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A Competitive Framework for Pricing Interconnection in a Global Telecommunications Market

Keywords

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MARK A. JAMISON*

In the late 1960s, managers of Ford Motor Company met in California to watch Ford employees disassemble and reassemble a Toyota truck — twice. The managers were speechless. American auto makers always needed rubber mallets to assemble their own cars and trucks because the parts did not fit. The Ford employees did not once need a mallet for the Toyota. The managers looked silently at the truck until the division general manager cleared his throat and said, “The customer will never notice.” Everyone excitedly nodded assent and left.¹

This was a defining event in the decline of the U.S. automobile industry. Faced with global change in the 1960s and 1970s, the U.S. automobile industry turned inward and continued its traditions of big cars, poor quality, high prices, and incremental change even though these traditions no longer matched reality.

These mistakes provide lessons for the telecommunications industry² and its regulators. In many instances, telecommunications providers and regulators are holding to traditions of market control, conventional services and networks, prices based on cost recovery,³ and incremental change. These traditions treat competition as the exception and monopoly as the norm. As a result, most regulatory issues are about how to regulate a monopoly that happens to have some competition, instead of how to treat a competitive service provider that happens to have a monopoly in some markets.

* Manager, Regulatory Policy and Coordination, Sprint Communications L.P. Portions of this paper are adapted from M. Jamison, *Impacts of Access Policies on Interexchange Competition*, presentation at the 25th Annual Conference of the Michigan State University Institute of Public Utilities (December 13, 1993) (available from author). The author would like to thank Richard Go, Mark Sievers, Peter Stapp, and J. Manning Lee for their helpful suggestions and information. The author would also like to thank Carol Weinhaus, Sandra Makeeff, and Dan Harris for numerous discussions on competitive and pricing issues. The opinions expressed are those of the author. The author is responsible for all errors and omissions.

1. D. KEARNS & D. NADLER, *PROPHETS IN THE DARK* 81-2 (1992). This rendition also appeared in *Changes in Technology*, paper distributed at the National Association of Regulatory Utility Commissioners' Keystone Communications Policy Conference (May 26-28, 1993).

2. From a global perspective, the “telecommunications industry” includes private companies and government owned telecommunications providers.

3. Prices are based on “cost recovery” when prices are designed to cover a service provider’s accounting costs. This is the traditional pricing model in the U.S.

Treating competition as the norm will be necessary to allow rivalry and diversity between service providers to build an advanced infrastructure and new services. Experience has taught us that competition results in lower costs and in innovations that customers want. Competition is essential for implementing significant technological changes because it is difficult for institutions to make fundamental changes to themselves.⁴ Also, telecommunications is becoming a commodity to be used by information services coming from the publishing, computer, and broadcasting industries.⁵ Trying to control information markets by controlling telecommunications markets may result in telecommunications playing only a minor role.

Structural changes in industry and public policy are necessary for changing the industry paradigms.⁶ The U.S. has used stringent line-of-business restrictions, such as those in the Modification of Final Judgment (MFJ),⁷ to ensure fair and equal interconnection and access payments⁸ for competitors. Since 1984, the divested Bell Operating Companies (BOCs) have had little incentive to favor their former parent, AT&T, over its interexchange carrier (IXC) rivals. Other countries are using privatization and liberalization to shift paradigms.

This paper discusses implications of adopting a competitive paradigm to one public policy issue — prices for interconnection.⁹ It refers to these prices as access charges. Competition has significant implications for traditional telecommunications pricing because, typically, pricing problems have been addressed through reallocation of costs — simply moving money from one place to another. This practice is in conflict with competition. Cost reallocation results in costs being allocated away from competitive markets and to noncompetitive services. Implicit in this is

4. Bailey, *Price and Productivity Change Following Deregulation: The US Experience*, 96 *ECON. J.* 1, 13-16 (1986); Kamien & Schwartz, *Market Structure and Innovation: A Survey*, 12 *J. ECON. LITERATURE* 1, 33 (1975); Winston, *Economic Deregulation: Days of Reckoning for Microeconomists*, 31 *J. ECON. LITERATURE* 1263, 1274 (1993). A related point is that rapid technological change decreases the desirability of large firms because economies of scale become less important. See Winston, *supra* note 4, at 1267.

5. C. WEINHAUS, T. MONROE, ET. AL., *THE INFORMATION STUDIO* 9-11 (1995).

6. N. TICHY & S. SHERMAN, *CONTROL YOUR DESTINY OR SOMEONE ELSE WILL* 303 (1993). For a discussion of utility regulatory reform efforts. see Trebing, *Public Control of Enterprise: Neoclassical Assault and Neoinstitutional Reform* 18 *J. ECON. ISSUES* 364 (1984).

7. *United States v. Western Electric Company, Inc.*, 525 F. Supp. 1336, 1353-7 (D. D.C. 1981) [hereinafter *MFJ*].

8. "Access" is the U.S. term for interconnection service provided by local telecommunications carriers to other carriers for completing calls. The prices for this service are called access charges. Interexchange carriers are the primary customers for access. Traditional local exchange carriers are the primary providers of access. This traditional U.S. definition of access is too restrictive for this paper. For purposes of this analysis, access is the service provided by any local carrier to other carriers for completing calls or other telecommunications transmissions.

9. For a general discussion of public policy changes necessary to match the new market realities, see C. WEINHAUS, T. RALSTON, ET. AL., *BREAKING THE MOLD: CHANGING POLICIES TO MEET CUSTOMER NEEDS* (1993).

that regulated companies do not risk loss as a result of competition — i.e., they are made whole. This is inconsistent with the profit and loss mechanisms necessary for effective competition.¹⁰

This paper describes markets and policies in several countries and draws policy conclusions. The U.S. situation is analyzed in detail. The first section of this paper describes the current market structures. The second section describes existing price structures, with particular emphasis on the U.S. This section also explains how existing price structures affect competition. The third section proposes a general structure for access pricing that is more consistent with competitive market structures than are the existing structures. The last section is the conclusion.

I. THE MARKET STRUCTURES FOR INTERCONNECTION

This section describes the market structure for interconnection. Market structure refers to the types of companies involved in a market, including their sizes, influence, and interactions.

Monopoly is the traditional market structure for local telephone networks. Even today, most countries restrict competition in local telecommunications. Where competition is allowed, it has only recently been authorized and competitive inroads are modest. As a result, new entrants seeking interconnection are generally faced with the problem of seeking interconnection with an incumbent monopoly.

