used to establish a rate for an essential input service that is charged to a competing new entrant by an incumbent provider. With respect to new market entrants, an efficient component pricing model will produce rates that encourage market entry.[102]

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98. Id. (footnotes omitted).

99. Id. at *154 ¶ 125.

100. Id. at *154–*155 ¶ 126 (citing Baumol & Sidak, Pricing of Inputs Sold to Competitors, supra note 10; Kahn & Taylor, supra note 78).

101. Id. at *155 ¶ 126.

102. Id. at *156 ¶ 127.

> An open video system operator's price to its subscribers will be determined by several separate costs components. One general category are those costs related to the creative development and production of programming. A second category are costs associated with packaging various programs for the open video system operator's offering. A third category related to the infrastructure or engineering costs identified with building and maintaining the open video system. Contained

The FCC's implication is that use of the ECPR to price mandatory access to an incumbent LEC's network would discourage entry. As the following section will explain, that implied criticism is incorrect. The M-ECPR does not deter entry. Although it benefits consumer welfare for the FCC to embrace the ECPR in at least some contexts, there is no economic justification for the agency to confine the rule's application to the facilities of LECs when they are entrants into other markets. If the FCC were to recognize, as we argue here, that ECPR prices are market-determined and market-constrained on a forward-looking basis, then it would be forced to acknowledge that all of the criticisms that we examine below do not apply to the M-ECPR.

D. *Misplaced Criticisms of the ECPR from Which the M-ECPR Is Immune A Fortiori*

Despite the distinguished group of economists who have endorsed the ECPR in its original form or in our refined M-ECPR form, and despite the FCC's own use of the ECPR in its establishment of rules for OVS and for the pricing of leased access to cable channels, the FCC argued in its interconnection proceeding that the costs of the ECPR are numerous and that they outweigh the rule's benefits. We consider now the standard criticisms of the ECPR, some of which the FCC did not raise, but all of which can be immediately answered. None of those criticisms accurately describes the properties of the M-ECPR.

1. *The M-ECPR Does Not Preserve Monopoly Rent.* — The FCC argued that the ECPR will protect monopoly profits if they are being earned by the incumbent LEC and that the rule does not ensure lower prices and higher outputs in a competitive market:

> Under the ECPR, competitive entry will not place at greater risk the incumbent's recovery of its overhead costs or any profits that it otherwise would forego due to the entry of the competitor. In other words, the incumbent's profitability would not be diminished by providing interconnection or unbundled elements or both . . . . The ECPR presupposes that the incumbent is the sole provider of a bottleneck service, and seeks to define efficient incentives for incremental entry based on that assumption. Under the ECPR, competitive entry does not drive prices toward competitive levels, because it permits the incumbent carrier to

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in each is a profit allowance attributed to the economic value of each component. When an open video system operator provides only carriage through its infrastructure, however, the programming and packaging flows from the independent program provider, who bears the cost. The open video system operator avoids programming and packaging costs, including profits. These avoided costs should not be reflected in the price charged an independent program provider for carriage. The imputed rate also seeks to recognize the loss of subscribers to the open video system operator's programming package resulting from carrying competing programming.

Id. at *156–*157 ¶ 127.

> recover its full opportunity costs, including any monopoly profits.[103]

For four reasons, the FCC's claim that efficient component pricing preserves monopoly rents is erroneous or misdirected. The FCC-ECPR is bad economics, but it is not the ECPR that Baumol, Willig, Sidak, and others have advocated. Nonetheless, the *First Report and Order* poisoned the lexicon of efficient component pricing and has obliged us to distinguish our refinement of the ECPR by coining the name M-ECPR to emphasize that its prices are market-determined.

a. *The ECPR with Falling Prices.* — The first flaw in the FCC's claim that the ECPR preserves monopoly rents is that it fails to account for recent academic research demonstrating otherwise. Contrary to the FCC's claim, the M-ECPR supports both efficient entry *and* falling prices for the end product.[104]

First, the access price derived from the M-ECPR permits price to fall and output to expand for the final product relative to the price and output that had obtained under regulation. Second, that result holds under a variety of market structures: In contestable markets, under noncooperative oligopoly, and in markets characterized by product differentiation, the M-ECPR rewards entry by more efficient rivals and produces lower prices for the final product. Finally, the equilibrium access price implied by the M-ECPR for each of those market structures is lower than the access price that would obtain in the stylized benchmark case in which the incumbent LEC is permitted (contrary to actual experience in regulated markets) to receive the entire monopoly rent in the opportunity-cost component of the ECPR.

b. *The Unrealistic Counterfactual of an Unregulated Monopoly Free of Mandated Cross Subsidies.* — The second flaw in the FCC's claim that the ECPR preserves monopoly rent is that the agency criticized the rule on the basis of imagined circumstances that do not exist in the real world. To assume that a regulated monopolist is routinely and consistently earning monopoly rents is counterfactual. The raison d'etre of public utility regulation is to prevent a firm thought to be a natural monopoly from setting the profit-maximizing price of an unconstrained monopolist. Contrary to the FCC's implicit assumption, state regulation in place before the enactment of the 1996 federal legislation should be presumed to have limited rather than facilitated the extraction of monopoly rents. Nonetheless, expert witnesses testifying on behalf of entrants in state arbitration proceedings

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103. Interconnection NPRM, supra note 11, 11 FCC Rcd. at 14,222 ¶ 147. Similarly, the Commission said in its NPRM on CMRS interconnection: "[B]ecause the ECPR would permit an incumbent carrier to recover its opportunity costs, including any monopoly profits in the sale of the final service, the use of this rule may prevent competitive entry from driving prices towards competitive levels." CMRS NPRM, supra note 85, 11 FCC Rcd. at 5046 ¶ 53.

104. See Daniel F. Spulber & J. Gregory Sidak, Network Access Pricing and Deregulation, J.L. Kellogg Graduate School of Management Working Paper, Northwestern University (Feb. 1997) (on file with the Columbia Law Review).

following the *First Report and Order* asserted, without empirical support, that the incumbent LEC "has substantial market power in many areas."[105] If state regulation failed to prevent incumbent LECs from earning monopoly rents, then state regulators should now correct their past failures directly. Indeed the Telecommunications Act of 1996 commands them to do so if they have not done so already.[106] But even if a state did permit an incumbent LEC to earn monopoly rents, the need to reform that state's regulation would not justify the FCC's rejection of the ECPR in favor of some other pricing method that will fail to yield efficient and compensatory pricing of mandatory network access.

Moreover, if monopoly rents do persist in the pricing of some final product sold by the regulated incumbent LEC, it is likely that regulators have authorized or mandated the extraction of those rents as part of an overall rate structure that is rife with cross-subsidies from one customer group to another. It is certainly possible, in other words, that the prices for specific services sold by the regulated incumbent LEC contain rents that the firm is obliged to extract from one set of customers and then dissipate in the course of subsidizing other services that the regulator orders the LEC to sell below cost. In that case, the recovery of the contributions to margin on the services supposedly generating the monopoly rents represents nothing more than a preservation of state-mandated cross-subsidies. Those positive contributions to margin should not be interpreted by the FCC in isolation as a preservation of monopoly rents that, on balance, flow from the combined classes of all customers to the incumbent LEC's shareholders. In any event, it is surely preferable for the regulator to eliminate the system of cross-subsidies altogether by rebalancing the rate structure, rather than to reject the M-ECPR and instead price network access selectively on the basis of incremental cost while continuing to require the incumbent LEC to price various other services below cost. Such a selective approach would violate sound economic analysis and deny the incumbent LEC the opportunity to recover its costs, which eventually would destroy the LEC's financial solvency and induce disinvestment in the network.

The unsubstantiated assertion that the incumbent LEC enjoys unconstrained market power flies in the face of established thinking in antitrust law. Legal and economic scholars have long recognized that naïve reliance on market shares in antitrust cases can produce diagnoses of monopoly power where none exists. Market power refers to the ability of a firm to raise price above the competitive level without losing so many sales as to make the price increase unprofitable. In terms of maximizing consumer welfare, public policy should ask whether a market produces

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105. Warren-Boulton Rebuttal Testimony, supra note 12, at 7; see also Kaserman Report, supra note 12, at 6 (describing incumbent LEC services "that remain subject to supply under conditions of significant monopoly power").

106. See Telecommunications Act of 1996, 47 U.S.C.A. § 253(a) (West Supp. 1997) (abolishing state and local legal barriers to entry).

the textbook result of perfect competition in the sense that price (in an industry without economies of scale or scope) is driven down to marginal cost. Market shares are merely an indirect indicator of whether price is likely to exceed marginal cost. In the stylized, perfectly competitive market, where price equals marginal cost, there are so many firms that no one firm has more than a small share of total sales made in the market.

The danger with market-share analysis, however, is that courts, regulators, and legislators will continue to rely upon it when it produces misleading inferences of market power or when more direct evidence of the margin between price and cost is readily available. The misdiagnosis of market power is especially troublesome in regulated industries like local telephony, which are subject to universal service obligations.

Economists have traditionally measured the market power of some firm i through the Lerner index L_i, named for economist Abba Lerner.[107] The Lerner index is an estimate of the proportion by which firm i's price P_i deviates from its marginal cost C_i' at the firm's profit-maximizing output:

$$L_i = (P_i - C_i')/P_i.$$

In a seminal article published in 1981, Professor William Landes and Judge Richard Posner derived an equivalent form of the Lerner index that is highly useful in antitrust analysis.[108] It enables one to infer the market power of any firm i by simultaneously considering the entire market's price elasticity of demand ε^d_m, firm i's market share S_i, and the price elasticity of supply of the j other firms on the competitive fringe of the market ε^s_j:

$$L_i = S_i/(\varepsilon^d_m + \varepsilon^s_j(1 - S_i)).$$

Through this restatement of the Lerner index, Landes and Posner provided a valuable insight. As long as a court considers all three variables—ε^d_m, S_i, and ε^s_j—it will arrive at the same estimate of a firm's market power regardless of how it defines the relevant market.[109] If one variable (often S_i, the share of the supposedly "relevant" market) is overstated or understated, then the other two variables will assume larger or smaller values that precisely offset the distorted estimate of the first.

Landes and Posner noted that high market shares in a price-regulated industry are either meaningless from a competitive perspective or indicative of prices that are set at or below marginal cost—that is, at or below the price that would obtain in a competitive equilibrium:

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107. See Abba Lerner, The Concept of Monopoly and the Measurement of Monopoly Power, 1 Rev. Econ. Stud. 157 (1934).

108. See Landes & Posner, supra note 51, at 944–45.

109. The price elasticity of demand, though a negative number, is often expressed as its absolute value, as it is here.

> To the extent that regulation is effective, its effect is to sever market power from market share and thus render our analysis inapplicable. This is obviously so when the effect of regulation is to limit a monopolist's price to the competitive price level. A subtler 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 monopoly 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 cost in others. In the latter group of markets, the regulated firm is apt to have a 100% 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 either forbidden by regulatory fiat to leave the market or that is induced to remain in it by the opportunity to recoup its losses in its other markets, where the policy of uniform pricing yields revenues in excess of costs. In these circumstances, a 100% market share is a symptom of a lack, rather than the possession, of market power.[110]

That assessment is directly relevant to the unsubstantiated assertion by numerous economists that the incumbent LEC possesses market power. If an incumbent LEC has a marginal cost of $20 for its provision of basic residential service but is ordered by regulators to charge only $15, then the LEC's Lerner index for that service is −0.33. The incumbent LEC has *negative* market power but virtually 100% of the market. Landes and Posner note that in such a case "the causality between market share and price 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."[111] The Ninth Circuit comprehended that relationship in *Metro Mobile CTS, Inc. v. NewVector Communications, Inc.* when it said: "Reliance on statistical market share in cases involving regulated industries is at best a tricky enterprise and is downright folly where . . . the predominant market share is the result of regulation. In such cases, the court should focus directly on the regulated firm's ability to control prices or exclude competition."[112]

c. *The ECPR with Facilities-Based Competition for Access.* — The third flaw in the FCC's claim that the ECPR preserves monopoly rents is that it misapprehends how the rule functions when there is facilities-based competition for the provision of network access. If facilities-based competition is infeasible, then the basis for the opportunity-cost calculation in the

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110. Landes & Posner, supra note 51, at 975–76 (footnote omitted).

111. Id. at 976.

112. 892 F.2d 62, 63 (9th Cir. 1989) (footnote omitted); accord, Consolidated Gas Co. of Fla. v. City Gas Co. of Fla., 880 F.2d 297, 300 (11th Cir.), vacated and reh'g granted, 889 F.2d 264 (11th Cir. 1989), aff'd on reh'g, 912 F.2d 1262 (11th Cir. 1990), rev'd per curiam on other grounds, 499 U.S. 915 (1991).

M-ECPR is the incumbent LEC's regulated margins. But if access competition is feasible, then the M-ECPR methodology requires pricing at the stand-alone cost of the best alternative technology for providing network access, even if that lower price of access fails to preserve the incumbent LEC's regulated margin. That is why the M-ECPR produces a market-determined price. Thus, contrary to the FCC's claim concerning the ECPR, the M-ECPR cannot and does not protect the incumbent LEC's regulated margins from the downward pressure of access competition. Market forces simply will not permit the incumbent LEC to charge a higher price than the stand-alone cost of the best alternative technology for provision of network access, even if the incumbent LEC may lawfully attempt in vain to do so.

The existence of access competition also establishes that the facilities of the incumbent LEC are not "essential," as that term has come to be known in antitrust law.[113] Entry barriers to facilities-based competition are not insurmountable, as evidenced by the substantial investment in transmission and switching facilities that has already occurred in the local exchange.[114] In addition, technological change has lowered the entrant's need to make irreversible, transaction-specific investment.[115] Wireless technologies lower the specificity of entry costs in comparison with traditional wired technologies. Consequently, there is less reason with each passing day to presume that the wireline facilities of the incumbent LEC, if unregulated by the states, still could generate the monopoly rents that evidently motivated the FCC's opposition to the states' use of the ECPR.

d. *Misdirected Criticism of Policy Instruments.* — The fourth fallacy in the FCC's claim that the ECPR perpetuates monopoly rents is that the agency attempts to redress a perceived failure of public utility regulation by manipulating the wrong policy instrument. Even if state regulators were to permit an incumbent LEC to earn monopoly rents (net of all government-mandated cross-subsidies), that fact would not undermine the economic efficiency *of the M-ECPR.* The rule's purpose is to reward efficient entry into the market for the end product by ensuring that the incumbent LEC sells network access to itself and to its rivals on the same, nondiscriminatory terms. The M-ECPR accomplishes that task regardless of the market structure and regardless of the presence or absence of economic rents.

