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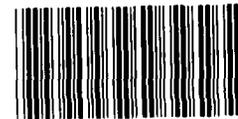
# General Accounting Office

## Survey Of Small Businesses' Reactions To Changes In The Costs Of Telephone Service

At the request of the House Committee on Small Business, GAO sent a questionnaire to a representative sample of small businesses asking them how they have been affected by changes in the costs of telephone service. The survey results project to over 2 million business establishments. One-fourth said their total monthly telephone bills had increased by more than 25 percent since January 1984. About 39 percent reported increases of less than 25 percent. Only 3 percent saw their bills decrease. The remaining businesses saw little change (27 percent) or did not answer the question (6 percent). Most of the businesses reported that they had neither increased nor decreased the number of their telephone lines nor passed higher costs on to their customers. This report provides detailed information on questionnaire responses and GAO's analysis.

GAO's questionnaire was designed to gather general information on how changes in telephone costs are affecting small businesses. Because of the limited scope of the questionnaire, GAO's survey results must be used with caution.

GAO also reviewed a 1984 report by Bell Communications Research, Inc., on the effect of changing telephone rates on small businesses. GAO found that the report, while providing detailed data on small businesses' telephone expenditures, should have included additional information on its methodology and limitations to help readers avoid drawing any improper conclusions.



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RESOURCES, COMMUNITY,  
AND ECONOMIC DEVELOPMENT  
DIVISION

B-217998

The Honorable Parren J. Mitchell  
Chairman, Committee on Small Business  
House of Representatives

The Honorable Ron Wyden  
House of Representatives

In response to your July 3, 1984, letter we have conducted a questionnaire survey to obtain information from small businesses on their reactions to changes in the costs of their telephone service. Our questionnaire survey was undertaken to assist the House Committee on Small Business' Telephone Task Force efforts to obtain information on how recent judicial and regulatory decisions dealing with the telephone industry were affecting small businesses. We also reviewed the basic methodology used by Bell Communications Research, Inc.<sup>1</sup> (Bellcore), in its November 1984 report of the impact of rate changes on small business. Assistance on other matters requested in your letter already has been provided.

We mailed a questionnaire to a nationwide representative sample of 2,214 small business establishments with fewer than 500 employees. Appendix I of this report discusses in detail our survey results, which are based on 1,239 returned questionnaires. These results represent about 2.2 million small business establishments in the United States.

In our pretests of the questionnaire we found that a lengthy and complicated questionnaire would be needed to obtain precise information on the economic impact of rate changes and other matters affecting small businesses' telephone service. In our opinion, data on the economic impact of telephone rate changes on small business must come from telephone billing information

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<sup>1</sup>Bell Communications Research, Inc., is a central services organization formed in 1984 following the divestiture of the 22 Bell operating companies from the American Telephone and Telegraph Company (AT&T). The divestiture agreement created seven new independent regional holding companies to provide local telephone service through the Bell operating companies. Bell Communications Research is owned by the regional holding companies. Its function is to provide them with central technical and support services.

maintained by the telephone companies. Because the Committee's office proposed that Bellcore and the Federal Communications Commission (FCC) conduct a study using actual billing records, we designed a questionnaire to gather general information on how changes in telephone costs are affecting small businesses. Due to the limited scope of the questionnaire, our survey results must be used with caution. The survey does not, for example, establish the causes or reasons for reported increases in telephone costs. Nor does the survey address the much broader issue of whether small businesses are faring any better or worse than large businesses or residential users. The information presented here reveals only a few aspects of the complex changes taking place in the area of telephone service.

Highlights from our analysis of questionnaire responses follow:

- One-fourth of the small businesses represented in our survey reported that their total monthly telephone bills had increased by more than 25 percent since January 1984. About 39 percent reported increases of less than 25 percent. Three percent saw their bills decrease. The remaining businesses saw little change (27 percent) or did not answer the question (6 percent).
- Constant or increased monthly charges were also reported for individual components of telephone bills, including local and long-distance service, equipment leasing, and Yellow Pages advertising. Few businesses saw decreases in the charges for these services.
- Nearly one-half of the small businesses said their combined intrastate and interstate long-distance costs had increased even though AT&T reduced interstate long-distance rates by 6.1 percent in May 1984.
- Most businesses indicated they had (1) neither increased nor decreased the number of their telephone lines (85 percent), (2) not adjusted the number of their long-distance telephone calls as a result of rate decreases (80 percent), and (3) not passed higher costs on to their customers (89 percent). About 69 percent said an additional 25 percent reduction in out-of-state long-distance telephone rates would have little or no effect on the number of their businesses' out-of-state long-distance calls.
- Small businesses with local measured service expressed no clear preference for or against this type of service. (Measured service charges for local calls are based on the number or length of calls made.)

--About 72 percent of the businesses with more than one telephone line were not aware of FCC's "end-user access charge" decision--a significant regulatory action implemented in May 1984 that increased local service telephone costs for multi-line businesses by up to \$6 a month per line.

Bellcore released its report, The Impact of End-User Charges on Small Businesses, in November 1984. The purpose of this report was to measure savings in long-distance charges to small businesses that will result from FCC's access charge decision. Using data from a sample of about 9,000 small business telephone bills, the report concluded that about one-half of all small businesses will save enough in reduced long-distance rates to cover increased telephone line charges. We reviewed certain aspects of the study's methodology and found that the population from which the Bellcore sample was drawn does not include many very small businesses and, therefore, was not representative of all small businesses. Also, the report, in presenting its sample results, did not provide sample variances so that confidence intervals for reported dollar expenditures and savings could be computed. Sample variances and confidence intervals are statistical measures that would have helped readers determine how much confidence they should have that values calculated from the sample reflect values of the total population. Additional information on sample variances and the limitations of the sampled population would have helped readers avoid drawing any improper inferences. Appendix IV contains more detail on the Bellcore study and methodology.

#### BACKGROUND

On May 23, 1984, the House Committee on Small Business commissioned a Telephone Task Force, comprised of 12 Committee members, to investigate the impact on small business of the many changes occurring in the telephone industry. The task force attributed rising telephone costs, in large part, to changes in the telephone industry caused by recent judicial and regulatory decisions. These decisions included the U.S. District Court's breakup of AT&T and FCC's access charge decision.

The FCC access charge decision has been especially controversial. In May 1984 it resulted in FCC's implementing a maximum \$6 monthly charge per line (referred to as either customer access line charge or end-user access charge) for business subscribers with more than one telephone line. In conjunction with this end-user charge, FCC ordered a 6.1 percent reduction in AT&T's interstate long-distance rates. Another FCC order will impose an access charge of \$1 a month on residential and single-line business customers beginning in June 1985. This charge will rise to \$2 in 1986. Additional reductions in AT&T's interstate long-distance rates are expected.

The access charge decision, along with other related FCC decisions, is intended to alter the manner in which the telephone industry's fixed costs are allocated and recovered. FCC believes its decisions will increase efficiency by tying rates more closely to the cost of providing the service. The primary concern of individual telephone subscribers, however, is that FCC's decisions could have a major impact on their telephone bills by changing the way local and long-distance services are priced--additional flat charges will be added to local telephone costs while AT&T's interstate long-distance rates will be lowered. In testimony before the task force, representatives of small business suggested that few small businesses would benefit from FCC's changes because many make only a limited number of interstate calls.

The Telephone Task Force believed it did not have enough useful information on the impact of rising telephone rates on small businesses. The task force found no comprehensive study of the impact of telephone rate changes on small businesses and criticized FCC for failing to adequately investigate the economic and social impacts of its telephone pricing decisions. The task force's findings were echoed in testimony before the task force on September 25, 1984, when the Small Business Administration's (SBA) Chief Counsel for Advocacy noted that the absence of information on small businesses' usage of the telephone system made it difficult to evaluate the impact on small businesses of FCC decisions.

Recognizing this lack of data, the House Committee on Small Business requested that we assist the task force in its investigation by developing a questionnaire for a survey of a statistical sample of small businesses. In addition, members of the task force staff asked Bellcore staff to measure the impact of recent FCC actions on small businesses by conducting a study using telephone billing data from some Bell operating companies. Bellcore's report was issued in November 1984.

#### OBJECTIVE, SCOPE, AND METHODOLOGY

Our objective was to respond to your request that we assist the Committee's Telephone Task Force in its investigation of the impact on small businesses of recent changes in the telephone industry. As agreed with the Committee's office, our assistance involved two tasks: (1) to develop and evaluate a questionnaire survey aimed at a nationwide sample of small businesses and (2) to review the methodology used in Bellcore's November 1984 small business telephone study.

Initially, the Committee's office expressed interest in a questionnaire designed to measure the precise economic effect on small businesses of specific regulatory decisions. We found in our pretests of the questionnaire that in order to meet this objective we would have had to considerably lengthen and

and complicate the questionnaire, thereby decreasing the response rate and increasing the possibility of receiving inaccurate data. For example, obtaining needed billing information from small businesses could require questionnaire participants to interpret data from several phone bills in addition to performing a series of sortings and calculations--depending on how many long-distance calls were made, how many were intrastate and interstate, and the number of phone companies used. We found in our questionnaire pretests that participants had failed to provide accurate information on several key questions.

Recognizing these limitations in a mail questionnaire, the Committee's office pursued discussions with FCC and Bellcore to obtain agreement on their undertaking a comprehensive study using actual billing information maintained by the Bell operating companies. Therefore, the Committee's office agreed to our developing a more general questionnaire structured around the following issues:

- What are the characteristics of typical small businesses and what type of telephone service do they have?
- To what extent have telephone costs for small businesses changed since January 1984?
- How have small businesses reacted to changing telephone costs?
- How will small businesses react to additional reductions in interstate long-distance telephone rates?
- How common is measured local service among small businesses and how much of a preference is there for it?
- Were small businesses aware of the access charge decision?

We selected a statistical sample of 2,214 small business establishments<sup>2</sup> with fewer than 500 employees from the Dun & Bradstreet Corporation's Market Identifier (DMI) file, a major source of data for SBA's small business data base and small business research studies. The DMI file is a computerized data base containing 5.5 million business establishments, of which about 4.5 million had fewer than 500 employees and met our other sampling criteria.

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<sup>2</sup>An establishment is defined as any single physical location where business is conducted.

Our survey results are based on the 1,239 returned questionnaires--a 56-percent response rate. These results are representative of about 2.2 million small business establishments, or about 50 percent<sup>3</sup> of the 4.5 million eligible establishments in the DMI file. Because we do not know how nonrespondents would have answered our questionnaire, we did not project our survey results to the remaining 50 percent. Our survey results also do not cover an additional 1.7 to 3.4 million very small businesses with a business telephone line that SBA staff in the Office of Advocacy believe to be excluded from the DMI file. We did not include these businesses in our survey because of the lack of an adequate, current data base from which to sample. According to SBA staff, many of the very small businesses not included in the DMI file are presumed to be owner-operated businesses with no paid employees.

Appendix III includes technical information on the scope and methodology followed in our survey, including additional information on the Market Identifier file, our criteria and procedures for selecting a statistical sample, and other matters. Our questionnaire survey was conducted from October 1984 to February 1985.

Our review of the methodology used in Bellcore's November 1984 report was limited to addressing two questions: (1) Does the population from which Bellcore drew its sample represent the universe of all small businesses with a business telephone line? and (2) Would information on sample variances have helped those using the study to judge the validity of its findings? We focused on these two questions because they were raised by Committee staff and the Congressional Research Service (CRS). CRS also reviewed Bellcore's methodology and issued a memorandum dated January 25, 1985, to the Committee on its findings. CRS noted limitations in the comprehensiveness of the population sampled and found a need for information in the report on sample variances so that the reliability of the data presented could be evaluated. These were basically the same limitations we found in our review.

