ORIGINAL

Marceil Morrell*
Assistant Vice President &-
Associate General Counsel-East Area

Anthony P. Gillman*
Assistant General Counsel

Florida Region Counsel**
Kimberly Caswell
M. Eric Edgington
Ernesto Mayor, Jr.
Elizabeth Biemer Sanchez

* Certified in Florida as Authorized House Counsel
** Licensed in Florida

GTE SERVICE CORPORATION

One Tampa City Center
201 North Franklin Street (33602)
Post Office Box 110, FLTC0007
Tampa, Florida 33601-0110
813-483-2606
813-204-8870 (Facsimile)

August 11, 1999

Ms. Blanca S. Bayo, Director
Division of Records & Reporting
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: Docket No. 990649-TP
Investigation into Pricing of Unbundled Network Elements

Dear Ms. Bayo:

Please find enclosed for filing an original and 15 copies of the Direct Testimonies of Michael J. Doane, Dennis B. Trimble and David G. Tucek on behalf of GTE Florida Incorporated in the above matter. Service has been made as indicated on the Certificate of Service. If there are any questions regarding this matter, please contact me at 813-483-2617.

Sincerely,

Kimberly Caswell

KC:tas
Enclosures

AFA
APP
CAF
CMU
CTR
EAG
LEG
MAS
OPC
RRR
SEC
WAW
OTH

RECEIVED & FILED
FPSC-BUREAU OF RECORDS

99 AUG 11 AM 10:25
MAIL ROOM

DOCUMENT NUMBER-DATE
09519 AUG 11 99
FPSC-RECORDS/REPORTING

Doane
DOCUMENT NUMBER-DATE
09517 AUG 11 99
FPSC-RECORDS/REPORTING

Trimble
DOCUMENT NUMBER-DATE
09518 AUG 11 99
FPSC-RECORDS/REPORTING

A part of GTE Corporation

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that copies of the Direct Testimonies of Michael J. Doane, Dennis B. Trimble and David G. Tucek on behalf of GTE Florida Incorporated in Docket No. 990649-TP were sent via U. S. mail on August 11, 1999 to the parties on the attached list.

Kimberly Caswell

Will Cox, Staff Counsel
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Nancy White c/o Nancy Sims
BellSouth Telecomm. Inc.
150 S. Monroe Street, Suite 400
Tallahassee, FL 32301-1556

Tracy Hatch
AT&T
101 N. Monroe Street
Suite 700
Tallahassee, FL 32301-1549

Joseph McGlothlin
McWhirter Reeves
117 S. Gadsden
Tallahassee, FL 32301

Angela Green
Fla. Public Telecomm. Assn.
125 S. Gadsden Street
Suite 200
Tallahassee, FL 32301-1525

Laura L. Gallagher
204 S. Monroe Street
Suite 201
Tallahassee, FL 32301

Peter M. Dunbar
Marc W. Dunbar
Pennington Law Firm
P. O. Box 10095
Tallahassee, FL 32302

Carolyn Marek
Time Warner Communications
233 Bramerton Court
Franklin, TN 37069

Charles J. Beck
Office of Public Counsel
c/o The Florida Legislature
111 W. Madison Street
Room 812
Tallahassee, FL 32399-1400

Richard D. Melson
Gabriel E. Nieto
Hopping Law Firm
P. O. Box 6526
Tallahassee, FL 32314

Jerry Blumenfeld
Elise Kiley
Blumenfeld & Cohen
1615 M Street, N.W.
Suite 700
Washington, DC 20036

Donna Canzano McNulty
MCI WorldCom
325 John Knox Road
Suite 105
Tallahassee, FL 32303

Bruce May
Holland Law Firm
P. O. Drawer 810
Tallahassee, FL 32302

Floyd R. Self
Norman H. Horton
Messer Caparello & Self
215 S. Monroe St., Suite 701
Tallahassee, FL 32301-1876

Patrick Wiggins
Charles Pellegrini
Wiggins & Villacorta, P.A.
2145 Delta Blvd., Suite 200
Tallahassee, FL 32303

Andrew O. Isar
Telecomm. Resellers Assn.
4312 92nd Avenue, NW
Gig Harbor, WA 98335

Terry Monroe
CompTel
1900 M Street, NW, Suite 800
Washington, DC 20036

David Dimlich
Supra Telecommunications
2620 SW 27th Avenue
Miami, FL 33133

James Falvey
e.spire Communications Inc.
133 National Business Pkwy.
Suite 200
Annapolis Junction, MD 20701

Scott Sapperstein
Intermedia Comm. Inc.
3625 Queen Palm Drive
Tampa, FL 33619

Michael Gross
FCTA
310 N. Monroe Street
Tallahassee, FL 32302

Susan Huther
MGC Communications Inc.
3301 Worth Buffalo Drive
Las Vegas, NV 89129

Dulaney L. O'Roark
MCI Telecomm. Corp.
780 Johnson Ferry Road
Suite 700
Atlanta, GA 30342

Monica Barone
Sprint
3100 Cumberland Circle
Suite 802
Atlanta, GA 30339

Charles Rehwinkel
Sprint-Florida
1313 Blairstone Road
MC FLTLHO0107
Tallahassee, FL 32301

Glenn Harris
NorthPoint Comm. Inc.
222 Sutter Street, 7th Floor
San Francisco, CA 94108

Christopher Goodpastor
Covad Communications Co.
2330 Central Expressway
Santa Clara, CA 95050

Brian Sulmonetti
MCI WorldCom Inc.
6 Concourse Parkway
Suite 3200
Atlanta, GA 30328

James P. Campbell
MediaOne
7800 Belfort Parkway
Suite 250
Jacksonville, FL 32256

Eric J. Branfman
Morton J. Posner
Swidler Berlin et al.
3000 K Street NW, Suite 300
Washington, DC 20007-5116

ORIGINAL

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Investigation into Pricing of Unbundled Network Elements	)))	Docket No. 990649-TP

DIRECT TESTIMONY OF

MICHAEL J. DOANE

ON BEHALF OF

GTE FLORIDA INCORPORATED

AUGUST 11, 1999

GTE FLORIDA INCORPORATED

DIRECT TESTIMONY OF MICHAEL J. DOANE

DOCKET NO. 990649-TP

I. INTRODUCTION AND PURPOSE OF TESTIMONY

Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.

A. My name is Michael J. Doane. I am President of PM Industrial Economics, Inc. My business address is 88 Kearny Street, Suite 1300, San Francisco, CA 94108.

Q. PLEASE SUMMARIZE YOUR PROFESSIONAL EXPERIENCE AND EDUCATIONAL BACKGROUND.

A. My expertise is in applied microeconomics and econometrics, and I have over eighteen years of consulting experience in regulatory economics. I have conducted economic research on a variety of antitrust and regulatory issues in network industries, including the telecommunications, electric power, natural gas, oil pipeline, and computer industries. My research includes econometric analyses of demand; studies of pricing and rate design; analyses of alternative regulatory approaches; cost and productivity measurement; and analyses of competition and industry performance. Prior to joining PM Industrial Economics, I was Vice President and Principal of Analysis Group Economics, where I managed the firm's San Francisco office and directed the firm's energy and telecommunications practice areas.

I have published articles in a number of academic journals, including the *Journal of Law & Economics*, the *Quarterly Journal of Economics*, the *Journal of Law, Economics & Organization*, the *Energy Law Journal*, the *Yale Journal on Regulation* and the *Hume Papers on Public Policy*, among others. I received a M.A. degree in applied economics from the University of California at Santa Barbara, and my B.A. in economics from the University of Connecticut. A copy of my *curriculum vitae* is attached as Exhibit MJD-1 .

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The primary purpose is to explain the approach the Commission should use if it proceeds with UNE deaveraging in the absence of retail rate rebalancing. This approach, which relies on a deaveraging adjustment charge (DAC), was introduced in the Direct Testimony of GTE witness Dennis Trimble. As Mr. Trimble makes clear, his deaveraging proposal based solely on TELRIC costs is appropriate *only if* implicit universal service support is removed from the ILEC's retail rates. The only way to ensure competitive neutrality is to align wholesale and retail prices with their costs; thus, GTE's primary recommendation is the simultaneous deaveraging of UNE rates, retail rates, and universal service support.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. The Commission should do everything in its power to establish competitive neutrality between incumbents and CLECs. Competitive

neutrality is achieved when UNE prices provide entrants and incumbents an equal opportunity to compete. This can only be done where UNE prices are consistent with retail prices and universal service support.

Competitive neutrality is best achieved by a regulatory environment in which all prices (retail and wholesale) are in line with costs after taking into account demand conditions. This solution, of course, requires the rebalancing of retail rates to eliminate the implicit support for universal service that currently pervades these rate structures. My testimony describes the basis on which appropriate deaveraging should occur to meet the twin goals of (1) preserving universal service and (2) promoting competition throughout Florida.

Q. PLEASE DESCRIBE FURTHER THE CONCEPT OF "COMPETITIVE NEUTRALITY."

A. The challenge before the Commission is to create UNE prices that promote efficient competition while preserving universal service. These two goals are inextricably linked. Efficient competition takes place in an environment that is competitively neutral, meaning that it does not favor incumbents in the final-product market over entrants or the reverse (See, e.g., William J. Baumol, *Having Your Cake: How to Preserve Universal-Service Cross Subsidies While Facilitating Competitive Entry*, YALE JOURNAL ON REGULATION, VOLUME 16, 1999, hereinafter Baumol Article.) (A copy of this article is attached as

Exhibit MJD-2 to my testimony.)

As Professor Baumol emphasizes in his article, the advantages of competitive neutrality are several:

> Competitively neutral prices ensure that neither the ILEC nor potential competitors are artificially excluded from any retail market. That is, the ILEC and any new competitors are allowed to serve each and every market, to the extent that it is efficient for each firm to do so.
>
> Competitively neutral prices eliminate the incentives for cream-skimming by competitors. That is, a competitor will have no incentive to favor the provision of high-margin (business) services over low-margin (residential) services.
>
> Competitively neutral prices promote competitive entry while preserving affordable rates to preferred customer classes.

In sum, only by establishing competitively neutral UNE prices can the Commission meet the twin goals of (1) maintaining universal service and (2) increasing competition in local service markets throughout Florida.

Q. DO CURRENT RETAIL PRICES IN FLORIDA PROMOTE COMPETITIVE NEUTRALITY?

A. No. Current retail prices for local exchange services in Florida contain significant implicit support for universal service. For example, GTE offers five different rate groups for business flat rate service, each of which exhibits a different level of contribution (defined as the difference between retail revenue and incremental cost). While Rate Groups 4 and 5 have prices that are 10 percent and 24 percent above cost, respectively, Rate Groups 1 through 3 have shortfalls of 13 percent to 46 percent. (See Florida Public Service Commission, *Report of the Florida Public Service Commission on the Relationships Among the Costs and Charges Associated With Providing Basic Local Service, Intrastate Access, and Other Services Provided by Local Exchange Companies*, at Table II-8, Feb. 15, 1999, hereinafter "FPSC Report".)

Particularly with regard to residential flat rate service, GTE's rates are well below the company's costs of providing the service; prices to end users are 45 percent to 80 percent below the level needed to recover costs. (See FPSC Report, Table II-3.) The provision of vertical services -- such as Call Waiting and Caller ID -- for both business and residential lines is a primary means by which ILECs like GTE offset such negative contributions. With only few exceptions, vertical services sold by GTE contain significant implicit support, although the margins on residential services are typically less than those on business services; rates are typically more than one thousand percent of costs, and contributions of approximately six thousand percent are

exhibited by some business services (see FPSC Report, Table II-29). GTE's vertical service prices, as with most ILECs, are thus based not upon costs, but upon a complex system of public policy considerations, in which prices for basic residential and a portion of basic business service are kept artificially below cost in order to promote universal availability of telephone service. These supported services are paid for by contributions earned on the provision of other services -- historically sheltered from competition -- that have been priced well in excess of costs.

Uniform UNE rates offered in the presence of retail prices that contain implicit support are not competitively neutral because they do not provide all suppliers an equal opportunity to compete. Such prices tilt the playing field by severely handicapping incumbent firms in some portions of the market (i.e., the above-cost services) and impeding entrants in other parts (the below-cost services).

Q. HOW IS THE ILEC HANDICAPPED IN THIS SITUATION?

A. The incumbent is handicapped in markets where retail rates are burdened with implicit support. In these markets, the CLEC can acquire UNEs at alleged "cost based" rates and profitably enter by just undercutting the price of the ILEC's retail service. Of course, there is no guarantee that this form of entry is beneficial to society because such handicapping permits the entry of less efficient (i.e., higher-cost) firms, thereby raising total costs and increasing the

average price of telecommunication services. Competitive markets do not permit such waste to occur, as the competitive process does not favor less efficient firms but instead dooms them to failure.

Q. HOW IS EFFICIENT ENTRY IMPEDED WHERE RETAIL RATES ARE REQUIRED TO BE BELOW COST?

A. Entry via UNEs is impeded in all markets with below-cost services. In these markets, cost based UNE rates exceed retail prices. This denies CLEC entry even in those cases in which the CLEC offers greater efficiency, although this problem is mitigated by the CLECs' opportunity to acquire resale services from the ILEC.

For example, if an ILEC's unbundled loop rate is $20, but the ILEC's rate for residential customers is, say, $18, then one ought not be surprised there is no competition for the ILEC's residential customers at this time.

The converse is equally true: if an ILEC's unbundled loop rate is $20, but the ILEC charges its business customer $50 to generate implicit universal service support, then an inefficient CLEC can enter the market to serve the business customer either through UNE purchases or facilities-based competition. As noted in Mr. Trimble's testimony and in GTE's filing in the FCC's ongoing "necessary and impair" docket, this is precisely what is happening in Florida today. Deaveraging UNE prices without removing implicit subsidies in retail

rates simply exacerbates this problem.

Q. ARE THE CURRENT RETAIL PRICES IN FLORIDA COMBINED WITH UNE PRICES DEAVERAGED BASED SOLELY ON TELRICS CONSISTENT WITH COMPETITIVE NEUTRALITY?

A. No. As noted above, such a deaveraging proposal would only exacerbate productive inefficiencies by enabling less efficient firms to underprice incumbent suppliers whose rates are burdened with implicit support. While this may give the *appearance* of competition, the Commission will have erred by increasing the number of competitors at the expense of the prospect of achieving superior efficiencies.

Q. HAVE ADVOCATES OF UNIFORM TELRIC PRICING RECOGNIZED THE NEED TO CONSIDER THE ILECS' RETAIL RATE STRUCTURE WHEN ESTABLISING UNE RATES?

A. Yes. The Baumol article presents a methodology for establishing competitively neutral prices for accessing those network elements considered to be bottleneck facilities. The system of non-uniform or differential access prices he recommends takes into account the incumbent provider's retail rate structure.

This is an important observation because the FCC and others have relied on an earlier affidavit co-authored by Professor Baumol, in which he stated that "the appropriate forward-looking benchmark for

pricing [UNEs] is total service long run incremental cost, or TSLRIC." (See Affidavit of William J. Baumol, Janusz A. Ordover, and Robert D. Willig, Section 3, at 2, Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, 11 FCC Rcd 15,499 (1996)). (Following both the filing of this affidavit and the release of the FCC's First Report and Order, it became industry practice to use the term "TSLRIC" to refer to the long-run incremental cost of a service and "TELRIC" to refer to the long-run incremental cost of a particular network element.)