The Judicial Committee of the Privy Council of the House of Lords recognized the efficacy of the ECPR when, in *Telecom Corporation of New Zealand Ltd. v. Clear Communications Ltd.*, that court of last resort considered whether the ECPR would violate section 36 of New Zealand's

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113. See United States v. Terminal R.R. Ass'n of St. Louis, 224 U.S. 383 (1912); MCI Communications Corp. v. AT&T, 708 F.2d 1081 (7th Cir. 1983).

114. See Daniel F. Spulber, Deregulating Telecommunications, 12 Yale J. on Reg. 25, 45–50 (1995).

115. See id. at 56–58.

Commerce Act by allowing Telecom to recover monopoly rents in the opportunity-cost component of the access price that it proposed to charge to the entering local carrier, Clear, for interconnection to Telecom's access network.[116] Their Lordships emphasized that courts applying section 36 "are not acting as regulators" and that section 36 "is only one of the remedies provided by the Commerce Act for the purpose of combating over-pricing due to monopolistic behaviour."[117] Other sections of the Commerce Act, Lord Browne-Wilkinson observed, are available to perform that role:

> Part IV [of the Commerce Act] deals separately with control of prices. Under s 53 the Governor-General, on the recommendation of the Minister, may declare that the prices for goods or services of any description supplied to or for the use of different persons are controlled. Under s 53(2)(a) a Minister cannot make such a recommendation unless he is satisfied the goods or services are supplied in a market "in which competition is limited or is likely to be lessened". Under s 70 the Commission may authorize a price to be charged for controlled services. Therefore s 36 is only part of an overall statutory machinery for dealing with trade practices which operate to the detriment of consumers. Another part of such machinery (Part IV) is specifically directed to the regulation of prices in markets which are not fully competitive.[118]

The Privy Council ruled that "the risk of monopoly rents has no bearing upon the question whether the application of the [ECPR] prevents competition in the contested area."[119] "If *both* Telecom and Clear are charging their customers the same amount in the area in which they are not competitors," their Lordships reasoned, "this does not have any effect on their relative competitiveness in the area in which they compete . . . ."[120]

e. *The Mistaken Critique of the ECPR by Professors Economides and White.* — Beyond positing counterfactual assumptions, the related theoretical case against the M-ECPR makes unrealistic assumptions and errors of reasoning. Professors Nicholas Economides and Lawrence White allege that, if the ECPR price is above marginal cost, there is an efficiency distortion.[121] Economides and White reason as follows. Because the M-ECPR

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116. [1995] 1 N.Z.L.R. 385 (Judgment of the Lords of the Judicial Committee of the Privy Council, Oct. 19, 1994). See also Baumol & Sidak, The Pricing of Inputs Sold to Competitors: Rejoinder and Epilogue, supra note 36 (discussing New Zealand interconnection litigation).

117. [1995] 1 N.Z.L.R. at 404.

118. Id.

119. Id. at 407.

120. Id.

121. See Nicholas Economides & Lawrence J. White, Access and Interconnection Pricing: How Efficient Is the "Efficient Component Pricing Rule"?, 40 Antitrust Bull. 557, 568–70 (1995). Economides has subsequently directed that criticism toward the M-ECPR as well in testimony to the Hawaii PUC. See Testimony of Nicholas Economides, In the Matter of AT&T Communications Co. of Hawaii, Inc., Petition filed Aug. 19, 1996 for

price entails a markup above marginal cost (in their model, marginal cost and incremental cost coincide), any lowering of price toward marginal cost must improve welfare. Even entry by a less efficient competitor—that is, a competitor with marginal costs *greater than* those of the incumbent LEC—will lower prices. Therefore, they assert, such inefficient entry improves welfare by lowering prices. Because the M-ECPR deters that type of inefficient entry, they conclude that the M-ECPR must not be efficient.

Each step of that reasoning is flawed. Are all markups above marginal costs inefficient? Surely not, since markups are a common feature of competitive markets, where firms cover fixed costs, or shared costs and common costs, through markups. The Walt Disney Company does not sell videos of *The Lion King* at the marginal cost of a blank video cassette. Ford, General Motors, Chrysler, Nissan, Toyota, and Honda operate in competitive markets, yet each of these multiproduct firms must sell its cars, trucks, and minivans above their respective marginal costs so that the firm can recover shared or common costs incurred across two or more product lines. The objection of Economides and White to the M-ECPR seems to be that it involves a markup over marginal cost. But that objection would apply equally to *all* markups—such as average cost pricing or Ramsey pricing, where fixed costs, or shared costs and common costs, are recovered through markups.

That criticism is clearly misguided because it is directed at constant per-unit pricing *in general*, not at M-ECPR pricing in particular. The M-ECPR pricing method allows any type of pricing to recover incremental cost plus opportunity cost. Firms charge customers a two-part tariff consisting of a usage charge and a connection charge. The usage charge can be a marginal cost price. The connection charge is a per-customer charge that recovers the difference between the M-ECPR amount and the amount recovered through marginal cost pricing. Then, based on well-known economic analysis, competition between firms offering two-part

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arbitration with GTE Hawaiian Telephone Co., Inc., Tr. at 520–34 (Haw. Pub. Util. Comm'n Oct. 17, 1996) (No. 96-0329) [hereinafter Economides Hawaiian Testimony]. For critiques of Economides and White, see Baumol, et al., Parity Pricing and Its Critics, supra note 10, at 155–56; Alexander C. Larson, The Efficiency of the Efficient Component-Pricing Rule: A Comment, 42 Antitrust Bull. (forthcoming 1997); William J. Baumol & J. Gregory Sidak, Pricing of Services Provided to Competitors by the Regulated Firm, *in* 3 Hume Papers on Pub. Pol'y No. 3, at 15, 30 (1995). As Larson shows, the model presented by Economides and White suffers from several problematic features:

> The three major weaknesses of the analytic framework Economides and White employ are: (1) the assumption of monopoly pricing in the downstream market; (2) the assumption of Bertrand-like limit pricing in the downstream market once entrants purchase the required upstream productive inputs; and (3) the market price elasticities of demand that Economides and White assume for the downstream market.

Larson, supra (manuscript at 4, on file with the Columbia Law Review). Economides and White respond in Nicholas Economides & Lawrence J. White, The Inefficiency of the ECPR Yet Again: A Reply to Larson, 42 Antitrust Bull. (forthcoming 1997).

tariffs assures an efficient outcome. Two-part tariff competition for the market eliminates excess profit and cross-subsidies and allows efficient entry.[122]

The assertion by Economides and White that inefficient entry improves welfare does not withstand scrutiny. Inefficient entry does nothing more than raise total production costs for the industry. That outcome cannot be desirable. Baumol, Ordover, and Willig sound the following warning, with which we entirely agree:

> It is . . . dangerous to use the bottleneck-service price as a means to stimulate downstream competition, because the result must amount to a cross-subsidy to entrants that leads to an excessive allocation of resources into that market. . . . When bottleneck prices are forced to artificially low levels to enable rivals to obtain a foothold, all of the problems entailed in infant-firm subsidies arise. For example, these subsidies undercut the incentives for entrants to reduce their costs.[123]

Nonetheless, the objection of Economides and White to the M-ECPR is that such inefficient entry is deterred. That result cannot be a problem with M-ECPR. Rather, it is a *virtue* of pricing that reflects economic cost. This argument by Economides and White therefore epitomizes the observation by Baumol, Ordover, and Willig (with which we wholeheartedly concur) that any "disagreement between" the academic proponents and opponents of efficient component pricing "stems largely from their adoption of goals that go beyond attainment of economic efficiency in supply," which Baumol, Ordover, and Willig define to consist "solely of the requirement that access prices do not preclude an efficient firm that is either the owner of the bottleneck or one of its rivals in the final-product market from participating in the supply of the end-user product that utilizes the monopolized input."[124]

Because Economides and White object to any pricing above marginal cost, they would prefer that all regulated facilities be priced at marginal cost. If the incumbent LEC firm is not to incur losses, marginal cost pricing requires either instituting a system of two-part tariffs or establishing an alternative means for cost recovery.

Economides and White assume that the incumbent LEC possesses an essential facility that resembles manna from heaven. In their framework, the entrant cannot duplicate the facility at *any* price, yet the incumbent LEC seems to have acquired the facility without incurring any cost. The facility is infinitely costly for the entrant and free for the incumbent LEC. That assumption is certainly unrealistic. In actuality, transmission facilities are costly to establish for incumbent LECs and can be constructed by an entrant at some cost that may be greater, equal to, or less than that of

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122. This analysis is performed in Daniel F. Spulber, Regulation and Markets 209–20, 260–61 (1989).

123. Baumol et al., Parity Pricing and Its Critics, supra note 10, at 162.

124. Id. at 146 & n.2.

the incumbent LEC. If the incumbent LEC incurred a cost in constructing the facility, then the alleged "profit" is little more than net revenue. The net revenue of the incumbent LEC could be larger than, equal to, or less than the cost that the incumbent LEC incurred in creating the facilities. Thus, even though the incumbent LEC's retail price involves a markup above marginal cost, the incumbent LEC's net revenue does not represent economic profit, but merely a recovery of investment. If the incumbent LEC's net revenue is less than the cost of creating the facilities, including the costs of capital, then the incumbent LEC could be making a *loss*, even with a positive markup over marginal cost. By ignoring the costs of establishing facilities in their assertion that the incumbent LEC is making profit (really a short-run operating profit), Economides and White effectively assert that positive operating margins are not efficient, thus ignoring the recovery of, and return on, capital provided by net revenues.

In sum, although the opportunity cost of selling facilities can include monopoly rents, if such rents are already present, that fact does not indicate a problem with M-ECPR. Rather, it is a feature of the existing market. Yet, such a situation is *not* consistent with effective regulation. If the criticism of M-ECPR is based on the assumption that regulation is ineffective, then the solution is to fix the regulatory problem, not to redistribute income across firms. As Baumol, Ordover, and Willig observe: "If it is the intention of Economides and White to criticize ECPR for its lack of promise as a cure for bottleneck monopoly, they can fault it with equal justice as a poor remedy for inflation or warts."[125] Moreover, the opportunity-cost component of the M-ECPR is at all times limited by the cost of the price of the best alternative net of the incumbent LEC's incremental cost. By assuming that competitive alternatives are prohibitively costly, Economides and White stack the deck. As long as there is the potential for entry of facilities-based competitors, the cost of competitive alternatives limits the rents on the incumbent LEC's facilities.

f. *Summary.* — The criticisms of the M-ECPR start from the counterfactual assumption that the incumbent LEC is earning monopoly rents. Presumably if it were, that fact would manifest a failure of regulation that should be corrected directly rather than through access pricing. It is certainly possible that specific services contain markups that are used to provide subsidies for other services of the regulated LEC that are provided below cost. If so, the recovery of those contributions to margin may

125. Id. at 156. The same argument appears in William B. Tye & Carlos Lapuerta, The Economics of Pricing Network Interconnection: Theory and Application to the Market for Telecommunications in New Zealand, 13 Yale J. on Reg. 419, 427–35 (1996), to which Baumol et al., Parity Pricing and Its Critics, supra note 10, at 159, respond: "To condemn a procedure that performs other useful tasks—the tasks it was designed to carry out—for failing to deal with the monopoly problem as well is patently a *non sequitur*." See also William B. Tye, The Pricing of Inputs Sold to Competitors: A Response, 11 Yale J. on Reg. 203 (1994).

represent a preservation of some cross-subsidies that are left in place by rate regulation. It would be misleading, however, to interpret that situation, created by the existing regulated rate structure, as a preservation of monopoly rents. It is preferable to eliminate the system of cross-subsidies by rebalancing the rate structure, rather than selectively pricing some access services based on costs while simultaneously pricing other services *below* cost. Such a selective approach not only is inconsistent, but represents a fundamental breach of the regulatory contract by not allowing the regulated firm the reasonable opportunity to recover its costs.

If facilities-based competition is not feasible, the basis for the opportunity cost calculation in the M-ECPR is the incumbent LEC's regulated margins. If the LEC is subject to price caps and earnings-sharing rules, then those features further constrain its earnings. Thus, the economic rents of the LEC are limited by regulation. When there is facilities-based competition, the M-ECPR methodology requires pricing at the best alternative price, even if that price lies below regulated margins. Thus, M-ECPR pricing cannot be said to protect those margins from competition. To the contrary, the M-ECPR method requires repeatedly adjusting the access price to equal the market price of the best alternative.

2. *The M-ECPR Does Not Limit Competitive Entry.* — Opponents of M-ECPR pricing assert that "ECPR-based prices are designed to keep competitors out of the market."[126] That claim is incorrect. To the contrary, as the Privy Council's analysis in *Telecom v. Clear* makes clear, the ECPR does not limit competitive entry in the case of interconnection of local networks to effect terminating access. That result holds a fortiori for the M-ECPR. Likewise, when entry occurs instead by means of resale or unbundled access to network elements, access prices that recover the incumbent LEC's TELRIC and its opportunity costs are no barrier to the entry of competitors that are at least as efficient as the incumbent LEC in the provision of retail services. In all three cases, prices that are computed according to the M-ECPR are both efficient and compensatory. By setting access prices that allow the incumbent LEC to recover its costs, retail rates will fall to reflect (1) the efficiencies of resellers and of aggregators of unbundled elements, (2) the increased demand at the lower prices, and (3) the lowering of the cost recovery per unit.[127]

Consider now how competition in the provision of network access affects the M-ECPR and the incentives that it creates for efficient entry. With facilities-based competition, it is evident that the M-ECPR does not impede entry. Setting the M-ECPR at the stand-alone cost of the best alternative technology allows the entry of other companies that are at least as efficient as the entrant that serves as the benchmark. The facilities-based entrant that serves as the benchmark, however, may be less effi-

126. Warren-Boulton Rebuttal Testimony, supra note 12, at 24.

127. For a technical economic analysis demonstrating these assertions, see Spulber & Sidak, supra note 104, at 29.

cient than the incumbent LEC because the ECPR price does not undercut that entrant's incremental cost.