To answer the two questions on Bellcore's methodology, we reviewed the November 1984 study, CRS' memorandum, and various SBA

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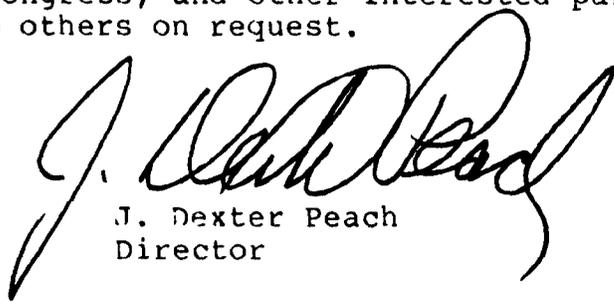
<sup>3</sup>We stratified our sample into three groups according to the size of the business as determined by the number of employees. The population, sample size, and response rate of each group differed. These differences caused our survey results to project to less than the percentage of returned questionnaires. (See table 19 in appendix III for detailed information on our projection.)

documents discussing the DMI file. We also discussed the file and other data on small businesses with staff familiar with business data at SBA, the Internal Revenue Service, and Bureau of the Census. In addition, we discussed the DMI file with the senior account executive who markets the DMI file to federal agencies for Dun's Marketing Services, a company of Dun & Bradstreet Corporation.

At the Committee office's request, we did not obtain official comments from FCC, SBA, and Bellcore on the matters discussed in this report. All three of these organizations have, of course, an interest in information on small businesses' telephone costs, usage, and service. Our methodology and survey results were discussed with officials of FCC's Common Carrier Bureau; officials of SBA's Office of Advocacy; and Bellcore's Division Manager for Government Affairs. We also discussed our review of Bellcore's November 1984 study methodology with Bellcore's Division Manager, who was the official responsible for the study. The views of these parties are included, where appropriate.

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As arranged with the Committee's office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 7 days from its date. At that time, we will send copies to the Chairman, Federal Communications Commission; the Chief Counsel for Advocacy, Small Business Administration; the Division Manager for Government Affairs, Bell Communications Research, Inc; interested congressional committees, subcommittees, and individual Members of Congress; and other interested parties. Copies will be available to others on request.



J. Dexter Peach  
Director

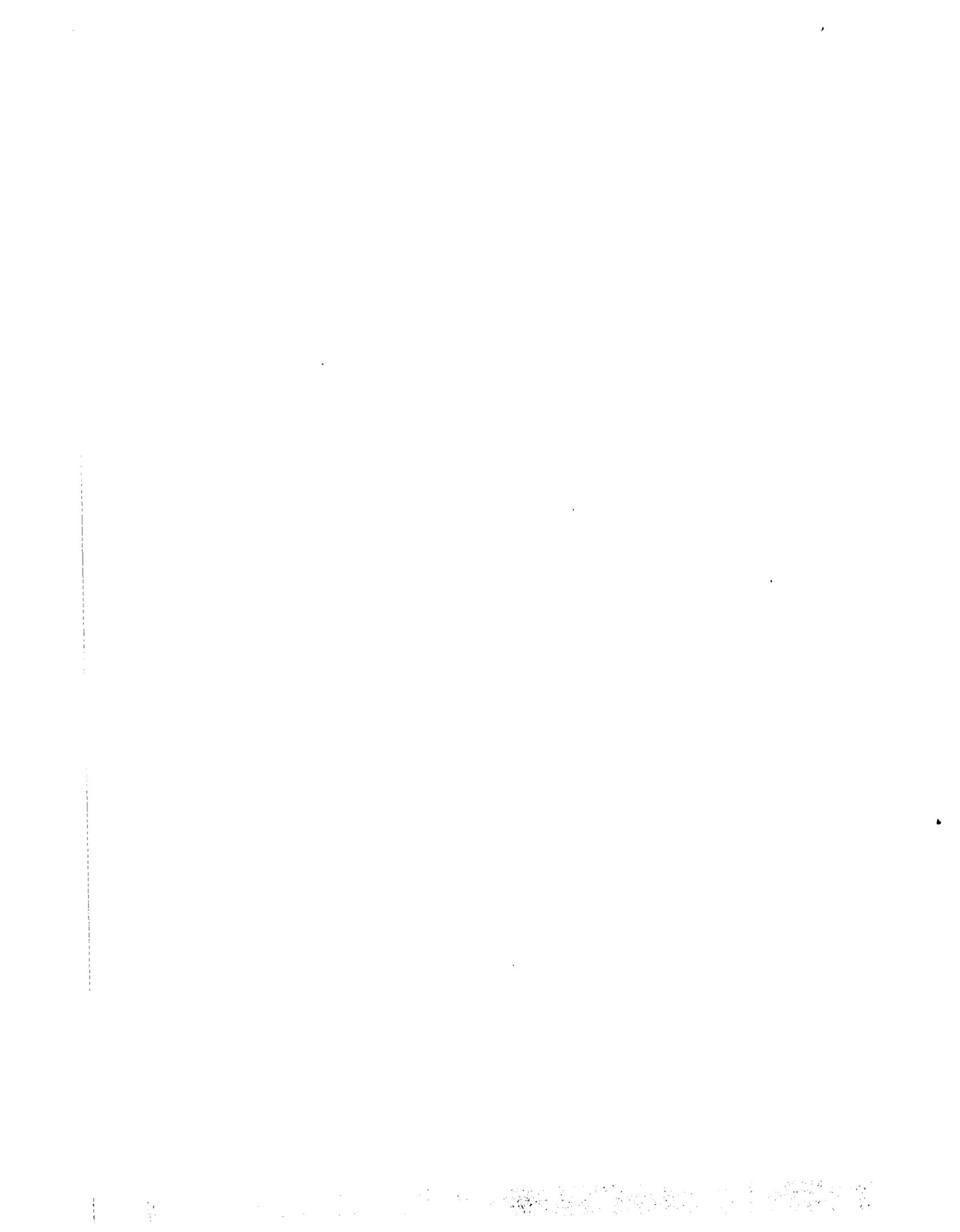


## C o n t e n t s

		<u>Page</u>
APPENDIX		
I	Analysis of Questionnaire Responses	1
II	GAO's Survey Questionnaire For Small Businesses	24
III	Questionnaire Scope and Methodology	30
IV	Review of Methodology Used by Bellcore in Its November 1984 Report on the Impact of End- user Charges on Small Businesses	39

### ABBREVIATIONS

AT&T	American Telephone and Telegraph Company
BOC	Bell operating company
CRS	Congressional Research Service
DMI	Dun & Bradstreet's Market Identifier file
FCC	Federal Communications Commission
GAO	General Accounting Office
LMS	local measured service
MTS	Message Toll Service
PPI	producer price index
SBA	Small Business Administration
SIC	standard industrial classification
SMSA	standard metropolitan statistical area
SSS	Social & Scientific Systems, Inc.
WATS	Wide Area Telephone Service



### ANALYSIS OF QUESTIONNAIRE RESPONSES

This appendix presents the weighted results of our questionnaire to small businesses. (The questionnaire itself is reproduced in appendix II along with the overall weighted responses, and a detailed discussion of our sample methodology is found in appendix III.) We begin with a section that categorizes the responding businesses in terms of their activity, size, location, and type of telephone company. Aside from indicating the variety of businesses that responded, these categories were useful in evaluating the questionnaire results. The overall responses to individual questions were broken down (cross-tabulated) by each of the categories in order to study whether responses of particular types of businesses (for example, those with only one telephone line) differed greatly from the overall responses. Cases in which the differences were notable are mentioned, where appropriate. In the sections that follow this background material, we indicate how the businesses responded to questions dealing with their telephone service. Their responses are grouped into six categories:

- typical total monthly telephone costs;
- changes in monthly telephone charges;
- reactions to increasing telephone charges;
- reactions to decreases in long-distance rates;
- reactions to local measured service (LMS);
- awareness of FCC's access charge decision.

As explained in appendix III (see p. 35), the weighted questionnaire results are limited to 50 percent (2,243,088) of the eligible population of 4.5 million private "for profit" small business establishments<sup>1</sup> with fewer than 500 employees. The results cannot be used to characterize any portion of the remaining 50 percent, which represents business establishments that did not return a completed questionnaire. The results also cannot be used to characterize any business establishment not included in the sample population.

#### CHARACTERISTICS OF SMALL BUSINESSES RESPONDING TO THE QUESTIONNAIRE

Using information obtained from the businesses responding to our questionnaire and from the Dun & Bradstreet Market

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<sup>1</sup>An "establishment" is any single physical location where business is conducted. See the Sampling Criteria section in appendix III, pages 32 to 34, for more details.

Identifier (DMI) file, we were able to characterize the businesses by their type of business activity, size, location, and type of telephone company.

### Types of business activity

Each business that we surveyed was identified by a standard industrial classification (SIC) code designating the type of business activity in which it is engaged. The SIC coding system is detailed, but business activities can be grouped into a few major industrial divisions. Table 1, column A, shows how the businesses that responded to our questionnaire were distributed by SIC division. For comparison, column B shows the distribution of all business firms listed in the DMI file maintained in the Small Business Administration's (SBA) data base, from which we drew our sample (see app. III, pp. 30 to 32, for details).

Table 1

### Distribution by Major Industrial Divisions

<u>Division</u>	<u>Col. A</u> Distribution of businesses responding to questionnaire	<u>Col. B</u> Distribution of all establishments in the DMI file (Dec. 1983)
	- - - - - (percent, rounded) - - - - -	
A. Agriculture	3	3
B. Mining	1	1
C. Construction	13	12
D. Manufacturing	11	9
E. Transportation, communication, and utilities	4	4
F. Wholesale trade	13	10
G. Retail trade	32	26
H. Finance, insurance, and real estate	10	8
I. Service	<u>13</u>	<u>27</u>
	<u>100</u>	<u>100</u>

As the table indicates, the profile of the businesses responding to our questionnaire is close to that of the firms in the data base. The one major exception, "Services," may be due to the fact that we excluded from our sample several types of service businesses (for example, hospitals, social service organizations, museums). (See app. III, pp. 32 to 34, for details.)

### Size of the businesses

Concerns have been raised by the House Committee on Small Business about how small businesses of various sizes would be affected by changes in telephone regulation and rates. We were therefore particularly interested in how responses to our questionnaire might differ by the size of the businesses. Although it is difficult to define "size," we chose three variables as being indicative of the responding businesses' size: number of employees, number of telephone lines, and the amount of gross receipts. As indicated by tables 2, 3, and 4, our overall questionnaire results include data from a considerable proportion of businesses at the low ends of these scales:

Table 2

Responding Businesses by  
Number of Employees

<u>Range</u>	<u>Percent (rounded)</u>
19 or fewer employees	86
20 - 99 employees	12
100 - 499 employees	<u>2</u>
	<u>100</u>

Table 3  
Responding Businesses  
by Number of Telephone Lines

<u>Range</u>	<u>Percent (rounded)</u>
Only one line	44 <sup>b</sup>
2 to 6 lines	44
More than 6 lines	9
[No response] <sup>a</sup>	<u>3</u>
	<u>100</u>

<sup>a</sup>In this table and subsequent ones, "no response" signifies those businesses that failed to respond to a question that they were asked to address.

<sup>b</sup>According to the FCC and Bell Communications Research, Inc. (Bellcore), the actual proportion of businesses with only one telephone line is probably higher than this. As noted in appendix III, pages 30 to 32, the DMI file from which our sample was drawn does not include many very small businesses that have no need for credit ratings or insurance and are owner-operated with no paid employees.

Table 4  
Responding Businesses  
by Amount of Annual Gross Receipts

<u>Range</u>	<u>Percent (rounded)</u>
Under \$150,000	35
\$150,000 - \$500,000	29
Over \$500,000	28
[No response]	<u>8</u>
	<u>100</u>

We cross-tabulated the responses of those businesses that were on the low end of all three scales. Of the 2,243,088 businesses represented in our questionnaire results, 22 percent (491,459) had 19 or fewer employees, only one telephone line, and gross receipts under \$150,000. We wished to determine whether businesses in this group were, because of their modest size, more

Type of telephone service

The Bell operating companies (BOCs) provide local telephone service to 80 percent of the nation's telephones, while approximately 1500 "independent" (non-Bell) telephone companies serve the remaining 20 percent. The businesses represented in our questionnaire results came close to matching this breakdown: 76 percent used a BOC for their local service and 22 percent used an independent company. (The remainder failed to specify which type they had.) In general, we found only a few differences between the questionnaire responses of businesses served by a BOC and those served by an independent company. These differences are noted, where appropriate.