In his recent article, however, Professor Baumol demonstrates, using what he refers to as "The Level Playing Field Theorem," that uniform prices for UNEs that fail to account for implicit supports in existing retail rates are *not* competitively neutral and, if adopted, will undermine productivity efficiency by enabling less efficient firms to undercut suppliers that are more efficient in their use of resources. When retail rate structures contain support for universal service, Professor Baumol states "to calculate the efficient price of a bottleneck service one need merely observe the final-product price currently charged by the owner of the bottleneck facility, and subtract from it the pertinent incremental cost." (Baumol Article, p. 10.) *This is precisely the deaveraging proposal that I discuss in more detail below.*

Q. MR. TRIMBLE ASSERTS THAT TELRIC-BASED DEAVERAGING

OF UNES WITHOUT RETAIL RATE REBALANCING WOULD BE THE WORST POSSIBLE OUTCOME OF THIS DOCKET. IS IT POSSIBLE TO ILLUSTRATE THE MAGNITUDE OF THE POTENTIAL PROBLEM?

A. Yes. Table One (MJD-3) calculates the arbitrage opportunity that would result if UNE prices were deaveraged solely on the basis of TELRIC. The average arbitrage opportunity is calculated as the difference between the average resale revenue per line minus the sum of the average UNE prices. For purposes of illustration, UNE prices are assumed to include a mark-up of 38% above the average TELRIC of each network element. In particular, Mr. Trimble's testimony demonstrates that there is significant variation in loop costs across GTE wire centers. To take account of this variation in loop costs, Mr. Trimble created fifteen categories of UNE prices based on the distribution of loop costs in the GTE service area. If UNE prices were deaveraged on the basis of TELRICs alone, in those wires centers in which the average loop cost is between $10 and $14.99 per month (wire centers accounting for approximately 13 percent of business lines) the average arbitrage opportunity would exceed $30 per month. In wire centers in which the average loop cost is between $15 and $19.99 (wire centers accounting for approximately 52 percent of business lines) the average arbitrage opportunity would exceed $23 per month. For service to business customers using UNEs, positive arbitrage opportunities would exist in wire centers accounting for approximately 98 percent of all business lines. In contrast,

deaveraging solely on the basis of cost would prevent efficient entry in wire centers accounting for 97 percent of all residential lines. In these locations, the resulting UNE rate would exceed the resale rate by a wide margin.

Q. WHAT DEAVERAGING SOLUTION SHOULD BE USED TO MITIGATE THE PROBLEMS REPRESENTED BY THE UNIFORM TELRIC PRICING APPROACH?

A. As long as retail price structures continue to have implicit universal service support, the solution to the problems created by uniform TELRIC prices lies (as is recognized by the Commission's questions on the matter) in some form of deaveraged of UNE rates. *The remedy, however, is not to deaverage UNE rates solely on the basis of forward-looking costs. The solution is to make adjustments that take into account the allocation of actual costs embodied in retail rates.*

Q. IS THIS THE PREFERRED SOLUTION TO THE PROBLEMS CREATED BY THE UNIFORM TELRIC PRICING APPROACH?

A. No. As discussed earlier, this proposal for deaveraging UNE rates should be considered a secondary solution. It is a fix that is required to preserve competitive neutrality in an environment in which retail prices contain implicit support. The preferred solution would involve the simultaneous deaveraging of both retail and wholesale rates. The deaveraging of retail rates would take into account both cost and

demand characteristics. The benefits of this approach are threefold: it would (1) enhance allocative efficiency in the pricing of retail services; (2) ensure competitive neutrality; and (3) promote competitive entry in all service markets to the benefit of Florida consumers.

Q. PLEASE DESCRIBE IN MORE DETAIL THE SPECIFICS OF YOUR DEAVERAGING PROPOSAL.

A. The proposal, which I call here the "Deaveraging Adjustment Charge," is described fully in the forthcoming *Yale Journal on Regulation* article that I co-authored with David S. Sibley and Michael A. Williams entitled *Having Your Cake: How to Preserve Universal-Service Cross Subsidies While Facilitating Competitive Entry: A Response* that is attached to my testimony (See Exhibit MJD-4). In that article, we show that UNE pricing is competitively neutral when the price paid by entrants equals (1) the ILEC's resale price minus (2) the incremental cost of remaining inputs supplied by the ILEC. As discussed above, this pricing rule is supported by a principal advocate of TELRIC UNE pricing, Professor Baumol, who has since clarified his position by noting TELRIC pricing is undesirable when the ILEC's retail rate structure contains implicit universal service support.

In practice, the Act requires ILECs to provide network elements on an unbundled basis to CLECs if the "necessary and impair" test is met. If the price of each element were set equal to its TELRIC, a surcharge

could be assessed equal to the difference between (1) the ILEC's resale revenues and (2) the sum of the TELRICs for the UNEs required to provide that resale service. Such a surcharge would eliminate the arbitrage opportunity created by uniform UNE prices and enable the continuation of implicit support in retail rate structures. This system of surcharges creates competitive neutrality by eliminating cream-skimming opportunities, while at the same time facilitating competitive entry into the market for the subsidized services.

Q. CAN YOU PROVIDE A NUMERICAL EXAMPLE TO ILLUSTRATE YOUR DEAVERAGING PROPOSAL?

A. Yes. Suppose a UNE combination that can replicate either a residential or business service is priced at $50 per month for a given geographical area. Suppose further that the ILEC's current price for business service in that area is $85, and that the ILEC's current price for residential service is capped at $15, the level deemed affordable by the Commission. In this scenario, competitors will purchase UNE combinations to cream-skim the ILEC's business customers and will leave the residential customers to GTE. But notice what happens if the Commission establishes the deaveraging proposal that I recommend. If avoided retailing costs equal 10 percent of the retail rate, the deaveraging charge for business and residential customers equals $26.50 and -$36.50, respectively. (The surcharge equals the retail price *less* avoided retailing cost *less* TELRIC of UNEs. In the case of the residential customer the surcharge equals $15 - $1.50 -

$50, or $36.50). Under this scenario, efficient competition will flourish, competitors will be encouraged to compete for all customers (including residential), and universal service flows will be maintained.

Q. CAN YOU ILLUSTRATE YOUR DEAVERAGING PROPOSAL USING THE INFORMATION PRESENTED IN TABLE ONE (EXHIBIT MJD-3)?

A. Yes. For the fifteen cost categories shown in the table, the charge is precisely the amount shown in the column labeled "average arbitrage opportunity." For example, in wire centers with UNE loop costs in the range of $10.00 - $14.99, the ILEC would have a competitive handicap of $30.25 per month. This handicap (equal to the ILEC's revenues in a resale environment less revenues obtained from the sale of UNEs calculated on the basis of TELRICs) is the CLEC's arbitrage opportunity. Deaveraging to promote competitive neutrality would eliminate this handicap by adding $30.25 to the UNE loop TELRIC. Similarly, in wire centers with UNE loop costs in the range of $25 to $29.99, the CLEC would have a competitive handicap because the TELRIC UNE rate exceeds the resale revenues by $16.47, on average. Thus, deaveraging to promote competitive neutrality would eliminate this handicap by subtracting $16.47 from the UNE loop TELRIC. Seen in this light, it is clear that this adjustment charge is beneficial to consumers in that it prevents costly cream-skimming that jeopardizes universal service while simultaneously permitting efficient entry into all residential markets.

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS.

A. My conclusions are summarized as follows:

In the presence of a retail rate structure that contains implicit support for universal service, uniform TELRIC prices encourage inefficient entry in some markets, while preventing entry altogether in other markets. Such an environment threatens the viability of universal service.

Competitively neutral UNE prices are required for the Commission to meet the twin goals of (1) maintaining universal service and (2) increasing competition in local service markets throughout Florida. As Mr. Trimble testified, competitive neutrality is best achieved by rebalancing retail rates toward cost, establishing an explicit universal service fund to maintain affordable rates, and aligning the ILEC's retail and wholesale rate structures.

Absent retail rate rebalancing and the establishment of an explicit universal service fund, competitive neutrality can be achieved only through the deaveraging of UNE prices. However, UNE rates should not be deaveraged solely on the basis of TELRIC. Such an approach is a move in precisely the wrong direction as it serves only to amplify the problems of uniform TELRIC prices.

The appropriate deaveraging of UNE prices must take into account

the ILEC's retail rate structure. Deaveraging on this basis is beneficial to consumers in that it prevents costly cream-skimming that jeopardizes universal service, while simultaneously permitting efficient entry into all markets.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

MICHAEL J. DOANE

Michael Doane is President of PM Industrial Economics, Inc., an economic research and consulting firm. He has provided management and economic counsel to public and private sector clients, primarily in the areas of antitrust, regulation, and complex business litigation. Mr. Doane's areas of specialization is applied microeconomics with an emphasis on network industries. His research includes:

- Economic analysis of entry regulation, rate regulation, and market power; industries examined include natural gas, oil pipeline, electric power, telecommunications, and computers ;
- Analyses of public utility pricing and rate design, cost allocation methodologies, cost and productivity measurement, electricity and natural gas demand, and energy conservation policies and investment;
- Evaluation of the effects of mergers on industry structure and competition;
- Valuation of natural resources for severance tax purposes;
- Studies of economic liability and damages in cases involving such issues as copyright infringement, breach of contract, product liability, price fixing, product tying, and foreclosure;
- Development of statistical models for certification and damage calculations in class action complaints; and
- Development of customer surveys and econometric models for various retail-based industries to predict product choice and market share; industries examined include transportation, telecommunications, retail gasoline, hotel, computers, food products, and home appliances;

Mr. Doane received his M.A. in Applied Economics from the University of California at Santa Barbara and has completed additional graduate study in price theory and econometrics. He holds an B.A. in Economics from the University of Connecticut. He is a member of the American Economics Association, the International Association of Energy Economists, and the American

Bar Association - Antitrust Section. Prior to joining PM Industrial Economics, Mr. Doane was a Vice President and Principal of Analysis Group, Inc., where he managed the firm's San Francisco office and directed the firm's energy and telecommunications practices. He also served as a Senior Economist at Arthur D. Little, Inc.

SELECTED CASEWORK

FEDERAL TRADE COMMISSION
Barnes & Noble, Inc.'s proposed acquisition of Ingram Book Company, 1999.
Consultant to Federal Trade Commission. Economic analysis of horizontal and vertical aspects of proposed merger.

STATE OF INDIANA UTILITY REGULATORY COMMISSION
In the Matter of the Commission Investigation Into Any and All Matters Related to Access Charge and Universal Service reform, Cause No. 40785, 1999.
Direct Testimony on economic issues surrounding confiscation claims.

UNITED STATES DISTRICT COURT, DISTRICT OF COLUMBIA
United States of America v. Microsoft Corporation, Civil Action No. 98-1232 (TPJ) and Civil Action No. 98-1233 (TPJ), 1998.
Consultant to the U.S. Department of Justice, Antitrust Division. Economic analysis of the competitive effects of Microsoft's bundling and contractual practices.

UNITED STATES DISTRICT COURT, WESTERN DISTRICT OF MISSOURI
Riverside Pipeline Company, et al. v. Panhandle Eastern Pipeline Company, 1998.
Economic analysis of Panhandle's interconnection policy and alleged Sherman Act violations.

UNITED STATES DISTRICT COURT, SOUTHERN DISTRIC OF TEXAS
Phillips Petroleum Company, et al. v. Heeremac, v.o.f., et al, 1998.
Economic analysis of damages arising from a price fixing conspiracy involving heavy-lift marine transportation.

NORTH CAROLINA UTILTIES COMMISSION
Docket No. P-100, Sub 133d, 1998.
Direct Testimony and Rebuttal Testimony on stranded costs in local telephony. Oral cross examination.

NATIONAL ENERGY BOARD, CANADA
Alliance Pipeline Application for a Certificate of Public Convenience and Necessity, 1998.

Economic analysis of the cost effectiveness and public interest implications of the proposed Alliance Pipeline in the Province of Canada.

STATE OF INDIANA UTILITY REGULATORY COMMISSION
In the Matter of the Commission Investigation and Generic Proceeding on GTE's Rates for Interconnection Service, Unbundled Network Elements, Transport and Termination Under the Telecommunications Act of 1996 and Related Indiana Statutes, Cause No. 40618, 1997.

Direct Testimony and Rebuttal Testimony on stranded costs. Oral cross-examination.

UNITED STATES DISTRICT COURT, EASTERN DISTRICT OF NEW YORK
FOX News Network, L.L.C. v. Time Warner, Inc., Time Warner Entertainment Company, L.P., Turner Broadcasting System, Inc. and R. E. "Ted" Turner III, 1997.

Economic analysis of issues pertaining to Sections 1 and 2 of the Sherman Act.

FEDERAL ENERGY REGULATORY COMMISSION
City of Las Cruces, New Mexico, Docket No. SC 97-2-000.

Economic analysis of stranded costs in the context of municipalization.

STATE OF PENNSLVANIA, PENNSYLVANIA PUBLIC SERVICE COMMISSION
Application of PECO Energy Company for Approval of its Restructuring Plan Under Section 2806 of the Public Utility Code, 1997.

Economic analysis of a proposed code of conduct to govern the relationship between PECO's regulated wire business and its competitive, unregulated businesses.

FEDERAL COMMUNICATIONS COMMISSION
Application of Ameritech Michigan Pursuant to Section 271 of the Telecommunications Act of 1996 to Provide In-Region, InterLATA Services in Michigan, 1997.

Analysis of competition in long distance phone markets and the public interest benefits of Ameritech's entry.

FEDERAL ENERGY REGULATORY COMMISSION
Southern Natural Gas Company, Docket Nos. RP94-67-000, et al, 1997.

Economic analysis of the prudency of long-term gas contracts.

ARBITRATION PROCEEDINGS
Implementation of the Local Competition Provisions in the Telecommunications Act of 1996.

Expert report and oral testimony in thirteen arbitration proceedings in nine states, 1996.

STATE OF CALIFORNIA, PUBLIC UTILITIES COMMISSION
Rulemaking on the Commission's Own Motion to Govern Open Access to Bottleneck Services and establish a Framework for Network Architecture Development of Dominant Network Carriers. Docket No. R.93-4-003, 1996.

Economic analysis of proposed pricing rules.

FEDERAL COMMUNICATIONS COMMISSION
Implementation of the Local Competition Provisions in the Telecommunications Act of 1996. CC Docket No. 96-98, 1996.

Economic analysis of the pricing provisions of the Act. Empirical study and affidavit prepared on behalf of GTE Service Corporation.

STATE OF ILLINOIS, ILLINOIS COMMERCE COMMISSION
Petition for a Total Local Exchange Service Wholesale Tariff from Illinois Bell Telephone Company d/b/a Ameritech Illinois and Central Telephone Company Pursuant to Section 13-505.5 of the Illinois Public Utilities Act, Docket No. 95-0458, 1995.

Economic analysis of the pricing of wholesale telecommunication services.

STATE OF CALIFORNIA, PUBLIC UTILITIES COMMISSION
Order Instituting Rulemaking on the Commission's Own Motion into Competition For Local Exchange Carriers, 1995.

Economic analysis of proposed local competition rules, including whether the rules afford the local exchange carrier an opportunity to earn a fair return on invested capital.

STATE OF WISCONSIN, PUBLIC SERVICE COMMISSION
Investigation of the Appropriate Standards to Promote Effective Competition in the Local Exchange Market in Wisconsin, Docket No. 05-TI-138, 1995.

Economic analysis of regulatory policy for the establishment of competitive local telephone services, including the pricing of interconnection, unbundled network elements, and wholesale services.

STATE OF MICHIGAN, PUBLIC SERVICE COMMISSION
In the Matter, on the Commission's Own Motion, to Establish Permanent Interconnection Arrangements Between Basic Local Exchange Service Providers, 1995.

Economic analysis of the pricing of wholesale telecommunication services.