Most countries in Europe still have monopolies for telephone service, but the trend is to open these markets. The European Union adopted a directive that all domestic markets are to be opened by 1998. There are exceptions. Greece, Portugal, Spain, and Ireland were given an extra five years to prepare their traditional telephone monopolies for competition. Belgium and Luxembourg were given two extra years.¹¹

The most notable exception to monopolies in Europe is the United Kingdom (U.K.). The U.K. opened its domestic markets to competition in 1984. At that time, British Telecom (BT) was privatized and a duopoly market structure was established. The competitor, Mercury Communications LTD, began operations in 1986. Mercury is owned by Cable & Wireless. The duopoly structure did not result in much competition for BT, so in 1991 the U.K. decided to open markets to more competitors. Today BT faces competition from at least 50 companies, including U.S. companies, cable television companies, and electric utilities. Still, BT continues to dominate the U.K. market — BT's U.K. revenues are nine times larger than Cable & Wireless's (BT's nearest competitor) revenues in all of

10. See, e.g., C. WEINHAUS, M. JAMISON, ET. AL., *NEW WINE AND OLD WINESKINS: MODELING EFFECTS OF COMPETITION AND EXPANDED INTERCONNECTION IN THE LOCAL EXCHANGE* 30 (1992).

11. THE YANKEE GROUP, *EUROPEAN INFRASTRUCTURE COMPETITION: THE FINAL FRONTIER ES-1* (1995).

Europe.¹²

New Zealand, Australia, Canada, and Japan are other countries that have opened their telecommunications markets to competition. New Zealand began its deregulation process in 1987, but the incumbent carrier, Telecom, still dominates the market.¹³ Clear, Telecom's primary competitor, began operations in 1991 and gained an 18% market share in toll by the middle of 1993. Clear's and other competitors' entry into local markets has been slowed by negotiations with Telecom over local interconnection.¹⁴ In November 1991, Australia opened its markets for a second carrier, Optus Communications, to compete with the recently privatized incumbent, Telecom Australia or Telstra. A third carrier, Vodafone, started providing mobile services in September 1993. Canada opened its long distance markets to competition in 1992, but initially limited entry to only one competitor, Unitel. Japan's telecommunications markets have been open to competition for several years, but the incumbent carrier, NTT, still dominates the market.¹⁵

U.S. local exchange companies (LECs) also continue to dominate their local markets even though there are other network providers. Providers of two-way communications in U.S. local markets include LECs, competitive access providers (CAPs), and cellular companies. CAPs provide local fiber optic networks in competition with LECs, although some CAPs are beginning to install local exchange switches.¹⁶ The total size of all local markets in the U.S. in 1993 was \$93 billion.¹⁷ LEC local wireline¹⁸ revenues were \$81.9 billion, all cellular company revenues were \$10.8 billion, and CAP revenues were \$350 million.¹⁹

Wireless services and wireline services form separate markets,²⁰ meaning that customers do not see them as substitutes. LECs have a

12. ELSEVIER ADVANCED TECHNOLOGY, PROFILE OF THE WORLDWIDE TELECOMMUNICATIONS INDUSTRY TO 1997 100-104 (3rd ed. 1994); THE YANKEE GROUP, *supra* note 1.

13. ELSEVIER ADVANCED TECHNOLOGY, *supra* note 12, at 109-10; M. MUELLER, ON THE FRONTIER OF DEREGULATION: NEW ZEALAND TELECOMMUNICATIONS AND THE PROBLEM OF INTERCONNECTING COMPETING NETWORKS 11 (1994).

14. MUELLER, *supra* note 13, at 13-18; Blanchard, *Telecommunications Regulation in New Zealand*, 19 TELECOMMUNICATIONS POL. 465-7 (1995).

15. ELSEVIER ADVANCED TECHNOLOGY, *supra* note 12, at 73, 104-5, 108-10.

16. MULTICHANNEL NEWS, ALT. ACCESS INDUSTRY CAPS OFF STRONG YEAR 1 (1994).

17. All currency references to U.S. industry are in U.S. dollars.

18. "Wireline" refers to telecommunications services provided over networks consisting of fiber optics, copper, coaxial, and microwave facilities. These are also called landline. "Wireless" refers to radio-based services such as cellular and paging.

19. UNITED STATES TELEPHONE ASSOCIATION, 1994 STATISTICS OF THE LOCAL EXCHANGE CARRIERS FOR THE YEAR 1993 9 (1994); NORTHERN BUSINESS INFORMATION, CELLULAR SERVICES REPORT 1994/1995 Exhibit 3-12a (1995); Multichannel News, *supra* note 16, at 1. These revenues are not adjusted for CAP access payments to LECs. CAPs pay access charges to LECs when CAPs connect to LEC networks and when CAPs put traffic on LEC networks. These access charges are generally significant compared to CAP revenues.

20. Affidavit of Jerry A. Hausman on behalf of the Regional Bell Operating Companies at 3; *MFJ*, 525 F. Supp. at 1336.

strong position in wireless markets where LEC-affiliated cellular companies accounted for \$5.5 billion, or 52%, of cellular revenues in 1993.²¹ Their largest competitor, AT&T, accounted for 15% of the market.²² LECs had 99.6% of the local wireline market. CAPs had the rest of this market. For all local markets, LECs had \$87.5 billion (combined wireline and wireless), or a 94% market share. Non-LEC cellular companies had between 5% and 6% of the combined markets, and CAPs had less than 1%.²³

U.S. LECs also dominant their access markets.²⁴ IXC are the largest customers of access. IXCs paid large LECs approximately \$20 billion for access services in 1993.²⁵ CAPs are the primary competitors of large LECs in this market and had revenues of only \$350 million in 1993.²⁶

Market share is only one factor in market dominance. Other factors include barriers to entry and exit, customer costs for changing suppliers,

21. Personal Communications Services, or PCS, is another form of wireless service. PCS is like cellular, but has a different place in the radio spectrum and PCS licenses are granted through auctions. PCS license auctions in the U.S. were completed in March 1995. The largest winners in the auction were the Sprint-Cable venture, AT&T, PCS Primeco L.P., and Pacific Telesis. The Sprint-Cable venture licenses cover 182.4 million people. AT&T's licenses cover 107.1 million people, PCS Primeco L.P.'s licenses cover 57.2 million people, and Pacific Telesis's licenses cover 31.0 million. The Sprint-Cable venture includes Sprint, TeleCommunications Inc., Comcast Corporation, and Cox Communications. PCS Primeco L.P. includes Nynex, Bell Atlantic, Air Touch Communications (the former Pacific Telesis cellular company), and U.S. West. On average, purchasers of PCS licenses paid \$15.54 per person for the licenses. These companies are now in the process of building their PCS networks.

22. This includes all BOC-affiliated cellular companies and GTE. Pacific Telesis's divested cellular operations are not included even though this new company operates in alliance with other BOC cellular companies. Sprint's cellular company is also excluded because Sprint's IXC operations are comparable in size to Sprint's LEC operations. Also, Sprint is spinning off its cellular operations.