With regard to long-distance service, 57 percent of the businesses reported that they used AT&T exclusively; 25 percent used only a competing long-distance company (such as MCI, GTE, and SBS); and 18 percent used the services of both AT&T and competing long-distance companies.

TYPICAL TOTAL MONTHLY TELEPHONE COSTS REPORTED BY BUSINESSES

Table 5 gives an overall breakdown of "typical" total monthly charges as reported by the businesses themselves. Also included are percentages reported by the "smallest" businesses, as defined earlier on pages 4 and 5 (i.e., those businesses that reported having 19 or fewer employees, and only one telephone line and annual gross receipts under \$150,000).

Table 5Typical Total Monthly Charges

<u>Range</u>	<u>Overall responses</u>	<u>"Smallest" businesses' responses</u>
	- - - - - (percent, rounded) - - - - -	
Under \$50	17	41
\$50 - \$99	17	30
\$100 - \$199	17	19
\$200 - \$499	22	5
\$500 - \$999	12	1
\$1,000 - \$2,499	7	0
\$2,500 - \$4,999	2	0
Over \$5,000	1	0
[No response]	<u>5</u>	<u>4</u>
	<u>100</u>	<u>100</u>

sensitive to increases in telephone costs.<sup>2</sup> We therefore report the responses from these "smallest" businesses alongside the overall responses in several of the tables that follow.

#### Number of business locations

A little over 80 percent of the responding businesses had only one business location. Businesses with more than one location were instructed to answer the questionnaire with reference to the situation at the one particular location to which the questionnaire was mailed.

#### Geographic distribution

The staff of the House Committee on Small Business was interested in determining the relative urban/rural distribution of the responding businesses. Two problems in doing this are (1) developing satisfactory definitions of "urban" and "rural" and (2) finding a means to apply the definitions to the businesses in question. We chose the federally designated Standard Metropolitan Statistical Areas (SMSAs) as both our definition and our means. SMSAs are used to present statistics on U.S. metropolitan areas. A metropolitan area is considered to be an integrated unit with a recognized urban population nucleus of substantial size. Businesses located within an SMSA can, in this sense, be considered "urban," while businesses outside an SMSA can be considered "non-metropolitan/rural."

Of the businesses represented in our questionnaire results, 73 percent were located within an SMSA (urban), while 27 percent were located outside an SMSA (non-metropolitan/rural). This corresponds closely with figures provided to us by an official of the U.S. Census Bureau, showing that approximately 25 percent of all business establishments in the nation employing fewer than 500 people are located outside of SMSAs. Our questionnaire results showed that businesses located outside of an SMSA tended to have fewer telephone lines than those within an SMSA. In addition, those located outside of an SMSA were more likely to have their local service provided by an independent telephone company and their long-distance service by AT&T (see the following section). All of these differences are in keeping with a non-metropolitan location.

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<sup>2</sup>One change that these single-line businesses did not experience in 1984 was the imposition of a customer line access charge, also known as the "subscriber line charge" or "end-user charge." Only multi-line businesses paid a line charge in 1984. Single-line businesses will pay a line charge beginning in June 1985.

As table 5 indicates, 51 percent of all the respondents reported having typical total monthly charges under \$200. Businesses located outside of SMSAs generally reported lower total monthly charges than those within SMSAs.

Table 5 also shows that most of the "smallest" businesses reported more modest amounts of total monthly charges--under \$100. This result suggests that our procedure of using the low ends of the three "size" variables (number of employees, number of lines, and amount of gross receipts) has isolated the responses of those businesses that are among the smallest users of telephone service.

In evaluating these total monthly charges, it must be remembered that they encompass more than local and long-distance service charges. Monthly bills also include, among other things, equipment leasing charges, installation and repair charges, and taxes. In addition, 65 percent of all the businesses reported that their monthly bills included Yellow Pages charges. Yellow Pages costs can be substantial, depending on the size and number of advertisements. These advertisements are a discretionary marketing expense and not a telephone service expense.

We had wanted to ask businesses to relate the size of their telephone costs to their businesses' net profits, but found in testing the questionnaire that businesses were reluctant to divulge such information. Instead, we asked them what the percentage was of their annual telephone costs to their annual gross receipts, with these results:

Table 6

Percentage of Annual Telephone  
Costs to Annual Gross Receipts

<u>Response category</u>	<u>Overall responses</u>	<u>"Smallest" busi- nesses' responses</u>
	- - - - (percent, rounded) - - - -	
1% or less	43	46
Greater than 1% but less than or equal to 5%	35	31
Greater than 5% but less than or equal to 10%	6	4
Greater than 10% but less than or equal to 25%	2	2
Greater than 25% but less than or equal to 50%	0	0
Greater than 50%	0	0
No opinion	<u>14</u>	<u>17</u>
	<u>100</u>	<u>100</u>

These responses must be used cautiously. As noted above, the telephone costs include charges other than for local and long-distance service. In addition, the ranges of the response categories are broad, and we cannot determine how the businesses are distributed within each range. Finally, gross receipts do not indicate the profitability of a business nor the importance of the telephone to business operations.

Regarding typical monthly long-distance costs, we had hoped to gather data in a way that would enable us to develop separate tables on intrastate costs and interstate costs. The distinction is important because the FCC has linked its access charge plan to a reduction in AT&T's interstate long-distance rates only. In testing our questionnaire, however, we found that many businesses were unwilling or unable to spend the time needed to go through a typical telephone bill, separate the itemized charges for intrastate calls from the interstate calls, and then total the charges

for these two types of calls. As a result, we asked the businesses simply to estimate their typical total monthly long-distance costs, recognizing that they would be combining intrastate and interstate costs. The results are as follows:

Table 7

Typical Total Monthly Long-distance Charges

<u>Range</u>	<u>Overall responses</u>	<u>"Smallest" busi- nesses' responses</u>
	- - - - - (percent, rounded) - - - - -	
Under \$50	41	69
\$50 - \$99	18	23
\$100 - \$199	12	2
\$200 - \$499	13	1
\$500 - \$999	6	1
\$1,000 - \$2,499	4	0
\$2,500 - \$4,999	1	0
Over \$5,000	1	0
[No response]	<u>4</u>	<u>4</u>
	<u>100</u>	<u>100</u>

These responses, particularly from the smallest businesses, indicate that many small businesses are not heavy long-distance users.

CHANGES IN MONTHLY TELEPHONE CHARGES

We asked the businesses how their typical total monthly charges have changed since January 1984. Given the importance of this issue, it would have been useful to have obtained a precise breakdown of the degrees of change (if any) that the businesses believed they were experiencing. In developing our questionnaire, however, we found that businesses were generally reluctant or unable to perform a detailed analysis of their billing records. We therefore used the broad categories found in table 8. We believe that even without analysis, businesses should be able to say whether their monthly costs changed by more than 25 percent (if the costs changed at all).

Table 8

Reported Changes in Total Monthly  
Charges Since January 1984

<u>Range</u>	<u>Overall responses</u>	<u>"Smallest" busi- nesses' responses</u>
	- - - - (percent, rounded) - - - -	
Increased more than 25%	25	24
Increased less than 25%	39	38
Remained the same	27	31
Decreased less than 25%	2	1
Decreased more than 25%	1	1
[No response]	<u>6</u>	<u>5</u>
	<u>100</u>	<u>100</u>

As table 8 indicates, only 3 percent of the businesses reported a decrease in their total monthly charges, and less than one-third reported no change. Most of the businesses report some degree of increase in their total monthly charges. Twenty-five percent<sup>3</sup> reported increases of more than 25 percent. Interestingly, the responses from the smallest businesses in table 8 do not differ much from the overall responses, though our cross-tabulations showed that businesses receiving local service from a Bell operating company tended to report somewhat higher increases than those served by an independent company. The increases reported in table 8 must be evaluated cautiously, however. To some extent, the increases may be due to factors other than rate increases, such as greater use of the telephone, repair costs, or higher Yellow Pages charges.

We asked the surveyed businesses to break out several key components of their bills--local service, long-distance service, equipment leasing, and Yellow Pages--and estimate the percent of changes in the monthly charges for these services since January 1984. The results are listed in tables 9 through 12.

Table 9 shows the reported changes in monthly charges for local service.

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<sup>3</sup>At the 95-percent confidence level, our analysis showed that the 25 percent of businesses reporting increases would not have varied by more than about plus or minus 3 percent. (See app. III, p. 36, for information on the computation of confidence levels.)

Table 9

Reported Changes in Monthly Charges  
for Local Service Since January 1984

<u>Range</u>	<u>Overall responses</u>	<u>"Smallest" busi- nesses' responses</u>
	- - - - (percent, rounded) - - - -	
Increased more than 25%	22	21
Increased less than 25%	38	37
Remained the same	28	32
Decreased less than 25%	1	0
Decreased more than 25%	0	0
Not applicable	1	3
[No response]	<u>10</u>	<u>7</u>
	<u>100</u>	<u>100</u>

Overall, 60 percent of the businesses reported increases in their local service costs. Less than one-third reported stable or declining costs. (Again, there is no great difference between the overall responses and those of the smallest businesses.) That there has been some increase in local service costs for businesses is borne out by the Bureau of Labor Statistics' producer price index (PPI) data. The PPI measures average changes in prices received by producers of a wide range of "commodities"--which include various types of telephone service. Between January 1984 and October 1984, the PPI data show that the prices received for local telephone service to business subscribers rose 6.1 percent. (By way of comparison, the index for local service to residential subscribers rose 6.4 percent.)

Table 10, for long-distance service, also shows a high percentage of businesses reporting increases in charges.

Table 10

Reported Changes in Monthly Charges  
for Long-distance Service Since January 1984

<u>Range</u>	<u>Overall responses</u>	<u>"Smallest" businesses' responses</u>
	- - - - (percent, rounded) - - - -	
Increased more than 25%	17	17
Increased less than 25%	29	29
Remained the same	35	35
Decreased less than 25%	5	4
Decreased more than 25%	1	1
Not applicable	2	5
[No response]	<u>11</u>	<u>9</u>
	<u>100</u>	<u>100</u>

Once again, there is little difference between the overall responses and those of the smallest businesses, although businesses located outside of SMSAs tended to report somewhat higher increases in long-distance costs than those within SMSAs.

As noted earlier, it is important to keep in mind that the reported increases in long-distance charges represent a combination of intrastate and interstate long-distance charges. Long-distance rates for interstate service did drop in 1984 when the FCC required AT&T to reduce its interstate long-distance rates by 6.1 percent in conjunction with the imposition of access charges on businesses having more than one telephone line. (Some other long-distance companies also voluntarily lowered their rates to some degree around the same time.) PPI data show that, overall, the prices received for long-distance toll service (both intrastate and interstate) declined by 1.5 percent between January and October 1984. This overall figure represents the combined effects of both increases and decreases in prices received for various types of toll service. The PPI data for intrastate Message Toll Service (MTS)<sup>4</sup> show an increase of 3.9 percent during the January to October 1984 period. On the other hand, the PPI data

<sup>4</sup>Message Toll Service is a non-private-line intrastate and interstate long-distance telephone service that permits local subscribers to establish two-way service on a message-by-message basis.

for other toll services show decreases: interstate MTS down 5.1 percent; interstate Wide Area Telephone Service (WATS)<sup>5</sup> down 4.6 percent; and intrastate WATS down 1.6 percent.