It is sometimes asserted that the ECPR excludes entrants that have the *potential* in the long run of becoming more efficient providers of some end service than the incumbent LEC. Perhaps the same argument would be directed at the M-ECPR. Proponents of that view are implicitly advocating an entry subsidy. The fallacy in that position, however, is that no one, including the regulator, can distinguish ex ante between those entrants that have such potential and those that do not. Furthermore, the incumbent LEC's forced subsidization of entrants is an undertaking that fundamentally differs in character from mandating that the LEC interconnect the networks of competing carriers, that it offer its retail services to competitors at wholesale, and that it offer its network elements to competitors on an unbundled basis. By effecting that subsidy, the regulator would force the incumbent LEC to fund a kind of public good: the entry of a multitude of inefficient firms into the local exchange market in the hope that one would eventually discover a lower-cost production technology than the incumbent LEC's for delivering an end service to consumers.

That end may be laudable in the minds of some persons—but the means should not be, for two reasons. First, the M-ECPR already rewards such innovation and does so in a neutral manner that does not condition the benefits that the innovating firm may reap from its achievement of cost-reducing breakthroughs on whether the innovator is the incumbent LEC or a new entrant. Second, if the government considers the quest for lower-cost technologies to be an endeavor likely to benefit the citizenry as a whole, it should expressly pay for the production of that public good, just as it might choose to subsidize other R&D activities believed to have potential public benefit. For the regulator, however, to require the incumbent LEC to subsidize its rivals' quest for superior production technologies is not only to impose a perverse regulatory policy, but also to confiscate the property of the incumbent LEC's shareholders and transfer it to shareholders of this class of favored entrants.

3. *The M-ECPR Does Not Impede Dynamic Efficiency.* — The FCC asserted in the notice of proposed rulemaking for its 1996 interconnection proceeding: "In general, the ECPR framework precludes the opportunity to obtain the advantages of a dynamically competitive marketplace."[128] That adverse result supposedly obtains because, according to the FCC, the incumbent LEC makes the same profits whether it provides the entire service or sells network access to entrants. In the FCC's view, that condition of indifference gives the incumbent LEC no incentive to reduce costs by introducing new technology or to provide better services. That reasoning, however, finds no support in either theory or experience.

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128. Interconnection NPRM, supra note 11, 11 FCC Rcd. at 14,222 ¶ 147.

Like the argument that the ECPR preserves monopoly rents, the argument that the rule (or the M-ECPR) impedes dynamic efficiency depends on the counterfactual assumption that regulators are either indifferent to the incumbent LEC's total factor productivity or ineffectual in creating incentives for productivity growth. Such an assumption ignores the prevalence of price caps, rate freezes, and other incentive regulation schemes that reward greater efficiency.[129] Nothing prevents regulators from building incentive mechanisms of that sort into their regulation of the pricing of mandatory network access under the M-ECPR.

4. *The M-ECPR Does Not Require Difficult Measurement of Future Earnings Forgone.* — The FCC argued that the difficulty of accurately measuring the incumbent LEC's loss of revenue would make the ECPR difficult to employ: "[A]s an administrative matter, it would be difficult for a regulatory agency to determine a carrier's actual opportunity cost."[130] That criticism is doubly unpersuasive. First, it fails to explain why the estimation of forgone net revenue would be any harder than the typical test-year calculations that are routinely conducted in rate proceedings, or the estimates of productivity growth that are necessary to price-cap regulation.

Second, the FCC's complaint is inconsistent with its own detailed discussion of how to compute opportunity cost when determining the mandatory price of leased access to cable channels.[131] In its March 29, 1996 order, the FCC devoted eleven paragraphs, consisting of more than 2,000 words, to a discussion of how to compute "net opportunity costs" for purposes of pricing leased access. In contrast, the FCC devoted only one sentence to the analogous issue concerning mandatory access to the local exchange network and gave no indication of why, only three weeks after its pronouncements on leased access, state and federal regulators should find the definition and measurement of opportunity costs to be an insuperable challenge.

Moreover, *any* method for computing prices for network access will entail some nontrivial administrative costs. The relevant objective, which the FCC seemed not to recognize, is not to minimize the regulator's administrative costs, but rather to maximize the gains in economic welfare from the access pricing rule chosen, net of such administrative costs.[132]

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129. See generally Sappington & Weisman, supra note 66.

130. Interconnection NPRM, supra note 11, 11 FCC Rcd. 14,222 ¶ 147. Oliver Williamson similarly asserts that there "are severe measurement problems posed" by efficient component pricing. Williamson, Some Precautions, supra note 84, at 1019.

131. See Leased Access Order on Reconsideration, supra note 93, at *70–*89 ¶¶ 79–89.

132. This principle is simply a variant on the argument, familiar in antitrust policy, that a liability rule should minimize the combined costs of false positives (type I errors), false negatives (type II errors), and the costs of administration. See Paul L. Joskow & Alvin K. Klevorick, A Framework for Analyzing Predatory Pricing Policy, 89 Yale L.J. 213, 222–42 (1979); see also Frank H. Easterbrook, Predatory Strategies and Counterstrategies, 48 U. Chi. L. Rev. 263, 318–19 (1981); Richard Schmalensee, On the Use of Economic Models in Antitrust: The *ReaLemon* Case, 127 U. Pa. L. Rev. 994, 1018–19 n.98 (1979). For

Regulators may understandably aspire to the quiet life of the former monopolists that they oversaw for decades. But if a particular access pricing rule stifles efficient entry or bankrupts efficient incumbents, it is hardly an endorsement for that rule that it requires few of the regulator's resources to administer.

5. *The M-ECPR Does Not Recreate Cost-of-Service Regulation.* — The M-ECPR is a method of pricing access that a regulator can use to unbundle an incumbent LEC's network. The rule is intended to produce efficient access and entry decisions and to compensate the incumbent LEC for the incremental cost and the opportunity cost of being compelled to allow a competitor to use the LEC's network. If, because of access competition, even the M-ECPR cannot produce an access price for the incumbent LEC's network that is compensatory in terms of recovering total costs, then the regulator must take an additional step to ensure that the LEC can achieve full recovery of the cost of providing mandatory network access to its competitors. The regulator can do so by imposing an end-user charge equivalent to the amount of the shortfall remaining after computation of the access price implied by the M-ECPR.

From this brief recapitulation, it should be clear that the M-ECPR does not recreate cost-of-service regulation. To the extent that regulated retail rates remain in force, the M-ECPR provides a means to translate those rates into access charges for UNEs. The continuation of regulated retail rates is a regulatory decision that is independent of the regulator's application of the M-ECPR to calculate the price of UNEs.

To be sure, the calculation of prices for UNEs does depend on the incremental cost and the opportunity cost borne by the regulated incumbent LEC. In the absence of regulation, the incumbent LEC would determine its own access charges in a similar manner. The regulation of prices for UNEs necessarily creates the need for the incumbent LEC to present cost information to the regulator as part of the process of administering the M-ECPR—or, for that matter, any other rule for access pricing. The relaxation of cost-of-service regulation, on the other hand, would allow the incumbent LEC to set its access charges without presenting cost information to its regulator.

With facilities-based entry, the M-ECPR bases rates on the cost of the best alternative technology for the provision of network access. That computation requires an estimation of the *competitor's* incremental cost. Such an exercise differs substantially from regulation based on the costs of the firm being regulated—namely, the incumbent LEC. Conse-

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extensions to telecommunications regulation, see Baumol & Sidak, Toward Competition in Local Telephony, supra note 10, at 131–32; MacAvoy, supra note 21, at 177–79; Kenneth J. Arrow et al., The Competitive Effects of Line-of-Business Restrictions in Telecommunications, 16 Managerial & Decision Econ. 301, 305 (1995) ("The goal of public policy in telecommunications should not be simply to minimize potential regulatory problems but instead to maximize net benefits to society."); J. Gregory Sidak, Telecommunications in Jericho, 81 Cal. L. Rev. 1209, 1216–17 (1993) (book review).

quently, when firms compete to provide network access, the regulator's application of the M-ECPR fundamentally departs from traditional cost-of-service regulation.

6. *The M-ECPR Is Not Fully Distributed Cost Pricing.* — Janusz Ordover warns: "To the extent that there are non-trivial common or shared costs among network elements, strict limits on their recovery are appropriate in order to avert *arbitrary* additives significantly above TELRIC and the inefficiencies of pricing based on fully distributed costs."[133] That statement is a non sequitur. The need to price above TELRIC is not equivalent to a need to resort to fully distributed cost (FDC) pricing. And, in any event, Ordover's concern is not an indictment of the M-ECPR because the rule is not a form of FDC pricing. To be sure, the M-ECPR is based on costs because it prices any network component at the sum of its incremental cost and opportunity cost. That exercise, however, need not entail the use of an arbitrary FDC allocation of joint and common costs. If the regulator preserves a structure of regulated rates, then any underlying cost allocation will be reflected in the calculation of prices for UNEs. Any problems with the outcome in that case result not from the M-ECPR, but from the regulator's failure to rebalance regulated rates.

With resale competition and flexible prices the M-ECPR adjusts downward to reflect falling retail prices. That adjustment does not imply any reliance upon FDC cost methodology. Similarly, if there is facilities-based competition, no FDC methodology motivates the result under the M-ECPR that the incumbent LEC should price access at the incremental cost of the best alternative technology for the provision of network access.

7. *The M-ECPR Does Not Rest on a Divergence of Social Opportunity Cost from Private Opportunity Cost.* — Some critics of the M-ECPR argue that its opportunity-cost component overstates the opportunity cost to society of providing UNEs. These critics assert that the social opportunity cost of providing the UNE is its TELRIC, whereas the M-ECPR gives the incumbent LEC its private opportunity cost, which assertedly contains monopoly rent. Professor Kaserman has testified:

> The ECPR, in all its versions, including the one proposed here, is an attempt to perpetuate the recovery of monopoly rents of an incumbent monopolist despite competition in complementary markets. The ECPR renames the "monopoly rents" of the incumbent as its "opportunity costs," and demands their recovery. There is no efficiency basis at all for such a demand. Although *social* opportunity costs are the appropriate measure of costs for an unbundled network element (and these are precisely what TSLRIC represents), *private* opportunity costs have, in general, no relationship to social opportunity costs. In fact, ECPR-based prices are bound to be higher than efficient prices based on social opportunity costs (TSLRIC-prices) because the ECPR rule—contrary to any notion of efficiency—adds the *pri-*

133. Ordover Testimony, supra note 12, at 21.

> *vate* opportunity costs of the incumbent monopolist to social opportunity costs.[134]

Similarly, Frederick Warren-Boulton has testified that, while "the private opportunity costs to [the incumbent LEC] of competition would include any reduction in profits which it earns as the dominant firm or costs it might incur in enhancing its efficiency," "these are not social opportunity costs."[135] Though similar to the earlier argument that the M-ECPR protects monopoly rent, this argument is one that turns on an interpretation of opportunity costs that is at odds with the accepted meaning of that concept among economic and legal scholars. As Judge Richard Posner has observed, "[c]ost to the economist is 'opportunity cost'—the benefit forgone by employing a resource in a way that denies its use to someone else."[136] Similarly, Joseph Stiglitz, the former Chairman of the Council of Economic Advisers, writes in his textbook that "when rational firms and individuals make decisions—whether to undertake one investment project rather than another, whether to buy one product rather than another—they take into account *all* of the costs, the full opportunity costs, not just the direct expenditures."[137] Finally, it is a matter of textbook economics that "opportunity cost is the same from the private and social points of view in the absence of external economics and diseconomies."[138]

With those textbook definitions of opportunity cost in mind, the fallacy in Kaserman's and Warren-Boulton's argument is self-evident. Suppose that *A* inherited a diamond ring in 1975, when the De Beers diamond cartel was still intact, and the ring was appraised at $50,000. *A*'s opportunity cost in 1975 of keeping the ring to wear rather than selling it would be $50,000. If *B* had bought *A*'s ring in 1975 for $50,000, *B*'s opportunity cost would have been his purchase price of $50,000. Now assume that the De Beers cartel has collapsed and the world market is flooded with diamonds. *A*'s ring is now appraised at $10,000, and *A*'s opportunity cost today of wearing the ring as jewelry rather than selling it

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134. Rebuttal Testimony of David L. Kaserman, Interconnection Contract Negotiations Between AT&T Communications of the Midwest, Inc., and GTE Midwest Inc. Pursuant to 47 U.S.C. Section 252, No. ARB-96-3, at 8 (Iowa Utils. Bd. filed Oct. 7, 1996) (filed on behalf of AT&T Communications of the Midwest, Inc.). Kaserman uses TELRIC and TSLRIC synonymously when discussing the pricing of UNEs. Identical language, updated to reflect the FCC's coining of the term TELRIC, appears in Warren-Boulton Rebuttal Testimony, supra note 12, at 24.

135. Warren-Boulton Rebuttal Testimony, supra note 12, at 24; accord, Henry Ergas & Eric Ralph, Pricing Network Interconnection: Is the Baumol-Willig Rule the Answer? 3 (prepared for the Trade Practices Comm'n, Australia, Feb. 24, 1994) (on file with the Columbia Law Review).

136. Richard A. Posner, Economic Analysis of Law 6 (4th ed. 1992).

137. Joseph E. Stiglitz, Economics 44 (1993). That definition coincides with the definition in Kaserman's own text. See Kaserman & Mayo, supra note 40, at 32.

138. James M. Henderson & Richard E. Quandt, Microeconomic Theory: A Mathematical Approach 302 (3d ed. 1980).

has fallen by $40,000 to $10,000. If *B* bought the ring today for $10,000, that price would be his opportunity cost.