23. These revenue figures include cellular long distance revenues. Except in cases when cable television companies also own CAPs, cable television companies are not included in these numbers because they are only beginning to provide two-way communications. Cellular revenues are not adjusted for access payments to LECs. These payments are generally small compared to cellular revenues.

24. Access markets are not independent of other local markets. Access is simply one type of transmission on a local network that provides numerous other services, including local exchange service. As a result, competition in access markets is necessarily tied to competition for local networks in general.

25. Large LECs received \$20.9 billion in access revenues in 1993. Large LECs are LECs that have more than \$100,000,000 in annual revenues. 47 C.F.R. § 32.11(a)(1) (1994). Large LECs also paid \$1.3 billion in access expenses in 1993, primarily to smaller LECs. FEDERAL COMMUNICATIONS COMMISSION, 1993/1994 STATISTICS OF COMMUNICATIONS COMMON CARRIERS 31, 35, 39 (1993).

26. The other competitors in this market are primarily the IXCs themselves. IXCs may use their own facilities or customer-provided facilities to avoid using LEC access services. Public data are not available on the extent of IXC-provided and customer-provided access; however, the amount should be smaller than CAP-provided access because CAPs should have scale economies that stand-alone IXC-provided and customer-provided access would not have.

and control of essential or bottleneck facilities. Indeed, these market share data may overstate LECs' future market power because in 1993 very few states allowed CAPs and others to compete with LECs. This is changing. Once legal, technological, and economic barriers to entry are removed, LECs should lose some of their control over local markets. This expectation is reflected in projections that CAP revenues will grow substantially in the next few years. Consultant estimates vary greatly, but put future CAP revenues in the range of \$1 billion by 1996 to \$10 billion by 1999.²⁷

II. ACCESS PRICES AND COMPETITION

This section describes problems with existing telecommunications pricing. The U.S. access price structures and pricing subsidies are described in detail. Next, this section explains how these U.S. prices are inconsistent with competitive markets. Lastly, this section describes how these pricing problems also exist in other countries.

A. U.S. Price Structures for Access

The U.S. price structures for access vary depending on the type of service and the type of customer. There are two types of access — switched access and dedicated access. Switched access applies to calls that go through a LEC local switch.²⁸ Dedicated access is a dedicated line between the customer and the carrier.

Access is paid by IXC's, cellular carriers, enhanced service providers (ESPs)²⁹ and potentially by new competitors in the local exchange. LECs may also pay access for long distance services that they provide. The access charges for these types of access customers are:

1. IXC's.

IXC's pay access charges to LECs on both ends of long distance calls³⁰ — on the originating end of the call if the customer placing the call uses a LEC network (e.g., a local telephone line), and on the terminating end of the call if the customer receiving the call receives it via a LEC network.

2. Cellular.

Cellular carriers pay access charges only when they send calls (i.e., terminate calls) into a LEC network. Cellular carriers do not origi-

27. THE YANKEE GROUP, A CAP MARKET UPDATE: NO FUTURE FOR THE INDEPENDENTS? 61 (1993); MULTICHANNEL NEWS, *supra* note 16, at 1.

28. A local switch is used to connect customers together for local calls, and to connect customers to long distance networks to place and receive long distance calls.

29. ESPs are companies that provide information services, primarily over data networks.

30. The calls may be local calls in some instances, but customers would generally be charged long distance prices for these local calls.

nate calls on LEC networks.

3. *ESPs.*

ESPs are treated like business local service customers. ESPs pay the same prices for interconnection that normal business customers pay.

4. *New local competitors.*

Charges paid by new competitors in local exchanges are still in the developmental stage. Some companies propose that new local exchange carriers be treated like existing LECs which generally do not charge each other for exchanging traffic.³¹ This is called a bill-and-keep arrangement. Some traditional LECs propose that new local exchange carriers pay existing IXC access prices. Others propose that lower prices be used. It is too early in the process to determine how U.S. regulators will ultimately resolve these issues.

5. *LECs.*

In some instances, a LEC may also pay access to other LECs when the LEC is acting as a long distance carrier. Generally, the LEC long distance carrier pays the same prices as IXCs, but there are exceptions. In some instances, the LEC will simply share its long distance revenues with other LECs instead of paying access charges. This arrangement is called a toll pool. In arrangements called extended area service, calls that would otherwise be long distance calls are treated as local exchange calls. With extended area service, the LECs generally do not charge their customers long distance prices, and the LECs do not charge each other for completing the calls. In other instances, the LEC long distance carrier may develop a contract with other LECs that give the LEC long distance carrier special prices for access services.

IXCs pay the highest switched access prices. IXCs pay LECs for processing calls through the LECs' local switches (called Local Switching), for carrying calls from the local switch to the IXCs' networks (called Local Transport), and for allowing use of the lines that connect customers to LEC local switches (called Carrier Common Line Charge or CCLC).³²

31. See, e.g., G. BROCK, *THE ECONOMICS OF INTERCONNECTION* (April 1995).

32. The CCLC is the largest component of access, approximately \$6.6 billion to \$7.1 billion annually nationwide, including Long Term Support (LTS). (LTS is an amount collected by some large LECs through their CCLCs, and transferred to some small LECs. LTS is approximately \$323 million annually.) The next largest component is the Residual Interconnection Charge (RIC), which is estimated to be approximately \$3.8 billion annually if implemented by all jurisdictions. The RIC resulted from an allocation of costs away from LEC Local Transport markets that are becoming competitive. Together, the CCLC and the RIC make up approximately 45% of all access charges collected by LECs. Amounts are from M. SIEVERS, *ACCESS SUBSIDIES, LONG DISTANCE COMPETITION AND THE ELIMINATION OF THE INTERLATA RESTRICTION 10* (February 23, 1994); Comments of the United Telephone Asso-

The prices for IXC switched access are generally regulated and contained in LEC tariffs on file with regulatory commissions. Cellular carriers do not pay CCLC. In addition, access prices charged to cellular carriers are generally kept in contracts rather than tariffs.

Access prices are generally marked up far above the cost of providing access. According to a study sponsored by the United States Telephone Association, the costs to LECs for providing IXC access services is approximately \$0.026 per minute. LEC revenues from IXC access services are approximately \$0.1053 per minute.³³ This means the mark-up in these access prices is approximately 300%.

Tables 1 and 2 summarize access price structures. Table 1 describes which kinds of carriers pay access to other carriers. The column on the left lists retail service providers. Retail service providers are carriers that are providing service directly to the retail customers. The other three columns show who retail providers pay for access. For example, Table 1 shows that IXCs pay access to traditional LECs, pay no access to cellular carriers, and generally pay access to new local carriers.

