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**Converging Industries Research
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Practical Solutions for Communications Policy

**Apples and Oranges:
Differences between Various Subsidy Studies**

October 10, 1994; Revised July 19, 1995

*Presentation at the November 1994 NARUC Meeting,
Reno, Nevada*

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**Telecommunications Industries Analysis Project:
Apples and Oranges:
Differences between Various Subsidy Studies**

Carol Weinhaus, Teresa Pitts, Mark Jamison, et *al.*
Paper originally completed October 10, 1994. Revised December 14, 1994; July 19, 1995.

Presentation at the November 1994 NARUC Meeting, Reno, Nevada.

The Telecommunications Industries Analysis Project is associated with the Public Utility Research Center at the University of Florida College of Business Administration.

Gordon Calaway, NECA, assisted with data for some of the analysis.

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Differences between Various Subsidy Studies

Various Estimates for Subsidies

Traditional policies for universal telephone service have concentrated on keeping prices for basic telephone service affordable for residential customers and for customers in high-cost areas, such as rural areas. Regulators and the telephone industry have tried to keep prices affordable by developing a system of subsidies that increase prices for other customers - primarily business, urban, and long distance customers - in order to cover the costs of serving the subsidized residential and rural customers.¹

Competition and changes in technology are making this traditional subsidy system unworkable for the future.² As a result, numerous policy makers, companies, and industry analysts have developed proposals for developing a new subsidy system for universal service.³

One of the key issues in developing a new subsidy system is, "How large is the subsidy?" Several recent studies have attempted to answer this question.⁴ The answers have varied widely, from \$1.1 billion to \$20 billion.⁵ The purpose of this paper is to explain some differences between these estimates, indicated in **Figure 1**.

Why are all of these estimates different?

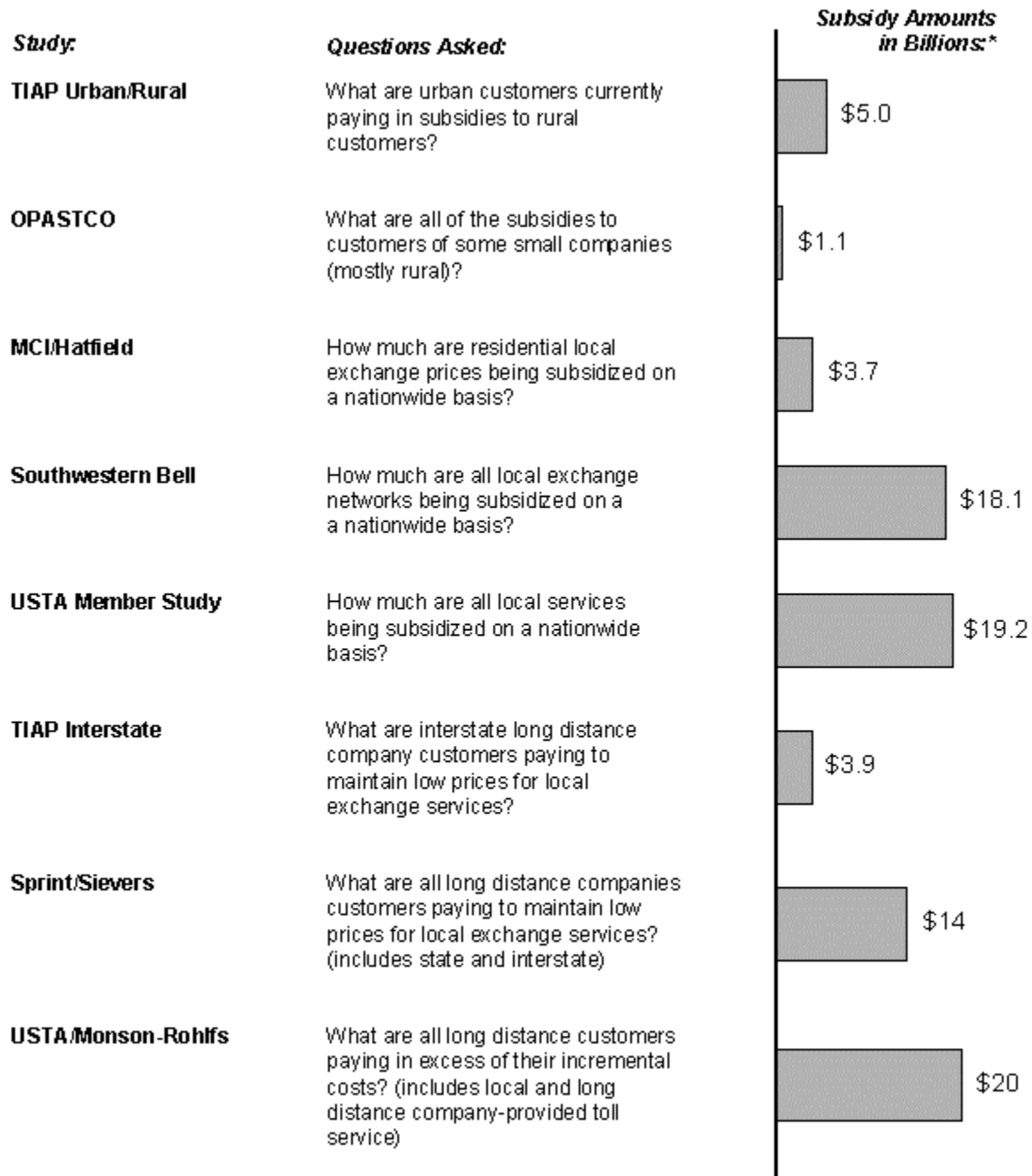
Each study answers different questions, as indicated in **Figure 1**. The studies examine different types of subsidies and markets, and they use dissimilar methods and data. In addition, there are varying views as to what constitutes incremental cost. For example, the MCI/Hatfield and the USTA/Monson-Rohlf's studies each use different definitions. There is a temptation to add or subtract these different study results; however, without detailed knowledge of each study, the resulting calculations are meaningless.