This PPI data suggests that the long-distance cost increases reported by the businesses in our survey may, to some extent, be due to increases in intrastate MTS costs. Those businesses making more use of intrastate MTS than other types of long-distance service might well find that their total long-distance costs are increasing despite cost reductions in other, less frequently used, types of long-distance service.

This explanation, however, would not seem to account completely for the 17 percent<sup>6</sup> of businesses reporting long-distance cost increases of 25 percent or more. Increases of this magnitude are well above the PPI 3.9-percent increase in prices received for MTS intrastate service. Since increases in long-distance costs (particularly for MTS services) are dependent on the amount of calling done as well as the rates for the service, it seems likely that businesses reporting sharply increased long-distance costs are, to some degree, making an increased amount of long-distance calls. However, the extent to which higher monthly long-distance calls are due to increased rates versus increased calling cannot be quantified by our survey results.

Tables 11 and 12 show cost changes since January 1984 in two other elements of the businesses' monthly bills: equipment leasing and Yellow Pages.

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<sup>5</sup>Wide Area Telephone Service allows a subscriber to make calls to specific geographic areas for a rate based on volume and time-of-day but generally less than that charged for a message toll service. Customers may also purchase "800" service, which permits the subscriber to receive calls placed from specific areas with no charge to the caller.

<sup>6</sup>At the 95-percent confidence level, our analysis showed that the 17-percent figure would not have varied by more than about plus or minus 3 percent.

Table 11

Reported Changes in Monthly Charges  
For Equipment Leasing Since January 1984

<u>Range</u>	<u>Overall responses</u>	<u>"Smallest" businesses' responses</u>
	- - - -	- - - -
	(percent, rounded)	
Increased more than 25%	15	13
Increased less than 25%	19	18
Remained the same	27	27
Decreased less than 25%	1	0
Decreased more than 25%	0	0
Not applicable	14	15
[No response]	<u>24</u>	<u>27</u>
	<u>100</u>	<u>100</u>

Table 12

Reported Changes in Monthly Charges  
For Yellow Pages Advertising Since January 1984

<u>Range</u>	<u>Overall responses</u>	<u>"Smallest" businesses' responses</u>
	- - - -	- - - -
	(percent, rounded)	
Increased more than 25%	12	13
Increased less than 25%	26	25
Remained the same	27	25
Decreased less than 25%	0	0
Decreased more than 25%	1	1
Not applicable	13	16
[No response]	<u>21</u>	<u>20</u>
	<u>100</u>	<u>100</u>

Once again, the overall responses and the smallest businesses' responses do not vary significantly from each other. The percentages of "not applicable" in tables 11 and 12 are most likely due to the fact that these questions would not be relevant to businesses that have purchased their own telephone equipment or refrain from advertising in the Yellow Pages.

PPI does not give data on equipment leasing. For directory advertising (Yellow Pages) the PPI shows an increase of 8.2 percent in prices received between January 1984 and October 1984.

REACTIONS TO INCREASING  
TELEPHONE CHARGES

As table 8 indicated, 64 percent of the businesses reported that their total monthly telephone charges had increased since January 1984. We asked this group how much of the increase they passed on to their customers. The overwhelming majority (89 percent) of this group stated that they passed "little or none" of these telephone cost increases on to their customers. This percentage was even higher (97 percent) for the "smallest" businesses in this group.

We then asked all of the businesses whether they had changed the number of their telephone lines since January 1984. Eighty-five percent<sup>7</sup> reported that they had made no changes. Of those that did change the number of lines, more businesses increased them (8 percent) than decreased them (5 percent). (The remainder did not respond to the question.) About one-half of the decreases were attributed to rising costs, about one-third to declining needs, and the remainder to other reasons.

These responses would suggest that the surveyed businesses are, in some way or another, absorbing the increased costs of telephone service. Our survey results do not indicate whether these increases are directly cutting into their profits, whether the businesses are compensating for the increases by economizing in other areas of their operations, or whether additional business activity is compensating for higher telephone costs.

REACTIONS TO 1984 DECREASES  
IN INTERSTATE LONG-DISTANCE CHARGES

We asked all the businesses to tell us how the 6.1-percent reduction in AT&T's interstate long-distance rate (along with reductions by other long-distance companies), discussed earlier, affected their use of long-distance service. Only 8 percent of the businesses reported that they had increased the amount of their long-distance calls because of the rate decrease, while 80 percent<sup>8</sup> reported no change. (The remainder either did not know or failed to respond to the question.)

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<sup>7</sup>At the 95-percent confidence level, our analysis showed that the 85-percent figure would not have varied by more than about plus or minus 3 percent.

<sup>8</sup>At the 95-percent confidence level, our analysis showed that the 80-percent figure would not have varied by more than about plus or minus 3 percent.

We then asked all the businesses to speculate on how an additional 25-percent reduction in interstate rates would affect their use of long-distance service. We chose this figure because at the time we prepared our questionnaire, the FCC and Bellcore indicated that the full implementation of the FCC access charge plan may result in a 30-percent (or more) reduction in AT&T long-distance rates. (We have not done any work to test the validity of this assumption.)

Table 13

Effect of an Additional 25-Percent Reduction  
in Interstate Rates on Long-distance Calls

<u>Response category</u>	<u>Overall responses</u>	<u>"Smallest" businesses' responses</u>
	- - - (percent, rounded) - - -	
My business would increase its out-of-state long-distance business calls by 25% or more	7	7
My business would increase its out-of-state long-distance business calls by 10%-25%	13	9
My business would increase its out-of-state long-distance business calls by less than 10%	7	4
There would be little or no effect on my business' out-of-state long-distance calls	69	76
[No response]	<u>4</u>	<u>4</u>
	<u>100</u>	<u>100</u>

Here again, a substantial majority in both groups thought that they would not change their current use of long-distance. This suggests that many businesses do not believe that the amount of their interstate long-distance calling has been significantly curtailed by price considerations. If it were, we would expect to find more businesses reporting that they would increase their interstate calling as rates dropped.

Many businesses do believe, though, that a substantial interstate rate reduction might have an effect in the areas of customer service and operating expenses. Table 14 shows that about half of all the businesses reported that an additional 25-percent reduction in interstate rates would help them to bring about improvements in these areas. (The businesses were asked to check all response categories that applied to them.)

Table 14

Effects of an Additional 25-Percent Reduction  
in Interstate Rates on Business Operations

<u>Response category</u>	<u>Overall responses</u>	<u>"Smallest" busi- nesses' responses</u>
	- - - - (percent, rounded) - - - -	
My business would be able to <b>improve service substantially</b>	10	6
My business would be able to <b>improve service somewhat</b>	11	10
My business would be able to <b>reduce expenses substantially</b>	12	5
My business would be able to <b>reduce expenses somewhat</b>	23	19
There would be <b>little or no effect</b> on my business' operations	50	62
Other effects	2	2

Note: Percentages do not add up to 100 because businesses could give multiple responses.

We found that the businesses' size was an important factor in how they responded in table 14. The differences in the responses center on "expenses" and show up in cross-tabulations by number of employees (table 14.1) and number of telephone lines (table 14.2).

Table 14.1

Response Differences in Table 14 on the  
Basis of Number of Employees

<u>Response category</u>	<u>Overall responses</u>	<u>Response by number of employees</u>		
		<u>19 or fewer</u>	<u>20 to 99</u>	<u>100 to 499</u>
	- - - - - (percent, rounded) - - - - -			
Reduce expenses substantially	12	11	15	24
Reduce expenses somewhat	23	22	32	37

Table 14.2

Response Differences in Table 14 on the  
Basis of Number of Telephone Lines

<u>Response category</u>	<u>Overall responses</u>	<u>Number of lines</u>		
		<u>Only 1</u>	<u>2 - 6</u>	<u>More than 6</u>
- - (percent, rounded) - -				
Reduce expenses substantially	12	4	16	26
Reduce expenses somewhat	23	18	26	40

These differences are not surprising, however. Our cross-tabulations show that total monthly long-distance bills for the responding businesses generally increase as the number of employees and number of lines increase. The dollar amount of savings from an interstate rate reduction would, therefore, tend to be higher for larger businesses that make a substantial number of out-of-state calls.

In evaluating the tables in this section, it should be borne in mind that they represent how businesses believe they would react to an additional 25-percent interstate rate decrease. They do not necessarily represent what the actual effects of such a reduction might be.

REACTIONS TO LOCAL  
MEASURED SERVICE

The House Committee on Small Business and representatives of the small business community have raised some concerns over the issue of local measured service (LMS), which is regulated by state public utilities commissions. Under LMS, businesses pay for local telephone calls on the basis of the number and/or length of calls made. Flat-rate service, on the other hand, enables businesses to make an unlimited number of local calls for a fixed monthly charge. In most states, businesses can choose between the two types of service. However, we identified telephone companies in at least 12 states and the District of Columbia that did not give their business customers the option of choosing between flat-rate service and LMS as of late 1983. One concern being raised is that businesses currently having flat-rate local service and making a large number of local calls might have higher monthly bills if telephone companies required them to use LMS. We therefore asked the surveyed businesses whether they had local measured service and, if so, why they had it and how satisfied they were with it.

Less than one-third (28 percent) of the surveyed businesses reported that they had LMS. (Most of them had a Bell company for their local service.) We asked businesses with LMS why they had LMS rather than flat-rate service, with the following results:

Table 15

Reasons Reported by Businesses  
for Having Local Measured Service

<u>Response category</u>	<u>Percent (rounded)</u>
Voluntarily chose measured service	14
Required to have measured service	44
Don't know	31
[No response]	<u>11</u>
	<u>100</u>

Businesses served by independent telephone companies more frequently reported that they had voluntarily chosen LMS than businesses served by Bell companies. The "voluntary" versus "required" figures in table 15 are difficult to evaluate, however, because such a large proportion of the businesses do not know why they had local measured service.

We asked businesses that reported having LMS whether they preferred it to flat-rate service. As shown in table 16 the overall reaction to LMS was fairly evenly distributed among favorable, neutral, and unfavorable responses. The smallest businesses, though, showed a stronger preference for LMS.

Table 16Reaction to Local Measured Service  
by Businesses with LMS

<u>Response category</u>	<u>Overall responses</u>	<u>"Smallest" busi- nesses' responses</u>
	- - - - (percent, rounded) - - - -	
Greatly prefer measured service over flat monthly rate	12	15
Prefer measured service over flat monthly rate	16	24
No preference	32	25
Prefer flat monthly rate over measured service	19	18
Greatly prefer flat monthly rate over measured service	9	6
[No response]	<u>12</u>	<u>12</u>
	<u>100</u>	<u>100</u>

Table 16 indicates that, as a group, the businesses in our survey that report having LMS are neither overwhelmingly in favor of it nor overwhelmingly against it. Twenty-eight percent<sup>9</sup> preferred LMS. It must be borne in mind, though, that the businesses with LMS constitute less than a third of all the businesses in our sample. These results do not, of course, indicate how the remaining two-thirds that currently have flat-rate local service would react to LMS if they were required to switch to it.

Our questionnaire went on to ask businesses that first began LMS in 1983 or 1984 what effect LMS has had on their telephone costs for local service. Table 17 shows that half of these businesses reported that LMS has resulted in higher local service telephone costs.

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<sup>9</sup>At the 95-percent confidence level, our analysis showed that the 28 percent would not have varied by more than about plus or minus 6 percent.

Table 17

Effect of LMS on Local Telephone Costs  
as Reported by Businesses  
First Using LMS in 1983 or 1984

<u>Response category</u>	<u>Overall responses</u>	<u>"Smallest" businesses' responses</u>
	- - - - (percent, rounded) - - - -	
My local service bill has greatly increased	33	[Too few "smallest" businesses in this category to yield meaningful results]
My local service bill has somewhat increased	36	
My local service bill has stayed about the same	21	
My local service bill has somewhat decreased	7	
My local service bill has greatly decreased	0	
[No response]	<u>3</u>	
	<u>100</u>	

As the table indicates, a substantial proportion of businesses that began using LMS in 1983 or 1984 reported that their local service bill has increased. Since we did not ask these businesses to quantify the degree to which their bills changed, our results can only suggest the general effect of LMS on this group of businesses.