Table 1. Who Pays Who for Access Services in the U.S.

Paying Carriers: Retail Service Providers	Receiving Carriers: Wholesale Network Providers		
	Traditional LEC	Cellular	New Local Carrier
IXC	Yes	No	Yes ³⁴
Traditional LEC — Local	No	No	Too early to tell
Traditional LEC — Long Distance	Traditional LEC	Cellular	New Local Carrier
Traditional LEC — Extended Area Serv.	No	No	Too early to tell
New LEC	Varies	No	Too early to tell
ESP	Yes	N/A	Too early to tell
Cellular	Yes	No	Too early to tell

ciation, In the Matter of Amendments to Part 36 of the Commission's Rules and Establishment of a Joint Board, CC Docket No. 80-286, Notice of Inquiry, Attachment 1 (October 28, 1994). Rules can be found in 47 C.F.R. §§ 69.108, 69.111, 69.124, 69.501, 69.603, 69.612 (1994).

33. C. MONSON & J. ROHLFS, *THE \$20 BILLION IMPACT OF LOCAL COMPETITION IN TELECOMMUNICATIONS* app. 2 (1993).

34 This is true for CAPs. It is too early to tell what the pattern will be for new local service competitors.

Table 2 outlines the kinds of prices carriers pay to LECs for access services and when these prices are paid. The first column lists paying carriers. The paying carrier is the retail service provider. The next two columns show which access prices are paid. The middle column indicates that some prices are tariffed. The column on the right indicates that some prices are under contract, which means that prices may vary among customers. Table 2 also differentiates between prices paid for originating calls and terminating calls. The top portion of Table two shows payments for calls that originate in LEC networks. The bottom portion shows payments for calls that terminate in LEC networks. If calls both originate and terminate in LEC networks, both payments are made.

Table 2. Who Pays What for LEC Access Services in the U.S.

Paying Carriers: Retail Service Providers	Prices Paid to LECs	
	Tariffed	Contract
FOR ORIGINATING CALLS		
IXC	CCLC, LS, LT	Rare
Cellular	NA (See Note 1)	NA (See Note 1)
New LEC	Varies(See Note 2)	Varies (See Note 2)
ESP	Local service	N/A
Traditional LEC for:		
long distance	Generally CCLS, LS, LT	Sometimes (See Note 3)
local	No charge	No charge
extended area service	No charge	No charge
FOR TERMINATING CALLS		
IXC	CCLC, LS, LT	Rare
Cellular	Rare	LS, LT
New LEC	Varies (See Note 2)	Varies (See Note 2)
ESP	Local service	N/A
Traditional LEC for:		
long distance	Generally CCLC, LS, LT	Sometimes (See Note 3)
local	No charge	No charge
extended area service	No charge	No charge

Acronyms:

- CCLC Carrier Common Line Charge. Charged for use of lines that connect customers to LEC local switches.
 LS Local Switching. Charged for processing calls through LECs' local switches.
 LT Local Transport. Charged for carrying calls from an LEC's local switch to the IXC's network.

Notes:

1. All cellular retail services originate on cellular networks.
2. Access arrangements vary for new LECs vary. Sometimes they are treated like traditional LECs, and there are no charges. This is called bill and keep. At other times, special prices are developed either through negotiation or by tariff. Some LECs propose to charge IXC access prices to new LECs.
3. Some LEC long distance carriers share toll revenues with LECs instead of paying access. Sometimes LEC long distance carriers negotiate access prices with other LECs.

Access prices vary with regulatory jurisdiction. Calls that originate and terminate in the same state are called intrastate calls. State public utility commissions regulate the access prices for intrastate calls, and prices vary from state to state. Calls that cross state boundaries are called

interstate. The Federal Communications Commission (FCC) regulates access prices for interstate calls.³⁵ ESPs are the exception to this arrangement. The FCC allows ESPs to purchase state local exchange service and use that service to originate and terminate interstate calls.

B. *Subsidies in the U.S. System*

The current U.S. regulatory pricing system is based on cost allocation and cost recovery: LECs record their costs according to regulatory accounting rules, allocate these costs among services and jurisdictions, and then recover the costs through prices.³⁶

This cost allocation system contains numerous subsidies or support mechanisms that are often associated with universal service.³⁷ Many of the mechanisms are explicit and can be quantified. Others, such as charging averaged prices to both high cost and low cost customers, are more nebulous.

Almost all of the explicit subsidies are funded by prices for access services. There are three basic types of explicit subsidies:³⁸

1. *Credits to customer bills*

Federal and state Lifeline Assistance programs provide approximately \$165 million annually to LEC low income customers.

2. *Payments to targeted LECs*

Approximately \$984 million in subsidies are targeted to small LECs and high-cost LECs annually.

3. *Untargeted subsidies*

Most of the subsidies are provided without any qualifying criteria or targeting. These are \$10.1 billion to \$10.5 billion annually.

Table 3 provides details on how these subsidy mechanisms work. The mechanisms are categorized according to the three types. The first column lists the names of the subsidy mechanisms. The next column shows the size of the mechanism, on an annual basis, in the 1993-1994 time frame. The middle column shows which type of carrier pays the subsidy. The next column lists who gets the subsidy. The last column describes

35. C. WEINHAUS & A. OETTINGER, *BEHIND THE TELEPHONE DEBATES* 49-50 (1988).

36. *Id.* at 33-69. Federal policies are defined in 47 C.F.R. §§ 32, 36, 65, 69 (1994).

37. For purposes of this paper, a financial support mechanism or subsidy is defined as any payment that would not exist if networks were unbundled and fully competitive, and/or if government regulations did not require the payments. Also in this paper, unbundled means that local loops, switching, and local transport are purchased separately.

38. Amounts are from M. Sievers, *supra* note 32, at 10; Comments of the United States Telephone Association, *supra* note 32, at Attachment 1. Table 3 provides a summary of the amounts. For an explanation of these systems, see generally C. WEINHAUS, S. MAKEEFF, ET. AL., *WHO PAYS WHOM? CASH FLOW FOR SOME SUPPORT MECHANISMS AND POTENTIAL MODELING OF ALTERNATIVE TELECOMMUNICATIONS POLICIES* (1992).

how the payments get from the payer to the recipient.