Figure 2 provides a detailed checklist of differences. Some of the items on the checklist cover the flow of subsidies by market segment. The market segments for subsidies are: services, geography, and customers. **Figure 3** indicates these three market segments and the direction of the subsidy flow for each.

The remainder of the paper gives a brief overview of each study. Each one-page description presents the approach used in the study, the definition of "subsidy," a description of the data set, a chart indicating the subsidy flows within the context of the total local exchange carrier and long distance carrier markets (\$127.6 billion in revenues in 1992), and the resulting subsidy.⁶

Differences between Various Subsidy Studies, cont.

Figure 1: Questions Asked by Each Subsidy Study and Resulting Subsidies



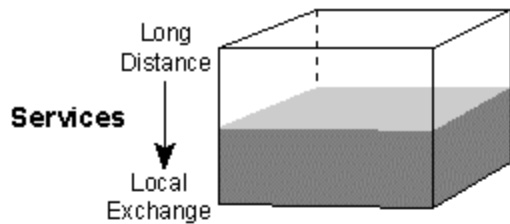
*There is a temptation to add or subtract these different study results; however, without detailed knowledge of each study, the resulting calculations are meaningless.

Figure 2: Checklist of Items Covered by Each Subsidy Study

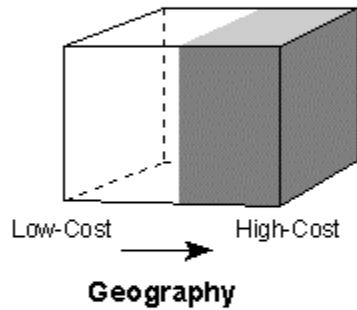
Questions covered by study	Study							
	TIAP Urban/ Rural	OPAS- TCO	MCI/ Hatfield	South- western Bell	USTA Member Study	TIAP Interstate	Sprint/ Sievers	USTA/ Monson- Rohlf's
Who gets subsidized?								
<i>Geography</i>								
Rural Customers								
OPASTCO areas	XXXXX	XXXXX						
All other areas	XXXXX							
<i>Customer Types:</i>								
Large/small								
Business/residential			XXXXX					
Income level								
<i>Services:</i>								
Local exchange	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
Who pays the subsidy?								
Long distance customers						XXXXX	XXXXX	XXXXX
Urban customers	XXXXX							
What are the Methods and Assumptions?								
Base year	1992	1992	1992- 1993	1993	1993	1992	1994	1991
<i>Costing Basis for the Subsidy:</i>								
Traditional accounting costs:								
Measures explicit subsidy mechanisms		XXXXX				XXXXX	XXXXX	
Maintains local exchange company revenues the same	XXXXX	XXXXX		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
Incremental costs:			XXXXX					
<i>Regulatory Jurisdictions Covered:</i>								
Interstate	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
State	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX		XXXXX	XXXXX

Differences between Various Subsidy Studies, cont.

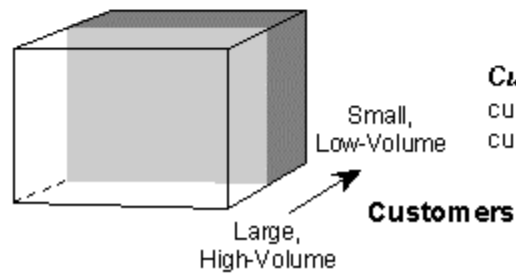
Figure 3: Subsidy Flows by Three Market Segments



Services: From long distance services to local exchange services.



Geography: From low-cost markets (generally urban) to high-cost markets (generally rural).



Customers: From large, high-volume customer markets to small, low-volume customer markets.

Subsidy by Market Segment

Study: TIAP Urban/Rural

What are urban customers currently paying in subsidies to rural customers?

Study: TIAP Urban/Rural

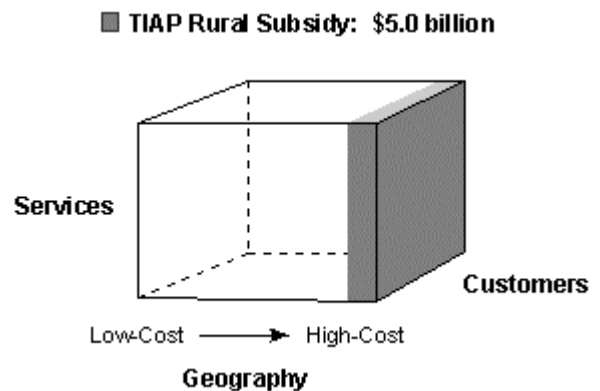
Approach: Compares nationwide rural customer revenues (payments to local exchange company costs for rural customers.

Subsidy Definition: The difference between embedded costs and customer payments.

Data Set: 1992 state and interstate data. Uses traditional accounting costs (embedded costs).

Subsidy is within context of total industry revenues of \$127.6 billion: Local exchange carrier, \$91.5 billion; and interexchange carrier, \$36.1 billion.

Subsidy Flows: Subsidies flow from urban areas to rural areas for all types of customers and services.



Result: On average, rural customer payments for telephone services are \$5.0 billion less than local exchange company accounting costs for rural customers

Study: OPASTCO

What are all of the subsidies to customers of some small companies (mostly rural)?