Kaserman's and Warren-Boulton's incorrect interpretation of social opportunity cost would lead to absurd, confiscatory results. To continue our diamond example, their understanding of social opportunity cost would justify denying *A* the right to sell his diamond in 1975 for anything more than its TSLRIC, which would approximate its $10,000 price after the collapse of the De Beers cartel (ignoring inflation and the time value of money). "Rents earned on services sold at supercompetitive prices are not a social opportunity cost," argues Warren-Boulton.[139] To take several more concrete examples, Kaserman's and Warren-Boulton's rule would require Microsoft to sell Windows 95 at its incremental cost of production or the Walt Disney Company to sell videos of *The Lion King* at the incremental cost of copying the motion picture to cassettes. Presumably Kaserman and Warren-Boulton would even advocate TELRIC as the price for competitor access to lines of code contained in Microsoft's Windows 95 operating system. The disincentive to investment and to R&D under policies based on such a misinterpretation of opportunity cost would be profound.

8. *Full Recovery of Forward-Looking Costs Through a Combination of the M-ECPR and an End-User Charge Is Not Tantamount to "Indemnification."* — Some respected regulatory economists have misunderstood the inability of efficiently determined prices for UNEs to achieve full recovery of the incumbent LEC's forward-looking costs. For example, Frederick Warren-Boulton has asserted that "[t]he FCC's TELRIC-based pricing proposal would permit the [incumbent LEC] to recover all of its forward-looking, efficient costs, including any joint and common costs, and it would be poor economic policy to indemnify any competitor against potential losses associated with competition."[140] That assessment is incorrect on multiple grounds.

First, Warren-Boulton is incorrect to suggest that the incumbent LEC is simply "any competitor," for its unique characteristic in the marketplace is that it continues to bear incumbent burdens (and indeed acquired new ones under the Telecommunications Act of 1996) despite the lifting of entry regulation that formerly provided regulators the mechanism by which regulators could credibly commit to giving the incumbent LEC a reasonable opportunity to recover its total costs. Second, given the inability of even the M-ECPR to ensure full cost recovery, it follows a fortiori that TELRIC pricing (which Warren-Boulton favors over the M-ECPR) would not suffice to recover all of the incumbent LEC's forward-looking costs.

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139. Warren-Boulton Rebuttal Testimony, supra note 12, at 28–29.

140. Id. at 4. "Offering a guarantee to *any* firm that it will be able to recover 'all its costs,'" Warren-Boulton continues, "is incompatible with competition and market discipline." Id. at 5. Warren-Boulton was formerly chief economist of the Antitrust Division of the U.S. Department of Justice.

Third, at a more substantial level, Warren-Boulton's criticism seems more plausibly redirected at the competitively neutral end-user charge. But even then, can the end-user charge fairly be said to "indemnify" the incumbent LEC in the face of competitive entry so that its incentives for efficiency evaporate? One would think that this risk is not substantial, for Warren-Boulton has nonetheless endorsed in principle the concept of an end-user charge to achieve cost recovery for the incumbent LEC.[141] Likewise, the end-user charge has received the endorsement of Professors Baumol, Ordover, and Willig, who advocate TELRIC pricing of UNEs notwithstanding their advocacy elsewhere of efficient component pricing in other markets.[142] The end-user charge therefore appears to be uncontroversial among the regulatory economists who have considered it, even those who oppose the M-ECPR.[143]

Furthermore, the extent to which an end-user charge might blunt the incumbent LEC's incentive to achieve greater efficiency would depend on the specific design of the end-user charge. If the regulator credibly committed itself not to adjust the end-user charge for an extended period of time, then the familiar efficiency incentives of regulatory lag would manifest themselves.[144] Alternatively, regulators could explicitly structure the end-user charge as a price cap, in which case the possible variations in design and the resulting incentives are considerable.[145]

Warren-Boulton bases his argument against full cost recovery for the incumbent LEC on its supposed inefficiency: "To the extent [the incumbent LEC] is currently inefficient or its costs reflect investments in facilities which are not required to service telephone demand, these costs should not be recovered via the prices for . . . unbundled network elements."[146] Kaserman, John Mayo, and others make the same argument when urging that the wholesale discount for resale of LEC services be increased by netting out monopoly rents and inefficiencies.[147] That argument invites three responses. First, to date, the economists who allege this incumbent inefficiency have not provided factual, let alone empirical, support for their allegation. Second, it is easy to assert that a regulated firm like a local exchange carrier *must* be inherently inefficient, since regulation is inferior to competition and cannot replicate its disci-

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141. See id. at 23, 31.

142. See Ordover Testimony, supra note 12, at 6; Affidavit of William J. Baumol, Janusz A. Ordover, and Robert D. Willig on behalf of AT&T Corporation, at 21–22 (May 17, 1996) [hereinafter Baumol-Ordover-Willig Affidavit] submitted in Interconnection NPRM, supra note 11.

143. Warren-Boulton's criticism of the end-user charge is limited to the uncertainty concerning the "nature . . . and application" of the charge and to the possibility of double recovery of costs. Warren-Boulton Rebuttal Testimony, supra note 12, at 33–34.

144. See, e.g., Baumol & Sidak, Toward Competition in Local Telephony, supra note 10, at 88–89.

145. See Sappington & Weisman, supra note 66, at 80–88.

146. Warren-Boulton Rebuttal Testimony, supra note 12, at 5–6.

147. See Kaserman Report, supra note 12, at 17–19.

plines; nonetheless, it bears emphasis that the investments of the incumbent LEC that the M-ECPR's detractors would characterize as inefficient (and thus costs that would become stranded in the face of competition) are investments that regulators approved beforehand as prudent. The argument is thus one of massive, persistent regulatory failure—for which opponents of the M-ECPR implicitly argue that the incumbent LEC should be held financially responsible.[148] Third, if they existed, inefficiencies in the incumbent LEC's cost structure could take the form of incremental costs as well as common costs. Pricing at TELRIC would not eliminate inefficiency that incurred incrementally with respect to the provision of a network element.

9. *The Nonexistence of Natural Monopoly Does Not Imply That the Incumbent LEC's Forward-Looking Common Costs Are Insignificant.* — Some economists who oppose the M-ECPR assert that the argument that an incumbent LEC has substantial forward-looking common costs to recover is really an argument that the firm is a natural monopoly. Those economists then attempt to rebut the existence of common costs by arguing that the empirical evidence compiled by Richard Shin and John Ying indicates that local exchange telephony is not a natural monopoly.[149] If an incumbent LEC is not a natural monopolist, the reasoning goes, then it cannot have substantial common costs.[150] And, if the incumbent LEC has only insignificant common costs, then TELRIC pricing is efficient and compensatory, and the M-ECPR is unnecessary.

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148. As we have previously noted, that argument distills to the assertion that the democratic institutions that produced public utility regulation and that have been politically responsible for overseeing the performance of regulators have failed miserably. See Sidak & Spulber, Deregulatory Takings and Breach of the Regulatory Contract, supra note 8, at 991–93.

149. See Kaserman Report, supra note 12, at 12 & n.11 (citing Richard T. Shin & John S. Ying, Unnatural Monopolies in Local Telephone, 23 RAND J. Econ. 171 (1992)). The Shin-Ying study used data from 1976 to 1983 and found that LEC costs were not subadditive before the AT&T divestiture. In subsequent empirical research, Ying similarly concluded that over the periods 1976–83 and 1984–91, LECs were not natural monopolies. Affidavit of John S. Ying at 2, Motion of Bell Atlantic Corp., BellSouth Corp., NYNEX Corp., and Southwestern Bell Corp. to Vacate the Decree, United States v. Western Elec. Co. (D.D.C. filed July 6, 1994) (No. 82-0192). Previous studies of natural monopoly conducted on the Bell System reached conflicting results. Compare L. R. Christensen et al., Econometric Estimation of Scale Economies in Telecommunications, *in* Economic Analysis of Telecommunications: Theory and Applications 27, 28 (Léon Courville et al. eds., 1983) (AT&T had scale economies) with David S. Evans & James J. Heckman, A Test for Subadditivity of the Cost Function with an Application to the Bell System, 74 Am. Econ. Rev. 615, 620 (1984) (AT&T's costs were not subadditive).

150. David Kaserman has testified that "Shin and Ying . . . found that [local telephony is] not a natural monopoly, and if it's not a natural monopoly then the economies of scale and scope cannot be very large." Testimony of David L. Kaserman, AT&T Communications of the Midwest, Inc.'s Petition for Arbitration with Contel of Minnesota, Inc., Pursuant to Section 252(b) of the Federal Telecommunications Act of 1996, OAH Docket No. 9-2500-10733-2, MPUC Docket Nos. P-442, 407/M-96-939, at vol. 4B, Tr. 111 (Minn. Office of Admin. Hearings, Minn. Pub. Utils. Comm'n, Oct. 22, 1996).

That argument is incorrect. It conflates economies of scope and natural monopoly. A given production technology exhibits the property of natural monopoly if a single firm can supply the market at lower cost than can two or more firms.[151] That textbook definition of natural monopoly is based on a cost function that assigns total costs to outputs. The cost function has the natural monopoly property if a firm with that cost function has lower costs than would an allocation of output among two or more firms *using the same cost function.* If the technology of local exchange telephony exhibits natural monopoly characteristics, then a single firm can construct and operate that network at a lower cost than can two or more firms. To assert that an industry is characterized by natural monopoly, one implicitly assumes that there is a single "best" technology that is commonly known, that all firms would have access to that technology, and that all firms employing that technology would be at the efficient production-possibility frontier.[152] In particular, the natural monopoly cost function is a long-run cost function, so that investment can be adjusted to achieve the efficient level of capital investment required for operating at minimum cost for each output level. The assumption of a single production technology with a single cost function is clearly violated by the observed fact that incumbent LEC networks currently operate alongside wireless networks and fiber rings built by competitive access providers.[153]

Plainly it is possible for a firm to experience economies of scope without being a natural monopoly. Multiproduct firms—such as Ford, RJR Nabisco, and Hewlett Packard—are prevalent despite the obvious available alternative of organizing the same economic activities in a multitude of single-product firms. The persistence of multiproduct organization of production strongly suggests that even firms in competitive markets experience economies of scope. But those economies need not be so large as to lead ineluctably to natural monopoly.

E. *Summary*

The FCC's abbreviated discussion of efficient component pricing in the NPRM in its 1996 interconnection proceeding did not do the concept justice. The ECPR is neither flawed nor impractical, as the FCC implied. Nor has the rule withered under the glare of academic scrutiny. To the contrary, it has blossomed. A rapidly growing body of economic analysis confirms the robust efficiency characteristics of the ECPR. That analysis makes clear that our refined M-ECPR not only is socially beneficial, but also is practical enough for the FCC and the state public utilities commissions to employ without undue administrative burden.

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151. See Spulber, supra note 122, at 3; Sanford V. Berg & John Tschirhart, Natural Monopoly Regulation: Principles and Practice 22 (1988); Jean Tirole, The Theory of Industrial Organization 19–20 (1988).

152. See Spulber, supra note 122, at 138.

153. See Spulber, supra note 114.

Contrary to the impression that competitive entrants sometimes create in regulatory proceedings, substantial intellectual support exists for efficient component pricing among academics and governmental bodies. In addition, the alleged shortcomings of the ECPR (or of the M-ECPR) that are commonly raised in the academic literature and in regulatory proceedings do not withstand close scrutiny. In short, despite the fusillade of criticisms lodged against the ECPR, the intellectual health of the rule in our refined M-ECPR version remains robust.

IV. Did Professors Baumol and Willig Reject the M-ECPR?

In an affidavit filed on behalf of AT&T Corporation in the FCC's 1996 interconnection proceeding, Professors William J. Baumol, Janusz A. Ordover, and Robert D. Willig endorsed the use of the ECPR for pricing mandatory network access but concluded that the proper price for the incumbent LEC to charge for mandatory network access under the Telecommunications Act of 1996 is total service long-run incremental cost (TSLRIC).[154] The Baumol-Ordover-Willig affidavit prompted other economists retained by AT&T to assert in subsequent arbitration proceedings: "Even the creators of ECPR, Drs. Baumol and Willig, note in a recent submission to the FCC that it is inappropriate to apply the ECPR to telecommunications to derive prices of unbundled elements."[155]

That assertion misapprehends both the ECPR and the caveats that Baumol, Ordover, and Willig expressed concerning the rule. Moreover, the actual evidence on the existence of shared costs or common costs in the incumbent LEC's network revealed the factual error in the assumption that motivated the qualification raised by Baumol, Ordover, and Willig. Once the significance of that factual error is comprehended, there dissolves any apparent disagreement that might have existed between our assessment that the M-ECPR is appropriate for pricing the components of the local exchange network, and the seemingly contrary assessment by Baumol, Ordover, and Willig. Indeed, Baumol, Ordover, and Willig have subsequently written that "among uniform, nonnegotiated, and non-discriminatory pricing mechanisms, *only* pricing of access to the bottleneck-input service satisfying ECPR can ensure avoidance of . . . inefficiency. In this sense ECPR is indeed a necessary efficiency requirement."[156]

A. *Baumol, Ordover, and Willig Endorsed the ECPR for Pricing Mandatory Network Access*

In recognition of the seminal contribution that Baumol and Willig have made to the theory of network pricing, scholars and jurists routinely call the ECPR the "Baumol-Willig Rule." Predictably, Baumol, Ordover,

154. See Baumol-Ordover-Willig Affidavit, supra note 142.

155. Kaserman Report, supra note 12, at 15 (citation omitted).

156. Baumol et al., Parity Pricing and Its Critics, supra note 10, at 148.

and Willig said in their 1996 affidavit that they "continue to believe that principles of ECPR are valid and serve a useful regulatory role."[157] The FCC's unsophisticated caricature of the ECPR, however, naturally caused Baumol, Ordover, and Willig to applaud the agency's tentative rejection of the ECPR "in a form *supposedly* advocated by us" and to state politely that the FCC's rejection of the ECPR "[was] proper, although for reasons that differ somewhat from those articulated in the Notice."[158] In other words, Baumol, Ordover, and Willig evidently concluded that the FCC's stated criticisms of the pricing rule *that the agency incorrectly described as being the ECPR* were misplaced.

Given that the FCC's stated reasons for rejecting its understanding of the ECPR (what we call the FCC-ECPR) did not motivate Baumol, Ordover, and Willig to conclude that application of the rule (as they originally and correctly defined it) would not serve the public interest in the present case, then by what rationale did they decline to apply to local telephony in the United States the same rule for pricing inputs that they advocated in railroading, in electric power, and in local telephony in New Zealand? The answer lay in the critical assumptions that Baumol, Ordover, and Willig made in their 1996 affidavit concerning the size and makeup of the opportunity-cost component of the ECPR in the specific context of local telephony.