FEDERAL ENERGY REGULATORY COMMISSION
SFPP, L.P., Docket Nos. OR92-8-000, *et al.*

Economic analysis of proposed ratemaking method for oil pipeline, and assessment of business risk claims, 1995.

STATE OF CALIFORNIA, PUBLIC UTILITIES COMMISSION
In the Matter of Alternative Regulatory Frameworks for Local Exchange Carriers, Docket NO. I.87-11-003.

Economic analysis of customer presubscription for intraLATA toll services, 1995.

FEDERAL COMMUNICATIONS COMMISSION
In the Matter of Market Entry and Regulation of Foreign-Affiliated Entities, IB Docket No. 95-22

Economic analysis of competition in international outbound long distance markets, 1995.

UNITED STATES DISTRICT COURT, DISTRICT OF COLUMBIA
U.S. v. Western Electric, Inc. and AT&T, Civil Action No. 82-0192 (HHG)

Economic analysis of competition in California long distance telecommunications markets, 1994.

UNITED STATES DISTRICT COURT, DISTRICT OF COLUMBIA
U.S. v. AT&T Corp. and McCaw Celluar Communications, Inc.

Economic analysis of proposed merger, 1994.

UNITED STATES DISTRICT COURT, DISTRICT OF COLUMBIA
U.S. v. Western Electric, Inc. and AT&T, Civil Action No. 82-0192 (HHG)

Economic analysis of competition in long distance telecommunications, 1994

FEDERAL ENERGY REGULATORY COMMISSION
Stingray Pipeline Company Docket, No. RP94-301-000

Economic analysis regarding the pricing of interruptible transportation services, 1994.

STATE OF NEW YORK, PUBLIC SERVICE COMMISSION
P.S.C. Case Nos. 94-E-0098 and 94-E-009

Tariff Design for commercial and industrial electricity customers, 1994.

FEDERAL COMMUNICATIONS COMMISSION
PP Docket No. 93-253

Implementation of Section 309(j) of the Communications Act Competitive Bidding.
Auction Design for Personal Communications Services, 1994.

FEDERAL ENERGY REGULATORY COMMISSION
Mojave Pipeline Docket, No. CP93-258-000

Economic analysis of bypass in the natural gas industry, 1993.

STATE OF CALIFORNIA, PUBLIC UTILITIES COMMISSION
Application of GTE California for Review of the Operations of Incentive Based Regulatory Framework Adopted in Decision 89-10-031.
Economic analysis related to the role of productivity in the price-cap formula, 1993.

FEDERAL ENERGY REGULATORY COMMISSION
Great Lakes Gas Transmission Limited Partnership, Docket No. RP 91-143-000
Prepared Direct and Rebuttal Testimonies. Economic analysis regarding the pricing of pipeline expansion projects, 1992.

MATTER OF ARBITRATION
Between ProGas Limited and Texas Eastern Transmission Corporation.
Economic analysis regarding the redetermination of a gas purchase contract, 1992.

U.S. DISTRICT COURT, NORTHERN DISTRICT OF ILLINOIS, EASTERN DIVISION
The Protectoseal Company v. Charles Barancik
Economic analysis pertaining to interlocking directorates, 1992.

INTERNATIONAL CHAMBER OF COMMERCE
Court of Arbitration, Paris, France
Panhandle Eastern Pipeline Company v. Northwest Alaskan Pipeline Company
Affidavit and arbitration testimony. Economic analysis regarding the redetermination of a gas purchase contract, 1992.

MATTER OF ARBITRATION
Between W&T Offshore, Inc. and Texas Eastern Transmission Corporation
Deposition and arbitration testimony. Economic analysis regarding the performance of a natural gas purchase contract, 1991.

FEDERAL ENERGY REGULATORY COMMISSION
Great Lakes Gas Transmission Limited Partnership, Docket No. RP 91-143-000
Prepared Direct Testimony. Economic analysis regarding the pricing of pipeline expansion projects, 1991.

SUPERIOR COURT OF THE STATE OF CALIFORNIA
City of Long Beach v. Pacific Refining Corporation
Deposition testimony and economic analysis of breach of contract claim, 1991.

FEDERAL ENERGY REGULATORY COMMISSION
Texas Eastern Transmission Corporation, Docket No. CP90-2154
Economic analysis of competition in the natural gas industry, 1991.

CANADIAN RADIO-TELECOMMUNICATIONS COMMISSION
Unitel and B.C. Rail/Lightel Applications to provide public long distance voice services and related resale and sharing issues.

Economic analysis of entry into the long-distance voice service market, 1991.

STATE OF ALASKA, DEPARTMENT OF REVENUE
Marathon Oil Company, Docket No. 89314

Economic analysis of alternative methods for valuing natural gas for severance tax purposes, 1990.

U.S DISTRICT COURT, DISTRICT OF CONNECTICUT
Great Northern Nekoosa Corporation v. Georgia Pacific Corporation and NM Acquisition Corp., a wholly owned subsidiary of GP Corporation

Economic analysis of the proposed acquisition, 1989-1990.

PUBLIC UTILITIES COMMISSION, STATE OF CALIFORNIA
Southern California Edison Company and San Diego Gas and Electric Company, Docket No. CP88-12-035

Economic assistance to counsel during merger review, 1989.

U.S. DISTRICT COURT, WESTERN DISTRICT OF TEXAS
JJ - CC Limited v. Transwestern Pipeline Corporation and Enron Corporation

Economic analysis regarding the performance of a natural gas take-or-pay contract, 1988.

FEDERAL ENERGY REGULATORY COMMISSION
Mojave Pipeline Company, et al, Docket No. CP85-437-000

Economic analysis of the impact of bypass in a regulated natural gas market, 1987.

PUBLIC UTILITIES COMMISSION, STATE OF CALIFORNIA
Application of Southern California Gas Company for authority to sell and leaseback its Headquarters Property, Application No. 87-07-041

Economic analysis regarding the regulatory treatment of the sale and leaseback of headquarters property, 1987.

U.S. DISTRICT COURT, WESTERN DISTRICT OF NORTH CAROLINA
H. Deadwyler, et al. v. Volkswagen of America, Inc.

Econometric analysis of the lost resale value of automobiles with design flaws, 1987.

U.S. DISTRICT COURT, DISTRICT OF COLUMBIA
Joseph A. Albert, et al. v. General Motors Corporation

Economic analysis of damages, 1986.

U.S. INTERNATIONAL TRADE COMMISSION
Investigation No. 337-TA-194, Certain Aramid Fibers
Statistical analysis of titanium prices, 1985.

INTERSTATE COMMERCE COMMISSION
Sante Fe-Southern Pacific Corporation, Control, Docket No. 30400
Statistical analysis of stock market prices at the time of announced merger, 1985.

ARTICLES IN REFEREED JOURNALS

"Having Your Cake: How to Preserve Universal-Service Cross Subsidies While Facilitating Competitive Entry: A Response, *Yale Journal on Regulation*, (with David S. Sibley and Michael A. Williams), Forthcoming, Summer 1999.

"Transmission Access Pricing and 'Non-Bypassable Competitive Transition Charges," *Natural Resource Journal, (1997)*, Volume 37 (with Paul W. MacAvoy).

"Municipalization: Bypass and Opportunism in the U.S. Electric Utility Industry," *Energy Law Journal, (1997)*, Volume 18, No. 2 (with Daniel F. Spulber).

"Forty Years of Regulatory Reform in the Natural Gas Industry," *Oil and Gas Tax Quarterly, (1996)*, Volume 45, No. 1 (with Paul W. MacAvoy and Michael A. Williams).

"System Average Rates and Management Efficiency: A Statistical Benchmark Study of U.S. Investor-Owned Electric Utilities," *The Energy Journal, (1996)*, Volume 17, No. 3 (with Ernst R. Berndt and Roy J. Epstein).

"Competitive Entry into Regulated Monopoly Services and the Resulting Problem of Stranded Costs." in *Humes Papers on Public Policy: Deregulation and Privatization in the United States, (1995)* Volume 3, No.3, University of Edinburgh, Scotland, (with Michael A. Williams).

"Evolution of the U.S. Spot Market for Natural Gas," *Journal of Law & Economics, (1994) Volume XXXVII (2)*, (with D.F. Spulber). Also Kellogg Graduate School of Management, Discussion Paper No. 91-48, Northwestern University. Invited paper presented at the State of California Public Utilities Commission's "En Banc Conference on Natural Gas Procurement," February 1992.

"Consumer Rationality and the Status Quo," *Quarterly Journal of Economics, (1991)* February, (with R.S. Hartman and C.K. Woo).

"Policy and Competitiveness Issues in California Long Distance Telephone Service Markets," (December 94), Yale School of Management, Working Paper Series C, #39, Government-Business Relations, (with Paul W. MacAvoy and Michael A. Williams).

"Federal Energy Regulatory Commission Order 636: Divestiture Of Gas Ownership By The Pipelines As The Penultimate Regulatory Reform In The Natural Gas Industry," (December 1994), Yale School of Organization and Management, Working Paper Series C, #38, (with Paul W. MacAvoy and Michael A. Williams).

PRESENTATIONS

"The Effects of Partial Deregulation on Gas Transportation Charges," *Conference on Deregulated Markets for Natural Gas*, John M. Olin Foundation Research Program for the Study of Markets and Regulatory Behavior, Yale School of Management, New Haven, October 1996.

"Renegotiating the Regulatory Contract: Opportunism, Municipalization and Bypass," EEI Municipalization and Bypass Conference," Washington, D.C., October 1996.

"Transmission Access Pricing and 'Non-Bypassable' Competitive Transition Charges," University of New Mexico Law School, Invited Paper, July 1996.

"Comments on Phase II Proposed Decisions: Wholesale Rates Established by Local Exchange Carriers," California Public Utilities Commission, All Party Exparte Meeting, February 1996.

"Competitive Entry Into Regulated Monopoly Services and the Resulting Problem of Stranded Costs," *Conference on Deregulation and Privatization in the United States*, John M. Olin Foundation Research Program for the Study of Markets and Regulatory Behavior, Yale School of Management, New Haven, May 1995.

"On the State of Competition in Long Distance Telecommunication Markets," Presented at Economic Round Table of San Francisco, April 1995.

"The Design and Implementation of Electricity Curtailment Programs," presented at the *Journal of Regulatory Economics* Editors' Conference, San Diego, October 1992.

"The Evolution of the U.S. Spot Market for Natural Gas," presented at the 14th Annual International Association for Energy Economics' North American Conference, New Orleans, October 1992.

"The Impact of Open-Access Regulation on the Geographic Scope of the Natural Gas Spot Market," Presented at the Center for Regulatory Studies Conference: "At the Crossroads -- Restructuring the Natural Gas Industry," Chicago, October 1991.

"Outage Costs as Design Criteria for Product Differentiation," (with C.K. Woo) New Service Opportunities for Electric Utilities: Creating Differentiated Products, Symposium sponsored by the Electric Power Research Institute and the University of California, Berkeley, September 1990.

"Estimating the Welfare Loss of Electrical Power Outages Using Contingent Valuation Survey Methods," presented at the Electric Power Research Institute Conference: New Dimensions in Pricing Electricity, Syracuse, NY, September 1988.

"The Contingent Market for Priority Electric Service," (with B. Neenan), presented at Rutgers University's Advanced Workshop in Regulation and Public Utility Economics, New Paltz, NY, May 1988.

"Taking the Con Out of Conservation Program Evaluation," presented at the 8th Annual International Association of Energy Economists North American Conference, MIT, Cambridge, MA, 1987.

"Measuring the Impact of Utility Conservation Programs," presented at the Electric Power Research Institute Symposium: Buildings and Their Energy Systems, Chicago, IL, 1985.

RESEARCH REPORTS

Renegotiating the Regulatory Contract: Opportunism, Municipalization and Bypass in the U.S. Electric Power Industry (with Daniel F. Spulber); prepared for the Edison Electric Institute, May 1997.

An Assessment of the Factors Affecting San Diego Gas & Electric Company's Electric Rates, prepared for San Diego Gas & Electric Company, May 1995.

An Evaluation of Public Preferences for Superfund Site Cleanup, Volume 1: A Preliminary Assessment (with W. Schulze, *et al.*). USEPA Cooperative Agreement # CR-821980, Office of Policy, Planning and Evaluation, U.S. Environmental Protection Agency, March 1994.

An Evaluation of Public Preferences for Superfund Site Cleanup, Volume 2: Pilot Study (with W. Schulze, *et al.*). USEPA Cooperative Agreement # CR-821980, Office of Policy, Planning and Evaluation, U.S. Environmental Protection Agency, March 1994.

Recommended Rate Redesign for the SC-3 and SC-3A Service Classes, prepared for Niagara Mohawk Power Corporation, 1993.

Analysis of the Electricity Tariffs of the Comision Federal de Electricidad, prepared for Secretary of Energy, Mines, and State Industries (SEMIP), 1993.

The Market for Electric Power in Niagara Mohawk Power Corporation's Service Territory, prepared for Niagara Mohawk Power Corporation, 1993.

Industrial Outage Cost Survey (with D. McCelland, W. Schulze and C.K. Woo), prepared for Niagara Mohawk Power Corporation, 1990.

Residential Outage Cost Survey (with D. McCelland, W. Schulze and C.K. Woo), prepared for Niagara Mohawk Power Corporation, 1990.

Recommended Approach for Collecting Data on Outage Cost and the Value of Service Reliability (with R.S. Hartman, W. Schulze and C.K. Woo), prepared for Niagara Mohawk Power Corporation, 1988.

A Review of Electricity Demand Price Elasticity Estimates, prepared for Southern California Edison Company, (with D. Aigner and E. Berndt), 1988.

An Econometric Analysis of Customer Subscription to the E-20 Interruptible Rate, prepared for Pacific Gas and Electric Company, (with C.K. Woo), 1988.

An Analysis of the Determinants Space Heating Fuel Choice, prepared for Brooklyn Union Gas Company under subcontract to Opinion Research Corp., January 1988.

Recent Contributions to the Theory and Measurement of Customer Value of Service Reliability, prepared for Niagara Mohawk Power Corp., September 1987.

The Determinants of Savingpower Audit Participation: An Analysis of the Market for Home Energy Audits, prepared for Niagara Mohawk Power Corp., April 1986.

An Analysis of Space Heating Fuel Choice in the Homeowner Replacement and New Construction Markets, prepared for the American Gas Association, May 1986.

A Survey of Residential Outage Costs, prepared for Pacific Gas and Electric Company under subcontract to Meta Systems, Inc., (with A. Sanghi and K. Van Lier) December 1986.

An Analysis of the Fuel Choice Decisions of Commercial Firms, prepared for Boston Gas Company under subcontract to Arthur D. Little, Inc., 1985.

A Critical Review of the Maryland Power Plant Siting Commission's Econometric Electricity and Natural Gas Demand Forecasting Models, prepared for the Maryland Power Plant Siting Commission, 1985.

Measuring the Impact of Residential Conservation, Volume II: An Econometric Analysis of Portland Electric Company Data, (with R.S. Hartman) prepared for the Electric Power Research Institute, EA-3606, September 1984.

Measuring the Impact of Residential Conservation, Volume III: An Econometric Analysis of General Public Utilities Data, (with R.S. Hartman), prepared for the Electric Power Research Institute, EA-3606, September 1984.

Measuring the Impact of Residential Conservation, Volume IV: An Evaluation of Alternative Methods, (with R.S. Hartman), prepared for the Electric Power Research Institute, EA-3606, September 1984.

Electricity and Natural Gas Conservation Potential in the San Diego Gas and Electric Company Service Area, prepared for San Diego Gas and Electric Company before the California Public Utilities Commission, 1982.

Southern California Edison Projections of Conservation Goals: 1982-1986, prepared for Southern California Edison Company before the California Public Utilities Commission, October 1981.