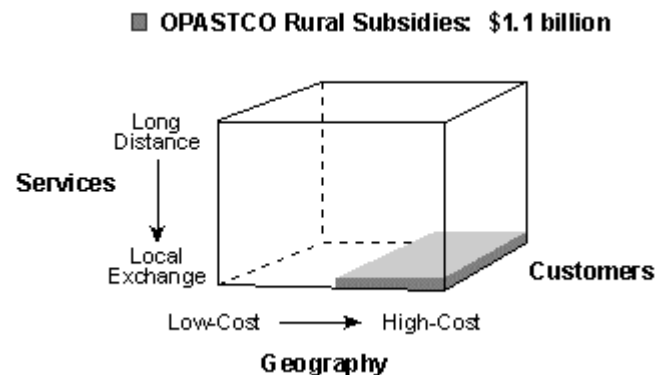
Study: OPASTCO

Approach: Identifies various components of subsidies for customers of some small companies (mostly rural). Calculates the effect of eliminating these subsidies on these companies' local exchange customers.

Subsidy Definition: The difference between embedded costs and customer payments for this subset of small companies.

Data Set: 1992 state and interstate data for 424 small local exchange companies that have high costs. Uses traditional accounting costs (embedded costs).

Subsidy Flows: Subsidies flow from all Other services and areas to customers of these small companies.



Result: Rural customer payments for telephone services from 424 small companies increase by \$1.1 billion if these customers have to pay all subsidies received by these companies.

Study: MCI/Hatfield

How much are residential local exchange prices being subsidized on a nationwide basis?

Study: MCI/Hatfield

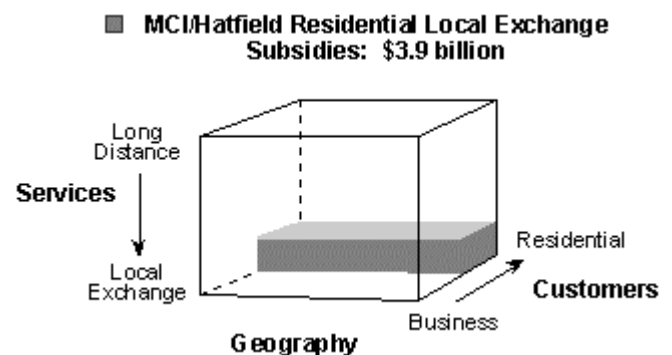
Approach: Compares nationwide average price for residential local exchange service to estimate of incremental cost of local exchange service. Assumes that local facilities are built from scratch.

Subsidy Definition: Difference between the national average price for residential local exchange service and the total service long-run incremental cost of an optimized local exchange network.

Data Set: 1992-1993 data. Uses incremental costs.

The nationwide average price for residential local exchange service is \$18.00 per month.

Subsidy Flows: Subsidies flow from all Other services to local exchange services.



Result: If the nationwide average price for residential local exchange service is maintained, local exchange companies need \$3.7 billion in subsidies to cover incremental costs. However, if local exchange prices in low-cost areas are decreased to their incremental costs, the total subsidy needed would increase to \$6.5 billion. These estimates assume optimized local exchange networks

Study: Southwestern Bell

How much are all local exchange networks being subsidized on a nationwide basis?

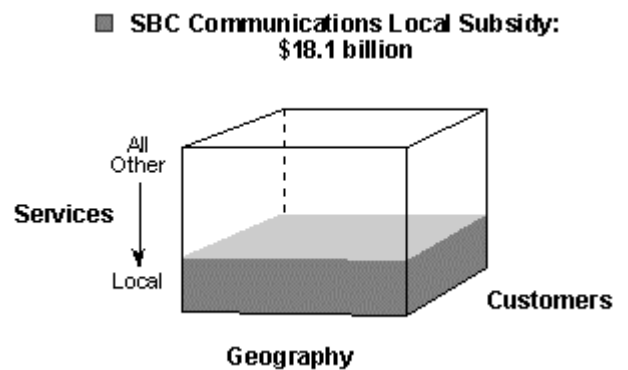
Study: Southwestern Bell

Approach: Compares dollars that customers pay for local services to local exchange company costs.

Subsidy Definition: The difference between historical revenues and accounting costs (embedded costs) allocated to local exchange networks. This difference is called "support" and not "subsidy" in the study.

Data Set: 1993 state and interstate data. Uses traditional accounting costs (embedded costs) for 646 local exchange companies (95% of local exchange company lines).