Data filed in actual state PUC proceedings revealed that the critical cost assumption made by Baumol, Ordover, and Willig was empirically unsupported.[159] Actual cost and price data from GTE Florida Inc., for example, confirm (1) that there are significant shared costs and common costs among network elements, such that pricing the incumbent LEC's wholesale and unbundled services at or near long-run incremental costs would fail to meet the statutory requirement that rates be just and reasonable and, in the case of unbundled elements, would exclude the reasonable profit allowed by statute; and (2) that there would be stranded costs *even if* the prices of wholesale and unbundled services were set according to the M-ECPR.[160] Had Baumol, Ordover, and Willig been aware of such empirical evidence of the existence of economies of scope when assessing the suitability of the ECPR to the pricing of UNEs in local telephony, their analysis would have led them to the same conclusion contained here: Pricing mandatory access to the incumbent LEC's network at TSLRIC would be insufficient on economic grounds to produce efficient incentives for entry and would be insufficient on economic (and constitu-

157. Baumol-Ordover-Willig Affidavit, supra note 142, at 8 ¶ 20.

158. Id. (emphasis added).

159. For example, joint (or shared) costs are 12 percent, and common costs are 15 percent, of the total costs of Ameritech Illinois. Only 55 percent of the Ameritech Illinois's total costs are incremental to specific services as defined by the Illinois Commerce Commission. See Comments of Ameritech Corporation at 63, submitted in Interconnection NPRM, supra note 11.

160. See Doane et al., supra note 37, at ii.

tional) grounds to produce just compensation for government-ordered use of the LEC's property by its competitors.

B. *Does Stand-alone Cost Equal Incremental Cost, and Are Shared Costs and Common Costs Trivial?*

A supplier would not voluntarily invest in a transaction unless it expected the returns from the transaction to cover all its economic costs, including a competitive return to invested capital. As noted earlier, the supplier's cost of investing in the transaction would include the highest net benefit of all opportunities forgone—that is, *opportunity cost.* The ECPR and M-ECPR extend that logic to the mandatory sale of network access by specifying: "optimal input price = the input's direct per unit incremental cost + the opportunity cost to the input supplier of the sale of a unit of input."[161]

If the firm has economies of scale or scope, then its sale of network inputs to a competitor at incremental cost would not give the firm a sufficient contribution to cover its total costs. The sale of the input at incremental cost would entail an opportunity cost in the amount of the contribution to revenue adequacy that the regulated firm would forgo by selling the network element to a competitor rather than using that input itself to produce a final product whose price incorporated the requisite contribution margin. Stated differently, in the absence of government compulsion and of facilities-based competition, no firm would sell an input to its competitor for less than the price that Baumol and Willig specified in their original exposition of the ECPR. The ECPR and M-ECPR, in other words, replicate the price that would result from voluntary exchange.

At the same time, the M-ECPR (1) establishes the proper incentives for efficient entry into the regulated market, and (2) ensures, when there are no competitive alternatives to the facilities necessary for access, that the price of government-mandated network access will not be so low as to be confiscatory under the Fifth Amendment.[162] Consequently, any pricing proposal for mandatory network access that would deviate from the M-ECPR must be scrutinized by regulators to ensure that it would not violate sound economic principles *and* constitutional protections against the uncompensated taking of private property.

The 1996 affidavit by Baumol, Ordover, and Willig, however, failed to provide either assurance. It assumed that an incumbent LEC would bear no opportunity cost by being required to sell UNEs at TSLRIC. But that critical assumption had no empirical basis; indeed, arbitration proceedings before state PUCs have received considerable empirical evidence substantiating the existence of shared costs and common costs in

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161. Baumol & Sidak, Toward Competition in Local Telephony, supra note 10, at 94.

162. See Sidak & Spulber, Deregulatory Takings and Breach of the Regulatory Contract, supra note 8, at 975–76, 978–80.

the provision of network elements necessary for local telephony. Stated differently, in their 1996 affidavit Baumol, Ordover, and Willig asserted that, if it were adjusted in the case of local telephony to reflect what they supposed was an absence of opportunity costs of any significant magnitude, the ECPR would yield the following formula:

> *Efficient price of aggregate network element = TSLRIC of aggregate network element + 0.*

Indeed, that formula has to be the correct interpretation of the Baumol-Ordover-Willig position, because the term "opportunity costs" did not appear in their affidavit despite its frequent use in their previous writings and testimony concerning the ECPR. Baumol, Ordover, and Willig were able to conclude that the efficient price of UNEs is TSLRIC, and to reach that conclusion in a manner consistent with their previous work on efficient component pricing, *only* because they assumed—incorrectly, as it turned out—that the incumbent LEC had "minimal or nonexistent" joint and common costs.[163]

Suppose, counterfactually, that the critical assumption of zero shared costs or common costs were true. In that case, several remarkable conditions would obtain: (1) the local exchange would have no economies of scope; (2) the local exchange market could be served just as efficiently by single-product firms, consistent with the classical definition of a perfectly competitive market; and (3) such technological conditions would obviate the access-pricing regime of the Telecommunications Act of 1996, as the services of the incumbent LECs' networks would be easily supplanted by competitive small-scale, single-product firms. If such a state of affairs existed, it would have been unnecessary for Baumol previously to have written:

> [E]ven if every one of a firm's services is sold at a price equal to its average-incremental cost, the firm's total revenues may not cover its total costs. Consequently, it is normal and not anticompetitive for a firm to price some or all of its products to provide not only the required profit component of incremental cost, but also some contribution toward recovery of common fixed costs that do not enter the incremental costs of the individual products. . . . Any service whose price exceeds its per-unit incremental cost provides such a contribution in addition to the profit required on the incremental investment contained in the incremental cost.[164]

The opportunity-cost component of the ECPR and the M-ECPR seeks to generate for the firm the contribution to margin essential to recover the firm's unattributable costs and thus to ensure its continued solvency. As we explained in Part I, however, the M-ECPR cannot ensure full cost recovery for the incumbent LEC.

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163. Baumol-Ordover-Willig Affidavit, supra note 142, at 13 ¶ 35.

164. Baumol & Sidak, Toward Competition in Local Telephony, supra note 10, at 102.

C. *Common Costs and Shared Costs Between Aggregative Categories and Between Individual Network Elements*

Baumol, Ordover, and Willig asserted that, with regard to *aggregative* categories of network elements (loop, switching, transport, signaling), "[e]conomies of scope, or cost subadditivities, among these categories are likely to be minimal or nonexistent."[165] Actual empirical evidence submitted in the state arbitration proceedings contradicts that assertion, however. But even if it were empirically supported, that assertion by Baumol, Ordover, and Willig would not preclude the existence of shared costs or common costs *within* any one of the aggregative categories of network elements. In other words, even if the statement by Baumol, Ordover, and Willig had been correct on its face as an empirical matter, it still could simultaneously be true that appreciable economies of scope exist among individual network elements within an aggregative category, such that setting prices at TSLRIC for unbundled services would surely fail to recover the totality of shared costs and common costs within that aggregative category. The incumbent LEC, after all, is not being asked by its rival to price *all* loops taken together or *all* switching taken together as a bundle, but rather to offer significantly finer disaggregations of its services. It is therefore significant that Baumol, Ordover, and Willig recognized that "[t]he competitive price for any such subcomponent must lie between the subcomponent's unit long-run incremental cost and SAC [stand-alone cost]."[166] In other words, by their own analysis, Baumol, Ordover, and Willig acknowledged that pricing unbundled network access at TSLRIC cannot recover shared costs and common costs.

Baumol, Ordover, and Willig further argued that the prices for unbundled network services should be priced above their incremental costs to recover shared costs and common costs, which within their framework equals "the difference between the TSLRIC of an aggregate of outputs, and the sum of the TSLRICs of each subset of those outputs."[167] According to Baumol, Ordover, and Willig, those costs "should be assigned to individual network elements on an efficient and competitively neutral basis."[168] Likewise, our earlier discussion of the M-ECPR showed that those costs should be recovered through prices on unbundled network services that exceed the TSLRICs for those services. Those costs should be recovered whether they are small or significantly large—in which case, as Baumol, Ordover, and Willig observe, "the method of revenue recovery should be consistent with allocative and competitive efficiency."[169] That outcome could only be achieved by pricing above the incremental costs

165. Baumol-Ordover-Willig Affidavit, supra note 142, at 13 ¶ 35.

166. Id. at 5 n.1.

167. Id. at 14 ¶ 37.

168. Id.

169. Id.

of the unbundled network services, according to the formula that Baumol and Willig had previously advocated elsewhere:[170]

> *Efficient price of unbundled network element = TSLRIC of unbundled network element + opportunity cost.*

Our analysis concurs with the conclusion by Baumol, Ordover, and Willig that such recovery of costs should be capped by stand-alone cost, which would properly include any shared costs and common costs, and that the access price should be no higher than "the imputed price charged by the [incumbent LEC] to itself in the context of a competitive offering."[171]

In light of the analysis contained in the affidavit by Baumol, Ordover, and Willig, how did AT&T propose in the FCC's interconnection proceeding to assign those shared costs and common costs to the unbundled network services? AT&T advocated a form of fully distributed cost (FDC) pricing known as the attributable cost method.[172] Such a pricing rule, however, could not be extrapolated from anything that Baumol, Ordover, and Willig had advocated in their affidavit, for the distinguishing feature of FDC pricing is that common costs are allocated without reference to any economically meaningful criteria. Indeed, Baumol and Willig had previously shown that various FDC methods were arbitrary and could produce widely different results.[173]

D. *Can Incumbent LECs Earn Monopoly Profits?*

Baumol, Ordover, and Willig expressed concern in their 1996 affidavit that existing rate structures for incumbent LECs included monopoly profits, which they believed could be passed on to entrants in access prices determined according to the ECPR.[174] That assertion, however, like their earlier assertion that shared costs and common costs in local telephony were insignificant, does not rest on any empirical evidence. Furthermore, it is inconsistent with the history of price regulation of incumbent LECs, which has controlled their earnings either through traditional cost-of-service regulation or through incentive regulation. Finally

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170. See Baumol-Willig New Zealand Brief, supra note 10, at 26.

171. Baumol-Ordover-Willig Affidavit, supra note 142, at 14 n.7.

172. "[T]he Commission should establish a presumption that such costs will be assigned on an equiproportional basis relative to causally attributable costs . . . ." Comments of AT&T Corporation at 64, submitted in Interconnection NPRM, supra note 11.

173. In a frequently cited article criticizing FDC pricing, Baumol and Willig wrote:

> The "reasonableness" of the basis of allocation selected makes absolutely no difference except to the success of the advocates of the figures in deluding others (and perhaps themselves) about the defensibility of the numbers. There just can be no excuse for continued use of such an essentially random or, rather, fully manipulable calculation process as a basis for vital economic decisions by regulators.

William J. Baumol et al., How Arbitrary is "Arbitrary"?—or, Toward the Deserved Demise of Full Cost Allocation, Pub. Util. Fort., Sept. 3, 1987, at 16, 21; see also Baumol & Sidak, Transmission Pricing and Stranded Costs, supra note 10, at 55–64.

174. See Baumol-Ordover-Willig Affidavit, supra note 142, at 8–9 ¶ 23.

Baumol, Ordover, and Willig have subsequently made clear that the existence of monopoly rents does not justify the rejection by regulators of efficient component pricing: "It is our position . . . that distortion of access prices *is the wrong instrument* for elimination of monopoly power or monopoly profits."[175] We agree. Moreover, any returns that the LECs might have obtained from achieving cost efficiencies under incentive regulation were an intended consequence of such regulation. For the regulator to eliminate those returns retroactively would amount to a breach of the most essential element in the bargain that the LEC and the regulator struck when replacing rate-of-return regulation with incentive regulation. Those returns in any case have been limited by sharing rules and other regulatory constraints. Finally, the assertion that regulators have been allowing incumbent LECs to earn monopoly profits is inconsistent with the incumbent LECs' existing and continuing obligations to serve.[176]

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175. Baumol et al., Parity Pricing and Its Critics, supra note 10, at 147 n.3.

176. The opportunity-cost component of the ECPR will necessarily be positive, Baumol had previously noted, "when a regulated firm has special-service obligations imposed upon it," Baumol & Sidak, Toward Competition in Local Telephony, supra note 10, at 108, as has been the case with any incumbent LEC. Elaborating on this point, Baumol has written:

> Examples include the arrangement under which the input supplier is also forced to serve as the "carrier of last resort," or when, as in the case of Telecom Corporation of New Zealand, the carrier is required to supply services to residential customers at rates that it claims to be insufficient to cover the pertinent incremental costs. *These obligations are appropriately treated as sources of common fixed costs for the firm; the costs must be covered legitimately by the firm's prices* and be taken into account in calculating its stand-alone-cost ceilings [for final-product prices].

Id. at 108–09 (emphasis added) (citing Clear Communications Ltd. v. Telecom Corp. of N. Z. Ltd., slip op. (H.C. Dec. 22, 1992)). In their 1992 testimony concerning the interconnection of Clear Communications to the local network of Telecom New Zealand, Baumol and Willig even more clearly endorsed the proposition that the opportunity-cost component of the ECPR must permit the incumbent LEC to recover the cost of government-mandated subsidies to residential customers:

> In the case at hand, a crucial issue is, if Telecom New Zealand provides interconnection to its local loops for the local loops that belong to Clear Communications, whether the price that Telecom New Zealand charges for this service should include any contribution toward coverage of the cost of the cross-subsidy to residential customers that is imposed by the government upon Telecom New Zealand. The question to be answered, then, is whether the price charged for interconnection should or should not include such a contribution. Once again, the competitive market standard provides an unambiguous answer: such a contribution is not merely permissible, it is *mandatory*.

Baumol-Willig New Zealand Brief, supra note 10, at 21–22 ¶ 40. Ordover has taken a contradictory position in an unbundling arbitration under the Telecommunications Act of 1996: "In my view, until the end-user rates are realigned with the underlying costs, M-ECPR and ECPR are not appropriate methodologies for setting rates for unbundled network elements." Ordover Testimony, supra note 12, at 47. Far from reducing the size of such public-service obligations borne by incumbent LECs, the Telecommunications Act of 1996 increased their obligations by creating new unbundling requirements and more expansive universal service obligations.