Table 3 shows that these explicit subsidies make up approximately 50% of the access payments by IXCs. Sievers and Monson-Rohlf's estimate that *all* subsidies make up 60% to 75% of access payments by IXCs.³⁹

Table 3. How the Explicit Subsidies in Access Work in the U.S.⁴⁰

Credits to Customers' Bills

Subsidy	Amount	Who Pays	Who Gets	How Dollars Move
Lifeline/Linkup	\$165 million	IXCs	Low income customers	<ul style="list-style-type: none"> ■ IXC pays per presubscribed line ■ Customer receives credit on bill

Payments to Targeted LECs

Subsidy	Amount	Who Pays	Who Gets	How Dollars Move
Universal Service Fund	\$725 million	IXCs	LECs with high loop costs	<ul style="list-style-type: none"> ■ IXC pays per presubscribed line ■ LEC receives based on loop costs
Long Term Support (LTS)	\$323 million	IXCs and CAPs in large-LEC exchanges	Small LECs	<ul style="list-style-type: none"> ■ IXC pays to large LECs ■ Large LECs send dollars to small LECs based on loop costs
Dial Equipment Minutes Weighting	\$259 million	IXC low cost customers	Small LECs	<ul style="list-style-type: none"> ■ IXC pays to medium-size LECs ■ Medium-size LECs send to small LECs based on size and switch costs

Untargeted Subsidies

Subsidy	Amount	Who Pays	Who Gets	How Dollars Move
Carrier Common Line (less LTS)	\$6.3 - 6.7 billion (nationwide)	IXCs and CAPs	LECs	<ul style="list-style-type: none"> ■ IXC pays per minute of access ■ LEC receives per minute of access
Residual Interconnection Charge (less tandem)	\$3.8 billion (nationwide)	IXCs and CAPs	LECs	<ul style="list-style-type: none"> ■ IXC pays per minute of access ■ LEC receives per minute of access

C. Effects of U.S. Access Price Structures on Competition

The current U.S. system for pricing access services hinders competition in four ways. First, the system gives LECs the opportunity and incentive to harm competition in downstream markets. Downstream markets are markets that rely upon local networks as an input for producing a final product or service. Long distance is an example of a downstream market and will be used to describe this effect. The second effect of the current system is that it hinders LECs' ability to compete in access markets that are subject to competition. The third way that the current access system harms competition is that it discriminates against some types of companies and in favor of others. The fourth way is that it provides

39. M. Sievers, *supra* note 32, at 1; C. Monson & J. Rohlf's, *supra* note 33, at app. 2.

40. Rules can be found in 47 C.F.R. §§ 36.125, 36.601-.741, 69.108, 69.111, 69.116-.117, 69.124, 69.501, 69.603, 69.612 (1994). Sources of amounts are M. Sievers, *supra* note 32, at 10; Comments of the United States Telephone Association, *supra* note 32, at Attachment 1.

opportunities for arbitrage.

The current pricing system for access services can hinder inter-exchange competition for two reasons: (1) the high mark-up above cost gives LECs the ability and incentive to vary prices among IXCs; and (2) access is the largest cost that IXCs have for providing their services.

LECs have the ability to vary access prices among IXCs because access prices are high compared to the underlying costs — the mark-up above cost is 300% according to the United States Telephone Association study. This high mark-up gives LECs the ability to have wide variances in the access prices they charge to different customers. For example, a LEC could offer a 50% discount to select access customers and still have a 100% mark-up above cost. In this instance, the price difference between customers would be large, but all access prices would still be profitable to the LEC.

LECs have an incentive to discount access prices to select customers in at least three situations: (1) when competition has entered only some access markets (discussed later in this section); (2) if these select customers are large enough to exert buying power on the LECs;⁴¹ and (3) if the customer is the LEC itself.⁴² LECs have begun advocating volume discounts for access services. This could be a response to buying power of some access customers, an effort to discourage large customers from using competitors by lowering the marginal price of access,⁴³ or both. LECs also have an incentive to reflect lower mark-ups in their own prices for long distance — i.e., when the LEC is its own access customer. These lower mark-ups would allow LECs to gain greater market share in downstream markets. Ameritech once proposed this as part of its plan to enter the interLATA long distance market.⁴⁴

Varying access prices between customers in downstream markets can harm competition if access is a significant cost to the downstream competitors. This is the case for interexchange markets. Access payments to LECs are approximately 45% of IXCs' cost of providing long distance

41. The ability to exert market power as a buyer is known in economics as monopsony power (when there is only one buyer) or oligopsony power (when there is more than one buyer). K. COHEN & R. CYERT, *THEORY OF THE FIRM* 267 (2nd ed. 1975).

42. LECs also have an incentive to charge different access prices between markets where LEC costs for access are different. However, this generally would have no uneconomic effect on competitive markets and so is not discussed in this paper.

43. The "marginal price" of access refers to the price for additional access minutes. For example, if the price per minute for access was \$0.05 for the first 1 million minutes, and \$0.03 for minutes beyond 1 million, the marginal price would be \$0.03 for a customer buying more than 1 million minutes.

44. The Wall Street Journal (Midwest Edition), December 7, 1993, at A3. The MFJ divided the U.S. into 160 local access transport areas or LATAs. Under the terms of the MFJ, BOCs are generally prohibited from carrying calls across LATA boundaries. (*MFJ*, 552 F. Supp. at 229, §IV.(K).) Ameritech's plan allows competition in its local markets in exchange for being allowed to carry interLATA calls.

services.⁴⁵ Indeed, access is the single most significant determining factor of IXCs' cost structures. If LECs were to give one IXC the 50% price discount described above, this carrier would have a 22.5% artificial cost advantage over its competitors. Since IXC margins are only 11% on average,⁴⁶ the IXC with the advantage may easily dominate the market. If LECs were to give discounts down to the price of a common form of dedicated access called DS1, the artificial cost advantage would be over 40%.⁴⁷

The high mark-ups in access prices also make it difficult for LECs to compete in access markets where there is effective competition. New businesses tend to enter markets first where mark-ups are highest and customer concentration is the greatest. This is how the U.S. telephone industry first developed in the late 1800s, and is how CAPs have entered the access market.⁴⁸ According to a 1993 Bellcore survey, requests from CAPs and others to locate facilities in LEC central offices⁴⁹ were concentrated in only 14% of LEC offices, but these offices addressed nearly 80% of all IXC access traffic.⁵⁰ This exposure — high access prices in densely populated markets — puts LECs in a bad competitive posture should access markets become competitive.