Subsidy Flows: Subsidies flow to local Networks from all other services.



Result: Nationwide, local service revenues are \$18.1 billion less than local exchange company accounting costs allocated to local networks.

Study: USTA Member Study

How much are all local services being subsidized on a nationwide basis?

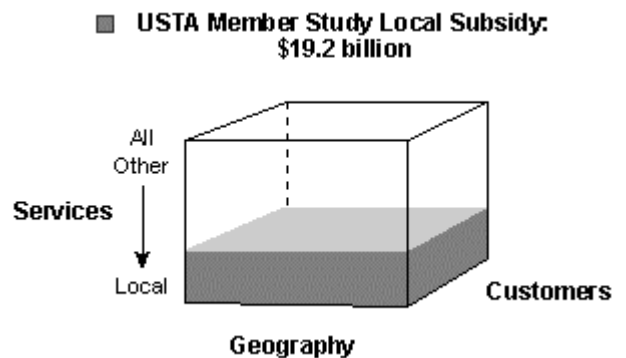
Study: USTA Member Study

Approach: Compares dollars that customers pay for local services to local exchange company costs.

Subsidy Definition: The difference between historical revenues and accounting costs (embedded costs) allocated to local services. "Local services" includes basic local exchange service and other local services and other local services such as directory and call forwarding.

Data Set: 1993 state and interstate data. Uses traditional accounting costs (embedded costs) for 14 local exchange companies. These costs were grossed up to represent all local exchange companies.

Subsidy Flows: Subsidies flow to all local services from all other services.



Result: Nationwide, local service revenues are \$19.2 billion less than local exchange company accounting costs allocated to local services.

Study: TIAP Interstate

What are interstate long distance company customers paying to maintain low prices for local exchange services?

Study: TIAP Interstate

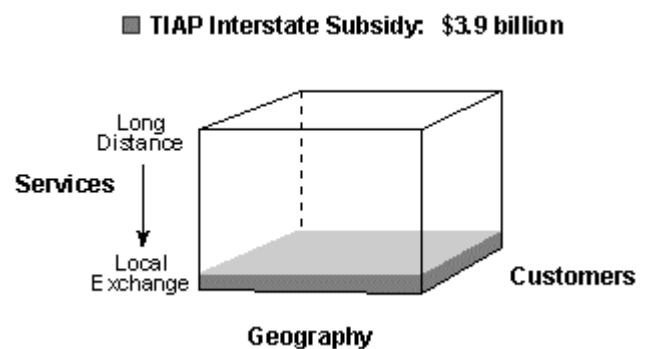
Approach: Shows the dollars transferred by specific interstate subsidy mechanisms for intrastate services, low-income households, and low prices in rural areas.

Subsidy Definition: The total of explicit interstate subsidy mechanisms.

Data Set: 1992 state and interstate data. Uses traditional accounting costs (embedded costs).

Subsidy is within context of total industry kept revenues of \$127.6 billion: Local exchange carrier \$91.5 billion and interexchange carrier \$36.1 billion. The amounts for the specific interstate subsidy mechanisms are \$0.6 billion for Universal Service Fund (high-cost loops), \$0.1 billion for Life-line and Link-up programs, \$0.3 billion for weighted dial equipment minutes (high-cost switching), and \$2.9 billion for carrier common line charges.

Subsidy Flows: Subsidies flow from long distance companies' interstate services to local exchange companies' services.



Result: Nationwide, long distance company customers pay an extra \$3.9 billion for their interstate services.