E. *Stranded Cost Recovery Through Competitively Neutral End-User Charges*

In their 1996 affidavit, Baumol, Ordover, and Willig advocated keeping cross-subsidies to a minimum: "A deliberate wedge between prices and TSLRIC is most likely to result from a decision to subsidize universal service or other regulatory goals."[177] That is because pricing below incremental costs for some services requires obtaining subsidies elsewhere, encourages excess demand for those services, and harms the financial solvency of the incumbent, thus placing it at a disadvantage relative to entrants. Furthermore, obtaining those subsidies by adding overcharges to other services inefficiently reduces demand for those facilities and places the incumbent at a competitive disadvantage to entrants that can price flexibly, which leads to inefficient bypass of existing network facilities. This analysis by Baumol, Ordover, and Willig concurs with our conclusion in Part I and in our previous writings[178] that regulators should rebalance the rates of the incumbent LECs to eliminate cross-subsidization.

Baumol, Ordover, and Willig also advocated competitive neutrality of funding and distribution mechanisms. That goal requires that regulatory obligations, price regulations, and unbundling requirements neither penalize nor reward incumbents or entrants. Baumol, Ordover, and Willig cautioned that deviations between prices and economic costs should not be allowed to distort competition between the incumbent LEC and its potential rivals: "To be competitively neutral, a regulatory wedge between prices and TSLRIC must never favor new entrants over incumbents, or *vice versa*."[179] They elaborated: "The reason is obvious: any such departures from competitive neutrality tend to channel the business to inefficient suppliers. This inefficient allocation of business will raise costs, repress innovation and investments and—as usual when competition is subverted—needlessly burden consumers."[180]

However, as Baumol had previously emphasized elsewhere, economic logic implies that this principle be applied not only to specific subsidies (for example, universal service), but to *all* pertinent costs, including the cost of regulatory obligations—past, present, and future. The entry of competitors not burdened by such expenses raises the prospect that such costs borne by the incumbent firm will be stranded:

> Stranded costs can be defined as those costs that the utilities are currently permitted to recover through their rates but whose recovery may be impeded or prevented by the advent of competition in the industry. Those costs represent expenditures incurred by a utility in the past in meeting its obligation to serve all customers within the area in which it held an exclusive

177. Baumol-Ordover-Willig Affidavit, supra note 142, at 21 ¶ 60.

178. See Sidak & Spulber, Deregulatory Takings and Breach of the Regulatory Contract, supra note 8, at 872–74.

179. Baumol-Ordover-Willig Affidavit, supra note 142, at 21 ¶ 61.

180. Id.

> franchise, granted to it under the traditional regulatory regime.[181]

Baumol has argued that such stranded costs should be recovered:

> The cost of recoupment of stranded costs can be considered part of the common costs to which the price of inputs supplied by the utility to other firms can appropriately contribute or even cover completely. A cost imposed by regulatory arrangements is as real a cost for the enterprise as any other, and an input price that helps to cover that cost is merely contributing to adequacy of revenues for the firm.[182]

If regulators "omit or limit recovery of portions of opportunity cost," Baumol concluded, their "pricing policies will undermine economic efficiency."[183]

As stated earlier, the ECPR and the M-ECPR imply that an incumbent LEC's price for a UNE should equal its long-run incremental costs plus its opportunity cost. But competition constrains the latter: The presence of facilities-based entry, and the possibility that entrants may purchase services under existing retail rates that are substitutes for the UNEs of the incumbent LEC, reduce the likelihood that the incumbent LEC will recover its total costs. That is because the incumbent LEC's price will be constrained by the stand-alone cost of the best alternative. It therefore bears repeating that M-ECPR pricing is not fully compensatory. Thus, as Baumol, Ordover, and Willig advocated, state regulators should consider rate rebalancing *before* imposing a system of prices for wholesale services and UNEs. If, however, the state regulator chooses not to rebalance rates, then, to preserve the existing contribution in the incumbent LEC's existing rate structure, a system of end-user charges must accompany the pricing of wholesale services and UNEs. As Baumol argued recently, "[t]he efficient component-pricing rule, and the competitive market model of which it is a constituent part, equip [regulators] to resolve [network] pricing and stranded cost disputes in the public interest."[184]

Baumol, Ordover, and Willig emphasized in their 1996 affidavit that cost must be examined on a forward-looking basis. That position necessarily applies to the future cost of regulatory obligations newly imposed on incumbent LECs by the Telecommunications Act of 1996. The Act imposes obligations on incumbent LECs, all of which will impose costs on a forward-looking basis that are not borne by potential entrants. One such costly obligation is the duty to provide interconnection to any requesting telecommunications carrier at "any technically feasible point

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181. Baumol & Sidak, Transmission Pricing and Stranded Costs, supra note 10, at 98.

182. Id. at 147.

183. Id.

184. Id. at 158.

within the carrier's network."[185] Equivalent access requirements apply to UNEs. The costs of those newly established obligations will be stranded unless they are either (1) recovered through competitively neutral charges, as Baumol, Ordover, and Willig advocated in their affidavit,[186] and as we advocated in Part I, or (2) included in the TSLRIC for a service.

In sum, our analysis is consistent with the recommendation of Baumol, Ordover, and Willig that the wedge between prices and costs be recovered in a competitively neutral manner. The relevant cost need not equal the incumbent's TSLRIC, however, but rather may equal the stand-alone cost of the best alternative. In their 1996 affidavit, Baumol, Ordover, and Willig accepted unquestioningly that the incumbent LEC's TSLRIC exactly equaled the stand-alone costs of potential entrants. In contrast, as Part I implied, we regard that question as an empirical matter to be determined in competitive markets. Contributions to universal service funds, to shared costs and common costs (which will be present if the incumbent LEC's TSLRICs are less than the entrant's stand-alone costs), and to other regulatory obligations that cannot be recovered in competitive markets are appropriately collected through competitively neutral charges that do not distort consumption and investment decisions. That was precisely the recommendation of Baumol, Ordover, and Willig in their 1996 affidavit when one follows their proposal for universal service funding to its logical economic conclusion.

F. *Summary*

Did the creators of the ECPR reject the application of that rule or of the M-ECPR to the pricing of UNEs in local telephony? Contrary to the assertions of some economists, the answer is no. The analysis of Baumol, Ordover, and Willig in their 1996 affidavit can be entirely reconciled with our M-ECPR analysis here. On the two most important regulatory questions concerning competition in local telephony, Baumol, Ordover, and Willig were in agreement with the analysis we present here. First, efficient component pricing is the proper method to price mandatory network access; mandatory access to the incumbent LEC's network should be no exception. Second, even when the ECPR is correctly administered to take the M-ECPR form that we have described, its automatic adjustment of the incumbent LEC's opportunity costs on a forward-looking basis will require regulators to impose competitively neutral charges to recover the incumbent LEC's stranded costs. The price of unbundled access must allow a market-allowed contribution to shared costs and common costs, over and above TSLRIC.

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185. Telecommunications Act of 1996, 47 U.S.C.A. § 251(c)(2)(B) (West Supp. 1997).

186. See Baumol-Ordover-Willig Affidavit, supra note 142, at 21–22; see also Ordover Testimony, supra note 12, at 22–23.

V. The Inefficiency of TSLRIC and TELRIC Pricing

Prospective entrants into local exchange telephony advocate that the prices for UNEs be set equal to the TELRIC or the TSLRIC per unit. To be sure, TSLRIC or TELRIC pricing is simple to understand. It would be a mistake, however, to equate simplicity with accuracy. Although employing a simple pricing mechanism may result in some savings in terms of administration, those possible cost savings are trivial compared with the short-term and long-term market distortions that would be certain to result from taking the easy way out. TSLRIC or TELRIC pricing is overly simplistic because it is simply the wrong pricing policy.

The problem with TSLRIC or TELRIC pricing generally is that it does not equal economic costs. That is why such pricing creates economic inefficiencies. The problems with TSLRIC or TELRIC pricing outlined below stem from that basic defect. To avoid redundancy, and because the economic analysis is the same in either case, we will subsume our critique of TELRIC pricing within that of TSLRIC pricing.

A. *TSLRIC Pricing Does Not Reflect the Incumbent LEC's Total Direct Costs*

The incremental cost of production is of value to the firm when it makes decisions comparing incremental revenue with incremental cost. Because a multiproduct firm has shared costs and common costs, however, TSLRIC pricing does not provide a complete picture of the firm's direct costs.

Certainly, there are circumstances in which TSLRIC pricing equals the firm's economic costs of production. If the firm provides only one service, then the incremental cost and stand-alone cost of the service are equal, and incremental pricing provides an accurate estimate of the firm's costs of production. If the firm provides multiple services, but the services have no shared costs or common costs—that is, there are no economies of scope—then incremental-cost pricing provides an accurate estimate of the costs of production. Those circumstances do not describe the technology and cost of local exchange telecommunications, however.

If all of the firm's services were to be sold at their TSLRICs, then the firm would not cover its total costs. The difference between a firm's total costs and the sum of that firm's incremental costs is equal to the firm's shared costs and common costs. Thus, under TSLRIC pricing the firm would incur losses exactly equal to that remainder—that is, the firm's shared costs and common costs.

The firm's shared costs and common costs are precisely its economies of scope, which means that they are the firm's efficiency gains from jointly producing multiple services. To price without regard to those costs is to penalize a firm for its efficiencies.

Because TSLRIC pricing fails to recover any of the incumbent LEC's shared costs or common costs, it interferes with the incumbent LEC's opportunity to earn a fair rate of return on its investment or even to re-

cover its investment. That outcome violates section 252(d)(1), added to the Communications Act in 1996, which calls for the firm to recover its costs, with pricing that may include a reasonable profit.[187] TSLRIC pricing *guarantees* losses and thus is inherently confiscatory. A policy that required TSLRIC pricing would therefore violate section 252(d)(1) and constitute a taking.

Some would suggest that the firm subject to TSLRIC pricing can make up its losses elsewhere, perhaps from retail sales or from the "next fertile field" that the incumbent LEC may enter in the newly deregulated environment. Although appealing on the surface, such a suggestion assumes that earnings from other services will be sufficient to cover shared costs and common costs. Such an unfounded assumption can easily fail to correspond to market conditions. Competition may but need not lower margins on those services identified by competitors in their unbundling requests; it is just as likely to do so on the remaining services. Indeed, with TSLRIC pricing, competitors are most likely to purchase those services that would have a markup in a competitive market, so as to free-ride on the incumbent LEC. Competitive firms are able to stay in business when they recover common costs and shared costs through revenues above incremental costs. The market-allowed contribution of "other services" cannot be predicted a priori. What *is* certain is that a firm that does not cover its common costs and shared costs will not remain in business for very long.

B. *TSLRIC Pricing Does Not Reflect the Incumbent LEC's Economic Costs*

TSLRIC pricing is not efficient because it does not reflect the incumbent LEC's economic costs, which include the direct incremental cost *plus* the opportunity costs of the facilities to which the incumbent LEC provides access. The TSLRIC pricing method is neither efficient nor compensatory because the incumbent LEC will not be allowed the opportunity to recover its economic costs.

Pricing the firm's outputs sold to customers differs from pricing the firm's inputs sold to competitors. The economic costs can be expected to differ. The incremental economic costs of inputs sold to competitors must equal the direct economic costs plus the opportunity costs to the firm of those inputs. To exclude the firm's opportunity costs in one's definition of costs, as do advocates of TSLRIC pricing, is simply an expedient by which regulators give competitors a free ride. It is not an assertion about economic efficiency.

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187. See Telecommunications Act of 1996, 47 U.S.C.A. § 252(d)(1) (West Supp. 1997).

C. *TSLRIC Pricing Should Not Be Confused with Competitive Pricing*

Some economists and regulators justify TSLRIC pricing by analogizing it to marginal cost pricing.[188] David Kaserman, for example, asserts with respect to local telephony that "with common cost present . . . the long-run competitive equilibrium . . . yields prices equal to marginal cost and a full cost recovery" of the incumbent LEC's total costs.[189] That justification for TSLRIC pricing rests on a misunderstanding of one of the most basic principles of economics. It is true, of course, that when price exceeds the marginal cost of production, there may be additional benefits to consumers from expansion of output to the point where marginal cost equals the price. That condition does not imply, however, that utility regulators should set prices for any and all services at their marginal cost (the cost of producing the last unit) or at average incremental cost (the incremental cost of producing the service divided by the number of units of the service provided). There are several fundamental problems with jumping to that conclusion.

With marginal cost pricing, costs are not covered in the presence of economies of scale (or, in the case of a multiproduct firm, when there are economies of scale and scope). Economists are familiar with the problem of pricing a bridge that costs $100 to build. The marginal cost of providing the services of the bridge are zero. What should be the price of crossing the bridge?[190] Efficiency considerations alone might suggest pricing at zero. Yet the bridge then would not be economically viable. One solution would be to finance the bridge using general taxation. That policy, however, would transfer income to users of the bridge from those taxpayers who are not users of the bridge. Whether such a solution is viewed as efficient depends on how one evaluates income transfers in determining

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188. See, e.g., Kaserman Report, supra note 12, at 6 & n.4.

189. Testimony of David L. Kaserman, AT&T Communications P–140, sub 51, vol. 2, Tr. 19 (N.C. Util. Comm'n Oct. 24, 1996) [hereinafter Kaserman North Carolina Testimony]. Kaserman's support for that proposition is Glenn M. MacDonald & Alan Slivinski, The Simple Analytics of Competitive Equilibrium with Multiproduct Firms, 77 Am. Econ. Rev. 941 (1987). MacDonald and Slivinski, however, develop a model of a two-product firm in which they assume that "the marginal cost of producing either [product] *rises*, and does so nonnegligibly." Id. at 945 (emphasis added). Thus, they assume a condition in which the marginal cost curve will intersect a product's average total cost curve at its minimum, such that marginal cost pricing can enable the firm to earn zero economic profit and thus break even. See id. at 944. Similarly, Kaserman asserts: "If the TSLRICs . . . [are] increasing, then even in the presence of common cost, even in the presence of large common cost, TSLRIC prices can be fully compensatory." Kaserman North Carolina Testimony, supra, vol. 2, Tr. 31 (citing MacDonald & Slivinski, supra). The fallacy in Kaserman's reasoning, and in his reliance on the article by MacDonald and Slivinski, is that an incumbent LEC is uniformly believed to operate over an output range in which marginal cost is *below* average total cost.