Forecasting the Peak Demand for Residential Natural Gas, prepared for Pacific Gas and Electric Company, 1980.

REFEREE

The Energy Journal, *Journal of Economics and Management Strategy*, and *Science*.

Having Your Cake: How to Preserve Universal-Service Cross Subsidies While Facilitating Competitive Entry

William J. Baumol[†]

Differential pricing for access to bottleneck inputs such as local telephone facilities or electricity transmission facilities is shown to solve the old dilemma of deregulation: facilitating competitive entry without destroying cross subsidies indispensable for "universal service" programs. If bottleneck facilities are inputs to two services, one of which subsidizes the other, entrants that provide the subsidized service must receive the same subsidy in the access price as consumers receive when they purchase those services. Rivals in the supply of the other service must contribute an equivalent subsidy through paying a higher access price. Differential access pricing allows efficient competitors to find it equally profitable to supply either service because any motive for "cream skimming" disappears. Such differential pricing, coupled with access pricing consistent with the Efficient Component Pricing Rule, is shown to be necessary for economic efficiency.

---

† Director, C.V. Starr Center for Applied Economics, New York University; and senior research economist and professor emeritus, Princeton University. I am grateful to the C.V. Starr Center for its support of this work. I am exceedingly indebted to Scott Bohannon of Sidley & Austin for his invaluable contribution in finding appropriate references to the legal literature and related matters. I must also thank the editors of this Journal for their very helpful suggestions and, as always, Sue Anne Batey Blackman, who deserves much credit and bears none of the guilt.

Introduction

Regulators have long suffered from an apparently irreconcilable dilemma. Their own understandable predilections, supplemented by powerful political pressures, have led them to impose a set of cross subsidies on the prices of the firms they regulate. Cross subsidies systematically favor particular groups of customers, such as household customers or isolated farmers, at the expense of other groups, such as business customers or those near supply sources, by forcing the latter group to subsidize the former.[1] At the same time, however, regulators have also sought to stimulate entry and competition in regulated industries. For example, the Telecommunications Act of 1996[2] requires a monopoly local telephone service provider to lease parts of its network to its competitors at cost-based rates, thereby allowing entrant firms to offer service without incurring the tremendous expense of building a duplicative network before beginning service. The dilemma is that the twin goals of imposing cross subsidies and promoting competition are ordinarily incompatible. Effective competition tends to eliminate the source of cross subsidies by driving down the prices of items that yield particularly large profits.

A number of misguided expedients have been adopted in an effort to reconcile these two conflicting objectives. Most notably, some regulators have taken actions that severely handicap incumbent firms in some portions of the regulated market while impeding entrant firms in other parts. The result is the creation of a cartel in which each firm is assigned its own monopolized terrain.[3] Of course, this gives the *appearance* of

---

1 For example, suppose it costs Bell Atlantic only $10 to provide most customers in New Jersey with local telephone service. Suppose further that the cost of service for some rural customers is considerably higher, say $50, and that the average cost of statewide service is $15. Rather than setting local rates near $10 for the majority of customers and $50 for the more costly rural customers, regulators may require Bell Atlantic to charge approximately $15 for all of its customers. The low-cost customers are then said to be cross-subsidizing the rural customers.

2 Pub. L. No. 104-104, 110 Stat. 56 (codified in scattered sections of 47 U.S.C.).

3 For example, it can be argued that in the U.K., telephone rates were set by regulation in a way that favored entrants in dealing with large business firms but handicapped entrants in sales to

competition but ultimately helps only to protect cross subsidies from the eroding effects of true competition.

In this Article, I propose a regime of *non-uniform* and competitively neutral pricing of access to bottleneck services owned by an incumbent monopoly. By "bottleneck" services, I refer to services that are indispensable to both the incumbent and its competitors in the production or delivery of the final product. I will show that the proposed arrangement is *competitively neutral*, meaning that it does not favor either the incumbent or the entrants in the final-product market. Moreover, I will prove that the arrangement is the only access pricing rule that can achieve neutrality in the presence of cross subsidy and price discrimination in final-product sales. Lastly, I will argue that all affected parties can gain from this arrangement, since it offers full access to efficient suppliers in each and every pertinent market. Both incumbents and entrants will gain by having access to all markets. The public will gain because competition will pervade the industry. Finally, regulators will gain because their apparently inconsistent goals will be reconciled: Pervasive competition will coexist with the cross subsidies they deem to be in the social interest.

This Article is divided into two parts. Part I provides relevant background information on bottleneck pricing issues. It discusses the importance of bottleneck pricing for regulatory policy, the parity-pricing formula for competitively neutral access to a single product market, and previous approaches to bottleneck pricing. Part II shows how parity pricing can be adapted to ensure competitive neutrality in a multi-product industry with cross-subsidies or differential pricing. It demonstrates that competitive neutrality requires differential access pricing that precisely replicates the price-cost differences among the final products for which the bottleneck facility is an input.

---

households. *See* ELI NOAM, TELECOMMUNICATIONS IN EUROPE 110-13 (1992); JOHN VICKERS & GEORGE YARROW, PRIVATIZATION: AN ECONOMIC ANALYSIS 229-30, 238-39 (1988). In the United States, some electricity cogenerators were not permitted to compete for customers with the utilities, but the utilities were forced to buy electricity from the cogenerators at prices set by regulatory formula. *See* MICHAEL E. SMALL, A GUIDE TO FERC REGULATION AND RATEMAKING OF ELECTRIC UTILITIES AND OTHER POWER SUPPLIERS 148-51 (3d ed. 1994).

I. Background: The Bottleneck Pricing Issues[4]

A. *Current Importance of the Issue for Privatization and Facilitation of Competitive Entry*

How to price bottleneck services is an issue that is being debated vigorously before courts and regulatory agencies throughout the industrial and industrializing world, with the formulas presented in this Article often being the focus of these litigative proceedings.[5] In the United States, the issue of pricing is at the forefront of discussion of means to facilitate competitive entry into activities that have traditionally been run by franchised monopolies.[6]

Bottleneck pricing is now a pivotal issue in at least three industries: telecommunications,[7] electric power,[8] and rail transportation.[9] In telecommunications, the equipment of the monopolist local telephone company become bottleneck facilities. Entrants are not able to operate without them, and the facilities are available from only one owner. In response, the government has required current monopoly providers of local telephone services to rent their facilities to entrants who desire to use them.[10] This allows entrants to avoid having to build expensive plants and equipment of their own, making entry a practical possibility. While this solution *seems* to solve the entry barrier problem, the regulating government agency must also specify the *price* at which the facilities will be offered to entrants. If the owner of the facilities is permitted to charge any price, it can protect itself from entry by setting the price at such an exorbitant level that no entrant can afford to pay it. In State Commission

---

4 For references to the current literature on the issue, the reader may want to consult William J. Baumol et al., *Parity Pricing and Its Critics: A Necessary Condition for Efficiency in the Provision of Bottleneck Services to Competitors*, 14 YALE J. ON REG. 145 (1997).

5 *See, e.g.*, Telecom Corp. v. Clear Communications, Ltd. [1995] 1 N.Z.L.R. 385; St. Louis Southwestern Ry.—Intertrackage Rights Over Mo. Pac. R.R.—Kan. City to St. Louis, 8 I.C.C.2d 80 (1991); Alternative Regulatory Frameworks for Local Exch. Carriers, 33 C.P.U.C.2d 43 (1989).

6 *See, e.g.*, Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, 11 F.C.C.R. 15,499, ¶¶ 3-5, at 15,505-06 (1996) (presenting this issue as one that the Telecommunications Act of 1996 seeks to address) [hereinafter *Local Competition Order*].

7 *See id.* ¶¶ 625-766, at 15,814-83.

8 *See* Inquiry Concerning the Commission's Pricing Policy for Transmission Services Provided by Public Utilities Under the Federal Power Act, 59 Fed. Reg. 55,031, 55,033-35 (1994); WILLIAM J. BAUMOL & J. GREGORY SIDAK, TRANSMISSION PRICING AND STRANDED COSTS IN THE ELECTRIC POWER INDUSTRY 115-58 (1995) (discussing the efficient pricing of electric transmission facilities and past pricing decisions by the Federal Energy Regulatory Commission).

9 *See, e.g.*, FMC Wyo. Corp. v. Union Pac. R.R., S.T.B. Fin., No. 33467, 1997 WL 768315 (S.T.B. Dec. 12, 1997); Central Power & Light Co. v. Southern Pac. Transp. Co., No. 41242, 1997 WL 299703 (S.T.B. Apr. 28, 1997).

10 *See* 47 U.S.C. § 251(c)(3) (Supp. II 1996); *Local Competition Order*, *supra* note 6, ¶¶ 342-365, at 15,671-83.

arbitrations and in proceedings before the Federal Communications Commission, carriers such as Bell Atlantic, GTE, and AT&T have advocated various cost standards, including both book (or historic) costs and forward-looking cost standards such as the Efficient Component Pricing Rule and Total Service Long-Run Incremental Cost.[11]

In electricity, the issue has been raised by the inauguration of competition in power *generation*. Today, and increasingly so in the near future, the established electric utility firms in the United States will face the competition of rival generators of electricity.[12] However, before electricity can be sold as a final product, it must be transported to customers. The large capacity and high cost of electricity transmission facilities make rivalry in electricity *transmission* (as distinguished from generation) impractical. Transmission facilities are often owned by electric utilities; these companies and their competitors in generation must use the same facilities to transport electricity from generating stations to customers. Thus, the transmission facilities are bottleneck inputs to the supply of the final product—delivered electric power—and the pricing issue is clearly analogous to the setting of a fee for use of a telecommunications facility as a bottleneck input.

The rail transportation case will bring out the issue most clearly.[13] Consider two railroads, *A* and *B*, which want to compete in serving cities *C* and *D*. The cities are separated by high mountains with a single pass, through which railroad *A* owns tracks and in which there is no room for a second set of tracks. Railroad *B* therefore rents permission to traverse (or trackage rights over) that portion of *A*'s route. The mountain pass is clearly a bottleneck input to the transportation of freight between the two cities. In these circumstances, the question is what is the efficient price that railroad *A* should charge its potential rival, *B*, for use of the tracks? Too high a price will patently exclude competition, while too low a price will entail a competition-distorting subsidy from the pass-owning railroad to the

---

11 *See, e.g.*, AT&T Communications, Inc. v. Bellsouth Telecomms., Inc., 20 F. Supp. 2d 1097 (E.D. Ky. 1998); Southwestern Bell Tel. Co. v. AT&T Communications Inc., No. A97-CA-132-SS, 1998 WL 657717 (S.D. Tex. Aug. 31, 1998); GTE South Inc. v. Morrison, 6 F. Supp. 2d 517 (E.D. Va. 1998).

12 *See, e.g.*, Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Servs. by Public Utils., 61 Fed. Reg. 21,540 (1996) (discussing several Federal Energy Regulatory Commission proceedings initiated to facilitate a more competitive electric industry); Ralph Cavanagh, *California Scores with New Electricity Choices*, SACRAMENTO BUS. J. (Aug. 11, 1997) <http://www.amcity.com/sacramento/stories/081197/editorial5.html>.

13 The simple example provided in the text has been litigated on numerous occasions. The most famous case, *United States v. Terminal Railroad Ass'n*, 224 U.S. 383 (1912), established the essential facilities doctrine in antitrust law. There, a group of railroads that jointly owned a bottleneck railroad terminal in St. Louis were denying their competitors access to the terminal. The Supreme Court found that this practice violated Section 1 of the Sherman Antitrust Act because it denied access to a facility essential for their competitors to compete. Today, railroad mergers continue to concern agencies such as the Surface Transportation Board. *See, e.g.*, *Central Power & Light Co.*, 1997 WL.

entrant.

The bottleneck pricing issue has arisen similarly in Australia,[14] the United Kingdom,[15] Hong Kong,[16] and the European Union.[17] Indeed, it appears wherever privatization initially leaves an industry in the hands of a monopoly or, at the very least, a large firm that possesses substantial market power. The issue of pricing is also likely to become an international matter of great urgency in the near future as a result of the Telecommunications Agreement of 1997, under which approximately seventy countries agreed to open their telecommunications markets to foreign competition.[18] If international competition is to become a reality, obstacles that impede entry by foreign rivals must be removed or reduced.

B. *Parity Pricing (ECPR): The Rule for Efficient Pricing of Bottleneck Services*

The most discussed solution to the problem of determining an efficient price for a bottleneck service is based on a result I call the Level-Playing-Field Theorem. This theorem tells us that only by using certain formulas (equations (1a) or (1b) below) can we *neutrally* price a monopoly-owned bottleneck service required by both the bottleneck owner and its final-product competitors. This rule is called the Efficient Component Pricing Rule (ECPR) or the *parity pricing* formula. The term "parity price" refers to the price at which a competitor neither receives nor gives up a competitive advantage to the owner of a bottleneck service for using that service. According to the theory, a level playing field, and hence efficiency in the competition between the bottleneck owner and its

14 To resolve the issue, the Australian Competition & Consumer Commission chose to use Total Service Long-Run Incremental Cost, the standard advocated by many potential entrants, over the Efficient Component Pricing Rule. *See* AUSTRALIAN COMPETITION & CONSUMER COMM'N, ACCESS PRICING PRINCIPLES (1997).

15 OFTEL, the telecommunications regulatory agency in the U.K., has embraced long-run incremental cost principles for pricing of bottleneck facilities owned by dominant carriers such as British Telecommunications. *See* OFFICE OF TELECOMM., OFTEL'S SUBMISSION TO THE MONOPOLIES AND MERGERS COMMISSION INQUIRY INTO THE PRICES OF CALLS TO MOBILE PHONES ¶ 3.2 (1998) ("OFTEL believes that the most appropriate and economically efficient basis for assessment of charges for a bottleneck service is that derived from forward looking Long Run Incremental Costs (LRIC).").

16 *See* 1 INTERNATIONAL TELECOMM. UNION, GENERAL TRENDS IN TELECOMMUNICATIONS REFORM 1998, at 96 (1998).

17 *See* Directive 97/51/EC of the European Parliament and of the Council of 6 October 1997 Amending Council Directives 90/387/EEC and 92/44/EEC for the Purpose of Adaptation to a Competitive Environment in Telecommunications, 1997 O.J. (L 295) 23; Council Directive 92/44/EEC of 5 June 1992 on the Application of Open Network Provision to Leased Lines, 1992 O.J. (L 165) 27; Directive 97/33/EC of the European Parliament and of the Council of 30 June 1997 on Interconnection in Telecommunications with Regard to Ensuring Universal Service and Interoperability Through Application of the Principles of Open Network Provision (ONP), 1997 O.J. (L 199) 32.

18 *See* World Trade Organization: Agreement on Telecommunications Services (Fourth Protocol on General Agreement on Trade in Services), 36 I.L.M. 354, 366 (1997).

competitors, can only arise if the bottleneck service in question is priced as follows:[19]

> *Bottleneck service price per unit = Bottleneck owner's final product price minus the incremental cost to the owner of all final-product inputs, other than bottleneck service.* (1a)

or, in convenient symbols:

$$P_b = P_{bf} - IC_{br} \qquad (1b)$$

where the subscript *f* refers to *final* product, so that P_{bf} is the price of the bottleneck owner's final product, and *r* refers to the *remaining* inputs (other than the bottleneck input) that enter into the incremental cost of the final product.

Exhibit 1, below, demonstrates that at any other price for the bottleneck service, a competitor's minimum viable final product price will not be equal to the bottleneck owner's price plus (or minus) the competitor's cost advantage (or disadvantage) in supplying the inputs other than the bottleneck service needed for the final product. In other words, at any other bottleneck service price, one of the suppliers will be unable to achieve the final product price advantage to which its own efficiency entitles it.

