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**Calculations and Sources for Revving up the  
Communications Economic Engine:  
Household Services, Monthly Bills, and  
Barriers to Competition**

**July 20, 1997; Revised July 22, 1997**

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# Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition

July 20, 1997; Revised July 22, 1997

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## Copyright and Project Address

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**Telecommunications Industries Analysis Project:**

***Calculations and Sources for Revving Up the Communications Economic Engine:  
Household Services, Monthly Bills, and Barriers to Competition***

Carol Weinhaus, Pat McLarney, John Gomoll, et al.  
July 20, 1997; Revised July 22, 1997

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

Graphics were produced by Mark Carroll.

For information on this research, contact Carol Weinhaus at:  
[www.ConvergingIndustries.org](http://www.ConvergingIndustries.org)

**ERRATA:** In this revised version, typographical errors have been corrected; the source of the Nielsen data is now correctly cited as Nielsen Media Research. The revised paper is otherwise the same as the original.

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## Project Information

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### List of Participants in the Telecommunications Industries Analysis Project

July 1997

State Regulators

NARUC Representatives from:  
California Public Utilities Commission  
Florida Public Service Commission  
Illinois Commerce Commission  
Iowa Utilities Board  
Massachusetts Department of Public Utilities

Companies and Governments

AT&T  
Bell Atlantic  
BellSouth  
Corning  
France  
France Telecom  
GTE  
Kalona Cooperative Telephone  
Nortel  
NTT America  
NYNEX  
Pacific Bell  
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Sponsors:

Corporation for Public Broadcasting

Assisting with *public* data:

Bellcore  
Federal Communications Commission  
National Exchange Carrier Association  
National Telecommunications and Information Administration

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## Project Information, cont.

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### Background on the Telecommunications Industries Analysis Project

The Telecommunications Industries Analysis Project (TIAP), a six-year-old research consortium, conducts and reports impartial research in the areas where network planning, business financials, and public policy (regulation and legislation) intersect. The participants actively work together to develop new options for telecommunications policies to meet the needs of consumers, governments, and companies in a changing, competitive environment. Participants include regulators, domestic and foreign telecommunications companies, materials and equipment manufacturers, and other communications-based organizations.

The purpose of the Project is to produce research and analysis that will assist policy makers in making informed decisions.

TIAP incorporates the following features:

- **Neutral setting**  
The Project provides a neutral setting, free of partiality, thereby ensuring objective and independent research.
- **Multiple viewpoints**  
Participants play an active role in the research and analysis, represent their own interests, and understand and assist in developing others' perspectives.
- **Analysis and results of alternatives**  
The Project provides research data, tools, and models for critical decision making.
- **Public distribution of research**  
Data used by this Project are publicly available. Research products become public domain information.

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# Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition

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## Introduction

This paper provides the background sources, data, assumptions, and calculations used to produce the figures in *Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition*.<sup>1</sup> To avoid confusion between the two papers, the companion paper is referred to as *Revving up the Communications Economic Engine* and this paper is referred to as *Calculations and Sources*. In order to keep the companion paper brief and to the point, *Calculations and Sources* provides the background data, calculations, sources, and assumptions.

*Calculations and Sources* uses available data to calculate the percentage of households with various products. Therefore, this paper shows patterns and ballpark numbers. There was no single, consistent source for the data. This lack of consistent, public data is an indication of the barriers between various communications industries — telecommunications (local and long distance, wireline and wireless), television and radio (which includes broadcast, cable, and direct broadcast satellite, or DBS), computers (including the Internet), and others (electric utilities, publishing, etc.).

## Sources and Calculations for Figures 1 and 2 in *Revving up the Communications Economic Engine*

**Figure 1** provides an overview of the average household monthly bills for various services: telephone (local and long distance), cable TV (basic and pay), wireless (cellular and PCS), and Internet services. If a household were to subscribe to all of these services, the average monthly total would be \$158.65. **Figure 1** also provides the percentage of total U.S. households with these services and usage statistics.

The data have been calculated with as much consistency as possible to show patterns; exact precision does not apply. For example, the calculated percentage of households with TVs for 1996 is 96.4%, while the U.S. Department of the Census data for 1994 show 98.3%. In showing overall patterns, this difference of 1.9% is not significant. Whenever possible, figures use the latest data (1996 or 1997); other calculations incorporate 1994 and 1995 data when later data are not available. Also, data for weekly totals are unavailable for some categories.