Study: Sprint/Sievers

What are all long distance company customers paying to maintain low prices for local exchange services? (state and interstate)

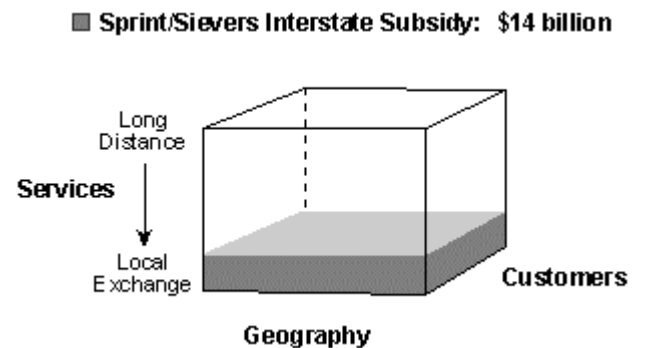
Study: Sprint/Sievers

Approach: Shows the dollars transferred by specific public policy mechanisms for local exchange company services, low-income households, and low prices in rural areas.

Subsidy Definition: The total of implicit and explicit state and interstate subsidy mechanisms.

Data Set: Projected 1994 state and interstate data. Uses traditional accounting costs (projected from embedded costs).

Subsidy Flows: Subsidies flow from long distance companies' customers to local exchange companies' customers.



Result: Nationwide, long distance company customers pay an extra \$14 billion for their services.

Study: USTA/Monson-Rohlf's

What are long distance customers paying in excess of their incremental costs?

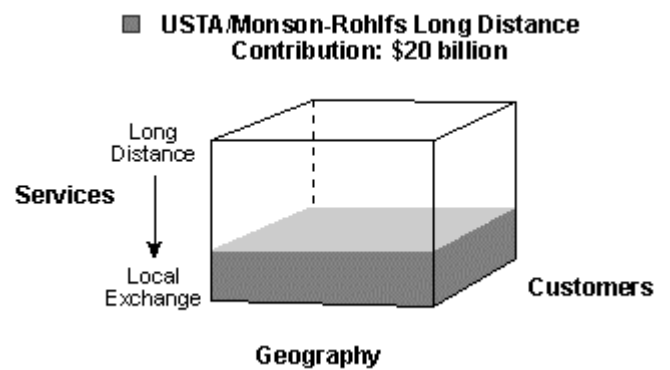
Study: USTA/Monson-Rohlf's

Approach: Shows the dollars that long distance customers paid in excess of their incremental costs. Assumes that local exchange company long distance facilities are built from scratch.

Subsidy Definition: The difference between historical revenues and the long-run incremental cost. This difference is called a "contribution" and not a "subsidy" in the study.

Data Set: 1991 state and interstate data. Uses historical revenues and incremental costs.

Subsidy Flows: Subsidies flow from long distance services (of both long distance companies and local exchange companies) to all other services.



Result: Nationwide, long distance customers of both long distance companies and local exchange companies pay \$20 billion above their incremental costs.

Notes

Notes

Gordon Calaway, NECA, assisted with data for some of the analysis.

Acronyms:

NARUC	National Association of Regulatory Utility Commissioners
NECA	National Exchange Carrier Association
OPASTCO	Organization for the Protection and Advancement of Small Telephone Companies
TIAP	Telecommunications Industries Analysis Project
USTA	United States Telephone Association

1. See Weinhaus, Carol; Makeeff, Sandra; Jamison, Mark; *et al.*, *Who Pays Whom? Cash Flow for Some Support Mechanisms and Potential Modeling of Alternative Telecommunications Policies*, Alternative Costing Methods Project, Program on Information Resources Policy, Harvard University, Cambridge, MA, November 15, 1992. See also Weinhaus, Carol; Makeeff, Sandra; Copeland, Peter; *et al.*, *What is the Price of Universal Service? Impact of Deaveraging Nationwide Urban/Rural Rates*, Telecommunications Industries Analysis Project, University of Southern California, Boston, MA, July 26, 1993.