190. See Jules Dupuit, On the Measurement of the Utility of Public Works, *in* Readings in Welfare Economics 255 (Kenneth J. Arrow & Tibor Scitovsky eds., 1969); Harold Hotelling, The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates, 6 Econometrica 242 (1938).

the effect on social welfare. Those income transfers have consequences for economic efficiency. Accordingly, it is desirable for users of the bridge to pay for the cost of the bridge.

To illustrate further how TSLRIC pricing fails to be a useful solution when there are significant shared costs and common costs, suppose now that the bridge accommodates both passenger cars and pedestrians. Again, the incremental costs of allowing each type of service equal zero. The shared costs and common costs are $100. Advocates of TSLRIC pricing would suggest pricing the bridge at zero for both passenger cars and pedestrians. As before, the bridge would not remain economically viable.

The analogy between competitive markets and regulated pricing as a guide to efficient pricing is somewhat strained. Even in the ideal case of "perfect competition" covered in basic economics textbooks, one cannot say that competitive firms price at marginal cost. Rather, the "perfectly competitive firm" takes the market price as a given and offers its output for sale at the market price. The firm, in this theoretical ideal case, sets its *output* level such that the firm's marginal cost equals the market price.[191] This is how in equilibrium the marginal cost of the firm equals the market-clearing price. That situation is different from the problem of a regulator seeking to determine the regulated firm's marginal cost, which will vary depending on the types of services and the volume of services that the firm offers. For regulators to determine what price equals the firm's marginal cost, *at the level of services demanded at that price*, is a fundamentally different and more complex problem. To make that determination, regulators not only would have to predict marginal costs at each level of output over a relevant range, but also would have to make projections of the quantity demanded of those services at the relevant prices so as to determine the equilibrium prices.

Finally, when textbooks speak of the marginal cost or incremental cost of the firm, they are referring to the firm's marginal *economic* cost. As any textbook will indicate, the economic costs of the firm's inputs refer to the direct cost of purchasing the inputs or the imputed *opportunity cost* of inputs that are not purchased. The firm's costs refer to the costs of the inputs used by the firm, with the cost function of the firm defining the minimum cost of producing output given the firm's technology and cost of inputs.

D. *TSLRIC Pricing Promotes Free Riding by Competitors*

TSLRIC pricing fails to address the problem of selling inputs to competitors. To illustrate these issues clearly, recall the fast-food stand that offers both hot dogs and hamburgers, each of which is cooked on the same grill. The unit incremental cost of cooked hot dogs to the firm is $1, and the unit incremental cost of cooked hamburgers is $2. The total

191. See, e.g., Paul A. Samuelson & William D. Nordhaus, Economics 130 (15th ed. 1995).

cost of the grill is $100. The fast-food stand charges its customers $1.50 and $2.60 for hot dogs and hamburgers, respectively, allowing the firm to cover its shared costs and common costs.

Proponents of TSLRIC pricing would have that fast-food stand sell cooked hot dogs and hamburgers to rival fast-food sellers at $1 and $2, respectively, ignoring the shared costs and common costs of the grill, which is the capital of the fast-food stand. The rivals could then offer the cooked hot dogs and hamburgers to the firm's customers at prices that are equal to or lower than the prices of the fast-food stand. Without question, this free riding would increase competition for the fast-food stand that owns the grill, so much so that the firm would be driven out of business. Such a pricing solution does not conform with any pricing behavior actually observed in a competitive market, and it cannot be justified on grounds of economic efficiency.

E. *TSLRIC Pricing Subsidizes Entrants*

Some proponents of TSLRIC pricing may argue that prices set at TSLRIC do not involve cross-subsidies, so that TSLRIC pricing would rebalance rates. That claim is false. The incremental cost test for cross-subsidization requires that each service, *and each combination of services*, must cover its incremental cost.[192] That outcome easily fails to occur with TSLRIC pricing as soon as the firm produces more than two services and any group of services has shared costs. This result is illustrated by the following example with three services:

Incremental cost of service *A*	=	$1
Incremental cost of service *B*	=	$1
Incremental cost of service *C*	=	$1
Shared cost of service *A* and *B*	=	$5
Total cost of all services	=	$8

The example shows that the incremental cost of services *A* and *B* taken together is $1 + $1 + $5 = $7. TSLRIC pricing would set the price of each service at $1. Services *A* and *B* taken together would have revenues of $2, which would fail to cover their $7 incremental cost. Thus, TSLRIC pricing creates cross-subsidies.

In a general sense, TSLRIC pricing creates cross-subsidies when multiple services are available that have shared costs or common costs. Those costs do not magically disappear. Failure to cover those costs makes those services available collectively at less than their total costs.

What are the consequences of cross-subsidization? Entrants will make efficient decisions about the mix of resale and facilities-based competition only if their access to existing networks is provided at prices

192. See, e.g., Baumol & Sidak, Toward Competition in Local Telephony, supra note 10, at 69–72.

that accurately reflect economic costs. Subsidizing services by pricing them at TSLRIC sends the wrong price signals and leads to incorrect decisions. When prices are too low, excessive use of underpriced facilities will result and thus distort the decisions of resellers. The entry and expansion of resellers is thus not only encouraged, but also financed by underpriced facilities.

Moreover, when network services are priced too low, the building of competing facilities is likely to be discouraged. Thus, rather than stimulating facilities-based competition, TSLRIC pricing discourages it. Why should an entrant seek a competitively priced alternative when it can free ride on the incumbent LEC's facilities at prices that are below cost? TSLRIC pricing turns out to be a misnomer: It should more appropriately be termed "individual-service LRIC," for it ignores the incremental costs of *combinations* of services.

Indeed, the problem is compounded by unbundling "at any technically feasible point," as envisioned by the Telecommunications Act of 1996.[193] Finer and finer partitioning of services wrings out the shared costs from TSLRIC prices and thus increases the subsidies inherent in such pricing. In the limit, the finer partitioning of services creates TSLRIC prices that will not cover the incremental costs of *any* pair or group of services that have shared costs.

F. *TSLRIC Pricing Creates Incentives for Excessive Unbundling*

TSLRIC pricing creates incentives for excessive unbundling because it ignores that unbundling shifts costs from attributable costs to shared costs and common costs. A firm cannot apply any pricing methodology independently of the characteristics of the products and services for which prices are being chosen. On the demand side, the characteristics of the products and services will affect the willingness of consumers to pay for those products and services. On the supply side, if the firm sets prices subject to regulatory controls based on its costs of service, the definitions of the products and services will significantly affect the costs that are attributable to those products and services.

The pricing methodology that regulators adopt for resale and UNEs should be flexible enough to adapt to the regulations governing the extent of unbundling. Efficient and compensatory pricing must allow the firm to recover its economic costs, including both its attributable costs and its unattributable costs—namely, its shared costs and common costs.

The measurement of costs depends on the definition of the firm's services. For a multiproduct firm, changes in the definition of classes of services and individual services will affect measures of incremental cost. Generally speaking, the more services that are defined by subdividing sets of services, the lower the attributable costs of individual services, and the higher the shared costs and common costs of those service. Without any

193. Telecommunications Act of 1996, 47 U.S.C.A. § 251(c)(3) (West Supp. 1997).

increase or decrease in total costs, it is simply more difficult to identify the attributable costs of a particular service as one moves toward higher levels of disaggregation in the classification of services.

Suppose, for example, that a company produces services that are grouped into two categories, *A* and *B*, and each category of services is sold as a bundle. The average incremental cost of category *A* is $10. The same is true of the average incremental cost of category *B*. Moreover, the firm has common costs of $20. Suppose that there are two services within category *A*, each of which has an incremental cost of $4, and that the two services have shared costs of $2, for a total of $10. By unbundling services in category *A*, the shared costs and common costs of the firm rise by $2 to $22. In state arbitration proceedings under section 252 of the Communications Act, for example, entrants have requested incumbent LECs to engage in "subloop unbundling," so that pieces of the loop (such as the network interface device, or NID, on the side of one's home) can be obtained independently of a "NID-less" loop and other subelements. One would expect subloop unbundling to raise the incumbent LEC's proportion of unattributable costs.

Unbundling therefore has the effect of decreasing the proportion of costs that are attributable, and of correspondingly increasing the proportion of total costs that are classified as shared or common. To the extent that the degree of unbundling follows regulatory dictates, the resulting service definitions may bear little relation to technological and managerial measurements of costs. Consequently, it becomes increasingly difficult to identify the firm's underlying cost components. Reliance on regulatory accounting measures, based on regulatory service classifications and unbundling requirements, is likely to cause inefficient decisions concerning the pricing of network components. That inefficient outcome is particularly likely to occur if, as one would expect, the packages of retail services that the incumbent LEC offered before the imposition of mandatory unbundling were intended to facilitate optimal management decisions about pricing and service offerings.

This effect of unbundling on cost calculations counsels regulators to take careful account of the interplay between unbundling requirements and pricing. Competing carriers have an incentive to request pricing at incremental cost to the incumbent LEC as a means of obtaining network services in a manner that avoids paying for the LEC's shared costs and common costs. Further, by requesting a finer and finer partition of the incumbent LEC's services into unbundled components, competitors shift costs away from measures of incremental cost and toward measures of shared costs and common costs. In the limit, groups of services may individually have negligible incremental costs, even though as a group, their shared costs and common costs are significant.

TSLRIC pricing thus creates a perverse incentive. Unbundling requests from competitors using an incumbent LEC's services may be strategic actions, rather than legitimate requests for access to network services.

Competitors not only avoid paying a portion of shared costs and common costs, but also have an incentive to request ever finer partitions of services, and interconnection at every technologically feasible point, so as to shift costs farther away from incremental costs and into shared and common costs. This strategic opportunity allows competitors to free ride on the incumbent LEC.

M-ECPR pricing avoids those perverse incentives because competitors must pay for the full economic costs of the services that they purchase—both the incremental costs and a portion of the shared costs and common costs. By allocating shared costs and common costs in a competitively neutral manner, M-ECPR pricing eliminates the incentive for competitors to make strategic requests for excessive unbundling. Instead, a competitor will purchase resale and UNEs on the basis of its market prospects rather than as an attempt to game the regulatory system.

G. *TSLRIC Pricing Fails to Include Increases in Shared Costs and Common Costs That Result from Unbundling*

Unbundling has costs. The provision of resale services and unbundled network components entails two types of costs: transactions costs and production costs. Unbundling should not be an end in itself because the bundling of products and services reduces customer transactions costs and enhances convenience. Access to a few types of local network elements is sufficient to achieve the objectives of deregulation. Competitive markets are capable of resolving the tradeoff between the need to customize offerings and the advantages of bundling. The costs of mandated unbundling must be reflected in estimates of the incumbent LEC's incremental costs, shared costs, and common costs and thus included in the prices for resale and UNEs.

Excessive government-mandated unbundling of services provided by LECs may lead to higher prices and customer inconvenience. Competition in the local exchange renders unnecessary much of this mandated unbundling. Bundling in a competitive market is self-regulating because consumer demand will determine which bundles of services a firm must offer to remain competitive. Regulatory commissions can therefore achieve their open access goals with limited unbundling; they need only selectively target those points of entry to the local exchange network that are shown not to be competitive and then price that network access at compensatory levels.

Unbundling entails transactions costs in comparison with goods and services that are sold together, because the firm must break down ordering, purchasing, billing, and pricing information for individual components. Most products and services offered by competitive companies are bundles of attributes or features. Customers also benefit from the convenience of purchasing a range of products and services from the same supplier that offers lower transactions costs through "one-stop shopping"

and bundling of products and services. Companies compete by offering packages of goods and services that enhance customer convenience.

For those reasons, many goods and services are sold as packages. Imagine buying an automobile or even a computer part by part. The final product not only is a physical package of components, but also is sold as a single product requiring only one set of transactions. Even when automobiles are customized with options, customers receive discounts when they choose standardized options packages. The greater the extent of standardization of bundles of features offered to either the customers or the competitors of the incumbent LEC, the lower will be the transactions costs associated with offering those features. Conversely, the more regulatory commissions require that each retail service or network component be sold separately, or in individually customized service packages, the greater will be the associated transactions costs.

Excessive unbundling is not only inefficient and unnecessary. It entails products costs as well. To unbundle retail services and network components, the incumbent LEC often needs to install complex switching equipment and to provide additional interconnection facilities for competitors. As with transactions costs, the more such resale and access facilities can be standardized, the lower will be the associated costs. If unbundling and regulated pricing requirements shift the costs to the incumbent LEC, competitors will have an additional strategic incentive to demand unique, customized wholesale and access services from the incumbent LEC.

The transactions costs and production costs due to unbundling represent *wholesaling* costs for the incumbent LEC. The incremental wholesaling costs that are attributable to individual services or elements must be included in their prices. In addition, any increases in shared costs or common costs that result from unbundling should also be reflected in the prices for resale and UNEs. A competitive firm would not provide a service if it did not generate sufficient revenues to cover its costs. Regulators should account for wholesaling costs in their pricing rules. If competitors do not bear the full economic costs of the services they purchase, they will not make efficient purchasing and investment decisions.

TSLRIC pricing will capture wholesaling costs if, and only if, all of those costs are attributable. But it will not capture those transactions costs and production costs due to wholesaling that increase shared costs or common costs. Thus, TSLRIC pricing fails to reflect the full economic costs of unbundling.

The inefficiencies associated with the transactions costs and production costs of specialized services under mandatory unbundling are a problem when costs are shifted to the incumbent LEC's other customers or when the LEC is expected to shoulder those costs as a means of easing the transition to competition. Unbundling then becomes an incumbent burden that potentially hinders the incumbent LEC's ability to compete and subsidizes new entrants, thereby distorting their decisions about how

much to invest in competing facilities. Just as overpriced network services can induce inefficient bypass decisions, so also can subsidized wholesale services induce underinvestment in facilities and overuse of network components relative to less costly alternatives.