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<sup>1</sup> Carol Weinhaus, Pat McLarney, John Gomoll, et al., *Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition*, presentation at the July 1997 National Association of Regulatory Utility Commissioners (NARUC) meeting, San Francisco, CA, Telecommunications Industries Analysis Project Work Group, Boston, MA, July 20, 1997.

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

### Data and Calculations for Percentage of Total Households with Various Communications Services, Average Residential Bills for Each Service, and Average Use

The following figures and text explain the derivation of the data in **Figures 1 and 2** of *Revving up the Communications Economic Engine*. There was no single consistent data source; therefore, the numbers come from data sets between 1994 and 1997. Calculations are based on the 1996 total number of U.S. households of 99,627,000.

Note: Where data are described as “calculated,” this means that data from original sources were adjusted in some way to serve the requirements of the context in which data were used.

**Figure 1: Calculations for Percentage of Total U.S. Households with Various Communications Services, Average Residential Bills for Each Service, and Average Use**

U.S. Households				
Line No.	Description	Data	Year	Source
1	Number of U.S. Households	99,627,000	Mar. 1996	<p>To keep the total number of U.S. households consistent, the calculations are based wherever possible on U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, <i>Statistical Abstract of the United States 1996 (116th Edition)</i> [hereinafter referred to as the <i>1996 Statistical Abstract</i>], Washington, DC, 1996, Table 709, "Money Income of Households — Percent Distribution, by Income Level, Race, and Hispanic Origin, in Constant (1993) Dollars: 1970 to 1994," page 461, and updates from the Bureau of the Census on May 27, 1997.</p> <p>The Census Bureau surveyed households in March 1996 to get the number of households by income for the previous year (1995). Therefore, in the <i>Statistical Abstract</i>, the total number of households is not necessarily consistent among tables.</p>

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

Telephone Service				
Line No.	Description:	Data:	Year:	Source:
2	Percent of Households with Telephones	93.9%	Nov. 1996	Percent Households: Federal Communications Commission (FCC), Common Carrier Bureau, Industry Analysis Division, <i>Telephone Subscribership in the United States</i> (hereinafter referred to as <i>Telephone Subscribership</i> ), May 1997, Table 1, "Household Telephone Subscribership in the United States," page 5.
3	Average Monthly Bill: Local	\$19.49	1995	Local Rates: Federal Communications Commission, Common Carrier Bureau, <i>Trends in Telephone Service</i> (hereinafter referred to as <i>Trends</i> ), March 1997, Table 8, "Average Monthly Local Telephone Rates (in October of Each Year)," page 12, and "Telephone Service Expenditures," Table 11, page 16.  Residential monthly services charges: unlimited local calling, subscriber line charges (SLCs), and taxes, including 911 charges; excludes touch-tone charges if additional.
4	Average Monthly Bill: Long Distance and Other Rates	\$42.00	1995	Toll and Other Rates: <i>Trends</i> , Table 11, page 16. Toll and other telephone expenditures: Calculated as total monthly bill minus the cost of basic local service. The "Toll and Other" category is primarily toll, but also includes charges for equipment, additional access lines, connection, touch-tone, call waiting, 900 service, directory listings, etc.
5	Average Monthly Bill: Total	\$61.49	1995	Line 3 plus Line 4.



## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

Telephone Service				
Line No.	Description:	Data:	Year:	Source:
6	Average Holding Time per Telephone Connection	4.37 minutes (or 0.073 hours)	1995	<p>Calculated from data from PNR and Associates Inc., June 1997. This number is based on the number of calls per month and the average length of conversation.</p> <p>Other data for holding time per connection (call duration): Traditionally, the average length of time per individual connection was 2.45 minutes per call (147 seconds per call). Information derived from Bellcore, <i>LATA Switching Systems Generic Requirements</i>, 1989, Section 17, Issue 3. A 5-minutes-per-call (300-seconds-per-call) average for 1995 was derived from 1995 and 1996 samples from data used to determine average switch size described in Carol Weinhaus, et. al., <i>A Snapshot in Time: LEC Switch Investment and Price Structures for Connections to the Switch Just before the Telecommunications Act of 1996</i>, presentation at the July 1996 NARUC Meeting, Los Angeles, CA, Telecommunications Industries Analysis Project, May 10, 1996, Appendix D.</p>
7	Average Length of a Local Call	3.87 minutes (or 0.065 hours)	1997	PNR and Associates Inc., June 1997.
8	Average Length of a Long Distance Call	7.75 minutes (or 0.129 hours)	1997	<i>ibid.</i>