Finally, we asked businesses that first began using LMS in 1983 and 1984 whether it has had any effect on the number of local telephone calls that they make. Seventy-eight percent reported that having LMS caused them to make neither more nor fewer local calls. (Nine percent made more calls; 12 percent made fewer calls; 1 percent did not respond to the question.)

AWARENESS OF FCC'S ACCESS  
CHARGE DECISION

We attempted to determine whether small businesses were generally aware of FCC's access charge decision. Our question on this issue read as follows:

"In May 1984 the Federal Communications Commission (FCC) required that all businesses with more than one telephone line pay a flat monthly 'end-user access charge' to their local telephone companies. Generally, this charge is between \$4 and \$6 per line. At the same time, FCC ordered AT&T to reduce its interstate long-distance rates by 6.1%. Since May, other long-distance telephone companies also have had similar rate reductions.

"Were you aware of the FCC "end-user access charge" decision?" (Yes or No)

Seventy-two percent of the businesses with more than one line said that they were unaware of the decision. As shown in table 18 these responses did not differ greatly between single-line businesses (which were not affected by the decision during our survey period) and the two multi-line categories defined by our questionnaire.

Table 18

Awareness of FCC's 1984  
Access Charge Decision

<u>Response category</u>	<u>Number of lines</u>		
	<u>Only</u> <u>1</u>	<u>2 - 6</u>	<u>More than</u> <u>6</u>
	- - - (percent, rounded) - - -		
Aware of the decision	20	25	35
Not aware of the decision	76	74	62
[No response]	<u>4</u>	<u>1</u>	<u>3</u>
	<u>100</u>	<u>100</u>	<u>100</u>

This suggests that while most businesses have seen increases in their telephone costs, many of them may not be aware of the regulatory decisions behind these increases.

CONCLUDING OBSERVATIONS

Our questionnaire was designed to gather general information on how changes in telephone costs are affecting small businesses. As noted earlier, the survey results must be used with caution. They clearly indicate that a substantial percentage of small businesses report increases (often over 25 percent) in telephone costs. But the questionnaire does not establish the causes of these increases. Nor does it address the much broader issue of

whether small businesses are faring any better or worse than large businesses or residential users. The information presented here reveals only a few aspects of the complex changes taking place in the area of telephone service.

U.S. GENERAL ACCOUNTING OFFICE



Survey of the Impact of Telephone Rate Changes on Small Businesses

INTRODUCTION

The U.S. General Accounting Office (GAO) is an agency that assists the U.S. Congress in evaluating federal programs. The Small Business Committee of the House of Representatives has asked us to determine how changes in telephone charges are affecting businesses by surveying a select sample of small businesses, like yours.

This questionnaire is an opportunity for you to provide information which could have an important effect on legislation that Congress might make in the area of telephone regulation. All information supplied to the GAO will be kept confidential. Only summaries will be used in reporting the questionnaire results to the Committee. No response will be identified with any individual or business. This questionnaire is numbered only to aid us in our follow-up efforts and will not be used to identify you with your responses.

Please return the completed questionnaire in the enclosed pre-addressed, postage-paid envelope within 10 days after receipt. In the event the envelope is misplaced, the return address is:

Mr. Ron Wood - Room 4476  
 U.S. General Accounting Office  
 441 G Street, N.W.  
 Washington, DC 20548

If you have any questions about the survey, please call John Findore or Lou Schuster collect at (202) 653-8200. We appreciate your help and cooperation.

ID1 (1-4)  
 CD1 (5)

ATTENTION BUSINESSES WITH MORE THAN ONE LOCATION:

All of the questions in this questionnaire refer only to the particular business at the location listed in our cover letter.

BACKGROUND INFORMATION ON YOUR BUSINESS

1. Does your business have any locations other than the one listed in our cover letter? (CHECK ONE.) (6)
  1.  18 Yes
  2.  82 No

NOTE  
 NUMBERS IN BOXES ARE  
 WEIGHTED PERCENTAGES
2. How many employees are on the payroll of the business location listed in our cover letter? (PLEASE EXCLUDE EMPLOYEES WHO WORK STRICTLY ON A COMMISSION BASIS.) (CHECK ONE.) (7)
  1.  86 19 or fewer employees
  2.  12 20-99 employees
  3.  2 100-499 employees
  4.  0 500-1000 employees
  5.  0 More than 1000 employees
3. What is this business location's annual gross receipts? (CHECK ONE.) (8)
  1.  35 Under \$150,000
  2.  29 \$150,000-\$500,000
  3.  28 Over \$500,000
  4.  8 No opinion

YOUR TELEPHONE COMPANIES

4. Is your basic local telephone service provided by one of the local Bell telephone companies listed below? (CHECK ONE. FOR YOUR INFORMATION, BELOW IS A LIST OF BELL TELEPHONE COMPANIES.)

- 1. [76] Yes (9)
- 2. [22] No...SPECIFY WHAT COMPANY PROVIDES THIS SERVICE? \_\_\_\_\_

[No response: 2]  
BELL TELEPHONE COMPANIES

- Bell of Pennsylvania
- C&P Telephone
- Diamond State Telephone
- Illinois Bell
- Indiana Bell
- Michigan Bell
- Mountain States Telephone & Telegraph
- Nevada Bell
- New England Telephone & Telegraph
- New Jersey Bell
- New York Telephone
- Northwestern Bell
- Ohio Bell
- Pacific Northwest Bell
- Pacific Telephone & Telegraph
- South Central Bell
- Southern Bell
- Southwestern Bell
- Wisconsin Telephone

5. In addition to your local telephone company, which other telephone companies provide local or long distance telephone service to your business? (CHECK ALL THAT APPLY.)

(10-18)

- 1. [63] AT&T
- 2. [9] GTE Sprint
- 3. [11] MCI
- 4. [2] Western Union
- 5. [1] SBS-Satellite Business Systems
- 6. [1] ITT-International Telephone & Telegraph
- 7. [16] Other (SPECIFY) \_\_\_\_\_
- 8. [2] Other (SPECIFY) \_\_\_\_\_
- 9. [0] Other (SPECIFY) \_\_\_\_\_

YOUR TELEPHONE CHARGES

6a. In Column A, indicate for this business location the typical total monthly charges from all telephone companies. (IN COLUMN A CHECK ONE.)

6b. In Column B, indicate for this business location the typical monthly long distance charges from all telephone companies. (IN COLUMN B CHECK ONE.) (19-20)

	COLUMN A	COLUMN B
	TOTAL MONTHLY CHARGES	LONG DISTANCE MONTHLY CHARGES
Under \$50	17	41
\$50-\$99	17	18
\$100-\$199	17	12
\$200-\$499	22	13
\$500-\$999	12	6
\$1000-\$2499	7	4
\$2500-\$4999	2	1
Over \$5000	1	1

7. Are Yellow Pages advertising charges typically included by your local telephone company in your business's monthly telephone bill? (CHECK ONE.) (21)

- 1. [65] Yes
- 2. [30] No

[No response: 5]

8. For each of the following types of telephone charges, how have your business's typical telephone costs from all telephone companies changed since January 1984? (FOR EACH TYPE OF TELEPHONE CHARGE CHECK ONE COLUMN.) (22-26)

TYPES OF TELEPHONE CHARGES	1. Increased By More Than 25% 2. Increased By Less Than 25% 3. Remained About The Same 4. Decreased By Less Than 25% 5. Decreased By More Than 25% 6. Not Applicable						[No responses]
	1	2	3	4	5	6	
a. Long distance service charges	17	29	35	5	1	2	11
b. Local service charges	22	38	28	1	0	1	10
c. Yellow pages charges	12	26	27	0	1	13	21
d. Equipment leasing charges	15	19	27	1	0	14	24
e. Other (SPECIFY)	1	1	1	0	0	4	93

9. Overall, how have your typical total monthly charges from all telephone companies changed since January 1984? (CHECK ONE.) (27)

- 1. [25] Increased by more than 25%
- 2. [39] Increased by less than 25%
- 3. [27] Remained about the same
- 4. [2] Decreased by less than 25%
- 5. [1] Decreased by more than 25%

--> SKIP TO Q. 11

[No response: 6]

10. How much of the increase in your total monthly telephone bill did you pass on to your customers by raising prices? (CHECK ONE.)

- 1. [89] Little or none (28)
- 2. [4] Some
- 3. [1] About half
- 4. [1] Most
- 5. [2] All or almost all

11. Since January 1984, <sup>[No response: 3]</sup> has there been an increase or decrease in the number of telephone lines at this business location? (CHECK ONE.)

- 1. [8] Increase (29)
- 2. [5] Decrease
- 3. [85] No change ---> SKIP TO Q. 13

12. Why did your business change the number of telephone lines? (CHECK ALL THAT APPLY.) <sup>[No response: 2]</sup> (30-34)

- 1. [21] Changes were in response to increases in telephone costs
- 2. [1] Changes were in response to decreases in telephone costs
- 3. [46] Changes were due to increases in my business's need for telephone lines
- 4. [10] Changes were due to decreases in my business's need for telephone lines
- 5. [10] Other (SPECIFY) \_\_\_\_\_  
\_\_\_\_\_

LOCAL MEASURED SERVICE

13. Is your business charged for basic local telephone service on a flat monthly rate or a measured service rate? (CHECK ONE.)

(35)  
Flat monthly rate-the rate is not dependent on the number or length of calls you make.  
Measured service rate-the rate depends on the number or length of calls you make.

1. [69] Flat monthly rate ---> SKIP TO Q. 19

2. [28] Measured service rate

14. Which of the following best describes why your company is charged a measured service rate? (CHECK ONE.) <sup>[No response: 3]</sup> (36)

1. [14] We voluntarily subscribed to local measured service

2. [44] We had no choice (flat rate service is not available)

3. [31] Don't know

15. Do you prefer measured service or a flat monthly rate? (CHECK ONE.) <sup>[No response: 11]</sup> (37)

1. [12] Greatly prefer measured service over flat monthly rate

2. [16] Prefer measured service over flat monthly rate

3. [32] No preference

4. [19] Prefer flat monthly rate over measured service

5. [9] Greatly prefer flat monthly rate over measured service

[No response: 12]

16. In what year did your business first begin using local measured service? (CHECK ONE.) (38)
1. [18] 1983 or 1984
  2. [66] Before 1983 ---> SKIP TO Q. 19  
[No response: 16]
17. Which of the following best describes the effect local measured service had on your local service telephone bill? (CHECK ONE.) (39)
1. [33] My local service bill has greatly increased
  2. [36] My local service bill has somewhat increased
  3. [21] My local service bill has stayed about the same
  4. [7] My local service bill has somewhat decreased
  5. [0] My local service bill has greatly decreased  
[No response: 3]
18. Which of the following best describes the effect local measured service had on your local telephone calling patterns? (CHECK ONE.) (40)
1. [0] My business made many more local telephone calls
  2. [9] My business made somewhat more local telephone calls
  3. [78] My business made about the same number of local telephone calls
  4. [6] My business made somewhat fewer local telephone calls
  5. [6] My business made many fewer local telephone calls
- [No response: 1]

ACCESS CHARGES

19. In May 1984 the Federal Communications Commission (FCC) required that all businesses with more than one telephone line pay a flat monthly "end user access charge" to their local telephone companies. Generally, this charge is between \$4 and \$6 per line. At the same time, FCC ordered AT&T to reduce its interstate long distance rates by 6.1%. Since May, other long distance telephone companies also have had similiar rate reductions.