---

19 As I have previously written and emphasized, this pricing rule is necessary but not sufficient for economic efficiency or protection of the public interest. In addition to equations (1a) or (1b), these goals require either effective competition or regulation in the final-product markets to ensure that the final-product prices yield no monopoly profits and no other efficiency-undermining distortions. For a summary of the discussion and references, see Baumol et al., *supra* note 4, at 147-48. It should be noted that the pertinent output increment for which the cost is calculated is the volume of business that is expected to be lost to competitors. I am grateful to Robert Graniere of the National Regulatory Research Institute for discussion related to this point.

EXHIBIT 1
The Level-Playing-Field Theorem: Derivation of the Competitive Neutrality Formula for Access Pricing[20]

To derive competitive-neutrality formula (1), we define a **level playing field** in the pricing of access to require the following:

Suppose a firm's incremental cost (IC) per unit of output of supplying the non-bottleneck components of the final product is X dollars less than that of a bottleneck-owning competitor (or the reverse). Then, this more efficient firm should just be able (without losing money) to price the final product by X dollars less than the price charged by its less efficient competitor.

More formally, we have as the definition of a level playing field:

bottleneck owner final-product price – minimum competitor final-product price = IC of owner-supplied remaining inputs – IC of competitor-supplied remaining inputs. (2)

But we know that the competitor's minimum (financially-viable) price is:

minimum competitor final-product price = price of bottleneck service + IC of competitor-supplied remaining inputs. (3)

Adding these two equations we immediately obtain the **competitive neutrality formula**:

the only price of bottleneck service that provides a level playing field = bottleneck owner final-product price – IC of owner-supplied remaining inputs. (4)

Competitive neutrality formula (4) is clearly the same as formula (1), so that any bottleneck service price that violates equation (4) or its equivalent (1) must tilt the playing field, favoring either the bottleneck owner at the expense of its competitors or the reverse.

It should be noted that the rule is not very difficult to carry out in practice or for the regulator to monitor. Nowadays in regulatory arenas, estimates of incremental costs are provided fairly routinely and appear to be determinable to a reasonable degree of approximation without

20 This formula was originally contributed by Robert Willig, with the current author participating in dissemination and adaptation to particular regulatory and analytic issues. For an early description of the analysis, see Robert D. Willig, *The Theory of Network Access Pricing*, *in* ISSUES IN PUBLIC UTILITY REGULATION 109 (Harry M. Trebbing ed., 1979).

enormous cost or effort. For example, telecommunications regulatory agencies in the United States (and possibly other countries as well) can use a number of off-the-shelf models such as the HAI Model, the Benchmark Cost Proxy Model, and the Hybrid Cost Proxy Model, to calculate universal service subsidies or incremental cost of telecommunications network components.[21] In addition, most of the state regulatory commissions have conducted a number of incremental cost studies over the past two years to determine unbundled network element prices.[22] Thus, if the rule is correct, to calculate the efficient price of a bottleneck service, one merely needs to observe the final-product price currently charged by the owner of the bottleneck facility and subtract from it the pertinent incremental cost.

C. *Previous Approaches to the Pricing of Bottleneck Services*

It is not possible to offer a general characterization of the methods previously used to determine the prices charged for bottleneck services. These prices were often arrived at by informal negotiation between the owner of the facility and its users. As far as I know, there were no generally accepted regulatory rules, but where the issue of pricing did arise, its resolution was based on what was deemed to be the pertinent cost, which generally meant the "fully allocated cost." The fully allocated cost of any product or activity may be described as the cost directly attributable to the item in question (in practice, an approximation to its incremental cost) plus some share of the firm's remaining costs. These remaining *common costs* range from the salary of the company president to the cost of a railroad track's construction and maintenance, which is attributable in common to the various commodities carried over the given route. Since no unique allocation standard is possible for costs that inseparably serve several purposes simultaneously, the share of common cost assigned to a particular product or activity was determined on the basis of an arbitrarily selected accounting criterion. The result was frequent litigation over the cost calculations.

---

21 *See* Federal-State Joint Bd. on Universal Serv., 12 F.C.C.R. 18,514 (1997) (analyzing a variety of models that use forward-looking cost methods for calculating universal service support). Many parties have submitted extensive comments and reply comments on how those models should be refined. *See id.* The FCC has recently released its guidelines on telecommunications cost modeling. *See* Federal-State Joint Bd. on Universal Serv., 1998 WL 751153 (F.C.C. Oct. 28, 1998)

22 *See, e.g.*, Petitions by AT&T Communications, Inc., MCI Telecomm. Corp. and MCI Metro Access Transmission Servs., Inc., for Arbitration of Certain Terms and Conditions of a Proposed Agreement with GTE Florida, Inc. Concerning Interconnection and Resale Under the Telecomm. Act of 1996, No. 970847-TP, 1997 WL 41243, at *63-*64 (Fla Pub. Serv. Comm'n May 21, 1997); AT&T Communications, Inc., No. P-140, Sub 50, 1996 WL 769763, at *30-*34 (N.C. Util. Comm'n Dec. 23, 1996), *aff'd*, No. P-140, Sub 50, 1997 WL 233035 (N.C. Utils. Comm'n Apr. 11, 1997).

A simple example will bring out most clearly the contrast between such procedures and parity pricing, using a rough characterization of earlier practice. I refer again to my railroad case, in which railroads *A* and *B* compete in serving cities *C* and *D*.[23] Railroad *A* owns the only tracks that can fit in the pass through the high mountains that separate the cities. Therefore, the mountain pass is clearly a bottleneck input to the transportation of freight between the two cities. Suppose railroad *A*'s incremental cost of carrying a carload of lumber between the two cities is $1,000, with $10 of this amount attributable to wear and tear of track when a carload of lumber crosses the pass. Railroad *A* has been charging shippers $1,500 per carload for this traffic and using the $500 surplus over the incremental cost of lumber transport for the entire route to cover costs common to lumber and other types of freight—costs such as track maintenance and replacement. The railroad earns no more than competitive profit overall.

Under these circumstances, the ECPR price for the right of railroad *B* to send a carload of lumber over the mountain pass is, by formula (1), the $1500 price charged by *A* for transport over the route, minus the $990 incremental cost of the non-bottleneck portion of the shipment ($990 = $1000 total IC minus the $10 bottleneck IC). Thus, the parity price is $510, which equals $1500 minus $990. However, at least until very recently, the regulators would have calculated the fee quite differently. For example, since the $10 incremental cost of *B*'s traversal is only one percent of the total incremental cost of the route, they can be expected to have reasoned that railroad *A* is entitled only to one percent of the contribution to common costs that flows from *B*'s shipment between the two cities, making the regulatory fee $15 rather than the $510 price required by the parity principle.

We see that the two prices can be dramatically different because one is based on a regulatory concept of equity and the other (the ECPR price) is based on the requirements of economic efficiency. At first glance it may appear that the far higher ECPR price is unfair because it extracts so high a fee for traversal of a small portion of the route. However, as Exhibit 1 implicitly demonstrates, the fee set at this level allows one to say that both railroads are paying the same price for traversal of the mountain pass. The lower, more traditional fee is therefore not only a subsidy to the other railroad that can permit it to take business away from a more efficient competitor; it also treats the two railroads differently, permitting railroad *B* to rent use of the mountain-pass tracks at a cost far lower than what it costs railroad *A* to provide the tracks.

23 *See supra* note 13 and accompanying text.

II. The Differential-Pricing Issue for Bottleneck Services

We come at last to the central issue of this Article: How can regulators permit competition in regulated industries without making it impossible to retain the cross subsidies that commonly serve as the instruments of universal service? Regulators seek to maintain cross subsidies in deregulated industries. However, universal service often makes this difficult, since it requires very low prices to impecunious consumers or consumers whose location makes them extremely costly to serve. These prices often fail to cover the costs of serving these customers, who are expected to refrain from purchasing the regulated service if the price of the service is not subsidized. But where such cross subsidies exist, competition will be driven to engage in "cream skimming." Competitors will focus on the more lucrative products of the regulated firm, which are the products that provide the revenues that finance the cross subsidies. Thus it may appear, at first glance, that competition is incompatible with the cross subsidies of universal service. This Part will show that competition and cross subsidies can, in fact, be made to coexist.

It should be noted here that cross subsidies may have a defensible social purpose. For example, an increase in the number of subscribers to telephone service increases the value of telecommunications facilities to retailing firms. Since these indirect benefits ("positive externalities" in the jargon of economics) accrue to the firms rather than to the subscribers who pay for the service they receive, both equity and efficiency can call for some subsidy from business subscribers to household subscribers. As another example, it may well be agreed that impecunious elderly persons should be ensured access to telephone service or to electric power, and that this requires that such services be provided to them at prices that do not cover the pertinent costs. But it may only be politically feasible to provide the funding for such low prices from the buyers of other services of the firm in question. Other reasonable grounds for the preservation of cross subsidies, both economic and sociological, can readily be suggested. There is nothing new in the observation that cross subsidies can sometimes be justifiable. Rather, the novel point is that such desirable cross subsidies can be made sustainable, despite the presence of competition, by appropriate access pricing rules.

An extension of the Level-Playing-Field Theorem demonstrates that it is possible to make competition and cross subsidies compatible. The Theorem shows that where there is cross subsidy or price discrimination of any sort in final product prices, then any *uniform* price for access to a bottleneck service cannot be competitively neutral. Such a uniform price *must* tilt the playing field by favoring some of the rival suppliers of final products at the expense of the others.

This observation is pertinent because, in practice, bottleneck inputs are rarely used only to produce a single product. A railroad bridge that all competitors along a given route must use can carry coal and wheat and many other products. A local telecommunications loop carries business and household telephone messages, data and voice messages, and messages from California and Connecticut. The question, then, is whether the price of a homogeneous bottleneck service should be fixed and independent of the final product in whose production it is used, or should *differential pricing* of the bottleneck service be permitted or even required, depending on the pricing of the final product for which it is employed. Here, I will argue that:

a) If there is discrimination in the bottleneck owner's prices of the final products, I and J, for which the bottleneck input is used, so that the difference between the bottleneck owner's prices for I and J is not equal to the difference between the incremental costs for I and J (that is, $P_{fbi} - P_{fbj}$ is not equal to $IC_{rbi} - IC_{rbj}$), then uniform pricing of the bottleneck service will either force the bottleneck owner to end its discriminatory pricing of the final product, or the market must, in effect, be transformed into a cartel in which different suppliers specialize in the supply of different products and do not compete with one another.

b) On the other hand, if there is differential pricing of the bottleneck service, so that the competitive neutrality formulas (1) are satisfied for *each* product for which the bottleneck service is required, then the differential pricing of the final product can be preserved, and effective competition can continue in the market for each of the final products. Specifically, such a differential pricing arrangement will be the only viable solution in a regulated market in which the regulator seeks to preserve effective competition and to impose some cross subsidy that is deemed to serve the public interest or to be required by political pressures

A. *Interfirm Discrimination Through Uniformity Of Access Price*

The analysis is straightforward. I will show that if differential prices are charged for final products that use the bottleneck service but the bottleneck service is priced uniformly in all uses, the playing field cannot be level. To show this, suppose that the bottleneck input is used to produce (at least) two final products, I and J, that are sold by the bottleneck owner at prices that are discriminatory in the sense that the price for product I

minus the incremental cost for product I is greater than the price for product J minus the incremental cost for product J:

$$P_{fbi} - IC_{rbi} > P_{fbj} - IC_{rbj} \qquad (5)$$

where the subscript r, again, refers to the cost of the *remaining* (non-bottleneck) inputs, assuming for simplicity that the incremental cost of bottleneck use is the same for both products. If the price of the bottleneck service, P_b, is set at the average (perhaps weighted) of the difference between the final price and the incremental cost ($P_f - IC_r$) for the two products, then the price of bottleneck service is greater than the price for product J minus the incremental cost for J:

$$P_b > P_{fbj} - IC_{rbj} \qquad (6)$$

So, if a competitor, C, has the same cost for the remaining inputs (that is, $IC_{rbj} = IC_{rcj}$), then

$$P_{fbj} < P_b + IC_{rcj} = min\ P_{fcj} \qquad (7)$$

meaning that a competitor who is just as efficient as the bottleneck owner in supplying product J will be unable, without losing money on sales of J, to charge a final-product price, P_{fcj}, that is as low as that of the bottleneck owner. Clearly, the playing field for sale of J will not be level, and the competitor will find itself unable to compete in the product-J market, even though it is an equally efficient producer of J. Of course, the problem is that the uniform price of the bottleneck service must exceed the competitively-neutral price for that input when it is used to produce output J. The competitor will be saddled with what amounts to an excessive discriminatory price for the bottleneck service that handicaps or prevents its competition with the bottleneck owner in the supply of product J.

The same reasoning shows that the uniform averaged competitively-neutral price for the bottleneck service will render the bottleneck service owner's price for product I greater than the competitor's minimum price for product I,

$$P_{fbi} > min\ P_{fci} \qquad (8)$$

if the bottleneck owner and the competitor are equally efficient in supplying product I. Thus, the averaged uniform price for the bottleneck service must tilt the playing field in the competitor's favor in the supply of product I.

More generally, we have the Uniform Access-Price Theorem: If the final-product prices for two goods that use a bottleneck service as an input are discriminatory in the sense of (5), then no uniform bottleneck-service price can satisfy the competitive neutrality requirement (4) for every final product, so that for those products for which it is not satisfied one of the suppliers of those products must be handicapped in a discriminatory manner.

The implications are clear. The competitor will be forced to supply those products in which the net yield to the bottleneck owner, $P_{fb} - IC_{rb}$, is greatest. This is another way of saying that the competitor will have no option but to engage in cream skimming.

There are two possible scenarios for the sequel:

a) The bottleneck owner will reduce its price for final-product *I*, and (particularly if it is losing money on *J*, meaning that a cross subsidy is involved) it may be forced to raise its price for final product *J* until the two sides of inequality (5) are made equal to one another. Then the discrimination in final-product prices will have been ended by competition—the expected sequel to cream-skimming competition.

b) Alternatively, either regulatory fiat or self-interest or some other exogenous force may keep the final-product prices of *I* and *J* at their discriminatory level. Then the bottleneck owner will find itself the sole supplier of product *J*, while the other firm (if there are only two firms) will become the sole supplier of *I*. In that case, the result will be, in effect, the establishment of a cartel in which each firm finds itself assigned an exclusive territory that is immune from direct competition. Some truncated competitive force will remain in the market, since each firm will have to keep the price of its final product below the level that will make entry into that field by the other firm financially feasible. But up to that limit each firm will be shielded from the constraint of effective competition. There will be more than one firm in the industry, but there will be no real competition.

B. *Consequences of Differential Competitively-Neutral Prices for Bottleneck Services*

As an alternative, the regulator can impose strict compliance with competitive neutrality for a bottleneck service, final product by final product. By now, it should be evident that this requires the price charged by the bottleneck owner to vary with the use to which the bottleneck

service is put by a competitor. It may require a bottleneck service fee of X dollars per minute when the bottleneck is used to carry calls from business customers and Y dollars per minute if it transmits calls from households. Competitive-neutrality formula (4) tells us, *ceteris paribus*, that the bottleneck service price must vary from one bottleneck use to another precisely by the amount that the corresponding final product prices vary. For example, given two final products with equal incremental costs for which the price of one product is 0.2 dollars more than the other, the competitively-neutral prices of bottleneck service for the two uses must also differ by exactly 0.2 dollars. Several consequences follow from such a pricing arrangement.