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

Cable TV Service				
Line No.	Description:	Data:	Year:	Source:
9	Percent of Households with Telephones that have Cable TV	69.3%	Mar. 1997	Based on background data from Nielsen Media Research (NMR), <i>Special Analysis</i> [hereinafter referred to as <i>NMR Special Analysis</i> ], March 1997, Table 1, page 1.
10	Percent of Total Households with Cable TV	65.1%	Calculated 1997	Line 2 times Line 9. Adjusts data for all households, since NMR surveys only households with telephones.
11	Number of Homes Passed by Cable TV Systems	93,200,000	Oct. 1995/ Sept. 1996	Cabletelevision Advertising Bureau (CAB), <i>1997 Cable TV Facts</i> , page 5.
12	Percent of Households Passed by Cable TV Systems	93.5%	Calculated 1996	Line 11 divided by Line 1. While 68.1% of households subscribed to cable TV (Sept. 1995 through Oct. 1996), 93.5% have a cable system passing nearby.
13	Percent of Households with Basic Cable TV	65.1%	Calculated 1996	Assumes that all households with Cable TV have basic as a pre-requisite for any other cable TV services.
14	Percent of Homes with Cable TV that Have Pay TV	75.0%	1994	<i>1995 Statistical Abstract</i> , Table 912, "Cable and Pay TV – Summary: 1970 to 1994," page 577. This source also gives the 1994 number of households with basic cable TV at 63.4%. Data for later years were unavailable.
15	Percent of Households with Pay TV	48.8%	Calculated 1996	Line 13 times Line 14.
16	Average Monthly Basic Cable TV Bill	\$23.07	1995	<i>1997 Cable Television Developments</i> , "Average Monthly Rates: 1980-1995," page 3.
17	Average Monthly Pay Cable TV Bill	\$8.59	1995	<i>1997 Cable Television Developments</i> , "Average Monthly Rates: 1980-1995," page 3.
18	Total Average Monthly Cable TV Bill	\$29.51	1995	Line 16 plus the product of Line 17 times Line 14. This understates the amount since some households have more than one premium pay TV channel. This also does not include pay-per-view prices.
19	Average Viewing Time per Week for Total Cable TV	27.6 hours	1995/1996	<i>1997 Cable TV Facts</i> , "Cable HHs View Less Broadcast than Non-Cable HHs Despite Greater Overall TV Viewing," page 15.

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**Calculations and Sources for Revving up  
the Communications Economic Engine:  
Household Services, Monthly Bills, and  
Barriers to Competition, cont.**

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Cable TV Service				
Line No.	Description:	Data:	Year:	Source:
20	Average Viewing Time per Week for Basic Cable TV	23.4 hours	1995/1996	<i>ibid.</i>
21	Average Viewing Time per Week for Pay Cable TV	4.2 hours	1995/1996	<i>ibid.</i>

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

Broadcast TV Service				
Line No.	Description:	Data:	Year:	Source:
22	Percent of Households with TVs	98.3%	1994	The <i>1995 Statistical Abstract</i> has the total percentage of households with TVs at 98.4% in 1994. ( <i>1995 Statistical Abstract of the United States</i> , "Utilization of Selected Media: 1970 to 1994," Table 897, page 517.) The percentages used show the overall patterns when comparing service penetration.
23	Percent of Households with TVs and without Cable TV	33.2%	Calculated 1997	Line 22 minus Line 10.
24	Average Monthly Broadcast TV Bill	\$0.00	1996	Consumers do not pay broadcasters. However, consumers do pay for TV sets, antenna, cable TV, etc.
25	Average Viewing Time per Week for Broadcast TV in Cable TV Households	32.4 hours	1995/1996	<i>1997 Cable TV Facts</i> , page 15.
26	Average Viewing Time per Week for Broadcast TV in Non-Cable TV Households	42.1 hours	1995/1996	<i>ibid.</i>
27	Difference in Broadcast Viewing	9.7 hours	Calculated 1996	Line 26 minus Line 25. <i>ibid.</i>
28	Average Broadcast Viewing Time per Week for All Households with TVs	35.6 hours	Calculated 1997	Line 25 plus the product of Line 23 and Line 27.