LECs face difficulties in responding to this competition. A natural reaction for LECs will be to vary access prices between competitive and non-competitive areas.⁵¹ This reaction faces some regulatory hurdles because it runs counter to the traditional regulatory practice of charging high prices in urban areas to cover costs of services in rural areas. Because of this practice, LEC costs in general in rural areas are 35% higher than LEC revenues in rural areas.⁵² When IXC costs are included, costs in rural areas are 39% higher than LEC and IXC revenues.⁵³ So ending this regulatory practice could result in higher rural prices for telecommu-

45. Weinhaus, Ralston, et. al., *supra* note 9, at 16.

46. SIEVERS, *supra* note 32, at 16.

47. Estimate of DS1 price is \$500 per month. C. WEINHAUS, T. PITTS, ET. AL., BEYOND FUTURE SHOCK: THE NEED FOR A NEW REGULATORY RESPONSE TO TECHNOLOGICAL CHANGE 17 (November 13, 1993). Minutes are assumed to be 9600 per month. DS1 is a dedicated circuit capacity that is equal to 24 simultaneous voice calls.

48. Mueller, *Universal Service in Telephone History: A Reconstruction* 17 TELECOMMUNICATIONS POL. 352, 356-7 (July 1993); THE YANKEE GROUP, A CAP MARKET UPDATE, *supra* note 27, at 6-17.

49. A central office is the place where local telephone lines connect to a LEC telephone switch.

50. F. W. NOLTE, LETTER TO R.O. CAULKINS (July 19, 1993).

51. LECs have been allowed to do this in some instances through a policy called "zone density pricing". This policy allows LECs to deaverage some access prices according to whether a market falls into a high density, medium density, or low density zone. "Density" in this case refers to the density of telephone usage in the area. See, e.g., Transport Rate Structure and Pricing, CC Docket No. 91-213, 7 FCC Rcd 7006 (1992).

52. C. WEINHAUS, S. MAKEEFF, ET. AL., REDEFINING UNIVERSAL SERVICE: THE COST OF MANDATING THE DEPLOYMENT OF NEW TECHNOLOGY IN RURAL AREAS 10 (1994).

53. C. WEINHAUS, S. MAKEEFF, ET. AL., WHAT IS THE PRICE OF UNIVERSAL SERVICE? IMPACT OF DEAVERAGING NATIONWIDE URBAN/RURAL RATES 11 (1993).

nications services.⁵⁴

Another LEC response could be to lower access prices, but this hinders LEC profitability. Access charges provide over 25% of LEC revenues on a nationwide basis.⁵⁵ And much of the mark-up in access prices resulted from allocations of local exchange line costs to access and long distance services. So from the perspective of traditional regulatory accounting, large and unilateral decreases in access prices could have large, negative impacts on LEC profits. For the time being, the need for a LEC pricing response is dampened somewhat because CAPs also pay access charges to LECs.⁵⁶

The third way that the current access system is inconsistent with competitive markets is that the system discriminates against some types of companies and in favor of other types — the system has different pricing arrangements for different types of customers. Tables 1 and 2 illustrate this. Prices are different for IXC access and cellular access. New local carriers may pay a third set of prices. LEC retail customers (i.e., residential and business customers) pay yet another sets of prices, and ESPs pay the same as the business retail customers. Also, LECs receive special pricing treatment from other LECs for local service, extended area service, and sometimes long distance service.

Tables 1 and 2 also illustrate that there are differences in when access is paid. For example, IXCs pay access when their customers use LEC networks to complete calls, and cellular carriers pay access to a LEC when a cellular customer calls a customer that is connected to the LEC network. However, a LEC pays no access to a cellular carrier when a LEC customer calls a cellular customer.⁵⁷ Also, traditional LECs generally pay nothing to each other when they complete local and extended area service calls — i.e., they have a bill-and-keep arrangement. As was indicated above, it is too early to tell whether new local competitors will also have bill-and-keep arrangements with traditional LECs, or have some other payment arrangement.

The fourth reason that the U.S. access system is inconsistent with competition is that it gives companies an incentive to arbitrage between the different access pricing plans. For example, some IXCs provide wireless services such as cellular. These IXCs pay IXC access charges to LECs for long distance calls, and pay the lower cellular access prices to LECs

54. The FCC has begun allowing LECs to vary access prices between urban and rural areas. 47 C.F.R. § 69.123.

55. WEINHAUS, RALSTON, ET. AL, *supra* note 9, at 16.

56. For switched access, CAPs pay basically the same access charges that an IXC would — CCLC, RIC, Local Switching, and either a collocation fee or an entrance facility fee.

57. LECs have been ordered by the FCC to pay cellular companies for terminating calls. See Implementation of Sections 3(n) and 332 of the Communications Act Regulatory Treatment of Mobile Services, Federal Communications Commission GN Docket No. 93-252, FCC 94-31 232 (March 7, 1994) (to be codified at 47 C.F.R. § 20.11). This has not been implemented.

for cellular calls. It would be difficult for LECs to know if an IXC is paying the appropriate price for terminating calls if the IXC were to combine its long distance and cellular trunks for terminating calls.⁵⁸

LECs have the same problem with interconnection with new LECs. New LECs may have the ability to terminate both long distance and local calls on the same trunks. The LEC would want to charge long distance access prices for the long distance calls and local access prices (which may be lower) for local calls, but may not be able to distinguish between the calls. Some LECs propose to remedy this problem by having the same access prices for long distance and local calls. However, if reciprocal, this arrangement creates the incentive for new LECs to encourage customers to originate calls through the LEC and terminate calls through the new LEC. If successful, this would force LECs to pay high termination prices to new LECs for local calls that LECs would normally have terminated on their own networks. The new LECs would pay little or no local access prices to the LEC because customers would be originating calls through the LEC, not the new LEC.

Pricing schemes based on the identity of the customer can continue only as long as LECs have sufficient market power to control prices, can limit resale of LEC services, and can identify calls as being local, long distance, intrastate, or interstate. As the numbers and types of alternative networks continue to increase, LECs are likely to lose much of this ability.

D. *Price Structures in Other Countries*

It is generally recognized that other countries face pricing issues similar to those in the U.S.⁵⁹ Telstra's revenues for providing long distance service were over seven times cost in 1987-1988, the last year for which disaggregated data were available. Even on a fully allocated cost basis,⁶⁰ Telstra's long distance revenues were 2.5 times cost in 1989-1990, and its local service charges covered only 70% of their costs. Also during 1989-1990, France Telecom's long distance revenues were nearly 4 times their fully allocated costs, and local service charges covered only 50% of their costs.⁶¹

A cross-country comparison by Datapro shows that similar pricing problems exist in the U.K., Japan, and New Zealand.⁶² Datapro compares

58. A trunk is a circuit that carries telecommunications traffic (voice, data, or video) between locations. In this case, the trunk connects an IXC's network to a LEC's network.

59. See, e.g., H. Hefekäuser, *The Universal Service Principle in a Competitive Market*, in PROCEEDINGS: COOPERATION AND COMPETITION IN COMMUNICATIONS 123-6 (S. Farnoux-Torporkoff & M. Botein eds. 1994); DATAPRO, WHO SHOULD PAY FOR THE LOCAL LOOP? (1992).