2. See Weinhaus, Carol; Jamison, Mark; Copland, Peter; *et al.*, *New Wine and Old Wineskins: Modeling Effects of Competition and Expanded Interconnection in the Local Exchange*, Alternative Costing Methods Project, Program on Information Resources Policy, Harvard University, Cambridge, MA, July 27, 1992; *What is the Price of Universal Service? Impact of Deaveraging Nationwide Urban/Rural Rates*, and Weinhaus, Carol; Pitts, Teresa, Jamison, Mark; *et al.*, *Abort, Retry, Fail? The Need for New Communications Policies*, Telecommunications Industries Analysis Project, Public Utility Research Center, University of Florida, Boston, MA, July 18, 1994.

3. See Noam, Eli, "NetTrans Accounts: Reforming the Financial Support System for Universal Service in Telecommunications," Discussion Paper presented at the Symposium on Universal Service in Telecommunications," Discussion Paper presented at the Symposium on Universal Service in the New Electronic Environment, co-sponsored by the Benton Foundations and Columbia Institute for TeleInformation, New York, NY, September 1993; Weinhaus, Carol; Monroe, Terry; Harris, Dan; *et al.*, *Getting from Here to There: Transitions for Restructuring Subsidies*, Telecommunications Industries Analysis Project, Public Utility Research Center, University of Florida, Boston, MA, July 18, 1994; Egan, Bruce and Wildman, Steven S., "Funding the Public Telecommunications Infrastructure," Discussion Paper presented at the Symposium on Universal Service in the New Electronic Environment, co-sponsored by the Benton foundation and Columbia Institute for TeleInformation, New York, NY, September 1993; MCI, *Definition and Funding Basic Universal Service: A Proposal of MCI Communications Corporation*, July 1994; and Ameritech, *In the Matter of a Petition for Declaratory Ruling and Related Waivers to*

Notes

Establish a New Regulatory Model for the Ameritech Region, filed with the FCC on March 1, 1993.

4. Some people disagree with using the word "subsidy" to describe these estimates. For example, Monson-Rohlf's describe their study as an estimate of "contribution" that would go away if local exchange services became competitive (see Monson, Calvin S. and Rohlf's, Jeffrey H., *The \$20 Billion Impact of Local Competition in Telecommunications*, Bethesda, MD, July 1993). Also, Southwestern Bell Telephone Company describes its study as an estimate of "support" (see Cooper, Paul L., *Meeting the Challenge of Universal Service in a Competitive Environment*, presentation at the 1994 Annual Conference on the Institute of Public Utilities, Michigan State University, December 13, 1994.) Some economists would argue that a subsidy is present only when a customer is paying above his/her stand alone cost in order to allow some other customer to pay below his/her incremental cost. Faulhaber, G.R., "Cross-Subsidization: Pricing in Public Enterprises," in *American Economic Review*, Vol. 65, 1975, pages 966-977. This term "subsidy" is chosen for this paper because it is the term most commonly used to describe the public policies that have been used to keep local exchange prices affordable.

5. See Hatfield Associates, *The Cost of Basic Universal Service*, Hatfield Associates, Inc., Boulder, CO, July 1994; MCI, *Defining and Funding Basic Universal Service* (hereafter, these two studies are MCI/Hatfield); *Who Pays Whom? Cash Flow for Some Support Mechanisms and Potential Modeling of Alternative Telecommunications Policies* (hereafter, TIAP Interstate); Weinhaus, Carol; Makeeff, Sandra; Copeland, Peter; et al., *Redefining Universal Service: The Costs of Mandating the Deployment of New Technology in Rural Areas*, Telecommunications Industries Analysis Project, Boston, MA, July 18, 1994 (hereafter, TIAP Urban/Rural); John Staurulakis Inc. And Patricia Lum, *Keeping Rural America Connected: Costs and Rates in the Competitive Era*, OPASTCO, Washington, DC, 1994 (hereafter, OPASTCO); Sievers, Mark, *Access Subsidies, Long Distance Competition and the Elimination of the InterLATA Restriction*, February 23, 1994 (hereafter, Sprint/Sievers); *The \$20 Billion Impact of Local Competition in Telecommunications* (hereafter, USTA/Monson-Rohlf's); *Meeting the Challenge of Universal Service in a Competitive Environment* (hereafter, Southwestern Bell); and United States Telephone Association, *USTA Universal Service Costing and Quantification Project Summary*, 1994.