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

Wireless (Cellular/PCS) Service				
Line No.	Description:	Data:	Year:	Source:
29	Total Number of Wireless Subscribers	44,042,992	1996	CTIA, website at <a href="http://www.wow-com.com/professional/index.cfm">http://www.wow-com.com/professional/index.cfm</a> on May 12, 1997, "CTIA's Semi-Annual Data Survey Results." Since this total is not divided into cellular and PCS subscribers, the calculations assume that the patterns are the same, or if there is a choice, the patterns are based on cellular subscribers since in the initial start-up period, PCS subscribers represent only a small fraction of the market.
30	Percent of Subscribers Paying for Cellular as a Household Bill	79.0%	1996	Nielsen Media Research website at <a href="http://www.nielsenmedia.com/news/hotech-summary.html">http://www.nielsenmedia.com/news/hotech-summary.html</a> on June 4, 1997. "Approximately four of five (79%) of these cellular phone owners said a household member was responsible for paying the cellular phone bill, while a substantial percentage (19%) indicated that the bill was paid for by a business." Calculations assume that if the bill is paid by a household member, it is a household service.
31	Number of Subscribers Paying for Cellular as a Household Bill	34,793,964		Line 29 times Line 30.
32	Percent of Wireless Subscribers with More than One Wireless Phone	34.0%	Mar. 1996	Peter D. Hart Research Associates, <i>Competition in the Wireless Market</i> (hereinafter referred to as <i>Hart</i> ), Washington, DC, February 1997, page 3.
33	Percent of Wireless Subscribers with Only One Wireless Phone	66.0%		100% minus Line 32.
34	Percent of Wireless Subscribers Who have Three or More Wireless Phones	16.7%		Hart, page 3. One in six wireless subscribers (16.7%) have 3 or more.

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

Wireless (Cellular/PCS) Service				
Line No.	Description:	Data:	Year:	Source:
35	Remaining Percent of Wireless Subscribers (Two Phones)	17.3%		Line 32 minus Line 34. If 34% have more than 1 and 16.7% have 3 or more, then the remaining percentage have 2 wireless phones in their household.
36	Number of Households with One Wireless Phone.	22,964,016		Line 33 times Line 31. The calculations assume one wireless phone per subscriber.
37	Number of Households with Two Wireless Phones	3,015,477		The product of Line 31 times Line 35 divided by 2.
38	Number of Households with Three or More Wireless Phones	1,656,855		The product of Line 31 times Line 34 divided by 3.5. Since the number of wireless phones is three or more, to turn the number of households into subscribers, the estimate used was 3.5.
39	Total Number of Wireless Households	27,636,348		Sum of Line 36, Line 37, and Line 38.
40	Percent of U.S. Households with Wireless Phones	27.7%		Line 39 divided by Line 1.
41	Average Local Monthly Wireless Bill	\$47.70	Dec. 1996	CTIA, website at <a href="http://www.wow-com.com/professional/index.cfm">http://www.wow-com.com/professional/index.cfm</a> on May 12, 1997, "CTIA's Semi-Annual Data Survey Results." Since there are no data for residential or business average monthly bills, and since the line between office and home use is becoming blurred, the price is the total average local monthly bill for December 1996.
42	Average Local Wireless Call Length	2.32 minutes (or 0.039 hours)	Dec. 1996	<i>ibid.</i> For 1996, the average length of a local call is 2.32 minutes; the average length of a roaming call is 3.24 minutes (or 0.052 hours).
43	Percent of U.S. Households with a Telephone that also have a Cellular Phone	38.5%	Mar. 1997	Based on background data from <i>NMR Special Analysis</i> , Table 24, page 28. The question was "Do you or does anyone in your household have a cellular phone?" This question does not differentiate between whether the cellular phone is for work, for home, or for both.

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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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Wireless (Cellular/PCS) Service				
Line No.	Description:	Data:	Year:	Source:
44	Percent of Total U.S. Households with a Cellular Phone	36.2%	Calculated 1997	Line 2 times Line 43.  This adjusts the percentage of households with telephones and cellular to account for the fact that NMR data include only households with telephone.
45	Percent of Households Adjusted by the Percent of Subscribers Paying Cellular as a Household Bill	28.6%	Calculated 1997	Line 30 times Line 44.  Adjusts households for only those paying cellular bill at home.
46	Difference between Calculation Used and Adjusted NMR	-0.8%	Calculated	Line 40 minus Line 45.

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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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Internet Service				
Line No.	Description:	Data:	Year:	Source:
47	Percent of Households with Internet Use	19.5%	Mar. 1997	FIND/SVP, New York City, NY: personal communication, July 2, 1997. Data are from March 1997 survey. For March 1997, the total number of households was 19.7 million. The Internet users were all adults. See also, FIND/SVP website at <a href="http://etrg.findsvp.com/internet/highlights.html">http://etrg.findsvp.com/internet/highlights.html</a> , "The American Internet User Survey: Survey Highlights," May 27, 1997.
48	Average Price for Flat Rate Residential Internet Service	\$19.95	Jul. 1997	Based on an informal survey of Microsoft Network (MSN), AT&T Worldnet, Saturn Internet, and America On-Line (AOL). Rates are for SLIP/PPP service with unlimited access to the Internet.
49	Average Length of Internet Session	1.4 hours	Mar. 1997	FIND/SVP, <i>op cit.</i>
50	Average Internet Use per Week	9.1 hours	Mar. 1997	<i>ibid.</i>