60. Fully allocated cost is a process of allocating accounting costs to services. All overheads and common costs are allocated. In most cases, loop costs are also allocated between local services and long distance services rather than directly assigned to local services.

61. DATAPRO, *supra* note 59, at 1-2.

62. *Id.* at 2.

local service charges to long distance charges for 1988-1989. According to Datapro, correct pricing would result in local service charges that are approximately 30 times the price of a 5-minute long distance call of 300-500 kilometers. In contrast to this optimal price relationship, the local-to-long-distance price ratio was 15:1 to 19:1 in the U.K., 4.2:1 in Japan, and 6.9:1 in New Zealand. Indeed, Telecom cut long distance prices 35-50% and raised local service prices 33% in anticipation of Clear entering the New Zealand long distance market. Once Clear entered the market, long distance prices decreased another 14% for small customers and 20-25% for large customers.⁶³

International communications services have similar pricing problems. Domestic telecommunications carriers receive payments from international carriers for calls that terminate in domestic carriers' respective countries. These payments are based on "accounting rates" that are negotiated between countries. Costs for international calls have declined, but the accounting rates have not kept pace. Accounting rates for calls between the U.S. and Western Europe countries are 2 to 7 times actual costs, between the U.S. and Japan are 3-4 times cost, and between the U.S. and Canada are 90% above cost.⁶⁴ The FCC and others have tried to put downward pressure on these accounting rates by advocating resale of international services and alternate calling procedures such as callback.⁶⁵

Prices in these countries will create problems similar to those found for the U.S. High long distance prices would generally make it difficult for incumbents to effectively compete with new entrants. On the other hand, if the high usage prices are passed on to the new entrants in the form of high access charges, their ability to compete would be diminished.

III. AN ALTERNATIVE STRUCTURE FOR ACCESS

Section II explained mismatches between the existing structure for access and competition. This section describes an alternative structure for access that is consistent with the development of competitive markets. Other policies that may be important for competition are not discussed.

To remedy the mismatches between competition and the existing access policies, a new access structure should be developed based on these principles:

1. *Non-discrimination*

Prices and services should be available to customers without discrimination as to who the customer is nor what the cus-

63. MUELLER, *supra* note 13, at 11-2.

64. J. Haring, J. Rohlf, & H. Shooshan III, *The U.S. Stake in Competitive Global Telecommunications Services: The Economic Case for Tough Bargaining* 4-5 (December 16, 1993) (copy available from Strategic Policy Research, 7500 Old Georgetown Rd., Suite 810, Bethesda, MD 20814).

65. THE YANKEE GROUP, *INTERNATIONAL SIMPLE RESALE: OPENING UP THE MARKET FOR INTERNATIONAL LONG DISTANCE* 1-3 (1995).

tomers does with the traffic.

2. *Modularity*

As competition increases, regulators should be able to easily change and remove pricing constraints without causing dislocations, such as in universal service policies.

3. *Low mark-ups*

Low mark-ups of price above incremental cost limit the potential for price discrimination and cross-subsidy.

4. *Flexibility*

Carriers should have the ability to lower prices and introduce more innovative price structures to respond to competition.

This section describes an alternative access structure that conforms to these principles. This access structure is described under the headings of non-discrimination, modularity, low mark-ups, and flexibility. Even though this structure is described under separate headings, it should be viewed as a single proposition. Some of the pieces of this structure may not make sense if they are separated from the whole.

The access policies in this section assume that the identities of traditional industry categories — LEC, IXC, cellular, cable television, etc. — will blur if not go away over time. Customers will receive services from service integrators. These companies will purchase network and service functions from other providers, and may or may not own their own networks and service functions.⁶⁶ This industry structure means that almost all network companies will provide wholesale services to service integrators, and may also provide retail services to end-use customers.

The access policies are described next.

A. *Non-discrimination Policies*

Non-discrimination is necessary to facilitate competition and to provide carriers with a pricing structure that is easy to administer. An access policy with a single wholesale pricing system and common carrier obligations would satisfy the non-discrimination principle. The wholesale pricing system would allow retail service providers to purchase network functions and usage for collecting traffic from customers, distributing traffic to end-use customers and other networks, and transporting traffic between specific points. These wholesale services would be available to any customer who was willing to accept the billing, engineering, etc., obligations of a network provider. The common carrier obligation would prohibit a

66. See generally E. Noam, *Beyond Liberalization: From the Network of Networks to the System of Systems* 18 TELECOMMUNICATIONS POL. 286 (1994). For an explanation of how this industry structure would work, see generally WEINHAUS, MONROE, ET. AL., *supra* note 5.

company from refusing to connect with customers except for normal business reasons, such as bill payment problems.

B. *Modularity Policies*

Modularity means that access policies are not interwoven between markets and with other regulatory policies such as universal service. This provides regulators with an exit strategy — i.e., markets that become competitive can be deregulated without changing regulations for other markets and for other policies.

A modular system for regulating prices should have two features: (1) price caps that the regulated company cannot manipulate; and (2) market-by-market prices. The price caps should be set in the regulatory process and have little reliance on data and studies that are under the control of the regulated company. Such a price cap can be determined at least two ways. One way is to use standardized cost or financial models to estimate what it should cost to provide access services in different types of markets. These models would serve as guides or formulae for adjusting access prices over time. Another method would be to link prices in non-competitive markets to prices in competitive markets. Current rate-of-return regulation should not be used because it provides companies with incentives and opportunities to cross-subsidize and increase costs. Existing price cap systems would also be inappropriate because their formulae and indices are based upon the regulation of entire companies, not just a limited set of services such as access and basic telephone services.

Regulating price caps on a market-by-market basis means that the maximum prices are set for each market. Once the market is deregulated, the price cap can be removed without creating the need for adjustments to any other pricing systems or other regulatory policies.

The modularity principle also means that universal service policies should not be funded through access prices.⁶⁷ A competitively neutral mechanism should be developed that provides subsidies that are:

1. *Based on customer need*⁶⁸

Payments should be based on customer's to afford basic services.

2. *Limited in size to what customers and service providers need*⁶⁹

67. For examples of regulatory tools that could be used to revise subsidy systems, see generally C. WEINHAUS, T. MONROE, ET. AL., *UNIVERSAL SERVICE TOOL KIT, PART 1: GETTING FROM HERE TO THERE: TRANSITIONS FOR RESTRUCTURING SUBSIDIES* (1994).

68. This does not necessarily preclude subsidies for infrastructure. Infrastructure subsidies may be needed if the public policy is that infrastructures should be deployed even if customers do not value them sufficiently to pay for them through prices, or cannot pay for them because of income or business limitations.