6. See *Abort, Retry, Fail? The Need for New Communications Policies*, (figure based on cash flows from *Who Pays Whom? Cash Flow for Some Support Mechanisms and Potential Modeling of Alternative Telecommunications Policies*).

List of Participants in the Telecommunications Industries Analysis Project, 1995

1995 List of Participants if the Telecommunications Industries Analysis Project

State Regulators	NARUC representatives from: Illinois Commerce Commission Iowa Utilities Board Massachusetts Department of Public Utilities New York Public Service Commission Washington Utilities and Transportation Commission
Regional Holding Companies	Ameritech Bell Atlantic BellSouth NYNEX Pacific Telesis Southwestern Bell
Company	US WEST
Independents	Anchorage Telephone Utility GTE Sprint Local Telecom Division
Interexchange Carrier	AT&T Sprint
Foreign Domestic	InfoCom Research, Inc. NTT America
Local, National, and International Services	BT France Telecom North America
Materials Manufacturers	Corning
Telecommunications Equipment Manufacturers	NorTel

Sponsors:

Corporation for Public Broadcasting

Assisting with *public* data:

Bellcore
Federal Communications Commission
National Exchange Carrier Association

Project Background

Background on the Telecommunications Industries Analysis Project

The goal of the Telecommunications Industries Analysis Project is to provide information to support the development of alternative communications policies to meet the needs of stakeholders in an environment that includes competitive and non-competitive markets, federal and state regulatory jurisdictions, and a proliferation of new services made possible by technological advances. The purpose of the project is to produce research and analysis which will assist policy makers in making informed decisions.

The project is a neutral forum of communications industry stakeholders exploring multiple viewpoints on selected issues. This forum incorporates the following elements:

- **Broad representation:** The current forum includes local exchange carriers, interexchange carriers, materials and equipment manufacturers, and regulators. The project actively seeks expansion of this forum to include other communications industry representatives such as competitive access providers, cable television companies, computer companies, electric power utilities, and publishers.
- **Multiple viewpoints:** Participants are required to have an active role in the research and analysis, to represent their own interests, to understand and to assist in developing others' perspectives, and to work toward the common goal of representing multiple views.
- **Analysis and results of alternative policies:** Research tools, including a jointly produced data base and computer software models, and data analysis developed by this forum create a common language for examining issues. The common language allows the participants to focus on underlying issues. Appropriate computer software tools are developed, and existing tools are modified.
- **All data, analysis methods, and results are public:** Data used by this project must be publicly available on a nationwide basis. Research products become public domain information.
- **Neutral setting:** The project resides in a neutral setting, free of partiality, thereby ensuring objective and independent research.

What the Project has Done

The project has conducted public workshops at the national meetings of the telecommunications industry regulators. The project's research papers have been the basis for meetings with the Federal Communications Commission, Congressional staffs, the Congressional Research Service, and the National Telecommunications Information Administration.

Project Background

The project has also produced a number of papers plus software modeling tools for analysis of financial structures and new technology deployment.

Financial Model and Associated Database

The objective of the financial modeling tool is to enable users to experiment with changes in the existing accounting and regulatory structures (including jurisdictional separations, interstate access charges, transport, and other interconnection issues). This tool and its associated database serve as a common language for discussing various public policy changes. This ability to create custom data sets allows users to model their own numbers.

New Technology Deployment Model Objective

The objective the New Technology Deployment Model is to identify and quantify the associated issues - regulatory, technical, financial, and demand - that will assist policy makers in their decisions concerning competition and new technology deployment.

The modeling process also identifies key elements associated with broadband deployment and analyzes the result of changing these key elements. The value of this tool is the ability of regulators, telecommunications companies, and others to experiment with various deployment options and to analyze the results.