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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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### Data and Calculations for Percentage of Households with Services by Household Income Level

The following figures and text explain the derivation of the data in **Figure 3** of *Revving up the Communications Economic Engine*. There was no single, consistent data source. Therefore the numbers come from data sets between 1994 and 1997. Often the 1994 data are expressed as a ratio. For example, the ratios of households by income for 1994 were used to distribute the 1996 household total into income categories.

The intent is to show overall patterns and various data sources were checked against each other to determine the accuracy of assumptions.

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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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**Figure 2: Percentage of Total U.S. Households by Income, *Statistical Abstract***

Household Income:	Percentage of Total U.S. Households	Number of U.S. Households (in thousands)
Under \$10,000	12.3%	12,254
\$10,000 - \$14,999	8.7%	8,668
\$15,000 - \$24,999	15.9%	15,841
\$25,000 - \$34,999	14.2%	14,147
\$35,000 - \$49,999	16.9%	16,837
\$50,000 - \$74,999	17.1%	17,036
\$75,000 and Over	14.8%	14,745
Total Households	99.9%	99,627

The total of 99,627,000 U.S. households is for March 1996. The percentages for the income categories are from 1995. To get the number of households in each category, the total was multiplied by the percentages in each category. Rounding in the percentage column leads to a total of 99.9%.

The data source for the percentage of telephones by income categories (**Figure 3**) has more categories than the household income data in **Figure 2**. Therefore, the percentages from **Figure 3** were distributed into these reduced categories (**Figure 4**).

*Sources:*

*1996 Statistical Abstract*, Table 709, "Money Income of Households – Percent Distribution, by Income Level, Race, and Hispanic Origin, in Constant (1993) Dollars: 1970 to 1994," page 461; Table 877, "Multimedia Audiences – Summary: 1996," page 561; and Table 66, "Households, Families, Subfamilies, Married Couples, and Unrelated Individuals: 1960 to 1995," page 58.

Updates for 1995 percentages and March 1996 number of households are from the U.S. Bureau of the Census, May 27, 1997 (personal communication). The Bureau surveys households in March to get the number for the previous year; therefore, the number of households is for the year of the survey. However, in order to match with numbers in earlier tables, apply percentages to the actual March year.

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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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**Figure 3: Percentage of Households (by Income) with Telephone Service, FCC Data**

<b>Household Income:</b>	<b>Percentage of Households (by Income) with Telephones</b>
Under \$5,000	75.6%
\$5,000 - \$7,499	83.1%
\$7,500 - \$9,999	87.2%
\$10,000 - \$12,499	88.8%
\$12,500 - \$14,999	91.7%
\$15,000 - \$19,999	93.0%
\$20,000 - \$24,999	94.5%
\$25,000 - \$29,999	96.2%
\$30,000 - \$34,999	97.5%
\$35,000 - \$39,999	97.9%
\$40,000 - \$49,999	98.5%
\$50,000 - \$59,999	98.8%
\$60,000 - \$74,999	98.8%
\$75,000 and Over	98.9%
Total Households	93.9%

Source:

*Telephone Subscribership*, Table 1, "Household Telephone Subscribership in the United States," page 5.

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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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**Figure 4: Percentage of Households (by Income) with Telephone Service, Distributed to *Statistical Abstract* Categories**

<b>Household Income:</b>	<b>Percentage of Households (by Income) with Telephone Service</b>
Under \$10,000	82.0%
\$10,000 - \$14,999	90.3%
\$15,000 - \$24,999	93.8%
\$25,000 - \$34,999	96.9%
\$35,000 - \$49,999	98.2%
\$50,000 - \$74,999	98.8%
\$75,000 and Over	98.9%
Total Households	93.9%

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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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### Cable TV Data and Calculations

To derive the percentage of households by income level with cable TV service, percentages developed from Nielsen Media Research (NMR) data were first adjusted to total number of U.S. households (**Figure 5**). Since the NMR survey was conducted by telephone, the data (Column A) were adjusted by the FCC telephone percentages by income level (Column B). The result of multiplying Column A times Column B produces the percentage of households (by income) with cable TV service. When required, these results were weighted for distribution into *Statistical Abstract* income levels. **Figure 6** shows the result of this distribution.