Were you aware of the FCC "end user access charge" decision? (CHECK ONE.) (41)

1. [23] Yes

2. [73] No

- [No response: 4]
20. How many telephone lines does your business have which employees use to make or receive outside telephone calls? (CHECK ONE.) (42)

1. [44] Only one telephone line

2. [44] 2 to 6 telephone lines

3. [9] More than 6 telephone lines

[No response: 3]

21. Has the reduction in long distance telephone rates by AT&T and other long distance telephone companies led your business to increase its long distance business calls? (CHECK ONE.) (43)

1. [8] Yes

2. [80] No

3. [10] Don't know

[No response: 2]



### QUESTIONNAIRE SCOPE AND METHODOLOGY

This appendix provides additional details concerning our questionnaire scope and methodology. The details cover (1) the data base from which the sample was drawn, (2) our criteria for selecting a statistical sample, (3) the procedures followed in drawing the sample, (4) weighting of sample results, (5) our pledge of confidentiality, (6) questionnaire mailings and responses, (7) the computer-based software package used to analyze questionnaire responses, and (8) computation of confidence levels.

#### SMALL BUSINESS DATA BASE

Sampling is the process of examining or measuring a smaller group of items, called a sample, in order to make generalizations about a larger group of items, called a "universe" or "population." Selection of the appropriate population for analysis is an important decision in a research study. We believe that the most appropriate population for a national study of small business phone usage would be all small businesses in the United States with a business telephone line. Unfortunately, we did not find a current data base of these businesses that also included data on the number of employees--a key measure of business size. The best available data base on businesses for our purposes appeared to be Dun & Bradstreet's Market Identifier (DMI) file, which is used as a major source of data for SBA's small business data base and small business research studies. Consequently, on the basis of discussions during the summer of 1984 with SBA and Committee staff, we agreed that the survey population for our questionnaire would be business establishments with fewer than 500 employees in the DMI file.

The DMI file contains records on approximately 5.5 million business establishments, large and small, of which 4.5 million met our sampling criteria. According to SBA's Office of Advocacy staff who are responsible for developing data on small business, this file is, despite some limitations, the most complete source of current data on individual U.S. businesses outside of that maintained by the Internal Revenue Service. The staff believes that the file includes almost all businesses with paid employees. One strength of the file is that it includes recent data on the number of employees for each business, which allowed us to select a stratified sample of businesses by number of employees. One weakness is that it does not include many very small businesses that do not have employees but may have a business telephone line.

The DMI file, developed and maintained by Dun & Bradstreet Corporation, includes business data on individual firms attempting to establish credit or interacting with other businesses seeking credit information, such as insurance companies. The file provides the name, address, and telephone number of the firm, type of firm, age of firm, and sales and employment data. The DMI file

is generally updated once or twice a year. New firms are added; out-of-business firms are deleted; and employment, sales, and related statistics are updated with new information.

We did not independently verify or assess the reliability of the DMI data base. The lack of time and resources precluded such an assessment. The results of our questionnaire did indicate, however, that the file's employment data, our key criterion for sample selection, were generally accurate. Our sample was selected from business establishments listed in the DMI file as having fewer than 500 employees. To check the accuracy of the employment data, our questionnaire included a question asking for the number of employees on the payroll at the business location. Only 11 of the 1,250 completed questionnaires reported 500 or more employees. These 11 were excluded from our analyses.

We did note two limitations in the DMI file, on the basis of a review of SBA publications and discussions with SBA staff, that affected our ability to project our sample results to the entire universe of small businesses with a business telephone line. First, the DMI file is a subset of the universe of small businesses with a business telephone line because generally it includes only businesses that need credit ratings and insurance and that have paid employees. The file does not include a large percentage of the smallest businesses. In a comparison of data primarily from the DMI file with data from the Internal Revenue Service's Statistics of Income for nonfarm proprietorships, partnerships, and corporations, SBA found that the probability of a firm's appearing in the DMI file is directly related to its annual sales size. The DMI file included only 3 percent of the enterprises below \$25,000; 40 percent between \$25,000 and \$99,999; 91 percent between \$100,000 and less than \$1 million; and 100 percent of the firms with sales of \$1 million or more.

SBA believes that most of the businesses not included in the DMI file do not have employees because the Census Bureau's Enterprise Statistics presents data showing that the majority of companies with less than \$100,000 in sales do not have employees. Many of these very small businesses excluded from the DMI data base may have a business telephone line. However, estimating how many is difficult. On the basis of discussions with knowledgeable staff at SBA, the Census Bureau, and the Internal Revenue Service, we found no accurate data on the number of small businesses with a business telephone line that are excluded from the DMI file. The SBA has obtained a commercially available "Yellow Pages" telephone listing called the Market Data Retrieval file. We have assumed that businesses advertising in the Yellow Pages will have a business telephone line. The Market Data Retrieval file was compared with the DMI file in 1981 and an additional 3.5 million businesses were identified that were not included in the DMI file.

In March 1985, SBA staff in the Office of Advocacy told us that they were in the process of updating their comparison using

current files. The Chief of the Data Base Branch estimated that the comparison will identify from 1.7 to 3.4 million establishments advertising in the Yellow Pages but not included in the DMI file.

The second limitation in the DMI file involves the deterioration of the file between updates as businesses cease operations and become inactive. An SBA senior economist familiar with the DMI file estimated that records on smaller businesses will deteriorate at the rate of about 1 percent a month. In addition, we might expect that the DMI file would include an unknown number of out-of-date or invalid addresses.

The DMI file from which our sample was pulled was updated in December 1983. We mailed our initial survey letter on October 25, 1984--10 months later. Thus, we should have expected about 10 percent of our questionnaires to be returned undelivered because the sampled business establishments had ceased operation. In addition, it could be expected that during our 3-1/2 month survey period, small businesses in the DMI file and our sample would continue to go out of business.

At the close of our survey in February 1985, we counted 346 questionnaires, or about 15.6 percent of our sample, returned unanswered because the post office could not deliver the questionnaire as addressed or because the business was no longer in operation. The percentage of questionnaires returned unanswered does not seem out of line with estimates of file deterioration.

#### SAMPLING CRITERIA

In a July 30, 1984, letter to SBA's Chief Counsel for Advocacy, we requested that SBA assist us in carrying out the task force's request by drawing a sample from the latest DMI file. SBA consented to our request. Our letter included a list of criteria as to how a statistical sample should be selected. These criteria were later revised on the basis of discussions with SBA and contractor staff. The three primary criteria along with explanatory comments are discussed below.

1. **Select a random sample of business establishments from the DMI file stratified into the following employee groupings:**

<u>Number of employees</u>	<u>Approximate sample size</u>
19 or fewer	1,000
20 - 99	700
100 - 499	500

--The sample size was an estimate based on the judgment of our technical staff. The lack of information on telephone usage by small businesses, noted previously,

precluded a more exact calculation of sample size. Also, since our questionnaire did not seek information to measure the precise economic impact of telephone rate changes on small businesses, an exact sample size was not critical.

--Stratification of the sample by number of employees is important because without stratification the sample drawn may not have had an adequate representation or mix of various business sizes. Stratification is also important because the number of employees provides a strong indication of business size, which is critical in a study of small business. SBA defines small firms using both 100 employees maximum per enterprise and 500 employees maximum per enterprise as its standard. Which definition is applied depends upon the average or typical firm in the industry under study. Committee staff directed GAO to apply the 500-employee standard to all industries. The staff also suggested the three employment size categories used in the survey.

--An "establishment" is defined as any single physical location where business is conducted. An "enterprise," or company, is a business organization consisting of one or more establishments under the same ownership or control.

--We decided to sample establishments rather than enterprises because individual establishments of multi-establishment enterprises could be served by different phone companies in different states under different service arrangements, thereby complicating the analysis.

**2. Delete establishments that are part of an enterprise that employs 500 or more people.**

--The purpose of the GAO survey was to evaluate the impact of telephone changes on small businesses. Small establishments owned by larger enterprises are not small businesses. For example, SBA does not believe a business (enterprise) made up of 100 establishments, each with 75 employees, is a small business.

**3. Delete establishments that are operated by the government, are nonprofit, or are quasi-governmental businesses, such as hospitals, schools, and transportation systems.**

--Specifically, we directed SBA to delete establishments with these Standard Industrial Classification (SIC) codes:

U.S. Postal Service	43XX
Hospitals	806X
Educational services	82XX
Social services	83XX
Museums, art galleries, botanical and zoological gardens	84XX
Membership organizations	86XX
Noncommercial educational, scientific, and research organizations	892X
Public administration (legislative, judicial, administrative, and regulatory activities of federal, state, local, and international governments)	90XX and beyond

--We requested that these industry segments be deleted because we wanted to survey private, for-profit small businesses.

--The SIC system provides a consistent method for organizing industrial data. Federal agencies and private analysts use these industry classifications developed by the Office of Management and Budget. The SIC system arranges all business establishments in the U.S. economy into 10 broad sectors. Each sector is composed of a number of industrial groupings known as two-digit industries. Each two-digit industry is divided into more specific three-digit industries which, in turn, are further divided into even more specific four-digit industries. A four-digit SIC code is included with each establishment record in the DMI file.

#### SAMPLING PROCEDURES

The procedures for selecting our sample establishments were carried out by Social & Scientific Systems, Inc. (SSS), the SBA contractor storing the DMI files.

There were a total of 5.5 million establishments in the December 1983 DMI file. After SSS deleted establishments with 500 or more employees, establishments that were part of an enterprise with 500 or more employees, and establishments with certain SIC codes, the eligible establishments in our survey population had dropped to about 4.5 million establishments. (See table I, col. 2, in this appendix.) According to SSS staff, the eligible establishments in the DMI file in each employee strata meeting our criteria were counted and then divided by the desired

sample size. The resulting quotient, rounded downward, was the sampling interval. This technique was considered reasonable because, according to SSS staff, establishments in the DMI file are not arranged in any order or pattern. Businesses are added to the file as they seek credit ratings from Dun & Bradstreet.

#### WEIGHTING SAMPLE RESULTS

Because the three employment groups in our stratified sample were drawn from subpopulations of substantially different size (see table 19), we weighted each returned questionnaire to reflect its proportional representation in the subpopulation from which the sample was drawn. The weight for each employment grouping was derived by dividing the number of business establishments in the respective subpopulation by the number of establishments sampled from that subpopulation. Table 19 shows the computation of the relative weights for each strata and the weighted number of establishments represented by returned questionnaires. The table also shows that the 1,239 returns are representative of about 2.2 million small businesses, or about 50 percent of the 4.5 million in our survey population.

#### CONFIDENTIALITY OF INDIVIDUAL RESPONSES

Because some small businesses might hesitate to complete the questionnaire if they perceived the information requested as sensitive, we extended a pledge of confidentiality to the respondents. We told them that no response would be identified with any individual or business and that only summaries would be used in reporting the questionnaire results to the Committee. Our pledge was agreed to by the Committee Chairman.

#### QUESTIONNAIRE MAILINGS AND RESPONSES

Our questionnaire was first mailed on October 25, 1984, to the 2,214 small business establishments in our sample. The questionnaires were addressed to the person reported to Dun & Bradstreet as performing the function of chief executive at the establishment. Two follow-up letters, along with additional copies of the questionnaire, were mailed on November 27, 1984, and January 11, 1985, to those businesses that had not responded. Our survey results are based on the 1,239 returned questionnaires received by February 14, 1985, from business establishments with fewer than 500 employees.

Table 20 summarizes the survey in terms of returned questionnaires, nondeliverables, and those not returned. The nondeliverables were those questionnaires returned by the post office because a forwarding address was lacking, the address was inadequate, the business was no longer in operation, or other such reasons.

### QUESTIONNAIRE ANALYSIS

To facilitate the computations necessary for analysis of the large amounts of data collected, we prepared a computerized data base of completed questionnaires. We used a standardized computer program frequently used in our work, called the Statistical Analysis System, to help analyze the computer-based data. This program provides various tools for data analysis, including information storage and retrieval, data modification and programming, statistical analysis, output format, and file handling.