69. For an example of how this could be done, see C. WEINHAUS, T. MONROE, ET. AL.,

Payments to support affordability of basic services should be based on the difference between the price the targeted customers can pay and the amount of revenue that a service provider needs to remain financially viable. This amount of revenue can be determined from market prices for services if markets are competitive, or benchmark costs. Benchmark costs are estimates of the economic costs of providing basic services.⁷⁰ The support payments can be provided either to providers of basic services or to customers.

3. *Nondiscriminatory*

All providers of basic services should be treated equally with respect to how their services are subsidized.

4. *Funded in a way that does not hinder competition*

Funding mechanisms should not disadvantage competitors that would be viable absent the subsidy mechanism. Funding based on telecommunications revenues net of payments to intermediary telecommunications providers is an example of such a mechanism.

C. *Low-mark-ups Policies*

The low-mark-up principle means that the mark-up of access prices above direct or incremental cost should be comparable to the mark-ups for other services.⁷¹ Access prices should make a contribution to joint and common costs to allow network providers to be financially viable.⁷² However, an unusually high mark-up permits the price discrimination described in the previous section, and facilitates cross-subsidy. The low mark-up could be achieved through direct regulatory oversight of prices. Regulators could generate or obtain estimates of costs for access services and adjust price caps so as to limit the amount of mark-up. Extensive resale may also facilitate low mark-ups.⁷³

UNIVERSAL SERVICE TOOL KIT, PART 2: BEYOND COST ALLOCATIONS: BENCHMARK SUBSIDY METHOD (1994).

70. These estimates would not be specific to any company, but would be representative of companies that are in the market. These economic costs should include incremental costs for basic services and a portion of joint and common costs to ensure that reasonably efficient service providers have an opportunity to remain financially viable.

71. In some instances, mark-ups for access may be higher than mark-ups for end-user prices for local service. This is because a local service provider's ability to sell access is dependent upon having local service customers. So a local service provider would be willing to have low prices for local service in order to be able to sell access.

72. See generally M. JAMISON, GENERAL CONDITIONS FOR SUBSIDY-FREE PRICES USING COOPERATIVE GAMES (1995), for an explanation of why it is generally true that all services should make a contribution to joint and common costs.

73. E. NOAM, PRESENTATION AT THE INTERNATIONAL TELECOMMUNICATIONS SOCIETY SYMPOSIUM ON STRATEGIC ALLIANCES & INTERCONNECTION: CONTRIBUTIONS OF GAME THEORY TO TELECOMMUNICATIONS (1995).

This principle conflicts with the efficient component pricing rule (ECPR) which was developed by Baumol and Willig⁷⁴ and is generally supported by incumbent monopolies. The ECPR recommends that interconnectors pay incumbent monopolies their opportunity costs of interconnection. In other words, interconnection prices would ensure that the incumbent monopolies make the same amount of profit regardless of whether there is competition.

The ECPR is inappropriate to use because it can result in high mark-ups, and because it is based on several assumptions that often do not match reality. These assumptions include: (1) there are no sunk costs and no monopoly profits;⁷⁵ (2) there is no discrimination against the interconnector in price or quality of interconnection; (3) the margin between the monopoly's input price and retail price reflects the monopoly's economic costs of producing the retail product;⁷⁶ (4) the retail market is homogeneous;⁷⁷ (5) interconnectors are price takers; (6) regulators are able to perfectly regulate the monopoly;⁷⁸ and (7) new competitors are more specialized than the incumbent monopoly.⁷⁹

D. Flexibility Policies

Carriers should be allowed flexibility to lower prices and introduce more innovative price structures. One common form of price flexibility is price bands — a policy where regulators allow companies to change prices between a predetermined maximum price and a predetermined minimum price. However, as long as maximum prices for access and non-competitive basic telephone services do not contain high contributions to joint and common costs, price floors should be unnecessary to facilitate efficient competition.⁸⁰ Therefore, carriers should be allowed to charge any prices that are below the low-mark-up maximum price. It is also unlikely that carriers could harm competition with alternative price structures as long as the maximum price is not exceeded. As a result, carriers should be allowed to also provide alternative price structures as long as the structures are non-discriminatory, especially in non-competitive access

74. Baumol, *Some Subtle Issues in Railroad Regulation*, 10 INT'L J. TRANSP. ECON. 341 (1983); Willig, *The Theory of Network Access Pricing*, in ISSUES IN PUBLIC UTILITY REGULATION 109-52 (H. Trebing ed. 1979).

75. Tye, *The Pricing of Inputs Sold to Competitors: A Response*, 11 YALE J. ON REG. 203, 206, 210 (1994).

76. Kahn & Taylor, *The Pricing of Inputs Sold to Competitors: A Comment*, 11 YALE J. ON REG. 225, 227, 230 (1994).

77. Willig, *supra* note 74, at 138; M. Armstrong & C. Doyle, *Access Pricing, Entry and the Baumol-Willig Rule*, Discussion Paper No. 9422, University of Southampton.

78. B. MITCHELL, W. NEU, ET. AL., *THE REGULATION OF PRICING OF INTERCONNECTION SERVICES 6-7* (1994).

79. Willig, *supra* note 74, at 139.

80. M. Jamison, *When does Cross-Subsidy Make Business Sense?* presentation at Telecommunications Infrastructure and the Information Economy: Interactions Between Public Policy and Corporate Strategy, University of Michigan, Ann Arbor, Michigan, March 10-11, 1995.

markets.

CONCLUSION

This paper describes: (1) why current access policies are inconsistent with competitive markets; and (2) an alternative access structure that could remedy these mismatches. The alternative access policies described are based on four principles: (1) non-discrimination as to who the customer is not what the customer does with the traffic; (2) modularity so that regulators can easily change and remove pricing constraints; (3) mark-ups of price above incremental cost that are low enough to limit the potential for price discrimination and cross-subsidy, yet high enough to keep service providers financially viable; and (4) price flexibility for access providers.

In some instances, these policies are significantly different than the status quo. Transitions will be necessary to allow customers and companies time to adjust.⁸¹ These transitions could include: (1) price adjustments and deregulation in other markets to allow companies to develop new sources of revenues; (2) increased competition to allow customers to choose among service providers and to encourage lower overall costs for the industry; (3) phase-outs of old subsidy systems and phase-ins of new systems; and (4) time for companies and customers to adjust.

Special accommodations may also be needed for rural areas. Costs in these areas are generally high, and cost-based prices may be unaffordable. Special subsidies for rural areas may be needed to ensure universal service and the development of rural telecommunications infrastructures.

81. WEINHAUS, MONROE, ET. AL., *supra* note 69, at 1.