H. *TSLRIC Pricing Creates Incentives for the Incumbent LEC to Reduce Its Common Costs or Shared Costs*

Because TSLRIC pricing fails to compensate the incumbent LEC for its shared costs and common costs, adoption of such pricing would create an incentive for the incumbent LEC to reconfigure its network and change the structure of the company so as to increase the proportion of costs that would be attributable to those services priced at TSLRIC, and to lower costs that would be classified as shared costs or common costs. This shift in the incumbent LEC's cost structure would not represent efficiency gains. By lowering shared costs or common costs, the company would potentially increase *total* costs because it would lose some of the benefits of economies of scope. Moreover, the reductions in uncompensated shared costs or common costs that are necessary to enable the firm to break even could result in a lowering of the quality of service or the elimination of some services that are uncompensated. Thus, TSLRIC pricing may well have unintended and adverse consequences.

I. *TSLRIC Pricing Lacks Dynamic Pricing Flexibility and Creates Incumbent Burdens*

TSLRIC pricing lacks dynamic flexibility, for there is no room for price adjustment. Pricing at the lowest possible level is not sustainable in the long run because no company can continue to operate indefinitely without covering its shared costs and common costs.

Proponents of TSLRIC pricing argue that, because prices in competitive markets tend toward incremental costs, regulators should immediately reduce price to its lowest level. That argument is flawed because it presupposes that a competitive market eliminates all margins over marginal cost. To the contrary, competitive markets determine the size of relative margins on products depending on many factors, including the extent of shared costs and common costs, demand elasticities, product differentiation, transactions costs, and marketing and sales efforts. Moreover, the argument presupposes that regulators can discern competitive price levels more accurately than the market can—a proposition forcefully rebutted by Hayek[194] and many after him.

A system of price caps protects consumers from price increases while allowing competitive price decreases. TSLRIC, however, is inconsistent with price caps. It does not allow prices to be adjusted in response to competition. Regulators should not adopt TSLRIC pricing to pursue a

194. See F. A. Hayek, The Use of Knowledge in Society, 35 Am. Econ. Rev. 519 (1945).

mistaken representation of how markets operate. Instead, regulators should let competition determine the margins on unbundled services. TSLRIC pricing, by automatically eliminating *all* margins, leaves the incumbent LEC no room for competitive price adjustment and thus creates a competitive disadvantage relative to new entrants.

The Telecommunications Act of 1996 offers an unprecedented opportunity for further growth of competition in local exchange telecommunications. As a precondition, however, the Act requires additional regulation of prices for resale and UNEs. To achieve the intended benefits of competition, it is essential that regulatory commissions grant incumbent LECs sufficient flexibility to adjust their prices for resale and UNEs to reflect customer demand and market conditions. Regulatory rules for pricing of resale and UNEs should allow the incumbent LECs to recover their economic costs, including the additional costs of following unbundling rules. If prices for resale and UNEs are to be regulated, then price controls should not discriminate against the incumbent LECs by placing them at a competitive disadvantage in the marketplace.

Regulatory commissions should allow the incumbent LECs the same flexibility in pricing and defining unbundled services that is available to entrants. Regulators should not mandate excessive unbundling of the "components" of demonstrably competitive services, for competitive markets suffice to determine the efficient extent of unbundling.

Whether the incumbent LEC is providing services to retail customers or to other telecommunications companies, negotiation and competition should be relied upon as much as possible to price services and to resolve whether particular services should be offered in combination with others or à la carte. TSLRIC pricing is an extreme negotiating position taken by entrants seeking access to network services and elements at prices below economic costs.

A regulatory commission should not establish pricing and unbundling restrictions that bias decisions about the type of technology that a carrier may employ to offer local telephony service. The absence of such restrictions should apply equally to the incumbent LEC and entrants. The pricing of UNEs should be determined by customer choice and competitive interaction between the incumbent LEC, entrants, and the many other providers of transmission capacity. TSLRIC pricing can bias technology choice by eliminating the rewards from economies of scope, thereby encouraging separation of network services into components associated with incremental costs.

J. *TSLRIC Pricing Is Discriminatory*

TSLRIC pricing is discriminatory because it creates subsidies for entering competitive local exchange carriers at the expense of the incumbent LECs. As we have demonstrated, TSLRIC pricing does not cover the incumbent LEC's direct economic costs because it ignores shared costs and common costs. Moreover, TSLRIC pricing creates cross-subsidies be-

cause it yields revenues that fail to cover the incremental costs of any two or more services that have shared costs. TSLRIC pricing further fails to cover the incumbent LEC's economic costs because it ignores the incumbent LEC's opportunity costs when it is compelled to sell inputs to competitors.

No competitive firm would agree to pricing below costs. No competitive firm could offer services that subsidize one another, or that contain subsidies for competitors and thus encourage free riding on the firm's facilities. By forcing the incumbent LEC to accept prices to which a competitive firm would never agree, TSLRIC pricing places the LEC at a disadvantage relative to its competitors. Facilities-based competitors certainly will not be subject to such pricing regulations. The discriminatory impact on the incumbent LEC of TSLRIC pricing is undeniable.

K. *Summary*

The supposed efficiency of TSLRIC pricing and TELRIC pricing is a mirage. Such pricing would not cover the firm's total direct costs, nor would it compensate the firm for its economic costs inclusive of opportunity costs. TSLRIC or TELRIC pricing does not emulate competitive pricing. To the contrary, TSLRIC or TELRIC pricing would invite free riding and would subsidize entrants, both conditions that competitive markets do not willingly tolerate. The imposition of TSLRIC or TELRIC pricing would create perverse incentives for the incumbent LEC to reduce its common costs and shared costs. That action would be the direct response to the tendency of such pricing to shift attributable costs to shared costs and common costs, and to increase the incumbent LEC's shared costs and common costs as a result of unbundling. In addition to those failings, TSLRIC or TELRIC pricing does not permit the incumbent LEC to have dynamic pricing flexibility. Such pricing discriminates in favor of entrants and against the incumbent LEC. In short, the call to apply TSLRIC or TELRIC pricing to resale and UNEs is a mantra that misapprehends the most basic principles of price theory.[195]

VI. Conclusion: The Tragedy of the Telecommons

The purpose of the Telecommunications Act of 1996 was to deregulate the telecommunications industry and to open its various markets to competition. Within six months, however, it became clear that the legis-

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195. There is an additional problem with TELRIC pricing that is too complex to address here due to space limitations. Through sections 251 and 252 of the Telecommunications Act of 1996, Congress effectively redefined the public purpose to which the private property of an incumbent LEC had been dedicated. It is an intriguing question of constitutional law whether a regulated firm, after it has held itself out as an integrated network providing service directly to customers, can be compelled to rededicate that network to providing service to other (unregulated) firms that compete with the regulated firm for sales to retail customers. See Northern Pac. Ry. v. North Dakota, 236 U.S. 585 (1915).

lation could not properly be called deregulation. Rather, it was managed competition or, to coin a new oxymoron, "competition *through* regulation." Few anticipated the tragedy of the telecommons—not the members of Congress who passed the Telecommunications Act, not the telecommunications companies who lobbied for (and presumably drafted) the legislation, not the FCC regulators who interpreted the legislation, not the telecommunications companies that lobbied *against* the legislation, and not the equity analysts at the investment banks who were expected to translate the turmoil in the industry into the stark metric of share price.

By "the tragedy of the telecommons" we are alluding to the 1968 article by biologist Garrett Hardin in which he argued that there was no technical solution to the problem of overpopulation.[196] The article, however, is more memorable for presenting a succinct, popular discussion of how the absence of property rights can induce the overconsumption and ultimate ruin of a public resource. Hardin's example was a pasture owned by the public in common. Individually, it would be in the interest of each herdsman to increase the size of his herd grazing on the publicly owned commons, notwithstanding the fact that collectively the overgrazing of the commons would reduce and eventually destroy its value for all herdsmen. Hardin, of course, was not first to recognize the problem of externalities that arise from public ownership. Coase, Alchian, and Demsetz had all explained how the absence of property rights induces the overconsumption of a resource,[197] and the basic insight can be traced to pioneers of economic theory such as Marshall and Pigou.[198] What Hardin did was to popularize the concept and add a philosophical twist. By describing what happens to the commons as a "tragedy," he did not intend the colloquial meaning of the word, but rather the meaning that philosopher Alfred North Whitehead imparted to the word: "'The essence of dramatic tragedy is not unhappiness. It resides in the solemnity of the remorseless working of things.'"[199]

The slow understanding of the implications of the Telecommunications Act of 1996 fits Whitehead's definition of tragedy. One senses "the solemnity of the remorseless working of things" as business executives, legislators, and regulators realize to their surprise that the legislation has turned the local telecommunications network into a kind of commons. What once was private property (subject to regulation, of course) has become a lesser form of private property. It is now prop-

196. See Garrett Hardin, The Tragedy of the Commons, 162 Science 1243 (1968).

197. See Armen A. Alchian & Harold Demsetz, The Property Right Paradigm, 33 J. Econ. Hist. 16 (1973); R. H. Coase, The Problem of Social Cost, 3 J.L. & Econ. 1 (1960); Harold Demsetz, Toward a Theory of Property Rights, 57 Am. Econ. Rev. Papers & Proc. 347 (1967).

198. See Alfred Marshall, Principles of Economics (7th ed. 1916); A.C. Pigou, The Economics of Welfare (4th ed. 1932).

199. Hardin, supra note 196, at 1244 (quoting Alfred North Whitehead, Science and the Modern World 17 (Mentor 1948)).

erty that has had excised from its essential elements the prerogative of the owner to exclude others at will. (Whether Congress has the power to effect that transmogrification without the payment of just compensation is doubtful, but it is not the central question that we wish to address here.) The fundamental change that Congress has made to the private ownership of the network would be less significant were it not that the terms of the transaction by which another firm may acquire access to the incumbent's network are mandated by regulation of the sort specified in sections 251 and 252 of the Communications Act.

When economists speak of network externalities, they usually refer to positive spillovers that arise from higher levels of network access and usage.[200] Network externalities are benefits to society that accrue as the size of a network grows. An individual consumer's demand to use the telephone network increases with the number of other users on the network whom he or she can call or from whom he or she can receive calls.[201] But economists have tended to ignore the negative externalities from higher levels of network usage. Nonetheless, negative network externalities relating to congestion plainly arise, notwithstanding the conventional view that networks have such expansive economies of scale that capacity is seemingly unlimited. That cheerful view overlooks that the design of local telecommunications networks is predicated on probabilistic estimates of congestion in the use of familiar functions (such as a dialtone when one picks up the telephone receiver) that consumers may have come to assume are available at all times on an unlimited basis.[202] The view overlooks as well that the consumption of network access and network usage, like the consumption of any normal good, will rise as price falls. The network outage experienced in August 1996 by the Internet access provider America Online[203] may be an imperfect analogy

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200. For surveys of this literature, see Stanley M. Besen & Joseph Farrell, Choosing How to Compete: Strategies and Tactics in Standardization, J. Econ. Persp., Spring 1994, at 117; Michael L. Katz & Carl Shapiro, Systems Competition and Network Effects, J. Econ. Persp., Spring 1994, at 93.

201. See, e.g., Bridger M. Mitchell & Ingo Vogelsang, Telecommunications Pricing: Theory and Practice 11 (1991); Lester D. Taylor, Telecommunications Demand in Theory and Practice 9 (1994); Jean Tirole, The Theory of Industrial Organization 405 (1988); Jeffrey Rohlfs, A Theory of Interdependent Demand for a Communications Service, 5 Bell J. Econ. & Mgmt. Sci. 16 (1974). Usually, we think of the network externality in telecommunications accruing when another access line or another node (exchange) is added to the network. "When a new node is added, the externality is reflected in the number of calls made between any existing nodes and the new node (not an increase in the calls between existing nodes)." Mitchell & Vogelsang, supra, at 11.

202. See Bell Communications Research, BOC Notes on the LEC Networks—1994 at 4-24 (1994) (describing blocking probabilities for trunking); 1 Bellcore, Telecommunications Transmission Engineering: Principles 604 (3d ed. 1990) ("[E]xcessively high traffic . . . has its greatest impact on switching system operation. This form of overload causes blocking of calls and a breakdown of service.").

203. See Lawrence M. Fisher, Data Network Fails, Vexing Small Business, N.Y. Times, Aug. 8, 1996, at D1.

to the congestion externality that may beset the local exchange network in the new era of unbundled access, but it nonetheless provides vivid evidence that congestion externalities can and do occur—even without regulatory intervention that stimulates demand for network access by virtue of having set access prices below the full economic cost to the incumbent network operator of providing unbundled functions to its competitors. By October 1996, Pacific Bell reported that roughly 15 percent of local calls were not being successfully completed in the Silicon Valley area of California because Internet usage there, while still a small fraction of total telephone subscribers, had risen to a level that it was seriously congesting the capacity of the local exchange.[204]

The tragedy of the telecommons also implies underinvestment in the maintenance, replacement, and enhancement of the local telecommunications network. If the incumbent LEC, the putative owner of the local network, no longer can recover the costs of investments that it would make on a forward-looking basis—let alone keep any economic rents accruing to such investments—then entrants become free riders and the incumbent LEC's incentive to make further investment in the local exchange network evaporates.

Carried to its logical conclusion, the tragedy of the telecommons implies that the owner of the local network will go broke and the quality of the network will deteriorate. Given the resistance of entrants and regulators to the combination of M-ECPR pricing for UNEs and a competitively neutral, nonbypassable end-user charge, the incumbent LEC will consistently fail to earn revenues from its local exchange operations that will cover its total forward-looking costs. Having imposed such regulatory policies concerning unbundling, the state will not be able to expect *any* private investor to take over operation of the local network in the absence of the payment of an explicit subsidy to cover operating losses. The alternative thus becomes public ownership of the network. The logical culmination of unbundling accompanied by TELRIC pricing and continuing asymmetric regulation of the incumbent LEC is the need for some public entity to buy the network and assume financial responsibility for its operating deficits. Paradoxically, the great unbundling experiment in the Telecommunications Act of 1996 shows indications of producing not deregulation, but subsidized competition and public ownership of private enterprise.

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204. See James Kim, Net Use Strains Phone Lines, USA Today, Oct. 30, 1996, at 1A. We analyze this issue at length in J. Gregory Sidak & Daniel F. Spulber, Cyberjam: The Law and Economics of Internet Congestion of the Telephone Network, 20 Harv. J.L. & Pub. Pol'y (forthcoming 1997).