1. Bottleneck-Owner Indifference Among Suppliers

With these access prices, the bottleneck owner will be *indifferent*, so far as profits are concerned, between use of its facilities by itself and use of those facilities by its competitors. The competitive neutrality pricing formula guarantees that the bottleneck owner will obtain exactly the same profit whichever of the two courses is taken. For with price set in accord with formula (4), the sale of I by a rival will yield bottleneck price:

$$P_{bi} = P_{fbi} - IC_{rbi} = R \qquad (9)$$

where R is defined as the cost of providing a unit of bottleneck service for product I *plus* the profit the bottleneck owner would obtain from its own sale of a unit of I.

Thus, for each product I, the price charged by the bottleneck owner to competitors for bottleneck services will give the owner exactly the same profit as if it had used the services to supply product I itself. This result is well known in the literature on parity (ECPR) pricing.[24]

2. Access Prices for Cross-Subsidized Products

The second implication of differential and competitively-neutral pricing is more surprising: It follows from (9) that if final-product J is the recipient of a cross subsidy and is therefore priced below incremental cost (its profit yield to the bottleneck owner is negative), then the competitively-neutral price for bottleneck service to be used in the production of J *must also be less than the incremental cost* of supplying the bottleneck service for the purpose!

24 *See, e.g.*, Baumol et al., *supra* note 4, at 146.

Though this result may seem bizarre at first, its logic is straightforward. Cross subsidy by the bottleneck owner means that in order for rivals to compete effectively with the bottleneck owner, replication of this cross subsidy must be available to them in some way. If the bottleneck owner sells product J to consumers at a price below cost, then it must provide its rivals with bottleneck service at a price that does not cover cost as well. In other words, if product J is the recipient of a cross subsidy when sold by the bottleneck proprietor, then competitive neutrality requires that the same cross subsidy be made available to rival suppliers of J through access pricing. Otherwise, rivals that have no other source of cross subsidy will not be able to compete in the supply of J because of their inability to match the bottleneck owner's final-product price of J. In these circumstances, if the bottleneck service price covers the entire incremental cost of providing the service for output J production, the playing field cannot be level.

3. Open Competition in all Industry Products

Differential and competitively-neutral prices offer entrants and other rivals of the bottleneck owner the prospect that they will be able to compete in every market in which the bottleneck owner offers products. Thus, unless their entry or survival is threatened by the inefficiency of their *own* operations, they will not find themselves excluded from any branch of the regulated industry.

4. Cream Skimming Prevention—Competitor Indifference Among the Different Products That Are Supplied with the Aid of the Bottleneck

The fourth consequence of differential and competitively-neutral prices is that they eliminate any incentive for cream skimming by competitors. The differential bottleneck service price is adjusted so that when a final product price is relatively high, the bottleneck service price for use in making that product will be elevated by exactly the same amount, other things being equal. Consequently, the competitor will have no incentive to favor high-priced products over low-priced products.

5. Preservation of Cross Subsidies Despite Effective Competition

The final implication of differential and competitively-neutral pricing should now be obvious. In contrast to what is normally expected, such a pricing arrangement is consistent with continued competition in each and every one of the bottleneck owner's products, along with preservation of

any and all cross subsidies in the bottleneck owner's final-product prices. Thus, these access prices enable the regulator to have it both ways. They enable competition to survive and even to permeate every branch of the regulated industry. They also permit retention of the cross-subsidies characteristically favored by regulators. Regulators can now require impoverished families, or isolated farmers and other customers whom it is especially costly to serve, to be granted subsidized prices. They can also demand that prices favor household over business customers. In short, differential and competitively-neutral pricing promotes universal service by means of cross subsidy without precluding the forces of competition that otherwise undermine universal service.

Conclusion

It is this last feature of differentiated, competitively-neutral pricing that may make it most attractive to regulators in practice and that may be most relevant for practice. It reconciles the goal of promoting competition with the objective of helping particular classes of customers. Moreover, it opens the regulated fields to entrants and permits them and other rivals to compete in every product market on the basis of relative efficiency. The public can benefit from the pervasive competition that it makes possible. Even the bottleneck owner has something to gain from the arrangement. Although the owner will end up facing rivals in the sale of every one of its products, it will not find itself effectively excluded from any of those markets by distorted prices. Furthermore, its legitimate profits will be protected through the competitively-neutral character of the bottleneck prices. It has been proven here that in an industry that is characterized by differential final-product prices and cross subsidy, as most regulated industries are in reality,[25] any uniform access price for bottleneck services cannot be competitively neutral. Productive efficiency is necessarily undermined when less efficient firms are allowed to undercut suppliers that are more efficient in their use of resources. Despite its advantages, differential competitive neutrality has rarely been considered as an option by either practitioners or analysts. This option should not be overlooked. Although it may prove to have shortcomings that have not yet been recognized, it merits careful consideration at the very least.

25 *See* W. KIP VISCUSI ET AL., ECONOMICS OF REGULATION AND ANTITRUST 532 (2d ed. 1995).

TABLE ONE (MJD-3)
ARBITRAGE OPPORTUNITIES CREATED BY DEAVERAGING UNE PRICES SOLELY ON THE BASIS OF LOOP COST

UNE Loop TELRIC	Business Customers		Residential Customers	
	No. of Business Lines (percentage)	Average Arbitrage Opportunity ($/month)	No. of Residential Lines (percentage)	Average Arbitrage Opportunity ($/month)
$10 - $14.99	70,076 (13.2)	30.35	46,395 (2.9)	3.67
$15 - $19.99	281,627 (52.9)	23.39	830,999 (51.6)	-3.32
$20 - $24.99	146,709 (27.6)	18.60	522,793 (32.4)	-7.68
$25 - $29.99	25,084 (4.7)	8.21	134,358 (8.3)	-16.47
$30 - $34.99	4,547 (0.9)	-0.36	41,152 (2.6)	-23.50
$35 - $39.99	1,428 (0.003)	-10.56	8,550 (0.5)	-26.83
$40 - $44.99	1,100 (0.002)	-15.02	12,099 (0.8)	-38.97
$45 - $49.99	762 (0.001)	-20.32	8,572 (0.5)	-44.09
$50 - $54.99	770 (0.001)	-19.82	3,114 (0.2)	-50.67
$55 - $59.99				
$60 - $64.99				
$65 - $69.99				
$70 - $74-99	236 (0.0004)	-62.98	2,065 (0.1)	-84.49
$75 - $79.99				
$80 - $84.99	97 (0.0002)	-58.20	1,232 (0.07)	-96.42
Total	532,436 (100.0)		1,611,329 (100.0)	

Having Your Cake—How to Preserve Universal-Service Cross Subsidies While Facilitating Competitive Entry: A Response

Michael J. Doane,[†] David S. Sibley,[††] and Michael A. Williams[†††]

Introduction

When the Telecommunications Act of 1996[1] was signed into law, supporters proclaimed it would revolutionize the $200 billion a year telecommunications industry and put Americans at the threshold of the information super-highway of the 21st century.[2] Three years later, the Act has generated more controversy than progress. Among other things, there has been a Supreme Court challenge to the authority of the Federal Communications Commission ("FCC" or "Commission") to set the prices at which local exchange companies must lease their networks to new entrants;[3] a federal court decision that the Act's restrictions on Bell Operating Companies create an unconstitutional "bill of attainder" (a decision overturned on appeal);[4] and repeated FCC and U.S. Department of Justice denials of Bell Operating Company petitions to enter in-region, long-distance markets under section 271 of the Act.[5]

The Act requires incumbent local exchange companies to provide "nondiscriminatory access to network elements on an unbundled basis" to

---

† PM Industrial Economics, Inc.
†† University of Texas at Austin
††† PM Industrial Economics, Inc. We would like to thank Paul MacAvoy for careful reading and most helpful comments. The paper is in memory of Ken Dunmore who introduced us to access pricing issues in local telephony.

1 Pub. L. No. 104-104, 110 Stat. 56 (codified in scattered sections of 47 U.S.C.).

2 *See, e.g.*, Implementation of the Local Competition Provisions in the Telecomms. Act of 1996, 11 F.C.C.R. 15,499, at 16,243-53 (1996) (first report and order) (statements of FCC Commissioners James H. Quello and Susan Ness).

3 *See* AT&T Corp. v. Iowa Utils. Bd., 119 S. Ct. 721 (1999).

4 SBC Communications, Inc. v. FCC, 981 F. Supp. 996 (N.D. Tex. 1997), *rev'd*, 154 F.3d 226 (5th Cir. 1998), *cert. denied*, 119 S. Ct. 889 (1999).

5 *See, e.g.*, Application of BellSouth Corp., BellSouth Telecomms., Inc., & BellSouth Long Distance, Inc., for Provision of In-Region, InterLATA Servs. in La., 13 F.C.C.R. 20,599 (1998) (memorandum order and opinion); Application of Ameritech Mich. Pursuant to Section 271 of the Communications Act of 1934, as Amended, to Provide In-Region, InterLATA Servs. in Mich., 12 F.C.C.R. 20,543 (1997) (memorandum order and opinion); Evaluation of the United States Department of Justice, Application of SBC Communications Inc. Pursuant to Section 271 of the Telecomms. Act of 1996 to Provide In-Region, InterLATA Servs. in the State of Okla., No. 97-121 (F.C.C. May 16, 1997) (visited Apr. 21, 1999) <http://www.usdoj.gov/atr/public/comments/sec271/sbc/afdvt03.htm>; Evaluation of the United States Department of Justice, Application by BellSouth Corp., BellSouth Telecomms., Inc., & BellSouth Long Distance, Inc. for Provision of In-Region, InterLATA Servs. in S.C., No. 97-208 (F.C.C. Nov. 4, 1997) (visited Apr. 21, 1999) <http://www.usdoj.gov/atr/public/comments/sec271/bellsouth/1262.htm>.

competitors.[6] This provision of unbundled network elements (UNEs) is intended to allow competing local providers to assemble services, using some or all of the incumbent's facilities, purchasing them in an *à la carte* fashion.[7] How to set the prices paid by competitive local exchange carriers for the UNEs of local exchange carriers has become perhaps the most contentious issue arising under the Act.

Throughout the debate, two primary pricing methods have been advocated: (1) the uniform, total element long-run incremental cost (TELRIC) approach, which is currently favored by the FCC and many state regulatory agencies, and (2) the efficient component pricing rule (ECPR). The TELRIC approach sets the price of an UNE equal to its direct, forward-looking cost (both capital and operating). The ECPR approach, by contrast, sets the price equal to (1) the incremental cost of an UNE plus (2) the incumbent's opportunity cost of providing the UNE to a competitor. This opportunity cost, in turn, equals the amount that the incumbent would have earned had it sold retail services using the unbundled network element.[8]

In a recent article in this Journal, Professor William Baumol presents a methodology for establishing competitively neutral prices for accessing the network elements of a bottleneck facility, such as the unbundled loops of a local exchange carrier.[9] As Professor Baumol notes, pricing access to bottleneck facilities is a matter of great urgency, having widespread application in such network industries as electric, gas, rail, and telecommunications, both in the United States and overseas.[10] The system of non-uniform or differential access prices he recommends is an extension of the ECPR methodology, with due allowance for the possibility that cross subsidies in the retail rate structure may require access prices below incremental cost. We agree with Professor Baumol's pricing

---

6 47 U.S.C. § 251(c)(3). "Elements" are the discrete network facilities that must work in concert to provide a "service." For example, in order to provide basic local telephone service to a residential end user, many elements of the local network come into play and can include the following: the local loop (typically, the twisted pair of copper wires connecting the end user's premises to the local exchange company's central office switch); the port, which connects the loop to the switch and generates dial tone for the line; the switching and routing performed by the switch hardware and software; specialized local network databases; network signaling facilities, which are separate from the circuits employed to carry voice; and the interoffice transmission facilities that connect a number of these elements to one another. *See* 47 U.S.C. § 153(45) (Supp. II 1996).

7 According to the statute, 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 . . . telecommunications service." 47 U.S.C. § 251(c)(3).

8 For example, if the incumbent's incremental cost of providing a loop to a business customer is $30, its retail business rate is $60, and the incumbent's cost of inputs the competitor will supply (for example, retailing costs avoided by the incumbent when making the loop available for resale) is $5, then the ECPR methodology sets a price of a business loop UNE equal to [$30 + ($60 – $30 – $5)], or $55. ECPR prices can also be calculated using an alternative, "top-down" approach—that is, by subtracting the cost of competitively supplied inputs from the incumbent's retail price for the input. Under this approach, the ECPR price would be $60 - $5 = $55 for the example business loop. Note that the "top-down" approach yields the same result as the "bottom-up" approach.

9 *See* William J. Baumol, *Having Your Cake: How to Preserve Universal-Service Cross Subsidies While Facilitating Competitive Entry*, 16 YALE J. ON REG. 1 (1999). Some unbundled network elements (such as switching) are comparatively easy for competitors to provide themselves, while others (such as the local loop) may be more difficult to duplicate. Professor Baumol identifies the latter type as "bottleneck" facilities or elements, as access to them must generally be secured from the incumbent local carrier. *See id.* at 3.

10 *See id.* at 4-6.

recommendation. Indeed, we have made the same recommendation previously in arbitration proceedings under the Act.[11] In those proceedings, however, state utility commissions frequently relied on an earlier affidavit co-authored by Professor Baumol, in which he stated that "the appropriate forward-looking benchmark for pricing [UNEs] is total service long run incremental cost, or TSLRIC."[12] After much debate and litigation, state public utilities commissions have overwhelmingly adopted the TELRIC approach in interim proceedings.[13]

The purpose of this Response is not to focus on Professor Baumol's (welcome) change in position, but rather to assist policymakers in understanding the subtleties of access pricing. In particular, we intend to highlight the substantial deficiencies of the TELRIC approach when used to price local telephone network elements for the transition to a more competitive environment. State commissions throughout the United States are now in the process of establishing "permanent" prices for UNEs.[14] (Telecommunications Act arbitration proceedings generally produced only "interim" prices.)[15] Unfortunately, Professor Baumol's prior affidavit, in our opinion, created some confusion over and was a factor in commission decisions to adopt TELRIC pricing in favor of ECPR. But as Professor Baumol's recent article in this Journal makes clear, when cross subsidies

---

11 *See* Michael J. Doane et al., An Economic Framework for Implementing the Pricing Provisions of the Telecommunications Act of 1996, at IV-1 to IV-12 (1996) (unpublished manuscript filed on behalf of GTE Corporation before state commissions pursuant to the arbitration provisions of the Telecommunications Act of 1996, on file with the *Yale Journal on Regulation*).

12 *See* Affidavit of William J. Baumol, Janusz A. Ordover, and Robert D. Willig ¶ 3, at 2, Implementation of the Local Competition Provisions in the Telecomms. Act of 1996, 11 F.C.C.R. 15,499 (1996) (No. 96-98). Following both the filing of this affidavit and the release of the FCC's First Report and Order, it became industry practice to use the term "TSLRIC" to refer to the long-run incremental cost of a service and "TELRIC" to refer to the long-run incremental cost of a particular network element. Unfortunately, there has been some laxity in the use of these terms in telecommunications fora, so that the older and more familiar "TSLRIC" is sometimes mistakenly employed in discussions of element access pricing. The reader should not be confused by this inconsistency but should instead focus upon the fact that a total long-run incremental cost pricing methodology is being applied. The concept behind TELRIC is the same as that of TSLRIC but is specific to a particular network element.