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

**Figure 5: Percentage of Households (by Income) with Cable TV Service, Adjusted NMR Data**

Household Income:	Percentage of Households with Telephone Service that also have Cable TV	Percentage of Households with Telephone Service Distributed to Match NMR Income Level	Percentage of Households (by Income) with Cable TV Service
	A	B	A * B
Under \$10,000	58.3%	82.0%	47.8%
\$10,000 - \$19,999	60.9%	91.2%	55.5%
\$20,000 - \$29,999	67.2%	95.4%	64.1%
\$30,000 - \$39,999	65.4%	97.7%	63.9%
\$40,000 - \$49,999	71.9%	98.5%	70.8%
\$50,000 - \$59,999	69.4%	98.8%	68.6%
\$60,000 - \$69,999	79.1%	98.8%	78.2%
\$70,000 - \$79,999	72.2%	98.8%	71.4%
\$80,000 - \$89,999	85.7%	98.9%	84.8%
\$90,000 - \$99,999	77.3%	98.9%	76.4%
\$100,000 and Over	88.1%	98.9%	87.1%
Not Respond	69.5%		
Total Households	69.3%	93.9%	65.0%

Source:

Column A is based on background data from *NMR Special Analysis*, Table 111, page 134. Percentage of households with telephone service (Column B) is based on *Telephone Subscribership*, Table 1, "Household Telephone Subscribership in the United States," page 5.

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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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**Figure 6: Percentage of Households (by Income) with Cable TV Service, Distributed to *Statistical Abstract* Categories**

<b>Household Income:</b>	<b>Percentage of Households (by Income) with Cable TV Service</b>
Under \$10,000	47.8%
\$10,000 - \$14,999	55.5%
\$15,000 - \$24,999	60.2%
\$25,000 - \$34,999	64.0%
\$35,000 - \$49,999	68.0%
\$50,000 - \$74,999	72.1%
\$75,000 and Over	82.2%
Total Households	65.0%

Source:

Rounding results in 65.0%; the calculated number used in the figures is 65.1%.

### **Broadcast TV Data and Calculations**

Data for percentage of households (broken down by income) with broadcast TV service were unavailable. Therefore, only the total broadcast TV data appear on the chart in *Revving up the Communications Economic Engine*.

Source:

The "98.3% of households with televisions" is from the *1995 Statistical Abstract*, "Utilization of Selected Media: 1970 to 1994," Table 897, page 517.

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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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### Cellular Data and Calculations

The wireless data is primarily cellular data since at the time of this paper, PCS services were in their first stages of deployment and represented a small fraction of the market. The wireless data generally combined work and home uses.

To derive the percentage of households (by income) with cellular service, percentages developed from NMR data were first adjusted to the total number of U.S. households (**Figure 7**). Since the NMR survey was conducted by telephone, the data (Column A) were adjusted by the FCC telephone percentages by income level (Column B). The result of multiplying Column A times Column B produces the percentage of households (by income) with cellular service. When required, these results were weighted for distribution into *Statistical Abstract* income levels. **Figure 8** shows the result of this distribution.

It is becoming increasingly difficult to make the traditional work/home or business/residential distinctions for communications services, since many people telecommute or work at home. Therefore, the calculations use a NMR number of 79% to adjust the percentages (**Figure 8**). According to the NMR website, "Approximately four of five (79%) of these cellular phone owners said a household member was responsible for paying the cellular phone bill, while a substantial percentage (19%) indicated that the bill was paid for by a business." Calculations assume that if the bill is paid by a household member, it is a household service.

The numbers for the two lowest income categories are based on a comparison of the calculated cellular data with those from other sources (including a discussion with the Cellular Telecommunications Industry Association, or CTIA). The lower percentages were used based on the results of these comparisons.



## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

**Figure 7: Percentage of Households (by Income) with Cellular Service, Adjusted NMR Data**

Household Income:	Percentage of Households with Telephone Service that also have Cellular Service	Percentage of Households with Telephone Service Distributed to Match NMR Income Levels	Percentage of Households (by Income) with Cellular Service for Both Work and Home
	A	B	A * B
Under \$10,000	13.1%	82.0%	10.7%
\$10,000 - \$19,999	16.6%	91.2%	15.1%
\$20,000 - \$29,999	26.0%	95.4%	24.8%
\$30,000 - \$39,999	36.2%	97.7%	35.3%
\$40,000 - \$49,999	46.7%	98.5%	46.0%
\$50,000 - \$59,999	54.6%	98.8%	54.0%
\$60,000 - \$69,999	52.2%	98.8%	51.6%
\$70,000 - \$79,999	66.7%	98.8%	65.9%
\$80,000 - \$89,999	65.7%	98.9%	65.0%
\$90,000 - \$99,999	68.2%	98.9%	67.4%
\$100,000 and Over	73.1%	98.9%	72.3%
Not Respond	33.9%		
Total Households	38.5%	93.9%	36.2%

Sources:

Column A is based on background data from *NMR Special Analysis*, Table 111, page 134. Percentage of households with telephone service (Column B) is based on *Telephone Subscribership*, Table 1, page 5.