### CONFIDENCE LEVELS

Our analysis in appendix I includes the computation of sampling error at 95-percent confidence levels for several of the responses to the questionnaire that we believed were of particular interest. These responses related to the percentage of businesses that said their total and long-distance bills had increased by more than 25 percent; businesses reporting that reductions in interstate long-distance rates have had no effect on their long-distance calls; businesses that had not changed the number of their telephone lines; and businesses that said they preferred measured service. Confidence levels indicate the degree of certainty with which the percentages of businesses responding could vary from those we would have observed if we had received a questionnaire from all 2.2 million businesses.

Table 19

GAO Calculation of Weighted Number of Establishments  
Represented by Returned Questionnaires

(1)	(2)	(3)	(4)	(5)	(6)
<u>Establishment employment size</u>	<u>Population in strata</u>	<u>Establishments sampled</u>	<u>Relative weight of each establishment (col. 2 divided by col. 3)</u>	<u>Questionnaires returned</u>	<u>Number of establishments represented by returned questionnaires<sup>a</sup></u>
19 or fewer	4,103,230	1,065	3,853	593	1,937,498
20 - 99	359,780	676	532	417	258,030
100 - 499	43,852	473	93	224	38,697
Not reported	N/A	N/A	N/A	5	8,863
Total	<u>4,506,862</u>	<u>2,214</u>		<u>1,239<sup>b</sup></u>	<u>2,243,088</u>

N/A - not applicable

<sup>a</sup>Computation of the number of establishments represented by returned questionnaires is not simply a matter of multiplying the number of returned questionnaires in each strata (col. 5) by the relative weight (col. 4). The computation is more involved because the actual employment size reported in the questionnaires did not always agree with the expected employment size as reported in the DMI file. The numbers in column 6 were computed using the expected employment size because that was the basis for sample selection.

<sup>b</sup>In total, 1,250 returned questionnaires were received. Included were 11 questionnaires reporting 500 or more employees; these were deleted from our analyses.

Table 20Summary of Questionnaire Returns

<u>Establishment employment size</u>	<u>Sample size (questionnaires mailed)</u>	<u>Returned questionnaires</u>	<u>Questionnaires undeliverable</u>	<u>Questionnaires not returned</u>
19 or fewer	1,065	593	241	228
20 - 99	676	417	79	177
100 - 499	473	224	26	213
500 or more	0	11	N/A	N/A
Not reported	<u>N/A</u>	<u>5</u>	<u>N/A</u>	<u>N/A</u>
Total	<u>2,214</u>	<u>1,250</u>	<u>346</u>	<u>618</u>

N/A - not applicable

REVIEW OF METHODOLOGY USED BY BELLCOREIN ITS NOVEMBER 1984 REPORT ON THEIMPACT OF END-USER CHARGES ON SMALL BUSINESSES

Our review of the methodology used in Bellcore's November 1984 report, The Impact of End-User Charges on Small Businesses, was limited to addressing two questions: (1) Does the study population from which Bellcore drew its sample represent the universe of all small businesses with a business telephone line? and (2) Would information on sample variances have helped those using the report to judge the validity of its findings? Our review found that the population sampled from does not include all small businesses and that information on sample variances was not presented in the report. Additional information in the report on sampling limitations and sample variances would have helped readers avoid drawing improper inferences about the study's results.

STUDY PURPOSE, METHODOLOGY,  
AND RESULTS

The purpose of the Bellcore study was to examine changes in local and long-distance telephone expenditures by small business customers that would result from FCC's access charge decision. This decision aims to tie rates more closely to the cost of providing telephone service by adding a flat monthly line charge to subscribers' local telephone bills while reducing interstate long-distance rates. In May 1984 FCC implemented a maximum \$6 monthly charge per line for business subscribers with more than one telephone line while, at the same time, ordering a 6.1-percent reduction in AT&T's interstate long-distance rates. In December 1984 FCC ordered a \$1 access charge on residential and single-line business customers beginning in June 1985 to be increased to \$2<sup>1</sup> in June 1986. FCC anticipates further long-distance rate reductions.

The Bellcore study also was designed to respond to information requests that were made of Bellcore by both the House Committee on Small Business and the FCC. The Committee staff expressed particular interest in knowing how subscriber line charges would affect various types of small businesses, as defined by number of employees and operating revenues. The FCC requested that small business telephone expenditures be broken down by the number of lines per firm because subscriber line charges are, or will be, assessed on a per-line basis.

Bellcore's methodology for accomplishing its purpose and responding to these requests was to create a data base that

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<sup>1</sup>At the time of Bellcore's study, FCC was considering a \$4 charge for residential and single-line business customers.

contained telephone billing information and business data for a sample of 9,085 randomly selected firms located in 23 states. All telephone billing information was obtained from the Bell operating companies. This information included the number of telephone lines per firm as well as expenditures for local, interstate, and intrastate service for April 1983. According to the study, the sample was confined to 23 states because all billing information for businesses in those states was recorded on the same computer record, thus facilitating timely analysis of the data. Individual billing records were compared to records in Dun & Bradstreet's Market Identifier (DMI) data base, which contains individual business data on number of employees, total annual revenues, and industry group (or line of business). If there was a match, that is, if a firm had both a billing record and a DMI record, it was included in Bellcore's study. According to the study director, if a business' billing record could not be matched with a record in the DMI file, that billing record was excluded from the analysis. He told us he did not know how many billing records were excluded because the study's focus was on those records that were matched.

One strength of Bellcore's methodology is that the foundation of the study's analysis is actual billing data from a large sample of small businesses.<sup>2</sup> As noted in our cover letter, we found that obtaining accurate, detailed cost data on telephone usage was not feasible with a mail questionnaire; the data, in our opinion, had to come from billing records maintained by the telephone companies.

The study made two principal assumptions: (1) the implementation of a \$6 end-user charge per line on multi-line businesses and a \$4 end-user charge on single-line customers and (2) an eventual total 30-percent reduction in interstate long-distance rates. The \$6 and \$4 charges were assumed to be maximum charges. In its analysis Bellcore used a national average of \$4.80 per line for multi-line businesses and a national average of \$3.81 for single-line business customers.

Bellcore's analysis of its sample data was generally a simple, straightforward process. The savings gained by sampled businesses were calculated by multiplying their interstate long-distance expenditures by 30 percent--the assumed reduction in long-distance rates. The additional subscriber line charges were calculated by multiplying the number of telephone lines serving the businesses by the applicable line charge--\$4.80 per line for multi-line subscribers and \$3.81 per line for single-line subscribers. By comparing the savings in long-distance charges with the subscriber line charges, the study determined whether the

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<sup>2</sup>We have, however, not verified billing data presented in Bellcore's report against the actual billing records.

sampled businesses gained enough savings from reduced long-distance rates to cover the added line charges.

In its study Bellcore presents the results of its analysis in a series of summary tables arranged in various formats: by number of employees, by number of telephone lines, and by type of industry. The focus of Bellcore's presentation is (1) the percentage of businesses in various categories whose long-distance savings will exceed end-use subscriber line charges and (2) the average net dollar savings for businesses. The study also includes an appendix providing a detailed breakout of the range of monthly interstate long-distance expenses incurred in April 1983 by the sampled businesses. For example, the appendix shows that there were 257 businesses in the sample with 2 lines and 10 to 19 employees. Of these businesses, 97 incurred monthly interstate long-distance expenses of \$0 to \$25; 16 had expenses of \$25 to \$30; 9 had expenses of \$30 to \$35; and so on.

#### LIMITATIONS OF STUDY POPULATION

On the basis of its analysis of the billing records and other data collected on the businesses in its sample, Bellcore presents its findings and conclusions as if they represent the universe of all small businesses. For example, the report states, "The results show that about one-half of all small business customers will make up end-user charges through savings in long-distance expenses alone." The report also states that the 23 states covered by its sample are "representative of the country as a whole in terms of both cost of providing telephone services and expenses incurred for those services by small businesses." Elsewhere, on the basis of similarities between firms in the sample and all firms in the DMI file, the report concludes that "the sample of firms used in this study is representative of all small business."

We do not agree that Bellcore's findings are representative of all small businesses. Because the sample was drawn from a population of businesses that were served by Bell telephone companies, that were located in 23 states, and that also had a data record in the DMI file, statistically the study's findings can only be representative of that specific group of businesses. The findings cannot be applied to those small businesses not included in the study population. Although the report did mention that only businesses served by Bell companies in 23 states were included in the study, the report did not discuss the DMI's lack of coverage of some small businesses.

According to SBA's March 1984 Annual Report on Small Business and Competition, the DMI file

". . . is a biased population sample because it includes only firms that need credit ratings and insurance. However, in today's economy, this encompasses most firms involved in a full-time business venture; principal

exceptions are wholesale, retail, and service firms and some finance, insurance, and real estate firms that do not have employees. Dun & Bradstreet has improved its coverage in recent years so that the DMI file contains employment and firm data similar to information collected by Census. The DMI excludes most establishments without employees and consequently underreports the number of these businesses. [Underscoring supplied.]

Additional information on the DMI file's lack of coverage is contained in appendix III.

If many of the businesses without employees excluded from the DMI file have a business telephone line and if the characteristics of their telephone usage differ from firms in the DMI file, then the conclusions reached in Bellcore's study may not pertain to those businesses. For example, businesses excluded from the DMI file may have long-distance expenses different from those businesses in the DMI file. Unfortunately, little is known about those businesses not found in the DMI file; even estimating their number is difficult. Although there is no accurate data on how many small businesses with a telephone line are excluded from the DMI file, we refer in appendix III to a current effort by SBA to compare the DMI file with a telephone Yellow Pages listing. This comparison is expected to identify from 1.7 to 3.4 million businesses advertising in the Yellow Pages that are not in the DMI file. Many of these businesses may be very small and have little economic impact, but if they have one or more business lines, FCC's access charge decision will affect them.

We recognize that the DMI file is one of the best business data bases available for research purposes. We have used it to draw the sample for our own survey. Nevertheless, its lack of coverage of some small businesses should also be recognized. Citing these limitations in a research study does not imply that the research is faulty or that the results are not useful. Full disclosure of sampling limitations is merely the means by which the researcher communicates to the reader the boundaries of the study's findings. It tells the reader what the findings represent and what they do not represent. A clear explanation of a study's limitations helps the reader avoid drawing improper inferences about the study's results.

In March 1985 we discussed the DMI file limitations with the Bellcore study director. His position was that the study's results were representative of all small businesses. He referred to the large number in his sample (60 percent of the 9,085 firms) that employ between 0 and 4 persons. He believed that these very small firms are representative of those businesses with no employees excluded from the DMI file. In our opinion, while this may seem to be the case, we believe it must be demonstrated statistically that very small businesses included in the DMI file exhibit the same patterns of phone usage as firms excluded from the file.

One possible approach for obtaining more precise information on those businesses excluded from the DMI file would be for Bellcore to analyze telephone billing records that cannot be matched with records in the DMI file and compare the results to those records that can be matched. The study director told us that he was discussing the possibility of additional analysis with Committee staff. He said whether Bellcore undertook another study depended on the costs involved, such as computer time, programming expense, and charges from Dun & Bradstreet for use of the DMI file.

IMPORTANCE AND MEANING  
OF SAMPLE VARIANCES

Two major questions of concern to the House Committee on Small Business are how many small businesses will be hurt by the access charge decision and how badly they will be hurt. In looking for answers to these questions, the Committee considers data on averages as potentially misleading. In its report, The Impact of Changes in the Telecommunications Industry on Small Business (House Report 98-1171, December 10, 1984), the Committee stated:

". . . The danger of relying on averages can be illustrated thusly: Ten people have enough food for an average intake of 2,000 calories per day. If five people eat 3,500 calories per day per person or 17,500 calories of the available 20,000 calories, then only an average of 500 calories per person per day are available for the remaining 5 people. On average nobody is starving, but in reality five people are getting mighty thin.

"Although, it looks as if businesses may on average do alright [sic] with the access fee, it appears that some will get mighty thin. How thin? Industry data is too thin to tell."