To determine the incremental cost to an incumbent of providing a service, one must look at the change in total cost to the firm resulting from a decision not to provide the service; in other words, the difference between total cost to the firm when the service is provided and the total cost if the service is not provided equals the portion of total costs attributable to the particular service. To illustrate this notion, assume a simple case in which a firm provides two services, *A* and *B*. The incremental cost (IC) of service *A* is equal to the change in total cost (TC) resulting from a decision to provide only *B* instead of both *A* and *B*: $IC(A) = \Delta TC = TC(A,B) - TC(0,B)$. Since total cost when only *B* is supplied is equal to the stand-alone cost (SAC) of *B*, the incremental cost of *A* can also be expressed as: $IC(A) = TC(A,B) - SAC(B)$. Similarly, $IC(B) = TC(A,B) - SAC(A)$. If the total cost of providing *A* and *B* together is less than the sum of the incremental cost of *A* and *B* individually, then $TC(A,B) < SAC(A) + SAC(B)$, and the firm realizes efficiencies from supplying both *A* and *B* together. With regard to the incremental cost of network *elements*, the same concept applies.

13 *See, e.g.*, Sprint Communications Co., No. 96-0375, 1997 WL 56,906, at *6 (Haw. Pub. Utils. Comm'n Jan. 17, 1997).

14 *See, e.g.*, Unbundled Network Elements, No. P-100 Sub 133d, 1998 WL 995837 (N.C. Utils. Comm'n Dec. 10, 1998) (order adopting permanent prices for unbundled network elements). In addition, many state commissions are now holding similar proceedings in the electric and natural gas industries to determine the pricing of distribution-related services. *See, e.g.*, Restructuring of the Emerging Competitive Natural Gas Mkt., No. 93-G-0932, 1994 WL 758686 (N.Y. Pub. Serv. Comm'n Dec. 20, 1994); New York Pub. Serv. Comm'n, *Policy Statement Concerning the Future of the Natural Gas Industry in New York State and Order Terminating Capacity Assignment* (last modified Nov. 3, 1998) <http://www.dps.state.ny.us/fileroom_htm/doc4962.htm>.

15 *See, e.g.*, Local Exch. & Local Exch. Access Telecomms. Competition, No. P-100 Sub 133, 1996 WL 130775 (N.C. Utils. Comm'n Feb. 23, 1996).

or other forms of discrimination exist in the retail rate structure, a uniform access price such as TELRIC cannot be competitively neutral.[16] Indeed, the application of TELRIC pricing in an environment characterized by such retail price discrimination (as is the current rate structure for local exchange telephony) is likely to promote inefficient market behavior. This Response demonstrates these points and further proves that in a comparison of TELRIC pricing versus what we refer to as the Market-Determined Efficient Component Pricing Rule (M-ECPR), M-ECPR is far superior to TELRIC in terms of allocative and productive efficiency.[17] We believe this latter finding has not been recognized by regulatory agencies.[18]

I. The Road to Competitively Neutral Access Prices

A. *Background on the Debate over Access Pricing*

After President Clinton signed the Telecommunications Act into law on February 8, 1996, the FCC initiated proceedings to implement its provisions. On April 19 of that year, the Commission released a Notice of Proposed Rulemaking (NOPR) that described its preliminary positions on a wide range of issues raised by the Act, one of the most important being the establishment of prices for UNEs under section 252(d)(1) of the statute.[19] In the NOPR, the Commission stated that it "tentatively conclude[d] that use of 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.'"[20] As we have demonstrated elsewhere,[21] the Commission's rationale was based on a complete misunderstanding of ECPR. In particular, the FCC failed to recognize that the presence of market alternatives would, in some instances, reduce an incumbent's opportunity costs, thus necessitating a reduction in UNE prices.[22]

---

16 *See* Baumol, *supra* note 9, at 11.

17 As explained in Part II, *infra*, there are crucial differences between ECPR and M-ECPR. *See also* David S. Sibley et al., Pricing Access to a Monopoly Input (Dec. 28, 1998) (unpublished manuscript, on file with the *Yale Journal on Regulation*).

18 Cf. AT & T Corp. v. Iowa Utils. Bd., 119 S.Ct. 721, 728 n.3 (1999) ("Incumbents argued . . . that [TELRIC] was unreasonable because it stranded their historic costs and underestimated the actual costs of providing interconnection and unbundled access. The Eighth Circuit did not reach this issue, and the merits of TELRIC are not before us.").

19 *See* Implementation of the Local Competition Provisions in the Telecomms. Act of 1996, 11 F.C.C.R. 14,171, ¶ 8, at 14,176, ¶¶ 117-156, at 14,209-25 (1996) [hereinafter *NOPR*] (notice of proposed rulemaking). Section 252(d)(1) of the Act states in relevant part that UNE charges "(A) shall be (i) based on the cost (determined without reference to a rate-based proceeding) of providing the interconnection or network element (whichever is applicable), and (ii) nondiscriminatory, and (B) may include a reasonable profit." 47 U.S.C. § 252(d)(1) (Supp. II 1996).

20 *NOPR*, *supra* note 19, ¶ 148, at 14,222.

21 *See* Doane et al., *supra* note 11, at III-11, IV-4 to IV-12.

22 The pricing rule that takes into account such market alternatives is the M-ECPR. *See infra* Part III; *see also* Doane et al., *supra* note 11, at IV-1 to IV-12 (providing a description of how M-ECPR can be used to establish unbundled network element prices). This rule, in addition to reducing access prices in the presence of market alternatives, involves the use of a competitively neutral surcharge that is required to ensure that the incumbent can satisfy its break-even constraint and remain solvent. As demonstrated in Part III, *infra*, M-ECPR yields the differential access prices now

In response to the NOPR, Professor Baumol wrote an affidavit (with Professors Janusz Ordover and Robert Willig) on behalf of AT&T in which he argued that ECPR pricing was inappropriate for the local telecommunications industry:

> The existing structure of end-user prices for local telecommunications is *not* appropriate as a baseline for ECPR or any other pro-competitive purpose; it is utterly inconsistent with the competitive policies of the 1996 Act. Cross-subsidies are common in the rate structure, and rates depart systematically from pertinent costs. In these circumstances, the old structure of rates is the wrong baseline for the pricing of network elements through the application of ECPR.
>
> Indeed, applying ECPR to the existing rate structure would result in component prices that lock in the [incumbent local exchange carrier's] monopoly profits and inefficiencies, would attract inefficient entry where rates are too high, and would preclude efficient entry where rates are too low. ECPR was never intended to (and cannot) substitute for competition for the monopoly network elements, or limit to fully competitive levels the prices paid by end users for services that use those network elements.
>
> Of course, as unbundling proceeds and competition spreads as a result of economic-cost-based pricing of network elements, end-user prices should be driven toward incremental costs. With the *appropriate* end-user prices at incremental costs, the component prices dictated by ECPR are no higher than [total service long run incremental cost].[23]

On the basis of this argument, Professor Baumol concluded that "the appropriate forward-looking benchmark for pricing is total service long run incremental cost, or TSLRIC."[24]

Following comments filed in response to the NOPR, the Commission released its First Report and Order on August 8, 1996.[25] In the order, the Commission concluded that ECPR pricing should not be used to establish rates for unbundled network elements: "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 ECPR are not cost-based."[26] There is some evidence that Professor Baumol's affidavit was influential with the Commission, since his affidavit advanced this same argument while the FCC's earlier NOPR did not.[27]

---

advocated by Professor Baumol.

23 Affidavit of William J. Baumol, Janusz A. Ordover, and Robert D. Willig ¶¶ 22-24, at 8-9, Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, 11 F.C.C.R. 15,499 (1996) (No. 96-98).

24 *Id.* ¶ 3, at 2. Professor Baumol further concluded that a particular engineering cost model produced by Hatfield Associates, Inc. "provides good empirical estimates of the TSLRIC of basic network elements." *Id.*

25 *See Implementation of the Local Competition Provisions*, 11 F.C.C.R. at 15,499 (first report and order).

26 *Id.* ¶ 709, at 15,859.

27 While the FCC "tentatively conclude[d]" in *NOPR* "that use of ECPR or equivalent methodologies to set prices for interconnection and unbundled network elements would be inconsistent with the . . . requirement that [prices] be based on 'cost,'" *NOPR*, *supra* note 19, ¶ 148, at 14,222 (1996), it did not examine the pervasive presence of cross subsidies in pre-Act local telephone rate

After the FCC issued its First Report and Order, state public utilities commissions held arbitration proceedings in accordance with the requirements of the Act to establish interim prices for unbundled network elements.[28] Collectively, the authors of this Response testified in more than forty such proceedings and advocated the same ECPR prices that Professor Baumol now agrees should be charged. However, with a few exceptions, commissions followed the FCC's lead and adopted uniform UNE prices based on TELRIC (usually with a modest, uniform markup for forward-looking common costs), frequently referring to the FCC's position on ECPR, which in turn cited the affidavit by Professor Baumol.[29]

It is not surprising that the agencies responsible for implementing section 252(d)(1) of the Act were influenced by Professor Baumol's recommendation. After all, Professor Baumol's name is closely associated with the ECPR pricing methodology, which is also known as the "Baumol-Willig Rule." Rejection of that rule by a principal advocate was a powerful argument in favor of uniform TELRIC access prices. Since uniform access pricing promotes cream skimming (or subsidizes entry), it is also unsurprising that competitive local exchange carriers (CLECs) advocated this method.[30]

B. *Problems with the Government's Position on Access Pricing*

Advocates of TELRIC pricing often assert that firms in competitive markets are limited to prices that recover forward-looking economic costs. For example, Professor Baumol argued in his affidavit before the FCC that "a defensible pricing standard must be based on forward-looking economic costs, not historic book costs, because the expansion, contraction, entry and exit decisions of competitors efficiently and necessarily turn on expected prices and costs and have nothing to do with costs expended historically or reflected on accounting books."[31] Professor Baumol further argued that the "measure of costs on which efficient prices are based, and

---

structures. The Commission did recognize that the "structure of incumbent LEC rates for interconnection and unbundled network elements will influence the incentives for interconnectors to purchase and use these services, independent of the level at which rates are set," but it limited this discussion of rate structures to separations between shared and dedicated facilities. *See generally id.* ¶¶ 117-154, at 14,209-24 (discussing "Pricing of Interconnection, Collocation, and Unbundled Network Elements" and local "Rate Structure").

28 *See, e.g.*, AT&T Communications of the Midwest, Inc., No. C-1400, 1997 WL 1055198, at *3-*4, *9 (Neb. Pub. Serv. Comm'n Apr. 14, 1997); Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, & Resale, No. UT-960369, 1996 WL 773361, at *1-*2 (Wash. Utils. & Transp. Comm'n Nov. 21, 1996).

29 *See, e.g.*, Petition of AT&T Communications of the Pacific Northwest, Inc., for Arbitration of Interconnection Rates, Terms, and Conditions with GTE Northwest Inc., Pursuant to 47 U.S.C. § 252(b), No. ARB 5, slip op. at 12 (Ore. Pub. Util. Comm'n Dec. 12, 1996) (arbitrator's decision); Petition of AT&T Communications of Pa., Inc. for Arbitration to Establish an Interconnection Agreement with GTE North, Inc., No. A-310125 F0002, slip op. at 4-5 (Pa. Pub. Util. Comm'n Dec. 5, 1996) (opinion and order).

30 Some of the appeal of uniform TELRIC pricing appears to have been based on the following result-oriented (and mistaken) syllogism: Many CLECs are better than few CLECs; low UNE prices encourage CLEC entry; therefore, low, uniform TELRIC prices are desirable.

31 Affidavit of William J. Baumol, Janusz A. Ordover, and Robert D. Willig ¶ 3, at 1, *Implementation of the Local Competition Provisions*, 11 F.C.C.R. at 15,499 (No. 96-98).

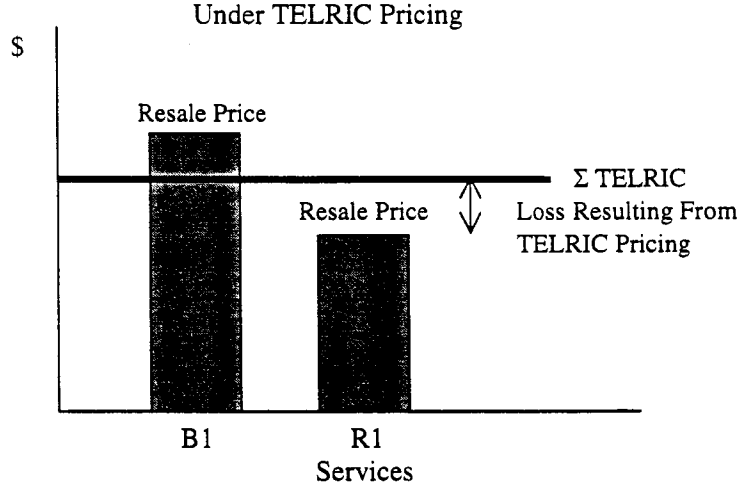
to which efficient prices converge in competitive markets, is *incremental* cost."[32]

As we have demonstrated elsewhere, and as recognized by Professor Baumol in his recent article, any system of uniform access prices imposed in the presence of retail price discrimination (*e.g.*, cross subsidies) cannot achieve competitive neutrality.[33] In particular, the TELRIC approach induces entrants to engage in cream-skimming and simultaneously prevents them from offering service to subsidized customers. Moreover, TELRIC pricing will not permit an incumbent local exchange carrier (ILEC) to recover the forward-looking incremental costs on which most commissions have based their pricing methodologies. These points can be seen with the aid of Figure One, as shown below. In that figure, an ILEC offers two services, residential (R1) and business (B1). The retail rates are not based, however, on forward-looking incremental costs because they contain cross subsidies. Consequently, the resale rate, which is defined as the retail rate minus the avoided cost of retailing, also contains a cross subsidy. Now suppose that CLECs could lease the underlying unbundled network elements required to provide R1 and B1 services at prices equal to their TELRICs. Uniform TELRIC prices, in combination with discriminatory resale prices, create an arbitrage opportunity that prevents the ILEC from recovering its forward-looking incremental costs. The most profitable route of entry for CLECs is to provide R1 service by resale and to provide B1 service through UNEs. Because provision of B1 service through UNEs just covers forward-looking incremental costs and provision of R1 service through resale fails to cover forward-looking incremental costs, the ILEC cannot recover its total forward-looking incremental costs.

32 *Id.* ¶ 11, at 4.
33 *See* Baumol, *supra* note 9, at 11.

FIGURE ONE

Illustration of an ILEC's Inability to Recover its
Total Forward-Looking Incremental Costs
Under TELRIC Pricing



Professor Baumol now agrees that if the final-product prices are discriminatory,[34] then the application of uniform prices to bottleneck services "will either force the bottleneck owner to end its discriminatory pricing of the final product, or the market must, in effect, be transformed into a cartel in which different suppliers specialize in the supply of different products and do not compete with one another."[35] In other words, if a uniform access price is set for a bottleneck service in the presence of discriminatory retail prices, then either (1) the discrimination in the retail prices must be eliminated, or (2) the markets must be bifurcated so that one firm serves customers receiving the discriminatorily low prices (perhaps with the assistance of a universal service fund to make up any difference between a subsidized rate and the cost of service), while another firm serves customers paying discriminatorily high prices. Note that the status quo is not a possible outcome. That is, setting uniform access prices in the presence of a discriminatory retail rate structure is not an equilibrium, because competitors will focus on the more lucrative products of the regulated firm, which are the products that provide the revenues that finance the cross subsidies.[36] That is another way of saying that the competitor will have no option but to engage in "cream skimming."[37] Of course, if the incumbent supplier of the two services had been earning a fair, competitive rate of return prior to entry, such cream skimming will thereafter prevent the firm from covering its total costs, contrary to the purpose of the Act.[38]

---

34 That is, if (1) the differences between prices of retail services using a bottleneck service do not equal (2) the differences between the incremental costs of the non-bottleneck inputs.