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

**Figure 8: Percentage of Households (by Income) with Cellular Service, Adjusted NMR Data Distributed to *Statistical Abstract* Categories**

<b>Household Income:</b>	<b>Percentage of Households (by Income) with Cellular Service for Both Work and Home</b>	<b>Assume 79.0% of Cellular Subscribers in Income Level Paid Cellular Bill from Home</b>	<b>Percentage of Households (by Income) with Cellular Service</b>
Under \$10,000	10.7%	79.0%	8.5%
\$10,000 - \$14,999	15.1%	79.0%	11.9%
\$15,000 - \$24,999	20.3%	79.0%	16.1%
\$25,000 - \$34,999	30.2%	79.0%	23.9%
\$35,000 - \$49,999	41.6%	79.0%	32.9%
\$50,000 - \$74,999	54.8%	79.0%	43.3%
\$75,000 and Over	69.8%	79.0%	54.3%
Total Households	36.2%	79.0%	28.6%

Source:

The adjusted NMR percentage of total U.S. households with cellular service of 28.6% is close to the percentage developed in Figure 1, Line 40, of 27.7%. Adjustment of 79.0% made for households paying cellular bills. NMR, website at <http://www.nielsenmedia.com/news/hotech-summary.html> on June 4, 1997.

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

**Figure 9: Percentage of Households (by Income) with Cellular Service: CTIA, Yankee Group, and Adjusted NMR Data**

Household Income:	Percentage of Households (by Income) with Cellular Service	Sources
Under \$10,000	3.5%	CTIA/Yankee Group
\$10,000 - \$14,999	4.0%	CTIA/Yankee Group
\$15,000 - \$24,999	16.1%	Adjusted NMR
\$25,000 - \$34,999	23.9%	Adjusted NMR
\$35,000 - \$49,999	32.9%	Adjusted NMR
\$50,000 - \$74,999	43.3%	Adjusted NMR
\$75,000 and Over	54.3%	Adjusted NMR
Total Households	27.7%	See <b>Figure 1</b> , Line 40.

*Sources:*

Comments on the percentages for households in the "Under \$10,000" and "\$10,000 - \$14,999" income categories are from CTIA, July 7, 1997. In addition, these percentages are also close to the data at the Yankee Group's website at <http://www.yankeegroup.com/abstract/4q96abs/Wmsegrpt.html>, accessed on July 8, 1997. Yankee Group, *Wireless Segmentation: Strategies for the Consumer, Executive Summary*, December 1996, Exhibit ES-1, "Current Penetration and Planned Purchases of Technology (on a Household Basis)."

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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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### Internet Data and Calculations

To derive the percentage of households (by income) with Internet access, percentages developed from NMR data were first adjusted to total number of U.S. households (**Figure 10**). Since the NMR survey was conducted by telephone, the data (Column A) were adjusted by the FCC telephone percentages by income level (Column B). The result of multiplying Column A times Column B produces the percentage of households (by income) with cellular service. When required, these results were weighted for distribution into *Statistical Abstract* income levels. **Figure 11** shows the result of this distribution.

It is becoming increasingly difficult to make the traditional work/home or business/residential distinctions for communications services since many people telecommute or work at home. Therefore, the calculations use a NMR number of 42.2% to adjust the percentages (**Figure 11**). The 42.2% is based on responses to NMR's question: "Regardless of whether or not you have used it, do you currently have access to the Internet at home?" and their data for total Internet access (both at work and at home).

The numbers for the two lowest income categories are based on a comparison of the calculated Internet access data with that from other sources (including a discussion with FIND/SVP). The lower percentages were used based on the results of these comparisons. It should also be noted that many of the low-income households with Internet access represent student households.