The science of statistics recognizes that while simple averages are useful, they can also be misleading. To provide more meaningful information, various statistical measures are available to show how much the average of a group of numbers differs from the individual numbers of that group. One such measure is called the variance. An important consideration in how statistical measures, such as variances, are reported is whether they are calculated from a sample or from a population. A sample drawn from a population is usually not an exact representation of that population. For example, the average telephone bill computed from a sample of small businesses usually will not be exactly the same as the average bill computed from the population of all small businesses; rather, the sample average will only be an estimate of the population average. In addition, there will be a distribution of telephone bills around both the sample and population average--some bills will be higher than the average, some lower. The distribution of all small business telephone bills has a variance

that can be measured (with complete data) or estimated (with sample data). This variance provides information on how dispersed small businesses' telephone bills are around the average.

The average and variance are called parameters. An estimate of a population parameter given by a single number is called a point estimate of the parameter. An estimate of a population parameter given by two numbers between which the parameter may be considered to lie is called an interval estimate of the parameter. Interval estimates indicate the precision or accuracy of an estimate and are sometimes preferable to point estimates. Generally, interval estimates are calculated on the basis of how confident the researcher wants to be that the actual population parameter lies between the interval estimate. The level of confidence desired is expressed as a percentage, and in the social sciences, 95 percent is frequently used. As applied to our example of small business telephone bills, the researcher might estimate from his/her analysis of the sample that the average bill of all small businesses with 19 or fewer employees is between \$50 and \$200 with a 95-percent confidence level.

#### SAMPLE VARIANCES NOT INCLUDED IN REPORT

The results presented in the Bellcore report do not include sample variances or confidence intervals. We believe information on sample variances would have improved the report's usefulness. The reasons why sample variances would be helpful are explained in a January 25, 1985, Congressional Research Service Memorandum to the House Small Business Committee. The memorandum, which discusses statistical issues with the Bellcore study, states:

". . . information on this sampling variance is needed to evaluate how reliable the data presented in all the tabulations are. Each entry in the tables has a sample variance. With estimates of this variance, you could construct confidence intervals around the estimates in the tables. These confidence intervals would provide you a range within which you could have 95-percent confidence (or any other level of confidence you would choose to use) that the actual figure for the total population would fall.

"For example, on page 5 of the report the analysis states that interstate long-distance expenses represent about 45 percent of total monthly telephone charges to small business customers. This is based on data in table 1 showing that out of an average of \$275 total monthly billing, \$124 is for interstate billing. These data are "point estimates" from the sample. Based solely on the sampling procedures, the statisticians who designed the sample can construct sampling variances that would tell you how much confidence you should have in the estimate. With the sampling variance

you can construct a confidence interval to tell you that with the sampling procedures and sample size used 95 percent of the time the true value of the population will fall within plus or minus some range of the estimate provided in the report. Continuing with the example, if the confidence interval were from 44 to 46 percent of total monthly telephone charges, you have substantially more confidence in that point estimate of 45 percent than if the confidence interval were 30 to 60 percent."

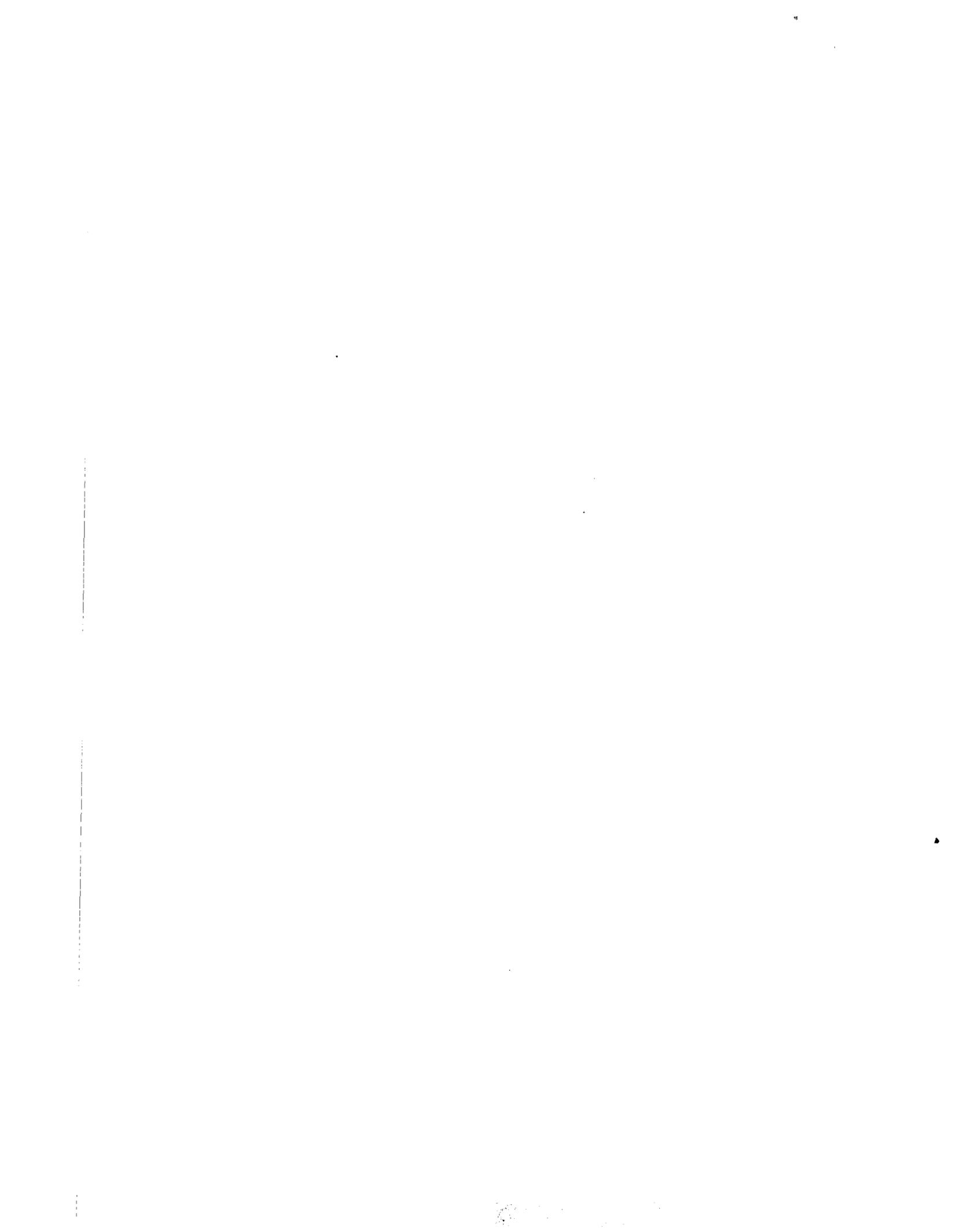
According to Bellcore's Division Manager for Government Affairs, the official responsible for directing the November 1984 study, the study was intended to provide understandable information for the policymaker who was viewed as a non-statistician. Consequently, the study director did not want to include a lot of statistical information that would not be intelligible to the lay reader and that could be misinterpreted or taken out of context. He also felt that the detailed breakout of interstate long-distance expenses included as an appendix to the study would be just as useful to the policymaker as information on sample variances. This breakout shows the number of businesses by number of employees and number of lines that have expenses within a given range, such as \$0 to \$25.

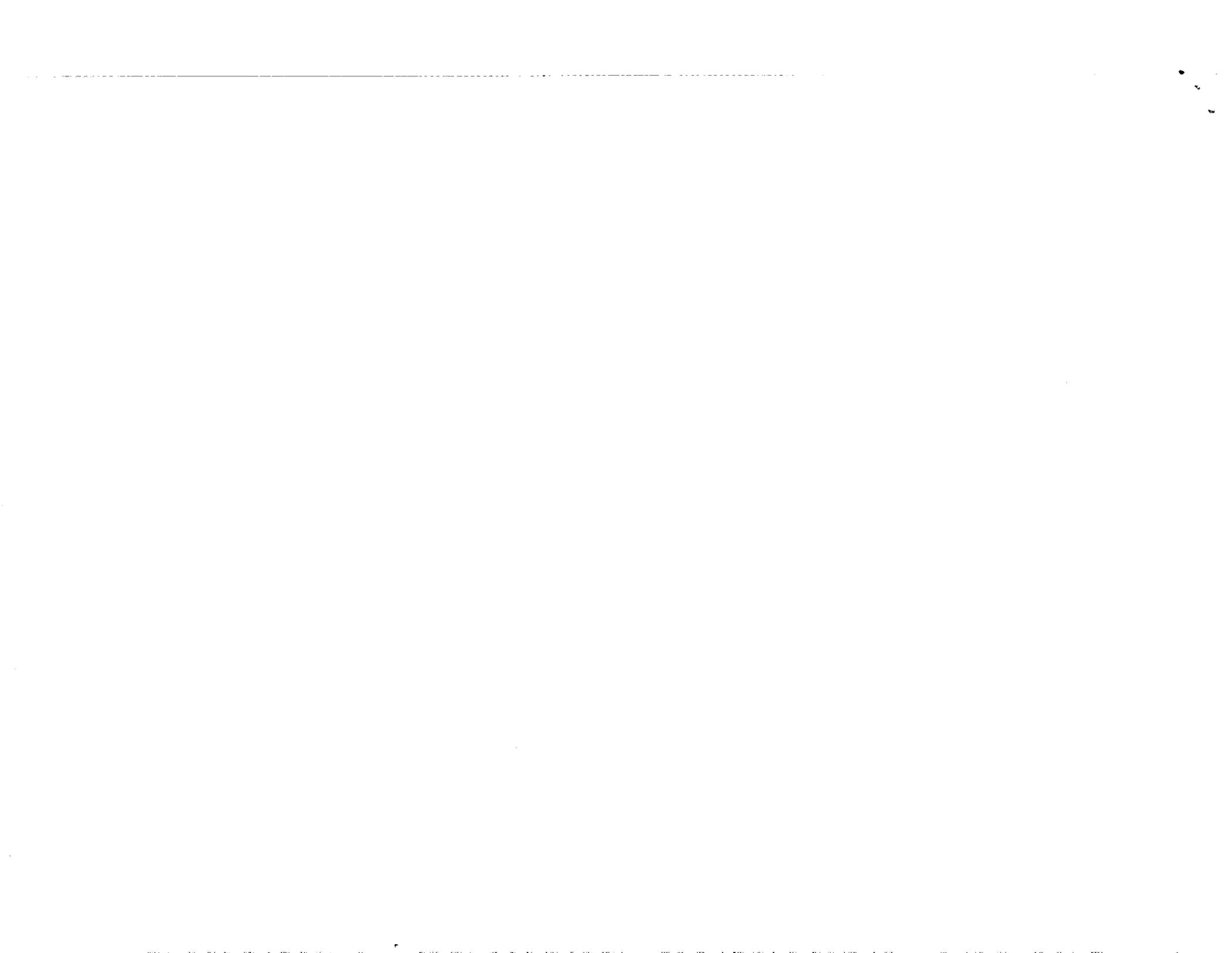
Although we agree that the detailed data on business long-distance expenses are useful in providing information on how these expenses vary with firms of different sizes, the data are not a substitute for sample variances. Sample variances are needed to determine the confidence interval of sample statistics and help judge the validity of the study's findings. We also do not agree that sample variances would be confusing to the lay reader. It would seem to us that by excluding information on sample variances, more confusion is possible if readers misinterpret the meaning of sample data presented in the report. However, it may not be necessary to provide sample variances for all statistics presented in the report, but only for those that are most important.

### CONCLUSIONS

The Bellcore report, relying on data from a large sample of actual business telephone bills, provides detailed information on the potential impact of FCC's access charge decision on a large segment of small business. However, the population sampled from does not include all small businesses and, therefore, inferences drawn from a sample of this population cannot be applied to all small businesses. Also, the data in Bellcore's report are only point estimates of the population sampled from. The report does not provide information on sample variances that would allow the reader to determine how much confidence he/she can have in the estimates.

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