35 Baumol, *supra* note 9, at 12.

36 *See id.* at 11.

37 *Id.*

38 *See, e.g.*, Michael J. Doane & Michael A. Williams, *Competitive Entry into Regulated Monopoly Services and the Resulting Problem of Stranded Costs*, HUME PAPERS ON PUB. POL'Y,

C. *Professor Baumol's Suggestion of Differential Access Pricing*

Differential access pricing solves this cream-skimming problem by setting the price of the "bottleneck" service to be paid by entrants equal to (1) the ILEC's resale price minus (2) the incremental cost of remaining inputs supplied by the ILEC. In practice, the Telecom Act may require ILECs to provide more than a single element on an unbundled basis to CLECs.[39] If the price of each element were set equal to its TELRIC, a surcharge could be assessed equal to the difference between (1) the resale price and (2) the sum of the TELRICs for the UNEs required to provide that resale service. Notice that in Figure 1 this assessment would result in a positive surcharge for B1 and a negative surcharge for R1. Such a surcharge would eliminate the arbitrage opportunity created by uniform UNE prices and enable the continuation of discriminatory retail rate structures.[40] This system of surcharges creates competitive neutrality by eliminating cream-skimming opportunities, while at the same time facilitating competitive entry into the market for the subsidized services.

The positive surcharge on B1 to prevent cream skimming, however, may not be sustainable if applied to UNEs other than true "bottlenecks." That is, if CLECs can themselves provide facilities at a cost lower than the differential UNE price (inclusive of the surcharge), then the surcharge will not be collected and the ILEC will be unable to recover its forward-looking incremental cost. In this circumstance, a competitively neutral, non-bypassable, end-user charge would be required to ensure competitive neutrality and to enable the ILEC to recover its forward-looking costs.

In his recent article, Professor Baumol supports the adoption of a differential access approach with the efficient component pricing methodology. He argues that:

> [ECPR prices are] not very difficult to carry out in practice or for the regulator to monitor. Nowadays in regulatory arenas, estimates of incremental costs are provided fairly routinely and appear to be determinable to a reasonable degree of approximation without enormous cost or effort . . . . Thus, if the rule is correct, to calculate the efficient price of a bottleneck service, one merely needs to observe the final-product price currently charged by the owner of the bottleneck facility and subtract from it the pertinent incremental cost.[41]

However, as raised by Professor Baumol, there are practical

Autumn 1995, at 33, 47 (1995) (explaining that a utility will exit a market if its marginal cost exceeds the competitive price in that market).

39 *See* Telecommunications Act of 1996, 47 U.S.C. § 271(c)(2)(B) (Supp. II 1996). In *Iowa Utilities Board*, the Supreme Court vacated the FCC rule requiring ILECs to unbundle specific elements, holding that the FCC did not adequately consider the "necessary and impair" test set forth in Section 251(d)(2) of the Act. *See* AT&T Corp. v. Iowa Utils. Bd., 119 S.Ct. 721, 734-36 (1999). The FCC is promulgating new rules to determine which elements, if any, incumbents are required to unbundle. *See generally* Implementation of the Local Competition Provisions of the Telecoms. Act of 1996, 64 Fed. Reg. 20,238 (1999) (to be codified at 47 C.F.R. ch. 1) (proposed Apr. 26, 1999).

40 Of course, rebalancing the retail rates to cost also could eliminate the arbitrage opportunity. But if regulators choose to maintain cross subsidies, then differential access prices are necessary.

41 Baumol, *supra* note 9, at 8-9.

"shortcomings" that complicate the application of differential access prices.[42]

The first such shortcoming is that the Telecommunications Act may require ILECs to unbundle more than just a single "bottleneck" element. Thus, it is necessary to determine the UNEs to which the surcharge (or surcredit) should be applied. As explained above, no surcharge can be applied to the many elements (e.g., switching service) provided in competitive markets. The least elastic network element is the local loop, although "competitive access providers" have bypassed the loop itself in many business districts. Thus, a solution to this shortcoming is to assign the surcharge only to the local loop, which is least likely to be bypassed.

A second shortcoming to the application of differential access pricing is that the size of the surcharge or surcredit varies with customer usage levels. For example, in order to be competitively neutral, the loop surcharge on business customers must be higher on high-volume customers than on low-volume customers. If a single surcharge were applied to all business customers, CLECs could profitably cream-skim customers with above-average monthly bills, while they would be effectively prevented from serving customers with below-average monthly bills through the use of UNEs.[43] There are two ways to mitigate this problem. First, a set of graduated surcharges and surcredits could be applied to capture most of the variation in customers' usage levels. Second, a single surcharge and a single surcredit could be calculated based on the usage levels of average business and residential customers. The consequent reduction in the recovery of forward-looking costs caused by CLEC cream-skimming would be recovered through the use of a competitively neutral, non-bypassable surcharge.

A final shortcoming is that any system of differential access prices provides incentives to misreport data. For example, a CLEC leasing a loop to serve a business customer has an incentive to report that the loop actually serves a residential customer. Similarly, if a system of graduated surcharges and surcredits were imposed, CLECs would have an incentive to report that their loops served low-usage rather than high-usage customers. These and other similar reporting problems suggest that practical applications of differential access pricing should be kept simple. For example, regulators should impose a single surcharge or surcredit based on the average usage levels of business and residential customers. Since such a simple system cannot prevent cream-skimming, however, a competitively neutral and non-bypassable surcharge would accompany the system of differential access prices to allow the ILEC to cover its forward-looking costs.

II. The Advantages of the M-ECPR Approach

We have proposed elsewhere an extension of the ECPR, which we

---

42 *See id.* at 17.

43 Of course, efficient CLECs could profitably serve customers with below-average monthly bills through the use of resale.

call the Market-Determined ECPR (M-ECPR).[44] The M-ECPR differs in two crucial aspects from the ECPR. First, the additional opportunity cost used in calculating the access price of a bottleneck service equals the contribution obtained from the service(s) produced using the monopoly input, taking into account any price reductions realized in the market. The maximum M-ECPR price for a bottleneck input, therefore, equals the price given by standard ECPR, but will be lower whenever competitive entry constrains the incumbent's ability to recover the level of contribution embodied in the regulated, pre-entry retail prices of services utilizing that input.[45] The second difference between our proposal and the standard ECPR is that we supplement it with an end-user charge in order to allow the incumbent firm to satisfy its break-even constraint and remain solvent.[46]

For ease of exposition, we will discuss the M-ECPR in a simplified setting often used in ECPR discussions. Assume that the production of a retail input requires a bottleneck input produced by a monopolist at a TELRIC equal to v. Assume also that the bottleneck monopolist is vertically integrated into the retail market; that there are other inputs associated with the retailing function that are produced in competitive input markets; and that the marginal cost of retailing is c to the incumbent. Suppose an entrant can provide the retailing function in competition with the bottleneck monopolist at a marginal cost of g but will need to lease the services of the bottleneck input at a price w from the input monopolist. Suppose also that the market-determined price for the retail product is P.

In this setting, the two pricing proposals discussed in this paper are TELRIC pricing ($w = v$) and ECPR ($w = P - c$), where $P - c$ is the opportunity cost to the incumbent of leasing one unit of the bottleneck input to its retail competitor, and w is constrained to be at least as great as v. As shown below, the allocative efficiency of each of these rules depends on the assumed competitive conditions in the retail market.

Price Competition. First, suppose that both firms produce identical versions of the retail good and that consumers all switch to the firm with the lower price. If the bottleneck monopolist employs TELRIC and sets $w = v$, then the retail price will be the perfectly competitive price at the monopolist's marginal cost ($P = v + c$). If the entrant is more efficient than the incumbent at the retailing function, then it will still set its price at P while retaining the entire retail market. Now, suppose that the input is priced according to the M-ECPR, so that $w = P - c$. Given that consumers

---

44 *See* Sibley et al., *supra* note 17 (discussing the M-ECPR in the context of a retail price greater than marginal cost). If the initial retail price is less than marginal cost, ECPR and M-ECPR yield equivalent prices, equal to the retail rate less avoided costs.

45 Returning to the example in note 8, *supra*, assume again that the ILEC retail rate for business service is $60, that the incremental cost is $30, and that the cost of other, competitively supplied inputs is $5. As noted before, ECPR results in an UNE price of $55 for the loop. Suppose further, however, that a competing provider is efficient and able to provide service to business customers for only $45 (net of retailing costs). Under M-ECPR, the incumbent's price for an unbundled loop would also fall to $45. Unless the ILEC responds with a corresponding price reduction, customers will migrate to the lower-priced competitor, thus diminishing the ability of the ILEC to recover the level of contribution that had been reflected in pre-entry retail prices. The M-ECPR thus takes into account the presence of market alternatives.

46 Continuing the example from the previous note, a competitively neutral end user charge of $10 would need to be added to the M-ECPR price of $45 in order to prevent arbitrage.

are assumed to switch to the firm with the lower price, P is interpreted to be the lower of the incumbent's price and the entrant's price. The entrant's profit when it signs up a customer is now $P - g - w$, which is equal to $c - g$, or the difference between the retail costs of the entrant and the incumbent. Note that a competitor will find entry profitable if, after paying the M-ECPR price to the incumbent, its other costs not associated with the monopoly input (g) are no higher than those of the incumbent. If the entrant is more efficient than the incumbent, then the entrant makes a positive profit on each consumer it attracts. Finally, if the entrant is equally efficient, we assume that the regulator provides the entrant an arbitrarily small subsidy per customer for entering. In either case, the entrant makes a positive profit proportional to the number of customers it serves. In this setting, the entrant's incentive is to maximize the number of customers served, which is done by setting P equal to $v + c$, the incumbent's marginal cost.[47] In this type of market, the M-ECPR and TELRIC approaches yield the same outcome. The results of this computation are summarized in Table 1.

TABLE ONE

A Comparison of TELRIC versus M-ECPR Pricing:
Summary of Results

Firm Behavior	Entrant is at Least as Efficient as Incumbent	Entrant is Less Efficient than Incumbent
Price Competition	M-ECPR and TELRIC both result in an equilibrium retail price equal to the incumbent's marginal output cost.	M-ECPR and TELRIC both prevent entry by inefficient competitors.
Quantity Competition	M-ECPR results in an equilibrium retail price equal to the incumbent's marginal output cost. TELRIC results in a retail price above incumbent's marginal output cost.	M-ECPR prevents entry by inefficient competitors, while TELRIC does not. TELRIC leads to lower (higher) welfare if market demand elasticity is sufficiently inelastic (elastic).
Monopolistic Competition	M-ECPR results in lower equilibrium retail prices for both the incumbent and entrant than TELRIC.	M-ECPR prevents entry by inefficient competitors, while TELRIC does not. TELRIC leads to lower (higher) welfare if market demand elasticity is sufficiently inelastic (elastic).

Quantity Competition. Now suppose that the retail market does not lend itself to the perfectly competitive outcome and that some form of non-price difference exists between the output of the incumbent and the output

[47] Recall that w cannot fall below v.

of the entrant. One plausible way to model this is to assume that the two firms are Cournot competitors. In this setting, if the bottleneck input is priced at TELRIC, the standard result of the Cournot model holds true: The equilibrium retail price will be above the marginal cost of either firm.[48] With M-ECPR, however, the entrant's profit per customer is $P - g - w = c - g$, so that total profit is simply equal to this quantity times the number of customers served by the entrant. Using technical arguments that are available elsewhere,[49] we argue that as long as the entrant is at least as efficient as the incumbent, the entrant will serve the entire retail market and will produce to the point where the retail price is equal to the incumbent's marginal cost, $v + c$. Because the TELRIC approach yields an equilibrium price higher than this level, M-ECPR is superior to TELRIC in terms of allocative efficiency.

Monopolistic Competition. In the cases of price and quantity competition, it is assumed that the entrant and the incumbent produce homogenous outputs. Even if we relax this assumption, M-ECPR remains more desirable than a TELRIC methodology. This case is more complicated to analyze than the previous cases because the prices of the differentiated products offered by the incumbent and the entrant will be different from one another. As a result, there is some ambiguity in determining the appropriate opportunity cost and defining the M-ECPR. Without going into a detailed analysis underlying the case of monopolistic competition (which we provide elsewhere),[50] we summarize that M-ECPR is still clearly superior to TELRIC-based marginal cost pricing. As long as the entrant is at least as efficient as the incumbent ($g < c$), the M-ECPR approach will yield equilibrium retail prices for both the differentiated products that are lower than those given by TELRIC pricing. When $g > c$, M-ECPR prevents market entry, while a TELRIC approach allows entry under certain conditions. Whether or not such entry increases or decreases consumer welfare depends upon a number of factors, including the elasticity of demand for the retail service, the level of pre- and post-entry prices in excess of marginal cost, post-entry market shares, and the magnitude of the entrant's inefficiency.[51]

In each of the three competitive cases outlined above, whenever the entrant is at least as efficient as the incumbent, the M-ECPR approach leads to greater allocative efficiency than does the TELRIC method. When the entrant is less efficient than the incumbent, there are cases in which TELRIC pricing is more efficient than the M-ECPR. The reason for this result is that the M-ECPR makes entry by inefficient competitors unprofitable, whereas TELRIC allows a less efficient competitor to survive in either monopolistic or Cournot competition and bid the retail price down. In this last case, the gain to consumers from entry outweighs the increase in resource cost due to the entrant's relative productive

---

48 *See generally* JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 209-38 (1989) (providing an overview of Cournot competition).

49 *See* Sibley et al., *supra* note 17, at 7-15.

50 *See id.* at 15-19. For a discussion of monopolistic competition, see OZ SHY, INDUSTRIAL ORGANIZATION: THEORY AND APPLICATIONS 133-67 (1995).

51 *See* SHY, *supra* note 50, at 143-62; Nicholas Economides & Lawrence J. White, *The Inefficiency of the ECPR Yet Again: A Reply to Larson*, 43 ANTITRUST BULL. 429, 431-32 (1998).

inefficiency. Assuming that the incumbent input monopolist has fixed or shared costs that must be covered, the equilibrium prices under either M-ECPR or TELRIC pricing will likely not cover total costs. For this reason, inframarginal costs will need to be covered with an end-user charge.

Conclusion

We agree with Professor Baumol's analysis of ECPR prices and his criticism of uniform access prices. We hope that he will continue to make clear to regulatory agencies throughout the United States and abroad his rejection of uniform access pricing schemes, such as TELRIC, and his advocacy of ECPR prices. As Professor Baumol correctly demonstrates through his "Level Playing Field" theorem, "only by using [ECPR pricing] can we *neutrally* price a monopoly-owned bottleneck service required by both the bottleneck owner and its final product competitors."[52]

The advantages of the M-ECPR approach are threefold. First, it allows entrants to compete in every market in which the bottleneck owner offers retail products, as long as the entrants are at least as efficient as the incumbent. Thus, the "playing field" will be level. Second, it eliminates arbitrage ("cream-skimming") opportunities, so that entrants have no incentive to favor the provision of retail services with relatively high prices over those with relatively low prices. Finally, it facilitates efficient entry into all the bottleneck owners' markets, while at the same time allowing regulators to maintain cross subsidies to further their social goals, such as universal service. As Professor Baumol summarizes, regulators "can have their cake and eat it too."[53]

52 Baumol, *supra* note 9, at 6.

53 William J. Baumol, Remarks at the American Enterprise Institute, Conference on Stranded Costs, Deregulatory Takings, and the Regulatory Contract: Legal and Economic Issues Spanning the Network Industries (Oct. 22, 1998); *see also* Baumol, *supra* note 9, at 1 (describing differential access pricing to bottleneck inputs as a way to preserve universal-service cross subsidies while facilitating competitive entry, or as a way to have "your cake").