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

**Figure 10: Percentage of Households (by Income) with Internet Service, Adjusted NMR Data**

Household Income:	Percentage of Households with Telephone Service that also have Internet Service	Percentage of Households with Telephone Service Distributed to Match NMR Income Levels	Percentage of Households (by Income) with Cellular Service for Both Work and Home
	A	B	A * B
Under \$10,000	29.8%	82.0%	24.4%
\$10,000 - \$19,999	31.1%	91.2%	28.4%
\$20,000 - \$29,999	22.6%	95.4%	21.5%
\$30,000 - \$39,999	44.1%	97.7%	43.1%
\$40,000 - \$49,999	51.1%	98.5%	50.3%
\$50,000 - \$59,999	55.6%	98.8%	54.9%
\$60,000 - \$69,999	59.7%	98.8%	59.0%
\$70,000 - \$79,999	57.4%	98.8%	56.7%
\$80,000 - \$89,999	71.4%	98.9%	70.6%
\$90,000 - \$99,999	59.1%	98.9%	58.4%
\$100,000 and Over	68.7%	98.9%	67.9%
Not Respond	33.9%		
Total Households	42.5%	93.9%	39.9%

Source:

Column A is based on background data from *NMR Special Analysis*, Table 111, page 134. Percentage of households with telephone service (Column B) is based on *Telephone Subscribership*, Table 1, page 5. Background for Internet access at home is from *NMR Special Analysis*, Table 84, page 104.

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

**Figure 11: Percentage of Households (by Income) with Internet Service, Adjusted NMR Data Distributed to *Statistical Abstract* Categories**

<b>Household Income Level</b>	<b>Percentage of Households (by Income) with Internet Access at Both Work and Home</b>	<b>Assume 42.2% of Internet Subscribers in Income Level Accessed Internet from Home</b>	<b>Percentage of Households (by Income) with Internet Access</b>
Under \$10,000	24.4%	42.2%	14.7%
\$10,000 - \$14,999	28.4%	42.2%	12.0%
\$15,000 - \$24,999	24.7%	42.2%	10.4%
\$25,000 - \$34,999	32.7%	42.2%	13.8%
\$35,000 - \$49,999	47.4%	42.2%	20.0%
\$50,000 - \$74,999	56.5%	42.2%	23.8%
\$75,000 and Over	65.2%	42.2%	27.5%
Total Households	36.8%	42.2%	23.3%

Source:

The percentage of households that have Internet access at home (42.2%) is based on background from the *NMR Special Analysis*, Table 84, page 104.

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## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

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Figure12: Percentage of Households (by Income) with Internet Service, Gvu Data

Household Income:	Percentage of Households (by Income) with Internet Access
Under \$10,000	3.6%
\$10,000 - \$14,999	4.8%
\$15,000 - \$24,999	7.0%
\$25,000 - \$34,999	10.2%
\$35,000 - \$49,999	11.5%
\$50,000 - \$74,999	21.0%
\$75,000 and Over	11.1%

Source:

GVU WWW Surveying Team, Graphics, Visualization, & Usability Center, College of Computing, Georgia Institute of Technology, Atlanta, GA, *GVU's Seventh WWW User Survey, Conducted April 1997*, at GVU's website: [http://www.gvu.gatech.edu/gvu/user\\_surveys/](http://www.gvu.gatech.edu/gvu/user_surveys/), accessed June 17, 1997.

## Calculations and Sources for Revving up the Communications Economic Engine: Household Services, Monthly Bills, and Barriers to Competition, cont.

**Figure 13: Percentage of Households (by Income) with Internet Access; FIND/SVP, GVV, and Adjusted NMR Data**

Household Income:	Percentage of Households (by Income) with Internet Service	Sources
Under \$10,000	3.6%	GVV Data and FIND/SVP discussion
\$10,000 - \$14,999	4.8%	GVV Data and FIND/SVP discussion
\$15,000 - \$24,999	10.4%	Adjusted NMR
\$25,000 - \$34,999	13.8%	Adjusted NMR
\$35,000 - \$49,999	20.0%	Adjusted NMR
\$50,000 - \$74,999	23.8%	Adjusted NMR
\$75,000 and Over	27.5%	Adjusted NMR
Total Households	19.5%	FIND/SVP

Sources:

Conversation with FIND/SVP, June 2, 1997, and FIND/SVP, Emerging Technologies Research Group's website: <http://etrg.findsvp.com/>, accessed June 16, 1997. Also, GVV's *Seventh WWW User Survey, Conducted April 1997*, and data from the adjusted NMR calculations.

Based on background data from *NMR Special Analysis*, Table 84, page 104. The question was: "The Internet is the large interconnection of computer network services through which computers worldwide share information. You can access the Internet directly through an Internet service provider or indirectly through an online service like America On-Line or Microsoft Network. Regardless of whether or not you have used it, do you currently have access to the Internet at home?"